Barriers and Opportunities of Cultural Heritage in Energy Transition

ecpe

enabling consumer
to become prosumer
in the energy transition era

Needs and Barriers of Prosumerism in the Energy Transition Era

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UNICAM
Università di Camerino
1336

Dykinson, S.L.

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Publisher: Dykinson, S.L. C/ Meléndez Valdés, 61. 28015 Madrid (España)
Internet: https://www.dykinson.com/
E-mail: info@dykinson.com

Title: Needs and Barriers of Prosumerism in the Energy Transition Era

Editor: Lucia Ruggeri

Publication Year: 2021

ISBN : 978-84-1377-381-0

Cover Picture University of Camerino, Comunication Area, Press Office and Marketing, February 2021

This e-book is published as a part of the FAR ECPE (Enabling Consumer to become Prosumer in the Energy transition era), University of Camerino as WP 2 deliverable, and is available for downloading in English at the ECPE Project website https://ecpe.unicam.it.

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Contents

Foreword

Lucia Ruggeri

The effective enforcement of energy transition is one of the keys to the successful fight to climate change. The interplay between the sustainable UN Agenda 2030 goals is a new interesting ground for the development of intersectorial and multidisciplinary studies.

Thanks to University of Camerino which is focused on the contamination between different scientific areas and really engaged in strengthening international research, a group composed by more than forty researchers of ten different nationalities is studying the energy policies and the new phenomenon of energy prosumerism. This book is the first direct result of the research activities granted by University of Camerino under the Programme FAR 2019 in the ECPE Project 'Enabling Consumer to become Prosumer in the Energy transition era' (more details about the project ECPE are available at https://ecpe.unicam.it/).

The object of this book is to collect and analyze the main barriers to self-consumption and prosumerism. Difficult as it is to discuss all obstacles in a single volume, the book focuses on selected barriers which impede the development of new types of fossil free energy production and consuption.

The energy communities could play a central role in the implementation of the energy transition strategies, but legal, social, economic, political and cultural barriers can hinder their spread.

To analyze the barriers and to find how to eliminate the obstacles to energy transition policies is pivotal to enhance research activities focused on the new EU Regulatory framework. Most in general it is crucial a multidisciplinary approach focused on the fight to climate change and the implementation of sustainable development. In this book are collected several articles which offer a different perspective on the energy transition barriers form different points of view and under different methodologies.

The book is composed of four parties. The first one is dedicated to the analysis of the methodology and the results offered by questionnaires supplied online in two languages (Italian/English). The survey is the basis of the Working Paper which is the deliverable of the ECPE Work Programme n. 2 and which constitutes the ground for a discussion into the research group. The second part of the volume collects the contributions focused on the social and economic barriers to prosumerism, while the third one is dedicated to a description of failure cases of self consumption.

Lesson learned by failure experiences in the world could favour a good implementation of the new EU Directive Renewable Energy Directive 2018/2001 (RED II) and Directive on common, rules for the internal market for electricity 2019/944 (IEM) in Italy an European Country which is strategic in the Energy policy of the

Mediterranean area. The last part of the book is composed of the visions and perspectives offered by Italian testimonials engaged as actors in the new energy market with different roles.

I am grateful for the generous support given by the editorial staff composed by Gopi Battinemi, Roberto Garetto, Federico Pascucci, Giovanni Russo and Karina Zabrodina, precious collaborators and valid researchers.

Thanks also to the Scientific Committee which honoured our work: Marine Cornelis, Francisco Lledó Yagüe and Luis E. Quintero.

As editor I am sure you will appreciate the volume which would like to offer an insight on new issues and challenges offered by the energy transition era.

PART I

THE ECPE SURVEY

The ECPE Questionnaire on Energy Transition, Energy Communities, Prosumerism, and Renewable Energy Directive. Methodological Approach

Roberto Garetto

1 Introduction

In a general perspective, the formulation of a research problem and the development of the research activities have as main purpose the awareness of the existence of specific situations that have a social impact. This awareness is supposed, later, to encourage actions aimed at solving possible related problems.[1] The ECPE research activities relate, *inter alia*, to collecting statistical data and to setting-up studies for effective and inclusive implementation of the awareness in the field of the energy transition, energy communities, and prosumerism. In particular, the ECPE Project focuses on the possible overcoming of barriers towards this line of development, with specific reference to the legal framework provided by the 'Clean Energy for all Europeans' Package.

A questionnaire aimed at collecting data on these specific issues was prepared by the ECPE Research Team[2] and proposed to a sample of about 500 people.

2 Methodological Approach

The drafting of the questionnaire required to adopt a convergent methodological approach, considering qualitative and quantitative methods as complementary (rather than as rival).[3]
A qualitative approach is indeed appropriate in primarily exploratory research. It is used to gain an understanding of underlying opinions. It provides insights into the problem and helps to develop hypotheses for potential further research. This

[1] Cf S. Nowak, *Methodology of Social Research. General Problems* (Dordrecht-Boston: D. Reidel Publishing Company, 1977), p. 8: '[the researcher] wants to make public opinion aware of the existence or the mechanism of a certain social problem in such a way to introduce certain groups undertake social actions aimed at solving the problem (…) and at the same time wants to point out measures which would lead to the solution of the problem thus revealed'.

[2] The questionnaire was prepared by Prof. Ivana Kunda and Prof. Sandra Winkler, Faculty of Law University of Rijeka, and dr. Giovanni Russo, School of Law, University of Camerino.

[3] T.D. Jick, 'Mixing Qualitative and Quantitative Methods: Triangulation in Action' 24 *Administrative Science Quarterly*, 602, 603 (1979): '[t]here is a distinct tradition in the literature on social science research methods that advocates the use of multiple methods. This form of research strategy is usually described as one of convergent methodology, multimethod/multitrait, convergent validation or, what has been called "triangulation". These various notions share the conception that qualitative and quantitative methods should be viewed as complementary rather than as rival camps. In fact, most textbooks underscore the desirability of mixing methods given the strengths and weaknesses found in single method designs'.

approach dives deeper into the problem.[4] On the other hand, a quantitative approach allows quantifying the problem by way of generating numerical data. This approach uses measurable data to describe situations and uncover patterns in research.[5] The mixing approach, known as data 'triangulation', takes the best of the two approaches and is thought to help in validating the claims that might arise from initial pilot studies.[6] The adopted mixed methodology[7] combines maximum openness about the collection of empirical data coupled with maximum rigour in analysis.

Effectively, the questionnaire can be considered 'mixed' because it was utilized by qualitative or quantitative approaches[8] in the following ways:

- The sample was chosen according to a qualitative standard (small sample size: 400-500 people), but the queries structure was related to a quantitative approach. The sampling procedure was hybrid: partially purposive, and partially based on probability, as the questionnaire was online, in an open-source platform, but its diffusion was managed by the research team mainly through groups of known people.
- The manner in which the research questions were developed is mixed. They were preplanned, but one query had participatory characteristics.
- In order to data collection, the mixed approach is confirmed. Two different collection procedures, about the language of the questionnaire (English and Italian), were provided. That enables the making of data analysis related to geographic areas.
- The questionnaire provides two types of data: numerical (queries from 1 to 5) and textual (query 6). That allows two different types of data analysis: statistical and thematic, and two types of conclusions, that can be defined as 'objective' and 'subjective'.

[4] P. Atkinson et al, 'A debate of our canon' 1 *Qualitative Research*, 5, 7 (2001). See also: M.R. Islam and C.J. Faruque, 'Introduction: Qualitative research: an effectual research tools for behavioural sciences', in M.R. Islam and C.J. Faruque eds, *Qualitative research: Tools and techniques* (North Charleston: Farwood Publishing, 2016), 11, 12.

[5] B.S. Lawrence, 'Levels of Analysis and the Qualitative Study of Quantitative Data', in F.J. Yammarino and F. Dansereau eds, *Multi-level Issues in Organizational Behavior and Processes* (Bingley: Emerald Group Publishing Limited, 2005), 231.

[6] W.K. Olsen, 'Triangulation in Social Research: Qualitative and Quantitative Methods Can Really Be Mixed' 20 *Developments in Sociology*, 103 (2004).

[7] A. Tashakkori et al, *Mixed Methodology: Combining Qualitative and Quantitative Approaches* (London: Sage Publications, 1998), 13.

[8] A. Tashakkori and J.W. Creswell, 'The New Era of Mixed Methods' 1 *Journal of Mixed Methods Research*, 3, 4 (2007).

3 The ECPE Questionnaire

The ECPE questionnaire consists of six queries and was preceded by the following explanation: 'In recent years more and more people are becoming aware of climate change caused by pollution. For this reason, humans are trying to limit their impact on the environment. The EU is taking an effort in that direction and our project is aimed at establishing the level of awareness of EU citizens about this issue'.

Queries from 1 to 5 are decision questions[9] that envisage only two possible answers: yes or no. Query 3 is a 'closed' complementation question.[10]

They are worded as follows:

1. *Have you heard of energy transition before solving this test?*
2. *Have you heard of energy communities before solving this test?*
3. *If your answers were yes: Have you ever looked for legal regulation which applies to energy communities?*
4. *Have you heard of prosumer before solving this test?*
5. *Are you aware that the European Union has adopted a directive promoting the use of energy from renewable sources which should be transposed by the Member States by 30 June 2021?*

Query 6 is a mixed twofold one. First a decision question, then an 'open' complementation question, which provides several possible answers, but as a further option, allows an undefined answer:

6. *Are there any aspects of the energy transition, and in particular the phenomenon of prosumerism, that you are interested in investigating? Check all that apply*
   - *Energy transition*
   - *Energy community*
   - *Prosumer*
   - *Rights and duties of an energy community*
   - *I do not know*

[9] S. Nowak, n 1 above, 14: 'decision questions are ones which consist in inverted statement (…). Such questions envisage only two possible answers: Yes or No'.

[10] ibid 14: 'complementation questions, that can be either in form of «open» questions, i.e. ones which do not definitely limit the kind of number of possible answers, or in form of «closed» questions, in which the number of possible answers is frequently predetermined'.

In order to achieve the maximum of spontaneity and immediacy, no personal information (such as age, gender, birthplace, education, nationality) was required from the respondents.[11] For this reason, the sample results indefinite (except for the option related to the language).

The survey was developed through a unique spreading mode: online questionnaires. No hard-copy questionnaires were provided. This choice originated on the awareness that online data collection allows accessing quickly and easily a larger and geographically distributed sample.[12]

As already pointed out, the questionnaire was available in English and Italian.

4 Conclusion

The questionnaire drafted by the ECPE research team was proposed in an open-source platform to a sample of about 500 people of different nationalities (the respondents indeed used different languages).

The questionnaire offers data concerning the understanding of the importance of energy transition and related issues. Not only can it provide useful information on the awareness of energy communities, but also on the level of interest in their function and potentiality. Furthermore, the questionnaire can offer data related to a new and relevant phenomenon in the field of energy: prosumerism. Also, it can provide data on the awareness of EU citizens with regards to the Renewable Energy Directive, that will be transposed by the Member States by 30 June 2021.

Finally, the findings collected in the survey permit to outline the hierarchy of interest among the issues addressed by the questionnaire.

[11] D.C. Pelz, 'The Influence of Anonymity on Expressed Attitudes' 18 *Human Organization*, 88 (1958): '[t]he assumption is that anonymous individuals will feel free to express themselves more frankly'.

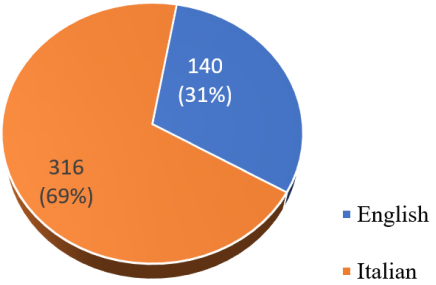
[12] F. Lefever et al, 'Online data collection in academic research: advantages and limitations' 38 *British Journal of Educational Technology*, 574, 581 (2007): '[o]nline data collection carries the potential of accessing a large and geographically distributed population, along with being time and cost efficient for the researcher'.

The report related to knowledge and interest in the topics related to the project 'Enabling Consumer to become Prosumer in Energy Transition Era (ECPE)'

Massimo Sabbieti and Fabrizio Quadrani

The survey carried out on the open-source platform Lime Survey was attended by 456 people, called to answer 6 questions; the questionnaire was prepared in both English and Italian, the participants opted as follows:

Initial language	
English	140
Italian	316
Total	456

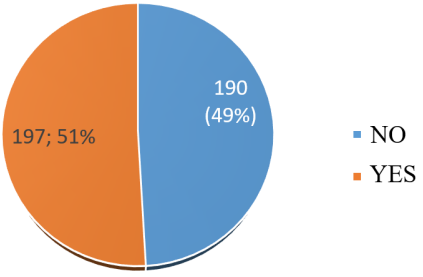


Analysis of answers to questionnaire questions

The percentages were calculated on the total of the answers given for each question and not on the total of the participants, therefore omitting the 'non-responses'

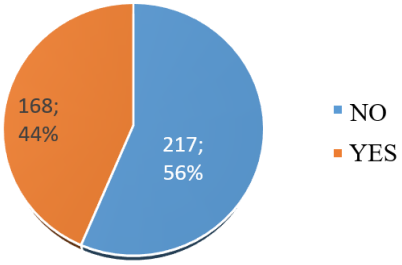
1. Have you heard of energy transition before solving this test?

Answer options	Answer n.	%
YES	197	51%
NO	190	49%
Total Answers	**387**	**100%**



2. Have you heard of energy communities before solving this test?

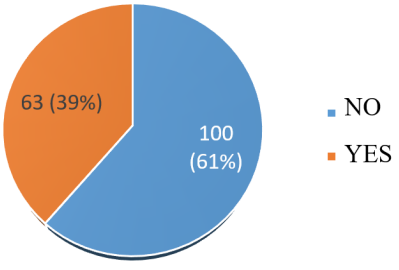
Answer options	Answer n.	%
YES	168	44%
NO	217	56%
Total Answers	385	100%



Only for who has answered 'YES' at question number 2:

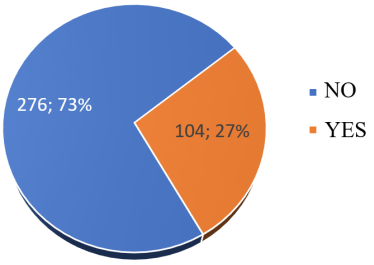
3. If your answers were yes: Have you ever looked for legal regulation which applies to energy communities?

Answer options	Answer n.	%
YES	63	39%
NO	100	61%
Total Answers	**163**	**100%**



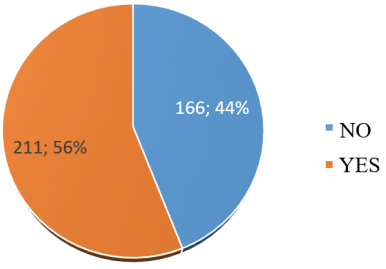
4. Have you heard of prosumer before solving this test?

Answer options	Answer n.	%
YES	104	27%
NO	276	73%
Total Answers	**380**	**100%**

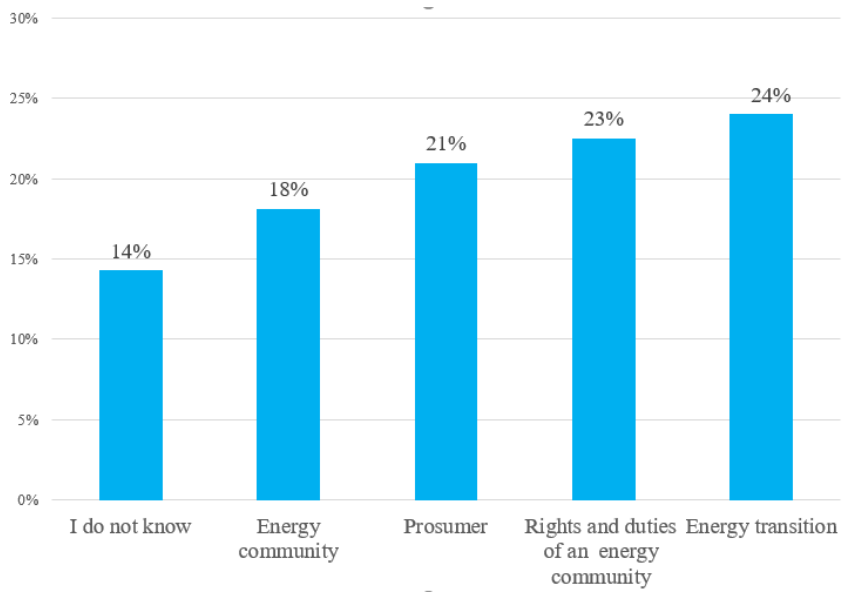


5. Are you aware that the European Union has adopted a directive promoting the use of energy from renewable sources which should be transposed by the Member states by 30 June 2021?

Answer options	Answer n.	%
YES	211	56%
NO	166	44%
Total Answers	**377**	**100%**



6. Are there any aspects of the energy transition and in particular the phenomenon of prosumerism that you are interested in investigating? [1]



Answer options	Answer n.	%
I do not know	85	14%
Energy community	108	18%
Prosumer	125	21%
Rights and duties of an energy community	134	23%
Energy transition	143	24%
Total answers	**595**	**100%**

[1] For this question it was possible to provide multiple answers; the percentage for each answer was calculated on the total of the answers provided.

ECPE Questionnaire: The Results on an European Perspective

Ivan Allegranti

1 The ECPE Questionnaire

This chapter analyses from a statistical perspective how EU consumers are aware of the energetic changes promoted by the latest 'environmental friendly politics' of the European Union.
The topics which the analysis is referred to are based on a questionnaire[1] promoted by the University of Camerino from 15 October 2020 to 20 December 2020 on behalf of the 'Enabling Consumer to Become a Prosumer in the Energy Transition Era' (ECPE) project.[2] The goal of the questionnaire, composed of six questions, is to 'establish the level of awareness of EU citizens about his issue and activities'.[3]
The questions raised in this investigation touch pivotal themes of this transitional era which are: the energetic transition, the energetic communities, the role and the definition of the 'prosumer' as a type of customer, and, finally, the knowledge of EU Directive (EU) 2019/944[4] and its imminent application from the 1st January 2021.[5] The scope of this research is to trace a general overview on how and if consumers know the topics included in the EPCE Questionnaire.
The methodology used to describe the findings of this chapter is the comparison between data/results based for each theme of the survey launched by the University of Camerino on a European Union level with a focus on Italy and on the survey itself.

1.1.Results of the ECPE Questionnaire

The ECPE survey has been conducted both in English (140 participants) and Italian (316 respondents) with a total of 456 participants. It emerges at first sight that 69% of the interviewed people have answered to the Italian version of the questionnaire.
On average, by confronting all the answers to the questions and the related percentages of affirmative answers, it comes out from the first question of the survey[6] that the respondents were aware of what energy transition was (51% stated that the term 'energy transition' wasn't new to their vocabulary), and that, as asked at

[1] Questionnaire ECPE available at http://survey2.cs.unicam.it/limesurvey/index.php/215966 (last visited 20 December 2020).
[2] ECPE website available at https://ecpe.unicam.it (last visited 21 February 2021).
[3] See n 1 above.
[4] European Parliament and Council Directive 2019/944/EC of the 5th of June 2019 on common rules for the internal market for electricity and amending Directive 2012/27 EU (recast) [2019] OJ I.158/125 .
[5] See Art. 73 of the Directive 2019/944/EC.
[6] The first question of the ECPE questionnaire states: 'Have you heard of energy transition before solving this test?'

question number five of the questionnaire,[7] there is a Directive of the European Union that disciplines this phenomenon (56% of affirmative answers).
Regarding the other three 'yes or no' questions of the survey, it appears that 56% of the respondents have never heard the term 'energy communities',[8] that the majority of them has never done research on the regulations and laws that rule the energy communities (61%)[9] and that 73% of them are not aware of who a prosumer is.[10]
The sixth question,[11] which was a multiple choice answer question, analyses the aspects that need to be taken in deep consideration so that this energy transition can be widely known by the majority of inhabitants. What emerges is that 24% of the respondents want to investigate more in the energy transition phenomena, secondly (23%) in the rights and duties of an energy community, thirdly (21%) on the concept of prosumer and, at least, on what an energy community is (18%). Only 14% of the interviewees did not know what to answer.

2 The Eurobarometer Questionnaire on EU Energy Policies

The European landmark, on the other side, on the general themes proposed by the ECPE Questionnaire is quite reassuring.
The 2019 'European's attitudes on EU energy policy Report' commissioned by the European Commission[12] analyses in a generalized way the same themes of the questionnaire.
What emerges clearly from the report is the 41% of all Europeans think that 'EU energy policy' means shifting from fossil fuels to renewable energy sources thus fighting and eliminating as much as possible the 'climate change issue' while on the one hand 28% of respondents think that 'EU energy policy' means decreasing energy

[7] Question number 5 of the ECPE questionnaire states: 'Are you aware that the European Union has adopted a directive promoting the use of energy from renewable sources which should be transposed by the Member States by 30 June 2021?'

[8] The second question of the ECPE questionnaire states: 'Have you heard of energy communities before solving this test?'

[9] Question number 3 of the ECPE questionnaire states: 'If your answers were yes: Have you ever looked for legal regulation which applies to energy communities?'

[10] The fourth question of the ECPE questionnaire states: 'Have you heard of prosumer before solving this test?'

[11] Question number 6 of the ECPE questionnaire states: 'Are there any aspects of the energy transition, and in particular the phenomenon of prosumerism, that you are interested in investigating?' Giving the possibility to choose the following answers: Energy transition; Energy community; Prosumer; Rights and duties of an energy community and I do not know.

[12] European Commission Directorate-General for Energy, Special Eurobarometer 492/2019, 'European's attitudes on EU energy policy' available at https://ec.europa.eu/commfrontoffice/publicopinion (last visited 21 February 2021). This survey is the first one by the European Union on the energy policies and wants to investigate the citizen's opinion on EU's energy policies which includes also the labelling promoted by the EU on appliances as well on what EU's priorities for energy policy should be in the next decade. This survey was carried out by the Kantar network across 28 EU Member states between 9-25 May 2019. About 27.438 people were interviewed for this questionnaire.

consumption across the EU while on the other hand, 27% stated that for them 'EU energy policy' it's about more competitive energy prices for consumers.
What emerges from this report is that 92% of the interviewees think that there needs to be secure access to energy for all EU citizens thus assuring (90%) a fair energy transition so that 'no citizen or region is left behind'. As emerges[13] this opinion is widely manifested in Greece (98%), Portugal and Spain (97%) and least strongly in Romania (79%) and Sweden (84%).
Concerning the question, if it is needed to be an increased competition in the EU energy market which can translate into a more competitive and affordable market for consumers, the citizen of the European Union have answered with Greece still leading the way with 98% of the respondents that agree on the matter which is followed by Cyprus, Portugal and Spain (97%), while the lowest levels of agreement come from Romanian citizens (76%), Sweden (79%) and the Netherlands (82%).
Similar results are reported for the question if it's the EU responsibility to 'facilitate consumer's choice of energy sources and suppliers'. Greek citizens agree on the subject with 97% of preferences, which is followed by Portuguese and Lithuanian respondents with both 96% while Romania (75%). Denmark (76%) and the Netherlands (77%) have the lowest number of respondents that agree on the matter.

3 The Italian Eurobarometer Questionnaire Results on EU Energy Policies

Analysing the same questions answered by Italian citizens[14] the answers are in the average proposed by other EU country respondents.
In fact, for most Italians, EU energy policy means shifting from fossil fuels to renewable energy sources thus fighting and eliminating as much as possible the 'climate change issue' while on the one hand (37%), followed by the statement for which EU energy policy means to contribute economic growth and employment by investing in new technologies (34%) while finally, the third answer is, as for the rest of Europe, reflects the following statement for which EU energy policy means competitive energy prices for consumers (30%).
91% of the Italian respondents think that the European Union needs to guarantee secure access to energy for all EU citizens thus assuring (90%) a fair energy transition so that 'no citizen or region is left behind'. The answer to this question is average as the rest of the European countries part of the survey.
Regarding the question, if there needs to be an increased competition in the EU energy market which can translate into a more competitive and affordable for consumers, 86% of the Italian citizens answered affirmatively.
Similar results are reported also for the question if it's the EU responsibility to 'facilitate consumer's choice of energy sources and suppliers'. In fact, for this answer, 91% of the interviews Italians agree on the matter.

[13] See page 29 of the report.
[14] The Report reflects the opinion of 1.023 Italian respondents.

4 Conclusions

Comparing the results of the ECPE questionnaire with the Eurobarometer questionnaire findings it emerges clearly that the knowledge and the awareness by the ECPE questionnaire respondents on the European policies related to the energy transition, energy communities, its regulations and legal implications need to be highlighted by a deeper communication and awareness program.
For instance, comparing these results with the ones of the Eurobarometer questionnaire raised across the European Union countries, the percentage of unawareness of the interviewees is, on average, lower than 10% with some countries, like Belgium, in which the awareness on the energy issue topics raises 99% of the interviewed people.
Still, it brings hope yet joyfulness the fact that the interest shown at question number 6 of the ECPE questionnaire on the topics such as the one of prosumer and energy transition that lights up curiosity in the respondents of the survey launched by the University of Camerino.

PART II

ENERGY MARKET: SOCIAL AND ECONOMIC ISSUES

Adapting the Energy Change: Risks and Opportunities

Gopi Battineni

Abstract Prosumers are making a big change in the energy space either by generating or saving energy. The prosumers are defined as the one who consumes and generates energy as most of the Americans are generating their energy by fixing solar panels on rooftops and consuming for electric vehicles. Changes in the climate have been identified as a risk for the global environment and impacts on climate-associated changes are going to worse in the future. While preventive measures in reducing the emission of greenhouse gas and avoiding dangerous interaction with the environmental system should be crucial. Therefore, this work presents the necessity of encouraging prosumers and adapting to the adverse effects of climate changes. Besides, we also discuss the risks and opportunities involved in these climate changes and this change should necessary to continue in the future in preventing global energy resources.

1 Introduction: Welcome to the Age of Prosumer

An exploration of the new actor's role in law-making has gotten attention since the 1990s. Advancements in environmental change and ecological law in this period have catalysed creative management approaches by non-state entrepreneurs and worldwide associations. These improvements have made new lawful difficulties, both public and private, in the context of worldwide multilevel governance.

Futurist Alvin Toffler thought of the name 'prosumer' in the mid-1980 to present individuals as both producers and consumers of a product.[1] Recently, the line among consumers and prosumers has become ever more hidden. For instance, as a prosumer we can advertise ourself on supply of energy through social media platforms like Facebook, Instagram, etc.

The energy progress, it's a deal can give prosumers much benefits than before. Once hidden buyers of energy, innovation will permit prosumers to take a functioning part in the administration of their dispersed energy assets like electric vehicles, sun-based photovoltaics, heat siphons, and energy stockpiling gadgets. They can deliver, sell, and purchase their energy.

'The energy sector is going through a huge scope in low-carbon progress' compose Rafael Leal-Arcas, Feja Lesniewska, and Filippos Proedrou in their 2018 paper, Prosumers as New Energy Actors.[2] 'What is underemphasized in this change is that it includes a significant change in perspective from a flexibly headed to an interest side energy strategy'.

This new prosumer role will bring advanced opportunities. Prosumers who don't need the weight of dealing with their requirements may wish to bring in specialists to deal with those supplies for them, for instance, permitting novel businesses to jump

[1] P. Kotler, 'The Prosumer Movement: A New Challenge For Marketers' available at https://www.ac-rwebsite.org/volumes/6542 (last visited 5 December 2020).

[2] R. Leal-Arcas et al, 'Prosumers: New actors in EU energy security' 48 *Netherlands Yearbook of International Law*, 139-172 (2017).

up.[3] Getting more engaged with the way toward delivering their energy will urge people to consider the sort of energy, and the amount of it they use. The changes being associated with the energy system has presented in Figure 1.

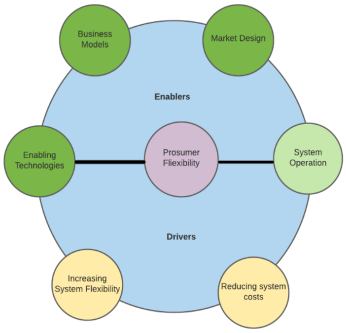


Figure 1. Changing energy scenery

By the combination of economic, geopolitical, climate, and technological considerations the energy industries are moving towards the new architecture with main pillars like cleaner energy mix, progressive electrification, transmit, and critically manage the energy sources. In this paper, we would like to discuss the necessity in the adoption of new energy along with associated challenges in particular with European energy systems.
Later this introduction the rest of the paper follows as in section 2 describes the importance of implementation of new energy sources by acknowledging prosumers; section 3 explains the key challenges and hurdles that these novel energy sources can possess. At the end, section 4 mentions the future scope of prosumer and the need for new thinking.

2 Adaption of Energy Changes (with Climate) in EU Nations

Climate or environmental changes can influence the energy area in different manners, going from seasonal changes to yearly warming and cooling needs; to risks and openings on energy development and supply situations. Risks include alterations for power plant proficiency rates, issues with cooling water, and danger to energy frameworks brought about by extraordinary climate marvels. Besides, energy systems can be more presented to harms by changing atmospheric conditions. In general, the European Commission aims to build the environmental flexibility of systems.
Environmental change impacts are normal all through the energy systems. On the interesting side, the equilibrium of warming and cooling request designs is changing because of rising temperatures. On the production side, impacts incorporate changes to the midpoints and inconstancy of wind, sun oriented and hydropower assets; the

[3] M. Izvercianu et al, 'Changing Marketing Tools and Principles in Prosumer Innovation Managemnt', in J. Politis ed, *Proceedings of the 8th European conference on management leadership and governance* (Neapolis University Pafos, Cyprus, 2012), 248.

accessibility of harvests for bioenergy feedstocks; expenses and availability of petroleum derivatives because of dissolving ocean ice and permafrost; thermo-electric force plants and transmission lines because of rising temperatures; technology downtime because of changes in the recurrence and power of extraordinary climatic events.[4]

These actual impacts have suggestions for the unwavering quality, cost, and nearby ecological effects of energy supply. Moreover, a few effects may bring about an expanded utilization of petroleum derivatives or reinforced infrastructure, and consequently, the increment of Green House Gas (GHG) discharges. For instance, decreases in the effectiveness of powerhouses, decreases in environmentally friendly power assets, or high storm risks to coastal outline. These would underestimate the effects to decarbonise the energy area.[5]

To guarantee mitigation and transformation alternatives can be completely analysed, it is hence basic that environmental change impacts are all together represented in the models which are utilized to inspect the practicality, implications, and involved costs of energy framework decarbonization pathways. Further examination into atmosphere impacts on the energy framework and their incorporation in cross-sectoral coordinated displaying is featured in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.[6]

A significant component in guaranteeing energy (and specifically gas) security is the full consistency of arrangements identified with the purchasing of energy from third nations with EU law. Such consistency checks for Intergovernmental Agreements (IGAs) and related business arrangements dependent on the applicable Decision are as of now completed after a Member State and a third nation has closed an understanding.

An important element in ensuring energy (and in particular gas) security is full compliance of agreements related to the buying of energy from third countries with European Union (EU) law. Such compliance checks for IGAs and related commercial agreements based on the relevant Decision are currently carried out after a Member State and a third country have agreed.[7] In practice, we can observe that re-evaluating such arrangements is extremely difficult. The places of the signatories have just been fixed, which makes political weight not to change any part of the understanding. Later on, the Commission should be educated about the arrangement of intergovernmental arrangements from a beginning phase, so a superior ex-risk appraisal of IGA's similarity with inner market rules and security of flexibly measures is guaranteed.

Commission support in such dealings with third nations and a move towards standard agreement provisos could likewise more successfully stay away from

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[4] J. Ebinger and W. Vergara, *Climate Impacts on Energy Systems: Key Issues for Energy Sector Adaptation* (World Bank 2011).

[5] Intergovernmental Panel on Climate Change and Intergovernmental Panel on Climate Change, 'Assessing Transformation Pathways'; J. Ebinger and W. Vergara, n 4 above.

[6] AR5 Climate Change 2013: The Physical Science Basis - IPCC available at https://www.ipcc.ch/report/ar5/wg1/ (last visited 5 December 2020).

[7] Decision no 994/2012 of the European Parliament and Council Establishing an Information Exchange Mechanism with Regard to Intergovernmental Agreements between Member States and Third Countries in the Field of Energy [2012] OJ 2012 L13.

excessive weight and guarantee regard of European guidelines. Thus, the commission will audit the Intergovernmental Agreements Decision and will propose alternatives to guarantee that the EU talks with one voice in arrangements with third nations.
The EU has received a few quantitative targets identified with the energy framework in its 2030 atmosphere and energy system. The European Commission has proposed a system for a climate-neutral economy by 2050, including a few long-term decarbonization situations up to 2050.[8]
The objective of a strong Energy Union with a motivation strategy at its best is to give EU consumers - families and organizations - secure, maintainable, serious, and reasonable energy. Accomplishing this objective will require a crucial change in Europe's energy framework.[9]
The vision is of an Energy Union where Member states see that they rely upon one another to convey secure energy to their residents, in light of genuine solidarity and trust, and of an Energy Union that talks with one voice in worldwide issues.
'Our vision is of an incorporated mainland wide energy framework where energy streams openly across outskirts, in light of rivalry and the most ideal utilization of assets, and with the compelling guideline of energy markets at EU level where vital' quoted in COM/2015/080.
The portion of environmentally friendly power sources in essential energy flexibly has too much in power age has dramatically increased since 1990. All worldwide and European decarbonization situations concur that these offers will keep on-increment quickly. Besides, the part of power as an energy transporter is expanding in all decarbonization situations. These improvements require the magnifying of electric grids, upgrading the degree of interconnection, and expanding the electricity storage.
The energy sector occupies a large part of water and land, the two of which can be affected by environmental change. The perfect energy change in Europe presents both openings and difficulties for environmental change transformation. From one viewpoint, supplanting coal-fired power plants with photovoltaics and wind power profoundly diminishes GHG outflows and water utilization, in this manner adding to moderation also as a transformation in water-scarce districts. On the other hand, biofuels, and carbon catch, and capacity need more water and additional arable land than numerous traditional energy technologies.

3 Risks and Opportunities in the Adoption of Energy Change

This section provides a summary of the opportunities and risks of climate change. The common trends associated with the adoption of energy changes have been classified into five categories below.

[8] 'Making the EU Climate-Neutral by 2050' available at https://ec.europa.eu/ commission/press-corner/detail/en/ip_20_335 (last visited 5 December 2020).
[9] European Commission Communication on A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, COM(2015) 080 available at https://eur-lex. europa.eu/le- gal-content/EN/TXT/?uri=celex:52015DC 0080 (last visited 5 December 2020).

A) Moving access to power supplies

Projected climbs in ocean level and more continuous and serious climate occasions, alongside progressing consumer requests will essentially influence admittance to fuel sources.[10]

Risks

- Changes to the individual landscape including sea level rises, ice dissolve, and permafrost liquefy will have an unconvinced impact on admittance to, and maintainability of petroleum product sales.
- Expanded asset deficiencies and shortage, specifically for petroleum products, because of climate inconsistency, will build the expenses of research and extraction.
- As asset accessibility varies, access to petroleum products and water will change, driving up discount energy costs.

B) High demand for solutions to energy management

Temperature boundaries and extreme climate, collaborated with a mix of energy change, are driving consumers, utilities, and energy organizations toward the executive's answers for a changing atmosphere.[11]

Opportunities

- With the increase of vehicle electrification, interest for power during peak periods could rise.
- Expanded customer attention to energy use and the board will prompt an increase in demand for services and items, including home energy reviews and energy global positioning frameworks.

Risks

- Temperature changes will affect hardware tasks, including heat trade, cooling cycles, and restricted days for boring wells, prompting increased expenses for equipment changes, new resources, and migration.
- A more factor and extraordinary atmosphere will bring about grid strains. Specifically, the change in summer and winter topographically will bring about diminished organization unwavering quality and expanded force blackouts.
- Unusual climate and temperature changes may lead to more prominent variances in consumer interest for energy.

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[10] Budget Office, 'The Budget and Economic Outlook: Fiscal Years 2007 to 2016' available at https://ww.cbo.gov/sites/default/files/109th-congress-2005-2006/reports/01-26-budgetoutlook.pdf (last visited 5 December 2020).

[11] 'Energy Management Systems Market to Reach $48,901.1 Million by 2026; High Demand for Novel Products to Boost Growth: Fortune Business Insights™' available at https://www.globenewswire.com/ news-release/2020/05/27/2039196/0/en/Energy-Management-Systems-Market-to-Reach-48-901-1-Million-by-2026-High-Demand-for-Novel-Products-to-Boost-Growth-Fortune-Business-Insights.html (last visited 5 December 2020).

C) Availability of water sources

Because of the increment in global temperatures, levels of both seawater and freshwater will change depending on the area, influencing energy and utility (E&U) operations.[12]

Opportunities

The hydroelectric phase may outcompete other power generation sources because of supplying favourable water conditions in certain geological localities.

Risks

- Shortages in water supply will compel cooling activities, tending to malfunctions of equipment, devaluation, and power blackouts.
- Sudden changes in the supply of water could bring about the transitory or everlasting conclusion of hydroelectric age plants because of a dry spell or extreme flooding.
- Increasing competition for water supplies among areas and networks will prompt a reduction of availability, high costs, and regulation of water licenses.

D) Pressure on investor policies

The desire for policies in low carbon environmental changes, and thus, financial specialist worries about companies' capability to successfully react, put a critical focus on E&U organizations to show how they are located to flourish in a low-carbon economy.[13]

Opportunities

Incentives on policies are designed to encourage utilities for accomplishing energy proficiency that can be accomplished through the commitment of consumers and adaption of new products and services.

Risks

- Financial specialists may look for organizations with fewer dangers identified with petroleum derivatives, and more prominent open doors for environmentally friendly power and development in technology.
- Expanded public examination including corporate energy and water use may prompt diminished speculation and harm to company reputation.
- Organizations face a changing and questionable policy landscape, specifically on the worldwide level, bringing about expanded risks regarding inaction.

E) Safety and security of the workforce

Adverse climate conditions may prompt expansions in safety and health risks associated with working environment security, including availability.[14]

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[12] V. Yevjevich and T. G. Sanders, 'Availability and Selection of Sources of Water for Water Supply Systems' 15 *Water Supply Systems. New Technologies*, 25-41 (1996).

[13] C. Driver e al, 'Dividend policy and investor pressure' in 89 *Economic Modelling*, 559-576 (2020).

[14] J. M. Beus et al, 'Workplace Safety: A Review and Research Synthesis' 6 *Organizational Psychology Review*, 352-381 (2016).

Risks

- As ocean levels rise and the seriousness and recurrence of fire, storms, and different hazardous natural changes increment, risks for exposure of physical risks to employees can rise.
- By increasing the number of unexpected weather events, openness to the work environment and accessible work in working offices may reduce, and results in uncertain working hours for representatives and an anxious labour force.
- Developed temperatures and fluctuations in water tables will build the disease spread, employees' threats in high-risk areas.
- As migration credited to environmental change builds, it will constrain representatives out of their present habitations, causing a move in labour force accessibility, including an expansion for climate refugees.

4 Future Scope of Prosumer and New Thoughts

Innovation is making it simpler to be a prosumer than at any other time, as well. Smart meters and apps could deliver ongoing reports on frameworks, systems of digital payment make purchasing and selling simpler, and the ascent of the gig economy implies that individuals are presently unquestionably more used to being a functioning member in regular transactions.

The greatest rise of power demand: as indicated by McKinsey's report Fuelling the energy change: open doors for financial organizations, it is growing multiple times quicker than for different powers. Furthermore, renewables, which can be created in family units, are getting less expensive than non-renewable energy sources.

On the other hand, the rise of the prosumer additionally focuses on new difficulties. Take fluctuating energy costs, for instance. What occurs if the value rises or falls forcefully and all the prosumers choose to purchase or sell simultaneously? The unnecessary interest could cause power blackouts or deficiencies, so request the board is critical.

Data is additionally crucial: in what manner would prosumers be able to best see how to accurately take an interest and benefit as much as possible from complex foundation and market? 'The arrangement of satisfactory and exact data to prosumers - with the goal that they can advance their smart grid using methods -just as the progress to focused, adaptable agreements to conform to the requirements of prosumers should be installed in all around expressed more extensive approach and market administrative systems' bring up Leal-Arcas, Feja Lesniewska and Filippos Proedrou.

The behaviour of consumers concerning their own energy needs can be changed in the future. Energy users mean not only basic power, gas, or home heaters anymore yet prosumers who produce energy via solar grids (i.e., photovoltaic boards) introduced nearby their homes and utilizing latest equipment, for example, heat siphons, energy storage gadgets (i.e., batteries) and electronic vehicles that will interface with the energy market through various evaluating instruments, for example, time-variable levies. Turning into a prosumer suggests addressing some challenges. For instance, issues will emerge for energy circulation networks if numerous prosumers respond to

a low or high market cost simultaneously. Synchronous responses can achieve failure of systems that might trigger power blackouts.

To address such issues can emerge out of new technologies in communications: smartphone or computer applications could help in the administration of supply prosumers' energy in the commercial centre via autonomous consideration of the power value which is formed to some extent by how all different prosumers connect in the commercial platform. Those mobile or computer apps would be utilized to the intelligent device controlling (on/off, temperature setpoints, etc) for adjusting prosumers' own energy needs and the impact of their activities on the solidness of the electricity systems. Nevertheless, before such sophisticated apps can become basic use, some research tools which can provide the power grid with corresponding flexibility have to be required. In this context, flexibility is the capability of the energy system for quick reaction and adoption of changes in demand and energy supply during the maintenance of a stable balance between those two.

The Future of Energy Based on Responsible, Civil Economics

Catia Eliana Gentilucci

Abstract The widespread development of energy prosumption must be a pivotal and sustainable element of the European Union's energy policy. This solution is certainly advantageous, and may even be indispensable for the purposes of energy security and environmental and social needs. The energy produced by prosumers can be obtained from a wide range of renewable energy sources regardless of climatic conditions.
The economic benefits deriving from the prosumption of energy are: the reduction of energy transmission costs, a better use of local energy resources and the involvement of local communities, the economic savings and the social benefits of a more conscious and active use of renewable energy sources.
Additional benefits come also from the greater efficiency deriving from the cooperation and social responsibility of producers.
This aspect concerns the civil economy and has already been dealt with in the past economists.
This contribution will analyze the evolution of economic thought on this issue and the resulting economic developments.

1 Introduction

The wide-ranging development of energy prosumption is a central, sustainable part of the European Union's energy policies. In light of environmental and social concerns, this solution is undoubtedly advantageous and may prove to be essential in the interests of energy safety.
Prosumer Energy has several advantages: it can derive from a wide range of renewable energy sources available in nature; it can be produced anywhere, independently of climatic conditions; is easily accessible to individuals; makes use of unlimited energy sources (solar, wind and water).
Nonetheless, governments and citizens (prosumers) who wish to transform an ethical ideal into reality face numerous difficulties. In this brief note, we shall reflect on the economic nature of prosumption and its potential for the economics of the environment.

2 Economy, Energy, Environment

The green economy is traditionally linked to the figure of Nicholas Georgescu-Roegen, an economist known for his magnum opus, 'The entropy law and economic process' (1971), the most important XX century study of economics and the environment.
In his work, the author starts from the premise that if environmental economics is to be given a scientific basis, a new, interdisciplinary approach is needed, leading to a thorough rethinking of the principles that are at the root of standard economic theory. The mechanistic structure of the modern-day economy has negative consequences. The first is the concept of economic processes as a circular flow within a closed, self-sufficient system. Circularity and reversibility are two characteristics of standard

economics, which developed around a static vision of reality as if we were in the field of mechanics.
Instead, in the more modern view proposed by Georgescu-Roegen, the most appropriate model to explain economics is the biological (model), not only because it links to environmental sustainability in economic growth but also because links between economic variables are better explained through thermodynamic processes (entropy).
This approach is not new, nor is it intended to provoke, but is connected to the Aristotelian concept at the basis of economic science, further pursued by subsequent medieval scholasticism, of an organic universe that distinguishes between matter and form, uniting the two dimensions in an ongoing process.
Mainstream XIX century economics offered a mechanistic, static view, composed of simple parts whose relational logic was unable to explain concepts such as the 'irreversible' state of resources and their 'irreproducibility', establishing the failure of mechanistic economic models at every structural crisis.
To better face the problem of growth and questions raised by economic progress, we must return to think which places economics firmly within its environment and takes into account costs and environmental sustainability.
The prosumption is a part of this environmental view of economics, one in which it is possible to tackle environmental crises and the depletion of natural resources by turning to renewable energy sources, in the context of a dynamic, progressive vision.
Georgescu-Roegen's great insight was that a programme of economic development should be based on the largest possible use of solar energy to save the planet's resources. To make this a reality, it would be necessary to implement production policies which use renewable energy sources. But, above all: it is necessary to reduce differences between rich and poor countries; to distribute these resources proportionally to the basic needs of humankind; to eliminate the waste of solar energy and develop the intelligent use of free time.

3 Energy and Society

The issue of energy is a part of the issues surrounding the equal distribution of resources, environmental issues and the ethics of our life habits.
Increasingly, the environment, energy and sustainability are linked to the economic crisis of the XXI century. In the last century, progress in science and technology has been constant and shockingly fast, changing social organizations and our lifestyle worldwide. This has all taken place so quickly that we wonder whether we are capable of sustaining such change, as evaluating the complex nature and consequences of technological progress is not an easy task.
One thing, however, is certain: technical progress has been facilitated by an increasingly efficient (at the lowest cost) use of available resources, though this has created situations which have undermined efficiency. That is to say, the result of technological development on the environment and energy use has not always been taken into consideration. The global industry which has been set up has fragile foundations: the environment has not always been able to withstand our actions.

This problem does not only affect rich nations but the entire planet. Ignorance and negligence have allowed (Asian) economies to tamper with the environment, so focused were they on leading global markets.

Only in the last twenty years have Europe and Western nations become aware of the risk this inconsiderate overexploitation of our environment and its resources means for our survival. Awareness of the fact that humanity has entered an extremely serious environmental era has permeated various levels of decision-making.

The crisis humanity finds itself in has three main aspects.[1]

First of all, it is a crisis of fundamental values, about two opposing points of view: how we could live and how we think we can live. We must choose between two options: either choose to use our technological know-how for the common good; or proceed in our path towards a 'collective suicide'. However brutal this statement might seem, it is the truth: we must learn to live on a planet which has almost been exhausted by our greed, or we have to contend with social conflict and wars fought to control planetary resources.

Secondly, taking our cues from Rattray Taylor (1971), we can state that if humankind sidesteps catastrophe, it will take a long time to heal from disasters of our own making. Global societies are far too overcrowded and diverse, 'impersonal' while solving our environmental and energetic problems needs a responsible, community-led approach. The risks for our planet and the survival of humanity are great.

Lastly, at a global level, the centres of power are aware that we have reached the point of no return: the natural replenishment of resources is inadequate. But at the same time, not everyone knows how best to utilise existing resources while respecting the environment; supranational directives, often vague and non-binding, alert us to existing issues but do nothing to help solve them.

One way to act in our effort to step back from our point of no return is to focus on the energy sector, as this is the basis of our production system and feeds the markets in which global society lives and thrives. Without energy, everything will come to a standstill.

Some fundamental aspects should be tackled urgently, such as energy prosumption, which could assist the reduction of energy consumption at a global level; regulate energy production in different countries based on available sources (solar, wind, water and general resources); eliminate pollution (switching from fossil fuels to electric); choosing sources which have a less environmental impact (wind farms instead of photovoltaic systems).

These points (well-known to literature)[2] show how essential it is to upend the Energy economic system.

Moving from the petroleum lobbies towards sustainable production using environmental resources, and responsible consumption. In this regard, energy prosumption seems to be a way to help humankind and our planet. The same sort of thinking should be applied to the Earth's other resources, which are finite and not sufficient to satisfy our needs.

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[1] G. Rattray Taylor, *La società suicida* (Milano: Mondadori Editore, 1971), 52.

[2] P. Ranci, *Economia dell'energia* (Bologna: Il Mulino, 2011), *passim*.

This problem, however, is not new: economists and scholars have been warning us of the dangers of the excessive consumption of our resources since the early nineteen hundreds.[3]
That notwithstanding, the damage done to the environment by different production processes was never factored into cost analyses; it was simply ignored or underestimated in an environmental and economic sense. Mankind saw the environment as a gift and took it for granted.
Time has shown us this is not the case; one must distinguish 'free' resources such as the wind, sun and water from rare resources (mines, fossil fuels, etc.).
We must also remember that even when free, ensuring these resources can be used is a costly process. Wind or watermills have an initial cost to set up and another cost linked to their effects on the environment; similarly, solar energy can be harnessed with prosumption, but this also requires investment, management and disposal costs.
The matter is complex and requires careful inquiry and targeted intervention at a global level, something that is lacking as the market is highly fragmented and knowledge is limited to few.

4 The Prosumption in Civil Economics

Generally speaking, energy prosumption is included in the macroeconomic need to rationalise the use of energy sources and the global need to respect the environment and limit the effects of pollution.
Therefore, the prosumption is not just an innovative, fashionable technique but something essential for the common good. We shall deal with the subject according to this understanding.
What is meant by energy efficiency? As in economics, it indicates the capacity a system has to obtain a result utilising less energy than other systems, thus increasing its yield and minimizing management and production costs. In substance, it points to the capacity for adopting the best technology along with a responsible, conscious behaviour applied to energy uses.
This approach calls for civic education and a series of existing juridical and technical infrastructures (including prosumption) which would allow these energy-saving policies to be applied.
The economic benefits deriving from energy prosumption are notable and can be studied at the macro level, such as the conservation of resources (scarce) and reducing pollution (which creates a wide range of problems for health and the environment); and micro, linked to the reduction in energy transmission costs, an improvement in the use of local energy sources and greater availability of energy (particularly useful in a capitalist system which is moving towards electric transport).
These benefits require the extensive involvement of local political groups and the social and civil commitment of citizens (participative citizenship for the common good).
Indeed, the first step towards making sure society is ready to accept and develop prosumption is to involve civil society, communicating the idea that the environment

[3] E. Corbino, *EEE. Energia, Economia, Energia* (Napoli: Edizioni Scientifiche Italiane, 2004); R. Molesti, *Economia dell'ambiente e bioeconomia* (Milano: Franco Angeli, 2003), 15.

and energy saving are essential to wellbeing, not just in an economic sense but for health, too.

In substance, it is necessary to move away from economic liberalism and delve into the view proposed by Civil economics (a discipline that evolved from the religious and social teachings of Saint Francis in Italy).

Liberalism, expression of the free market and a pillar of the liberal economic expansion that guaranteed the economic growth of capitalist countries from the XIX to the XX century, has shown its tendency to dehumanise economic development; nowadays (from the start of the XXI century onwards), we see the need for a different type of progress, one that is not just economic (in terms of profit and mathematical 'efficiency') but also civil and linked to an awareness of human rights (including the right to health, education and integration), open to well-being and the welfare society, more 'effective'[4] and democratic (inclusive, not only to fossil fuel lobbies).

A key part of renewable resources is their territorial distribution. The sun, the wind, the sea and its tides cannot be transported and energy production using these sources is necessarily (and democratically) distributed in different areas.

Diffuse prosumption ensures economic savings and social benefits, but it requires that energy is consumed consciously; furthermore, communities are required to collaborate in a 'competitive' manner (a concept taken from civil economics).

In truth, the prosumption can only be achieved in a social context in which participants collaborate and overcome the idea that economics is a zero-sum game (I win, you lose).

The socio-economic context in prosumption is geared towards the common good: an individual is OK if everyone is OK, because 'together we grow' and increase the common good.

Traditional Anglosaxon economics views collaborative competition to be a visionary, utopian way of doing economics; however, in the Mediterranean tradition of civil economics (from the historical roots of the Renaissance and the Italian Enlightenment),[5] it is the only way to guarantee economic growth and civil progress.

To implement prosumption policies, the existing economic paradigm must be changed, more sustainable lifestyles must be offered. It would help if people were made more aware of the fact that natural goods are not meant for individuals but are part of the common good, therefore meant for the community.

The relationship between goods-utility-need must also turn the corner, from a consumer logic towards one which prioritises ethics and values; one in which contributing to the common good is more relevant than the satisfaction of a need. In this view, responsible, conscious consumption brings benefits to society, not only because renewable energy resources have been chosen but because this reduces pollution and increases the feeling of belonging to a community.

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[4] Effectiveness is the adequacy of the means used to obtain a given result. It considers the social effects of the results obtained. The efficiency, on the contrary, refers to minimizing costs and so it's a simplistic economic indicator because it does not take into account environmental and social impact of productive activities.

[5] L. Becchetti et al, *Microeconomia. Un testo di economia civile* (Bologna: Il Mulino, 2010). S. Zamagni and L. Bruni, *Economia civile. Efficienza, equità, felicità pubblica* (Bologna: Il Mulino, 2004), 71-80.

If everyone is a producer and consumer of energy, they will feel more responsible. The prosumption can therefore be considered a relational good (particularly dear to Civil economics) as it stems from a relationship and creates a relational logic between prosumers and the community.
It is interesting to note that, unlike traditional economic goods, prosumer goods do not have a decreasing marginal utility; instead, utility increases with the diffuse production and consumption of goods and the interaction of community and prosumer.[6]
Prosumption uses non-economic goods such as water, sun and wind to create economic energy; initial production costs are slashed, as are energy costs. Distribution should not be affected by market distortion and oligopolistic control mechanisms, and to avoid this the state should implement welfare society policies to regulate the distribution of energy and activities connected to prosumption, as well as educate on the correct use of these market methodologies.

This logic is not completely visionary is confirmed by political debates on global issues such as the environment, health, peace and human rights, which can be solved through reciprocity, collaboration, inclusion and the acknowledgement of diversity. Keywords which have an economic significance in civil economics but which were excluded from the vocabulary of XIX century economics.
The EU's current commitment is set out by the Environment Council which defines objectives the EU aims to reach within 2050 and can be summed up in this manner: living in a waste-free environment, resources are managed sustainably, biodiversity is protected and restored. This means protecting, conserving and improving the EU's natural capital; transforming the EU into a low-emission economy that is efficient in its use of resources, green and competitive; protecting EU citizens from pressure and risks to health and well-being linked to the environment. But most of all, making sure that EU members can deal with global environmental and climate challenges efficiently.[7]
In this regard, The 2030 Agenda reminds EU citizens of the road to take to live in a sustainable, free society. Upon closer examination, these objectives can only be met by applying the principles of civil economics (see keywords above).
The diffuse prosumption is among these objectives and can be included in the energy technologies accepted by Agenda 2030.

5 European Policies

Of all the renewable energy sources, the one most used in diffuse prosumption is, without a doubt, solar energy, as this is widely available and easy to convert into energy using consolidated, low-cost technology.
The gradual availability of storage systems which increased at the same time as costs fell, has allowed prosumers to accumulate excess energy to be used at a later date or sold to other energy suppliers.

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[6] B. Gui and R. Sugden, *Economics and Social Interaction: Accounting for Interpersonal Relations* (Cambridge: Cambridge University Press, 2005), *passim*.
[7] E.M. Gui and I. MacGill, 'Typology of future clean energy communities: an exploratory structure, opportunities, and challenges' 35 *Energy Research & Social Science*, 34 (2018).

This hybrid market (production + consumption) has incentivised the economy and created new jobs as well as satisfying consumer needs in terms of their direct participation in economic processes.
The new energy paradigm has inevitably led to increased complexity in the management of the power grid and services connected to energy supply. The development of energy prosumption requires distribution and transmission networks and their operation to be adequate.
One necessary condition is the parallel development of intelligent networks near production sites. The final aim is the existence of numerous, increasingly self-sufficient units which require a reduced consumption of energy but can meet peak energy demand requirements.
Recent studies[8] have shown the prosumption market is complex and disorganised so there is still a lot to be done, most of all to ensure that good intentions are not replaced by capitalist oligopolistic logic.[9] EU members still follow highly different policies and this does not help achieve hoped-for objectives.
Until now, the main challenge at European level has regarded the creation of a body of basic laws to manage the production, consumption and management of renewable energy in EU countries.[10] Countries which have so far adequately observed European directives are Germany, France, the Netherland and the United Kingdom. While Belgium, Croatia and Italy are still not showing adequate levels of self-consumption.
The main opportunities offered by the European plan concern the establishment of competitive business models which can create technological districts. This is happening in Germany, where the virtual prosumption grid offers a series of opportunities for collective economic growth in terms of occupation and the development of new technologies.[11]
But even when the benefits of renewable energy projects have not been widely shared, people with no access to a presumption plant have been able to share energy output at a reduced cost.
Even though there are as yet no specific laws in Italy regulating self-consumption, there is an existing law allowing the self-production and consumption of renewable energy. There are no restrictions on the size of self-consumption systems, nor limits on the quantity of electricity that can be produced. Any excess energy must, however, be bought by the owner of the plant.

6 Conclusions

Moreover, issues concerning poverty, security and climate change appear to promote the use of energy prosumption.

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[8] I. Campos et al, 'Regulatory challenges and opportunities for collective renewable energy prosumers in the EU' *Energy Policy*, 138 (2020).

[9] D. Hendricks and R. Mesquita, *Prosumer Guidelines for Eight EU Member States. European Renewable Energies Federation* (Berlin: European Renewable Energies Federation, 2019), 45-50.

[10] Parere del Comitato economico e sociale europeo su 'L'energia e le cooperative energetiche dei prosumatori: opportunità e sfide negli Stati membri dell'UE'. *Gazzetta Ufficiale*, 2017/C 034/07.

[11] M.J. Burke and J.C. Stephens, 'Political power and renewable energy futures: a critical review' 35 *Energy Research & Social Science*, 78, 78-93 (2018).

A low-emission economy is based on the link between energy, environment and economy. This requires the adoption of objectives which aim for tackling climate change and integrate with measures which aim to tackle the financial crisis we are currently undergoing. These objectives have to decouple economic growth on the one hand and environmental impact and the exploitation of resources on the other.
In this vision, prosumption, in its incarnation as a civil economics activity, offers meaningful opportunities for the development and transformation of the energetic-economic systems, towards a more sustainable incarnation.
The implementation of these policies is strongly correlated to the diffusion of technologies which reduce environmental impact and create opportunities for socially responsible economic development.

The Energy Market in Kazakhstan: The Current State and the Prospects

Meruyert Narenova

Abstract The article considers the current state and prospects of the energy market in Kazakhstan. The country has abundant natural energy resources – namely oil, gas, coal and uranium, influencing its economic development. Since Kazakhstan has gained sovereignty in 1991, a series of reforms in the energy market has been implemented with the goals of the national economy becoming more efficient and productive in the global world. In the early steps of reforms, to tackle the challenges of being competitive entailed some sensitive measures such as the liberalization in the energy market, restructuring of the assets, the new approaches on the price policy and some others. During the last decade, Kazakhstan sets for the transition to the 'green' development path and faces new challenges of economic growth.

1 The Economic Growth in Kazakhstan

In modern time, the Republic of Kazakhstan is characterized as a country with a stable political and social situation and the high growth rate of the national economy. Since gaining independence, the country traced the visible results in achieving long-term sustainability and competitiveness.

In Kazakhstan the number of documents has been developed to build up the legislative and institutional basis for the implementation of economic reforms, including 'Strategy Kazakhstan-2050', Strategic Development Plan till 2025, Strategy of the Fortified Industrial-Innovative Development and some others. These steps have created the necessary framework for the country's transition to sustainable development.

A key macroeconomic indicator such as Gross Domestic Product (GDP) characterizes the dynamics of overall economic development of the country. During the last two decades, it shows relatively high growth of the Kazakhstani economy sustaining the pace of transition fairly steady.

Kazakhstan benefited abundantly from the high commodity prices occurred in the world markets in the 2000s as the national economy heavily relies upon the exports of mineral resources, including energy ones. It is convincingly stated:

'By most comparisons, Kazakhstan's economic performance since 2000 appears to be outstanding. Between 2000 and 2017, Kazakhstan's economy grew by an annual average of 6.5 per cent, faster than that of almost all other Central Asian and the Commonwealth of Independent States (CIS) economies. The income per capita rose by an annual average of 5.3 per cent – a performance exceeded only by China among Kazakhstan's income comparators in 2000…Kazakhstan's strong growth generated widespread benefits; as a Asia'.[1]

[1] 'Kazakhstan. Reversing Productivity Stagnation. Country Economic Memorandum' *The World Bank 2018* (13) available at http://pubdocs.worldbank.org/en/277921541744930801/KZ-CEM- Final-Oct-31-Final.pdf (last visited 25 November 2020).

Significant achievements due to the favourable world economy conjuncture created conditions for the country to overcome the social issues and build up the basis for diversification of the economy. Currently, the World Bank classifies Kazakhstan as the upper-middle-income country with per capita GDP in 2019 of 11.518,4 (constant US$), following Russian Federation (12.011,5) and remarkably surpassing not only all Central Asia countries - Kyrgyzstan (1.161,4), Tajikistan (1.121,1), Turkmenistan (7.647,9), Uzbekistan (2.459,0), but also some European States.[2]
Kazakhstan strives to keep the economic model ensuring the high growth rate, though since 2010 the national economy has been suffering substantially of the financial crisis and the entailed slowdown of global consumption in the commodity markets. Despite these negative cumulative effects, the national economy shows a relatively satisfactory level of economic development. In 2010-2014 the annual GDP growth amounted to 4.2-7.4%, followed by the decline to 1.1-1.2%, and the recent rise to 4.-4.5% in 2017-2019.[3] The referred trend of the macroeconomic indicator, to a certain extent, reflects the national economy's adjustment to the volatile conjuncture of world markets.

2 The Energy Market in Kazakhstan

Kazakhstan is a country with the territory of 2,724,900 km2 ranked among the top largest ten in the world and the population of a little above 18.8 million inhabitants. It's the largest land-locked State situated in the inner part of the Eurasian continent.
The energy market in Kazakhstan consists of five major sectors – oil, gas, coal, power generation and uranium (extraction). Kazakhstan is one of the major world producers of such fossil fuel resources as coal, crude oil and natural gas. In 2018 Kazakhstan produced 108 million tones (Mt) of coal, crude oil (91.9 Mt), and natural gas (38.7 billion cubic meters (bcm), being ranked 9th, 17th and 24th in the world accordingly.[4]
The energy market development in the country fully relies on abundant natural resources. Substantial coal reserves are sufficient to supply country's energy needs for the next 150 years, the world's largest deposits of uranium, significant deposits of natural gas and petroleum also ensure the country in the development endeavours.
'In 2015 Kazakhstan's total proved primary energy reserves, including oil, gas, and coal, amounted to 21 billion tons of oil equivalent (toe). Kazakhstan's proven reserves of uranium, which are also substantial, are estimated at the energy equivalent of over 10 billion toes, bringing total primary energy resources available to be produced to 32 billion toes. This represents about 3.6% of the world's total'.[5]

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[2] Available at https://data.worldbank.org/indicator/NY.GDP.PCAP.KD (last visited 25 November 2020).

[3] Available at https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=KZ (last visited 5 November 2020).

[4] 'Kazakhstan energy profile. Country Report - April 2020' *International Energy Agency (IEA)*, available at https://www.iea.org/reports/kazakhstan-energy-profile#country-overview (last visited 25 November 2020).

[5] O. Ketova 'Report Contract No 2500145107' (3) available at https://www.unece.org/fileadmin/DAM/projectmonitoring/unda/16_17X/A2.1_Implement_Natl_CS/Kazakhstan_EnergySectorReport.

At the end of 2018 Kazakhstan's proved oil reserves estimated as 3 900 Mt and the reserves-to-production (R/P) ratio was 42.7 (up to 1.7% of the world's total liquid reserves and 12th place worldwide); natural gas deposits with 1 000 bcm of proved reserves (0.5% of total world reserves) at an R/P ratio of 40.7; and proven reserves of coal amounted to 25 605 Mt (2.4% of total world reserves) at an R/P ratio of 217.[6]

The country has enormous potential for renewable energy, which equals on wind energy (900bKWh a year), solar energy (3000 solar hours a year), hydro energy (62bKWh a year).[7]

Though the visible progress on the path of diversification, Kazakhstan is still highly reliant on energy resources, which remain of paramount importance for its economy. As of 2019, fossil fuel resources sector amounts to one-fifth of GDP (21.3% in 2018), about two-thirds of total export earnings (70% in 2018) and almost half of the country's state budget revenues (44% in 2018).[8]

Kazakhstan is a net exporter of energy, with total energy production (178 million tons of oil equivalent (Mtoe) in 2018) prevailing more than twice its energy demand (43%). At the end of 2019 total installed power generating capacity reached 22 986 MWt (+4.7% to 2018) and disposable power capacity is 19 329MWt (+2.3% to 2018).[9] The major source of energy production in Kazakhstan is coal (87.2% of total production), geographically the North zone produces more 76% of total energy production and consumes more than two-thirds of the overall amount, with the share of inhabitants in total country's population of 41%. It is due to the location of the largest industrial consumers in that region.

Although Kazakhstan benefits from the substantial mineral resources, the energy efficiency of the national economy is not satisfactory, hindering its development and hampering productivity growth. An indicator of total primary energy supply divided by GDP on purchasing power parity (TPES/GDP PPP, toe/thousand 2015 USD) used by International Energy Agency (IEA) reflects the energy efficiency level of the economy. In 2018 for Kazakhstan it is equal (0.2 toes/thousand 2015 USD), same is for Russian Federation, and the value is twice higher than for the EU 28 States and OECD countries (0.1).[10]

Looking back, Kazakhstan achieved some improvements in the energy efficiency of the economy. In 1990 the indicator was 0.3, with the highest value of 0.4 in 1992, then,

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pdf (last visited 25 November 2020).

[6] 'BP Statistical Review of World Energy 2019 68th edition' (2) available at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf (last visited 25 November 2020).

[7] Available at https://rfc.kegoc.kz/media/news/IrenaBaku/3%20Kazakhstan%20country%20presentation%20%20Zhenis%20Dyussenov.pdf (last visited 25 November 2020).

[8] 'Национальный энергетический доклад KAZENERGY 2019' (National Energy Report KAZENERGY 2019) (13) available at https://www.kazenergy.com/upload/document/energy-report/National Report19_ru.pdf (last visited 25 November 2020).

[9] АО 'Halyk Global Markets', 'Обзор рынка электроэнергии Казахстана 21 August 2020', Almaty, 20 20, 1 (JSC 'Halyk Global Markets', 'Kazakhstan Energy Market Review, 21 August 2020', Almaty, 20 2020, 1).

[10] Available at https://www.iea.org/data-and-statistics?country=KAZAKHSTAN&fuel=Energy%20pply&indicator=TPESbyGDPPPP (last visited 25 November 2020).

during the next decade, gradually falling to the lowest level of 0.13 (2015), 0.14 (2016-2017), with the following new climb up to 0.2 (2018).
There are some objective factors partly explaining Kazakhstan's GDP of being highly energy-intensive:

- Climate. Most of the territory is in the area of the cold sharp continental weather entails additional costs to provide normal living and working conditions, especially comparing European countries;
- Current structure of the economy with the dominant role of the energy-intensive industries (mining and metallurgy), amounting roughly 38% of the country's GDP and consuming about 67% of the generated electricity;
- The vast territory with low population density (19 times less than in the EU countries). As a consequence, the industry tackles the significant technical electricity losses due to the long distances of electricity transmission.

The country's current efficiency performance is caused by the existing technological, technical and infrastructural factors in the energy industry. Kazakhstan has to tackle several problems of modernization and technological advancement in the sector as the outdated technology and old infrastructure play the retarding role. There are many ways to achieve the higher efficiency - the development of less energy-intensive industries of the economy, the structural shifts towards the low carbon energy sources, the active implementation of the 'green economy' incentives, the systemic approaches on the energy saving, the 'environment friendly' consumption models and some others.
Since gaining independence in 1991, the Kazakhstani energy sector has undergone deep transformations, significantly enhancing overall results due to market liberalization and industry regulation. As an early adopter of the liberalized multi-market model, by the better balancing of the supply and demand and improving quality of service, Kazakhstan has been fairly regarded as a market reform leader among the countries of the former Soviet Union.
Despite this progress, much of the sectoral reforms remain not fully implemented. Kazakhstan's energy sector experiences the tough government regulation and price controls, and the relations with the investors, both local and foreign, need to be improved.

3 The Governance and Institutions

The energy sector in Kazakhstan is a core industry, which plays a pivotal role in the sustainable development of the country and receives thorough attention in government policy measures. Kazakhstan is one of the first countries, signing and ratifying the Energy Charter Treaty (ECT, 1995). It created the basis for stable, sound and non-discriminatory legal framework for cross-border relations in the energy sector. In 2015, on the 70th United Nations General Assembly, when the Development Agenda for the period after 2015 was adopted, Kazakhstan, along with other States, signed this document, emphasizing the pertinence of the Sustainable Development Goals (the SDGs) to the priorities and tasks of the country's development. The SDGs

are reflected in the Kazakhstani national legislation, supporting and promoting the so-called Agenda until 2030, and serve as a proper instrument to assess their achievement.

Key priorities of the energy industry development are formulated in several national documents, setting the primary legislation on the sustainable development, energy efficiency, green economy standards, liberalization and competition policy, renewable and nuclear energy, and other aspects. Among them are:

- 'Strategy Kazakhstan-2050' (2012), aiming to create favourable conditions for investors to improve their profitability and returns on investments. One of the goals is to alternate the traditional energy sources by the renewables (solar and wind) as of 50% of power consumption by 2050;
- 'Concept on the transition of the Republic of Kazakhstan to the "green economy"' (2013) conceives the gradual structural shifts in the power generation sources towards the alternative ones (solar, wind, hydro and nuclear) as of 3% by 2020 (solar and wind), 30% by 2030 (solar, wind, hydro, nuclear), and 50% by 2050 (solar, wind, hydro, nuclear) over the level of 2008. Along with that, the growth of gas in total power generation increases by up to 20% by 2020, 25% by 2030, and 30% by 2050. A key priority is reducing CO2 emissions in the energy sector relative to 2013 levels: to 15% by 2030, and 40% by 2050;
- 'The Concept of Fuel and Energy Sector Development to 2030' (2014) pursues the goals of improving the energy efficiency in the country to sustain the steady economic growth, ensure the national energy security, widening the resource base, the pollution reduction into the environment by producing of 30% of the energy by the renewables in 2030, with the following increase to 50% by 2050, thus building up the transition of Kazakhstan to 'green economy';
- 'The Programme 100 Concrete Steps' (2015) encompasses measures on five institutional reforms and aims to create a professional government; ensure rule of law; conduct industrialization policy and sustain growth;
- 'The Law on Energy Conservation and Energy Efficiency' with amendments and additions (2019) defines the approaches on energy efficiency measures in Kazakhstan in the mid and long-term perspective;
- 'On the Concept of the Foreign Policy of the Republic of Kazakhstan for 2020-2030' (2020) describes the framework for strengthening the international cooperation to attract high-quality foreign investment in main sectors of the economy, facilitating the transfer of advanced foreign technologies to Kazakhstan as an important part of the innovation and industrial processes, providing favourable external conditions for the implementation of the 'Green economy' Concept to increase the efficiency of use of water, land, biological and other resources. Governance policies in the energy market are defined by several public bodies: Ministry of Energy is a main regulatory authority defining policy on the full cycle of the extraction, production, transportation and distribution of hydrocarbons and coal, power generation, nuclear energy;

- The Ministry of Industry and Infrastructural Development is authorized on the measures of industrial sector development, modernization and innovation policies, technology and science development in all sectors of the national economy;
- The Ministry of Ecology, Geology and Natural Resources deal with the environment protection, 'green economy' policy measures, waste management (excluding municipal, medical and radioactive waste), etc.;
- Two ministries of the economic profile - the Ministry of National Economy coordinates the macroeconomic policy by procedures of strategic and budget planning and the Ministry of Finance is responsible for the sound budget policy.

4 Prospects for the Energy Market in Kazakhstan

The Kazakh government identifies the constraints of the energy sector development, related to the long-term sustainability, lack of balance between the generating capacities and growing demand for energy and fuel, the high energy intensity of the economy, insufficient level of energy efficiency and outdated 'not eco-friendly' technologies etc. The appropriate legislative and institutional framework to fulfil the SDGs in the forthcoming period is elaborated to support the energy sector.

In Kazakhstan, the efforts to pave the way for the sustainable growth have brought the first positive, though moderate, results. For example, in 2016-2020 the power generation from renewable sources increased accordingly by solar from 86.3 to 603.4MkWt, wind – from 927.9 to 1433.6 MkWt.

However, the share of renewables in total electricity production is still very low - 0.98% (2016) with slightly increasing to 2.3% (2019), and the annual growth rate is rather encouraging – 24.1% (2016) and 77% (2019).[11] The International Exposition 'Astana EXPO2017 – Future Energy' held in 2017, to some extent, was the turning point in the minds for the wide range of consumers in the country. A boosting interest in clean technologies and renewables and their benefits occurred after that event, bringing to raising awareness of a new behavioural model of being prosumer.

Despite the successful implementation of the implemented policy measures on the comprehensive development of the energy sector in Kazakhstan, there are remaining challenges for the country to tackle with in the future years. They include:

- Steady improvement of economic performance on such indicators as labour productivity, labour costs per unit of output, the disparity on income between the different groups of population (rich and poor). Kazakhstan is still lagging of developed countries considering these key development indicators;
- Substantial reduction of CO2 emissions on environment and improvement of energy intensity of the national economy, elaboration of the comprehensive legislative documents supporting the transition to the new, 'more green' economy;

[11] Data of 2020 - for the first half of the year available at https://www.gov.kz/memleket/entities/energo/activities/4910?lang=ru (last visited 25 November 2020).

- Elaboration of living standards aimed at new quality of life (the health of the nation as an ultimate goal), encompassing a wide range of indicators, such as 'eco-friendly' culture, efficient waste management, healthy nutrition, etc.;
- Improvement of policy measures on R&D (currently 0.2% of GDP) to shift from the old economic model to more innovative, modernized industry structure, with an appropriate set of incentives on taxation and other financial instruments towards the sound 'green economy'. Adopted by the Majilis (Parliament) of the Republic of Kazakhstan just recently, in November 2020, the 'Ecological Code' is one of the examples of such progress in the sustainable development path.

Energy Consumption and Social Harm: How the Misuse of State Power Creates Inequality and Social Injustice

Baris Cayli Messina

Abstract Sustainable energy consumption depends on the methods to use energy by the public and the governance of energy consumption based on certain norms and regulations. Yet it has been widely overlooked that the reach of energy consumption to a wider population, who are economically in a disadvantageous position, may also play a key role. This study takes attention to the democratisation of sustainable energy consumption by highlighting the role of state institutions and state-private cooperation. This study suggests that the misuse of state power and corruption manifested in the state-private cooperation pose serious risks to the democratisation of sustainable energy consumption and increases social harm for the disadvantageous communities in society.

Social harm is a type of harm that can be categorised either as a state crime or a crime that is led by the state-private cooperation targeting the rights of citizens who are in a less powerful position in terms of social capital. Energy consumption and its link to social harm is an understudied subject which can be helpful to address so we can reveal the social dimensions of sustainable energy consumption and its access to wider society through teasing out the principles of equality and social justice.

Even though economic growth and environmental equality have a positive correlation; it has been found that energy consumption produces significant detriments for the environment.[1] The need for energy and its consumption by traditional methods particularly lead to deteriorating situations in developing and rural areas. In rural Tibet, for example, 'traditional biomass energy takes up to almost 70%, which leads to a series of serious eco-environment problems such as deforestation, soil erosion, grassland degradation, desertification, and some other problems such as human beings diseases and loss of time for education and recreation'.[2] Unsurprisingly, McGee and Greiner found that 'independent of income inequality and other drivers of emissions, increases in renewable energy consumption reduce emissions. However, when national income inequality is considered, as inequality increases renewable energy consumption is associated with a much larger decrease in emissions'.[3] Therefore, energy consumption and the type of energy consumed by different communities reveal the level of inequality and injustice in diverse societies.

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[1] J. Baek and G. Gweisah, 'Does income inequality harm the environment?: Empirical evidence from the United States' 63 *Energy Policy*, 1434, 1434-1437 (2003).

[2] G. Liu et al, 'Rural household energy consumption and its impacts on eco-environment in Tibet: taking Taktse county as an example' 12 *Renewable and Sustainable Energy Reviews*, 1890, 1890-1908 (2008).

[3] J.A. McGee and P.T. Greiner, 'Renewable energy injustice: The socio-environmental implications of renewable energy consumption' 56 *Energy Research & Social Science*, 101-214 (2019).

Sustainable energy consumption is an important factor that needs to be encouraged by states and international organisations. There is a strong relationship between climate justice and the curb of energy, the use of clean and renewable energy, reforestation which can help greatly to reduce inequality, 'since the greatest benefits are expected to accrue to lower-income households, which are more likely to live in areas heavily affected by air pollution and poor air quality'.[4] Yet inequalities between regions within the same country or the lack of access to the similar form of technology to produce and consume sustainable energy hinder both environmental justice and manifest global injustice across the world. Hence, countries need to take action to prevent energy inequalities both within and between the regions.[5]

Social inequality, economic injustice, and spatial disparities in the political and economic arena hinder the opportunities to realise environmental justice and provide opportunities for environmental crime.[6] Privatisation plays a key role in unleashing marketing forces whose primary agenda focuses on the profit-making rather than offering sustainable and just energy consumption. The intervention of state with policies centralising the needs of people and protection of the environment ought to be the principles to prevent inequality and social injustice. However, at this juncture, the question remains how state agencies can be independent and take control of energy consumption policies while regulating the free market with transparent and accountable policies.

As Stanczak righteously mentioned, 'state-corporate crime symbiosis' and 'regimes of permission' direct the analysis of social harm at systemic relations and processes expressed through state and corporate practices constitutive of capitalism.[7] The energy consumption and its relation to global justice cannot be functioned of independently in the free market where the state-private cooperation's priorities do not lie in the preservation of the environment. This is particularly more vehement outcome in illiberal democracies and authoritarian regimes that limit the access to sustainable energy and implement policies that bring detrimental effects on the environment. Yet even in advanced economies, such as in the UK, social harm of the state can be found not only in the aftermath of the energy production and in the process of its consumption but also during the extraction of energy. Short and Szolucha argue that 'while the UK is yet to see unconventional gas and oil extraction reach the production stage, as this article shows, local communities can suffer significant harms even at the exploration stage when national governments with neoliberal economic agendas are set on developing unconventional resources in the

[4] A. Hajat et al, 'Socioeconomic disparities and air pollution exposure: a global review' 2 *Current Environmental Health Reports*, 440, 440-450 (2018).

[5] X. Yao et al, 'Inequalities by energy sources: An assessment of environmental quality' 15 *Plos one*, e0230503 (2020).

[6] R. White, 'Eco-global criminology and the political economy of environmental harm', in N. South and A. Brisman eds, *Routledge international handbook of green criminology* (London-New York: Routledge, 2013), 243-260.

[7] D. Stańczak, 'State–Corporate Crime and the Case of Bt Cotton: On the Production of Social Harm and Dialectical Process' 6, 2 *State Crime Journal*, 214, 214-240 (2017).

face of considerable opposition and a wealth of evidence of environmental and social harms'.[8]

Overall, sustainable energy is key to realise both environmental justice and global justice. However, the role of state institutions cannot be overlooked to realise such a goal because the lack of transparency among the state institutions as well as profit-oriented state-private corporations may pose serious risks threatening sustainable energy consumption and surge their social capital while putting additional barriers both for the socially disadvantageous communities to consume sustainable energy. Therefore, the state institutions may need to regulate the sustainable energy consumption and energy market by developing an ethos of justice in both extractions of energy, its sustainability, and consumption by a wider community rather than socially privileged communities and countries across the world.

[8] D. Short and A. Szolucha, 'Fracking Lancashire: the planning process, social harm and collective trauma', 98 *Geoforum*, 264 (2019).

Overcoming Energy Poverty through Becoming a Prosumer?

Roberto Garetto

Abstract Despite energy poverty is not a recent issue, as it dates to the 70s of last century, a general and accepted definition of the term is not yet available. Firstly the paper traces the development of scholars' definitions of energy poverty, then subsequently points out the centrality of energy poverty issues in the EU 'Clean Energy Package'. Related to the effort to mitigate energy poverty is the emergence of a new energy market player: the prosumer. This term comes from the intersection of the words 'producer' and 'consumer'. The affirmation and vitality of the prosumer model in the field of energy is now widely accepted. The paper presents the main reasons for its validity and makes references to the role of prosumerism in the EU 'Clean Energy Package'. It finally highlights the effectiveness and limitations of prosumering in the fight against energy poverty.

1 Energy Poverty: Origin and Evolution of the Concept

Energy poverty cannot be considered to be a recent issue, but the impact of what it involves on society has been increasing and becoming significant in recent years.
A general and accepted definition of energy poverty is not yet available, since the concepts currently related to this phenomenon are highly subjective and consider some aspects more relevant than others, according to different personal beliefs.
If something can be said for sure, it is that the phenomenon is multi-dimensional,[1] that is, it depends on different variables and dimensions.[2]
The term 'energy poverty' itself became of general use in the United Kingdom in the 70s of last century, as a result of the energy crisis of 1973, triggered by the increase in energy prices, due to the decision of several countries of the Organization of the Petroleum Exporting Countries (OPEC) in which they refused to export oil to Western countries, which greatly increased the price of crude oil at that time.[3]
Following the 1973 oil crisis, energy poverty often labelled 'fuel poverty' in this first phase, became a distinct issue of public concern in the United Kingdom.[4] The diffused lack of household capacity to access the energy necessary to be able to lead a dignified

[1] See Commission Recommendation (EU) 2020/1563 of 14.10.2020, on energy poverty [2020] OJ L 357/35, at Recital 20.

[2] C.A. Bollino and F. Botti, 'Energy Poverty in Europe: A Multidimensional Approach' 70 *PSL Quarterly Review*, 473, 499-500 (2017): '[o]wing to the multidimensional nature of the issue, a number of energy poverty metrics have been developed according to two main approaches: expenditure-based (built on data on household energy expenses) and consensual-based (referring to perceived energy deprivation). A handful of studies analysed the extent and the determinants of energy poverty across Europe in the spirit of the latter approach'.

[3] The effective role of OPEC in the crisis can be questionable anyway. See: L.E. Cuervo, 'OPEC from the Myth to Reality' 30 *Houston Journal of International Law*, 433, 465-466 (2008): 'OPEC is vilified in the United States as responsible for the 1973 oil embargo, lines and no fuel at gasoline stations and even for not lighting that year's national Christmas tree.In reality, OPEC may not be to blame for high oil prices'.

[4] J. Rosenow et al, 'Fuel poverty and energy efficiency obligations. A critical assessment of the supplier obligation in the UK' 62 *Energy Policy*, 1194 (2013): 'fuel poverty is a key driver of British energy policy after it became a distinct issue of public concern following the 1973 oil crisis'.

lifestyle encouraged various researchers and institutions to study and offer the first definitions of this social phenomenon during the following decade. One of the first definitions of fuel poverty was developed by Jonathan Bradshaw in 1983: 'a lack of sufficient resources to buy adequate heat and light'.[5]

This first definition is based on a clear awareness of the complexity of the phenomenon.

In particular, it takes into account how fuel poverty can manifest itself in ways that are often different from those commonly attributable to a state of poverty. Some people are indubitably poor but can afford adequate warmth at home, while others are not in poverty but cannot afford adequate warmth. They indeed can live in houses that are very difficult or expensive to heat. In other cases, some people can have adequate warmth, because they sacrifice the expense of adequate diets, while other people do not have adequate warmth, despite an adequate income, for fear of fuel bills or helplessness.[6]

Despite the social exhaustiveness, this definition does not include any quantitative indicator and only considers temperature as an influencing factor in general.

In 1991, Brenda Boardman proposed another more objective definition: fuel poverty occurs when a household could not 'have adequate energy services for 10 per cent income'.[7]

Boardman later clarified her definition, specifying that the mentioned percentage refers not to actual expenditure, but a hypothetical one. That makes the evaluation more objective.

Furthermore, she argued that the acceptable level of heating in the households is taken to mean that the home is heated in line with the standards recommended by the World Health Organization (WHO): 16 °C in kitchen and circulation areas, 18 °C in bedrooms, 21 °C in living areas and bathrooms.[8] In specific areas they can be determined on higher standards, anyway: in Scotland, for instance, it is required 23 °C for living rooms for the elderly (people aged 60 years or over).[9] It should be considered, also, the proportion of the house: in case of under-occupation, the household could be in severe fuel poverty in some periods but have an annual income over the poverty line.[10]

Referring to 'energy services', Boardman stigmatizes the incompleteness of perspectives exclusively related to 'adequate' warmth, whose lack is often considered

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[5] J. Bradshaw, 'Introduction', in Id and T. Harris eds, *Energy and Social Policy* (London: Routledge and Kegan Paul, 1983), 2.

[6] ibid 2: '[s]ome people are poor but can afford adequate warmth. Others are not in poverty but nevertheless cannot afford adequate warmth - because their houses are very difficult or expensive to heat. There are also people who purchase adequate warmth only at the expense of adequate diets or going short in other ways. Then there are those who live in cold conditions despite having incomes which are sufficient to purchase adequate warmth - because of helplessness or a fear of fuel bills'.

[7] B. Boardman, *Fuel poverty: From cold homes to affordable warmth* (London: Belhaven, 1991) 227.

[8] World Health Organization. Regional Office for Europe and R.P. Ranson, *Guidelines for healthy housing* (London: WHO Regional Office for Europe, 1988), 155.

[9] B. Boardman, *Fixing fuel poverty: Challenges and solutions* (London: Routledge, 2010), 22-23.

[10] T. Sefton and J. Chesshire, *Peer review of the methodology for calculating the number of households in fuel poverty in England: final report to DTI and Defra* (London: DEFRA/DTI, 2005), 28.

the specific indicator of fuel poverty. This way she reconnects the latter to the general concept of energy poverty.[11] It must be recognized, anyway, that for other uses of energy, there is less precision in the determination of the parameters than for the heating.[12]

A more current definition of energy poverty must also take into account information technology and appliances indispensable for everyday life.[13]

Some EU institutions have included different indicators to detect energy poverty. Among the most significant institutions, it has to be mentioned the EU Energy Poverty Observatory (EPOV), developed by a consortium of 13 organisations, including universities, thinks tanks, and the business sector.

EPOV provides four different primary indicators of energy poverty. Two are based on self-reported experiences of limited access to energy services: arrears on utility bills and low absolute energy expenditure (that means: absolute energy expenditure below half the national median). The other two are calculated using household income and energy expenditure data: high share of energy expenditure in income and inability to keep home adequately warm.

The Observatory provides also other secondary indicators, relevant in the context of energy poverty, but that cannot be directly considered indicators of energy poverty itself. The secondary indicators include energy prices and housing-related data.[14]

It is easily predictable that a concept of energy poverty related to these indicators is not static, since the condition of a household, as well as the situation of its occupants, are constantly subjected to change.

A concept that allows us to cover this situation of constant change is energy vulnerability,[15] referred to as the probability that a household can easily find itself in a situation where it does not have an adequate amount of energy services.

The relevance of energy poverty and energy vulnerability among European citizens is impressive: nearly 34 million people are unable to afford to keep their homes adequately warm in 2018. In the same year, 6.8% of private households in the European Union (30.3 million) could not keep up with their energy bills and therefore

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[11] B. Boardman, n 9 above, 23: 'households need hot water, lightening, cooking and all the other uses of energy in the home'.

[12] T. Sefton and J. Chesshire, n 10 above, 38.

[13] S. Bouzarovski, *Energy poverty: (Dis)assembling Europe's infrastructural divide* (Cham: Palgrave Macmillan, 2018), 1: '[e]nergy poverty occurs when a household is unable to secure a level and quality of domestic energy services–space cooling and heating, cooking, appliances, information technology–sufficient for its social and material needs'.

[14] The secondary indicators are listed by EPOV as follows: fuel oil prices; biomass prices; coal prices; household electricity prices; district heating prices; household gas prices; natural gas prices for household consumers; dwelling comfortably cool during summer time; number of rooms per person (owners and renters); dwelling comfortably warm during winter time; dwellings in densely populated areas and in intermediately populated areas; poverty risk; dwellings with energy label A; energy expenses, income quintile; dwelling equipped with air conditioning; dwelling equipped with heating; excess winter mortality/deaths; presence of leak, damp, rot. The indicators list is available at: https://www.energypoverty.eu/indicators-data (last visited 5 December 2020).

[15] Cf A. Gatto and C. Drago, 'A taxonomy of energy resilience', 136 *Energy Policy* 111007, 1 (2020).

were at risk of being cut off. At the same time, 7.3% of the European Union population (37.4 million people) experienced uncomfortable ambient temperatures at home.[16]
Also, it must be pointed out that there is a global energy inequality, that according to data from the International Institute for Applied Systems Analysis (IIASA), energy consumption is concentrated in the wealthy population. The poorest 40% of the world's population only disposes of some 10% of global income and final energy use; the richest third disposes of two-thirds of global income and final energy.[17] These data highlight that overcoming energy poverty is a special urgency in the perspective of human rights, too.[18]

2 Energy Poverty Issues in the 'Clean Energy Package'

In November 2017, the European Parliament, the Council, and the Commission jointly and solemnly proclaimed the 'European Pillar of Social Rights':[19] a set of 20 principles about equal opportunities and access to social protection and inclusion. Article 20 of this document defines energy as one of the basic services that everyone is entitled to access and states that it must be provided support for the ones who need to access these services.
The 'Clean Energy for all Europeans package', commonly referred to as the 'Clean Energy Package', is a set of eight legislative acts on the energy performance of buildings, renewable energy, energy efficiency, governance and electricity market design. The European Commission published its initial proposal for the package in November 2016. The package was completed by the publication of its final texts in the Official Journal of the European Union in June 2019. This legislative package aims to promote a proper energy transition. Energy poverty is a key concept incorporated in the rulebook.
The 'Clean Energy Package' is composed of four Directives and four Regulations.
Among the Directives, significant on the theme of energy poverty are three of them: the Energy Performance in Buildings Directive (EU) 2018/844,[20] that updates and amends many provisions from the Directive 2010/31/EU, the Energy Efficiency Directive (EU) 2018/2002,[21] and Electricity Directive (EU) 2019/944.[22] The fourth

[16] Data from 2018. Eurostat, SILC [ilc_mdes01].
[17] International Institute for Applied Systems Analysis, *Energy Inequality*, 12 August 2014, available at: https://iiasa.ac.at/web/home/research/alg/energy-inequality.html (last visited 5 December 2020).
[18] Cf R. Garetto, 'Sustainable development and equal access to energy sources. A human rights based approach' 6 *SWS International Scientific Conference on Social Sciences. Conference Proceedings*, 177, 180 (2019).
[19] European Parliament, Council, European Commission, Interinstitutional Proclamation on the European Pillar of Social Rights [2017] OJ C 428.
[20] European Parliament and Council Directive (EU) 2018/844 of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency [2018] OJ L 156/75.
[21] European Parliament and Council Directive (EU) 2018/2002 of 11 December 2018 amending Directive 2012/27/EU on energy efficiency [2018] OJ L 328/210.
[22] European Parliament and Council Directive (EU) 2019/944 of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU [2018] OJ L 158/125.

Directive, less directly related to energy poverty issues, is the Renewable Energy Directive (EU) 2018/2001.[23]

Recital 59 of the Electricity Directive, 2019/944/EU points out that energy poverty is caused by a combination of low incomes, high energy expenditures and low energy efficiency housing. However, the objective measurement of energy poverty remains difficult. Article 29 of the same Directive establishes that the Commission must guide the definition of a 'significant number of households in energy poverty.' Moreover the Regulation (EU) 2018/1999 requires the Member States to provide appropriate indicators for measuring energy poverty.[24] As there is no standard definition of energy poverty, it is left to the Member States to formulate their standards, according to their internal situation.

Nevertheless, the recent Directive 2018/844/EU, in conjunction with the amended Directive 2010/31/EU, provides disclosures useful for the comprehension of possible causes and consequences of energy poverty, emphasizing the importance of policies to manage the issue.

The recast Electricity Directive, 2019/944/EU, requires Member States to take appropriate measures where energy poverty is detected, including measures to address broader poverty. Member states must also protect energy-poor customers, especially those who live in remote areas. An innovative aspect of the legislative framework is that it is requested to determine the number of households in energy poverty. The mentioned Article 29 of the Directive (EU) 2019/944 provides that the Member States are obliged to assess the number of households falling into situations of energy poverty and states that they must establish and publish a set of criteria that can support the assessment. These criteria 'may include low income, high expenditure of disposable income on energy and poor energy efficiency'.

Article 27 of the same Electricity Directive affirms the principle of universal service of electricity, by requiring the Member States to ensure the right of all householders - and where deemed appropriate, also of small enterprises - to be provided of electricity of a specific quality at reasonable, easy and comparable, transparent and non-discriminatory prices.

The Directive 2018/2002/EU, amending Directive 2012/27/EU, provides that the Member States take into account the need of reducing energy poverty while fulfilling their energy efficiency obligations.[25]

Lastly, the Commission Recommendation, of 14 October 2020, on energy poverty[26] at Recital 1 offers a concise definition of energy poverty: 'a situation in which

[23] European Parliament and Council Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) [2018] OJ L 328/82.

[24] European Parliament and Council Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council [2018] OJ L 328/1. See Article 3(3)(d): 'Member States shall: [...] assess the number of households in energy poverty'.

[25] European Parliament and Council Directive (EU) 2018/2002, Recital 23.

[26] Commission Recommendation (EU) 2020/1563.

households are unable to access essential energy services.' Among these, it must be mentioned adequate warmth, cooling, lighting, and energy to power appliances. Access to energy services, which promote a decent standard of living and health, is essential for social inclusion. Addressing energy poverty thus has the potential to bring multiple benefits, including lower spending on health, improved comfort and wellbeing, and improved household budgets.[27]
The very recent Recommendation rightly points out that the Covid-19 pandemic makes more urgent solving the problem of energy poverty to meet the needs of all EU residents.[28] As more and more European citizens may not be able to afford the use of basic energy, especially in the case of rising unemployment.[29]

3 Emergence of a New Energy Market Player: The Prosumer

The term 'prosumer' comes from the intersection of the words 'producer' and 'consumer'.
The related concept was coined in the 80s of last century by Alvin Toffler, who despite not having energy markets in mind, was referring to the 'prosumer' as a customer actively taking part in the process of co-creating products.[30] In the Toffler's perspective, prosumers already existed in the pre-industrial world - that he calls the 'first wave' - as in the past people mostly used to produce and consume their food, goods and services. The industrialization, during the 'second wave', enhanced the mass-production and separated consumption and production.[31]
Toffler takes the view that society is now moving toward a 'third wave', in which many people will decide to produce and consume their products and services on a high-technology basis.[32]

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[27] ibid Recital 2.

[28] Cf R. Nagaj and J. Korpysa, 'Impact of COVID-19 on the Level of Energy Poverty in Poland' 13 *Energies* 4977, 1, 15 (2020): 'as the COVID-19 crisis continues, the proportion of the energy purchase costs in households' budgets will grow sharply'. On energy poverty in the emergencies regulatory framework, see also: L. Ruggeri and M. Giobbi, 'Vulnerabilità economica tra diritto emergenziale e contrattuale - Economic vulnerability between emergency and contract law' 12 bis *Actualidad Jurídica Iberoamericana*, 340, 349-350 (2020).

[29] ibid Recital 15.

[30] See K. Kotilainen, 'Energy Prosumers' Role in the Sustainable Energy System', in W. Leal Filho et al eds, *Affordable and Clean Energy. Encyclopedia of the UN Sustainable Development Goals* (Cham: Springer Nature, 2020).

[31] A. Toffler, *The third wave* (New York: Bantam Books, 1980), 266: '[d]uring the First Wave, most people consumed what they themselves produced. They were neither producers nor consumers in the usual sense. They were instead what might be called "prosumers". It was the industrial revolution, driving a wedge into society, that separated these two functions, thereby giving birth to what we now call producers and consumers. This split led to the rapid spread of the market or exchange network–that maze of channels through which goods or services, produced by you, reach me and vice versa'.

[32] A. Toffler, n 31 above, 275: '[i]n this system the prosumer, who dominated in First Wave societies, is brought back into the center of economic action – but on a Third Wave, high – technology basis'.

The concept of 'prosumer' entered into economic scientific literature a decade later, thanks to Philip Kotler,[33] and from there it gained importance into the energy lexicon. In the field of energy, the term 'prosumer' refers to 'an energy user who generates renewable energy in his/her domestic environment and either store the surplus energy for future use or trades to interested energy customers in smart grid'.[34] We can find other definitions in specific prosumer literature,[35] but all of them finally refer to energy users who produce energy that will be consumed within the grid.

The European Parliamentary Research Service (EPRS) has defined the electricity prosumers as 'consumers who both produce and consume electricity'.[36] According to this definition, prosumers 'self-consume' some of the electricity they produce and sell the excess production to the market. When their production is low, prosumers will import electricity from the grid. This way they are consumers in certain instances, and producers at others.

The EPRS divides prosumers into four categories.[37]

The first one is composed of residential prosumers. They are citizens who produce their electricity on their property, eg with rooftop photovoltaic (PV) panels or through micro combined heat and power (CHP).

In the second category, there are communities and citizen-led renewable energy cooperatives ('Res Coops'), such as housing associations, foundations, charities. They are not commercial actors, but produce energy for self-consumption, mainly by rooftop PV panels and wind turbines.

The third category is composed of commercial prosumers. They are business entities, eg small and medium-sized enterprises (SMEs), department stores, office buildings, whose main purpose is not electricity production. They, however, reduce their energy bills by installing generators such as rooftop PV and CHP.

In the last category, there are public prosumers, such as schools, hospitals and other public institutions, that self-generate electricity.

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[33] P. Kotler, 'The Prosumer Movement. A New Challenge for Marketers' 13 *Advances in Consumer Research*, 510, 510-513 (1986).

[34] A.D. Rathnayaka et al, 'Framework to manage multiple goals in community-based energy sharing network in smart grid' 73 *International Journal of Electrical Power & Energy Systems*, 615 (2015).

[35] Cf R. Zafar et al, 'Prosumer based energy management and sharing in smart grid' 82 *Renewable and Sustainable Energy Reviews*, 1675 (2018): '[r]enewable energy produced by consumers can be used as a new source of energy and can be shared to other consumers and thegrid; the production and sharing of energy converts a consumer into prosumer. Prosumers not only consume energy but also share excessive energy generated by renewable energy sources with grid and/or with other consumers in a community'. Y. Parag and B.K. Sovacool, 'Electricity market design for the prosumer era' 1 *Nature Energy* 16032, 1, 3 (2016): '[p]rosuming refers to when energy customers actively manage their own consumption and production of energy'.

[36] European Parliamentary Research Service and N. Šajn, 'Electricity 'Prosumers'. Briefing', November 2016, PE 593.518, 1, 2: 'Prosumer' is a relatively new term that, in the energy field, most often denotes consumers who both produce and consume electricity. They "self-consume" some of the electricity they produce, and sell the excess to the grid. But when their production falls short, they also buy power from the grid, which makes them both producers and consumers'.

[37] ibid 2.

The affirmation and vitality of the prosumer model in the field of energy occurred in the last decade, is seen with three main reasons.[38]
The first one has an economic nature.
The costs of installing and maintaining energy devices (eg rooftop PV panels and battery storage) in many cases has decreased significantly, due to large-scale subsidies offered in the various EU Member States, such as Germany[39] and Spain.[40] The increase in demand lowered the overall cost of these devices for all consumers, due to economy of scale in electricity devices factories. The second reason is related to the enhancement of consumers' awareness of the benefits of renewable energy. The understanding of the consequences of climate change has created widespread interest among consumers to produce and consume energy from renewables.[41] The third reason refers to the low level of trust in electricity companies to respect the rules and regulations set up to protect consumers in some EU Member States.[42] Many EU citizens feel more comfortable by producing their energy, even if it would be costlier than acquiring from the public grid.
The Commission, inspired by the rise of the prosumerism phenomenon, and perhaps by the related regulations in some EU Member States,[43] opted for the prosumer as the focus of the 'Clean Energy Package'.

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[38] I. Herrera Anchustegui and A. Formosa, 'Regulation of Electricity Markets in Europe in Light of the Clean Energy Package: Prosumers and Demand Response', in T. Hunter, I. Herrera Anchustegui, P. Crossley and G. Alvarez eds, *Routledge Handbook of Energy Law* (Oxon: Taylor & Francis, 2020), 88.

[39] C. Dieckhoener, 'Does subsidizing investments in energy efficiency reduce energy consumption? Evidence from Germany', *Institute of Energy Economics at the University of Cologne, EWI Working Paper 12/17*, 1, 2-3 (2012).

[40] M. Bailera and P. Lisbona, 'Energy storage in Spain: Forecasting electricity excess and assessment of power-to-gas potential up to 2050' 143 *Energy*, 900, 902-903 (2018).

[41] This growing awareness must be seen in relation to the concept of sustainable development: cf R. Garetto, 'El principio del desarrollo sostenible en el contexto de la Unión Europea y en el plano internacional - The principle of sustainable development in the context of the European Union and at the international level' 10 *Revista Jurídica Mario Alario D'Filippo*, 174, 182-183 (2018). The growing trend of the awareness is demonstrated in some specific areas of the World (eg Europe and North America) and is directly proportionate to the level of democratization. See S. Adams and C. Nsiah, 'Reducing carbon dioxide emissions; Does renewable energy matter?' 693 *Science of the Total Environment* 133288, 1, 8 (2019): 'democracies are more likely to be pro-environment than non-democracies [...] the effect of renewable energy is more pronounced in more democratic states than in less democratic states'.

[42] European Commission, Consumers, Health, Agriculture and Food Executive Agency (Chafea), 'Seco- nd consumer market study on the functioning of the retail electricity markets for consumers in the EU', September 2016, B-1049, 377: '40% of consumers surveyed "strongly agreed" when asked whether they trusted their electricity company to respect the rules and regulations set up to protect consumers; this figure varied between 15% in Bulgaria and 68% in Finland'.

[43] In the United Kingdom the legislation that is relevant for prosumers is dating back to the last decades of XX Century: the Electricity Act of 1989. In Germany the Renewable Energy Source Act of 29 March 2000 (Erneuerbare Energien Gesetz–EEG) was amended in 2017 (EEG 2017). Cf I. Campos et al, 'Regulatory challenges and opportunities for collective renewable energy prosumers in the EU' 138 *Energy policy* 111212, 1, 6 (2020).

4 Prosumerism in the 'Clean Energy Package'

The 'Clean Energy Package' includes provisions expressly related to prosumers. The backbone of the new prosumering framework is constituted by Article 15 of the Electricity Directive (EU) 2019/944 and Article 21 of the Renewable Energy Directive (EU) 2018/2001.

Article 15 of the Electricity Directive (EU) 2019/944 is centred on the 'active customer'. It is the core of prosumer regulation in the whole 'Clean Energy Package', and expresses the vision of the European legislator on the issue: customers shall participate in all energy markets as equals among all the other traditional market players.

Therefore, Article 15 entitles customers to operate either directly or through aggregation, to sell self-generated electricity, including through power purchase agreements, to participate in flexibility and energy efficiency schemes, and to be subject to cost-reflective, transparent and non-discriminatory network charges.

Article 15 strongly discourages disproportionate technical and administrative requirements, procedures and charges for active customers. In this way, it reduces the impact of bureaucracy.

Residential storage facilities are a central issue in the development of prosumerism. Hence, Article 15 obliges the Member States to ensure that active customers, who own a storage facility, have the right to a grid connection within a reasonable time. They must not be subjected to any double charge - including network charges - for stored electricity remaining within their premises and for flexibility services provided to system operators, nor disproportionate licensing requirements and fees.

Article 21 of the Renewable Energy Directive (EU) 2018/2001 offers specific provisions for renewable energy generation, storage and consumption.

It entitles renewable 'active customers', individually or through aggregators, to generate renewable energy, including for their consumption, store and sell their excess production of renewable electricity, including through power purchase agreements, electricity suppliers and peer-to-peer trading arrangements.

Residential storage plays a key role: customers are entitled to install and operate storage systems combined with renewable installations for self-consumption without liability for any double charge, including grid fees for stored electricity.

Article 21 also provides with regards to the excess energy fed into the grid. Self-generated renewable electricity fed into the grid must be remunerated reflecting the market value taking into account the long-term value of the electricity fed into the grid, the environment and the society. Article 21 does not allow charges or fees on self-consumed and self-generated renewable electricity, except in specific cases expressly mentioned. Member States have to create an enabling framework after having assessed the existing unjustified barriers. That enabling framework shall address the accessibility of self-consumption to all final customers, including low-income households. Other possible unjustified regulatory barriers to renewable self-consumption - including for tenants - will be avoided, and incentives to building owners aimed at creating opportunities for self-consumption will be ensured.

Prosumerism cannot be conceived exclusively in an individualistic perspective. Collective prosumer assumes therefore a central role. The 'Clean Energy Package'

provides different legal definitions of collective renewable energy prosumers, a theme strictly related to prosumerism.
The Renewable Energy Directive (EU) 2018/2001 defines 'renewable energy community' at Article 2(16) as a legal entity which is based on open and voluntary participation, is autonomous and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by the legal entity itself. Renewable energy communities must also be natural persons, SMEs or municipalities; in other words, non-corporate actors, whose primary purposes are social, economic, or environmental outcomes, beyond financial profit.
According to Article 22(1)(b) and 22(1)(c) of the same Directive, renewable energy communities are entitled to self-arranged sharing of renewable energy within the community and to access all suitable energy markets directly or through aggregation in a non-discriminatory manner.
Article 22(4)(f) provides that participation in renewable energy communities is accessible to all consumers, including those in low-income households. Despite this call of inclusiveness, Directive (EU) 2018/2001 does not provide targeted measures to ensure that renewable energy communities can be accessible to low-income households.
Directive (EU) 2018/2001 at Article 2(15) defines 'jointly acting renewable self-consumers' as a group of at least two jointly acting renewables self-consumers who are located in the same building or multi-apartment block. This is a form of collective self-consumption, possible only to households who share a specific geographic location.
Electricity Directive (EU) 2019/944, at Article 2(11), defines 'citizen energy community'. This legal entity is similar to the renewable energy community, but it may also engage in operating grid infrastructure, aggregation, storage, energy efficiency services or other energy services (Article 2(11)(c)).
The main difference between the citizen energy community and the renewable energy community is that the activities of the first one are restricted to the electricity sector.
Furthermore Directive (EU) 2019/944 does not provide that the activities of the citizen energy community cannot constitute a primary commercial or professional activity. Also, there are no geographic limitations, so that this type of community can consist of a no 'basic network,' as is often the case with renewable energy cooperatives.[44]

5 Effectiveness and Limitations of Prosumering in the Fight against Energy Poverty

In the 'Clean Energy Package,' the fight against energy poverty and the inclusion of

[44] A. Wierling et al, 'Statistical Evidence on the Role of Energy Cooperatives for the Energy Transition in European Countries' 10 *Sustainability* 3339, 1, 20 (2018).

consumers at risk of poverty[45] and low-income households have a prominent place.[46]
In this context, the prosumer concept plays a central role, both from an economical and a technical perspective,[47] and could contribute to mitigating energy poverty.[48]
The hypothesis of overcoming energy poverty through prosumerism requires to preliminary consider the question if the future of prosumerism will be inclusive, or if it will be, for the most part, a prerogative of affluent social classes.[49]
Despite the particular emphasis reserved to prosumer in the 'Clean Energy Package', it is not certain yet which side of this spectrum would dominate in a long-term perspective. It will depend on some preconditions, such as technical and infrastructural factors related to the geo-environmental localization of low-income households.[50] Poor condition buildings in degraded urban areas hardly can offer the opportunity of prosumering initiatives, unless preliminary they are inserted in global requalification plans.
Not only will the evolution of prosumerism depend on the degree of complexity of prosumer-related bureaucracy,[51] but also its affordability. In this respect, it is essential to provide incentives and subsidy schemes.
Also, a key role is played by socio-cultural factors. Often energy poverty is considered only in the economic side. On the contrary, the issue has a wider impact, that goes further the mere level of income. Elderly and disabled people, as well as the ones deprived of 'energy literacy'[52] for cultural deficits or, sometimes, for gender issues, must be considered as potential victims of this specific form of discomfort. These

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[45] Cf I. Kyprianou et al, 'Energy poverty policies and measures in 5 EU countries: A comparative study' 146 *Energy & Buildings* 46, 54: '[w]hile EU directives mention EP and suggest guidelines for MSs to act upon, said guidelines are not specific to energy vulnerable consumers, but consumers at *risk of poverty* in general' (emphasis added).

[46] J. Lowitzsch, 'Investing in a Renewable Future–Renewable Energy Communities, Consumer (Co-)Ownership and Energy Sharing in the Clean Energy Package' 9 *Renewable Energy Law and Policy* 1, 3 (2019).

[47] L. Romero Rodríguez et al, 'Mitigating energy poverty: Potential contributions of combining PV and building thermal mass storage in low-income households Energy' 173 *Conversion and Management*, 65, 66 (2018).

[48] S. Milčiuvienė et al, 'The Role of Renewable Energy Prosumers in Implementing Energy Justice Theory' 11 *Sustainability* 5286, 1, 2 (2019): '[a]s energy consumers are also becoming producers, a new energy market player – the prosumer – is emerging. Moreover, currently distributed generation based on renewables could guaranty a sustainable energy supply, which is more effective in economic terms than the current centralized process using fossil fuels. The adoption of these solutions can contribute to mitigating energy poverty'.

[49] R. Paltrinieri and P. Degli Esposti, 'Processes of Inclusion and Exclusion in the Sphere of Prosumerism' 5 *Future Internet*, 21, 26 (2013): '[t]he process of differentiation is at the root of processes of inclusion and exclusion that govern relationships between individuals in society, and within relationships between social classes'.

[50] S. Bouzarovski, 'Energy poverty in the European Union: landscapes of vulnerability' 2 *WIREs Energy and Environment*, 276, 282 (2014): 'building and housing sites are the cause of heavy burdens'.

[51] The effective promotion of prosumerism requires reducing bureaucracy. Cf R.J. Antonio, 'Is Prosumer Capitalism on the Rise?' 56 *The Sociological Quarterly*, 472 (2015).

[52] For a proper definition of 'energy literacy', cf D. Brounen et al, 'Energy literacy, awareness, and conservation behavior of residential households' 38 *Energy Economics*, 42, 44 (2013): 'making the optimal choice when considering an investment in more energy-efficient equipment'.

categories will difficulty participate in prosumer initiatives unless they are the target of specific programmes that will provide them 'facilitators' that can assist and support them.

Inclusiveness needs to be a guiding principle in prosumering initiatives. The risk of unwittingly ignoring the situations pointed out above and opting for some exclusionary and privileging choices is very high. That would happen, for example, implicitly favouring prosumerism initiatives for targets (individuals or collectives) that have the prevalence of a certain age[53] or gender,[54] or that are characterized by sufficient financial means, as well as targets provided of expertise and time to be more closely involved in decision-making.

It needs to point out that the effectiveness of prosumerism on the issue of energy poverty could be incremented also through targeted external actions on the energy market, that would not necessarily require direct involvement in self-production from low-income households.

It must be considered that the prosumer tends to place his energy production on a local plane, with microgrids, designed to sell the energy surplus to the consumers through blockchains. Indeed, as the final energy price is composed of electricity generation, transportation, and tax costs, the recourse to the local market highly reduces cost related to transportation. Among the local consumers connected in a microgrid, some can have low-income or can be at risk of poverty. The surplus of energy production could be automatically allocated to them who, in normal conditions, would find more obstacles in accessing the energy market.[55] This kind of action could be supported by a genuine policy of incentives (eg: reduction of tax cost) for the prosumer provided by the Member States that are required to transpose the legal acts of the 'Clean Energy Package' into national law.

It would be however simplistic to say that prosumerism is a sort of 'panacea' for energy poverty.[56] It must be considered indeed that the availability of renewable energy sources has an uneven distribution, as it happens for fossil energy sources, too. The energy transition, from a global perspective, will deeply change the scenario, but will not entirely solve the problem of energy poverty: inequality will persist between some areas that have an abundance of renewable energy sources and others that have a shortage of them. The same prosumerism will not have a significant incidence on areas deprived of relevant access to renewable energy. The constant technological

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[53] Younger generations are more familiar with an imprescindible aspect of energy prosumerism: smart technologies. Cf 32: M. Baron, 'Do we need smart cities for resilience' 10 *Journal of Economics & Management* 32 (2012): 'Smart City is quite appealing to expectations and lifestyles of modern urban citizens, especially the young and 25-40 aged generation, who are well accustomed to utilizing ICT in everyday life and work'.

[54] K. Standal et al, 'Engaging men and women in energy production in Norway and the United Kingdom: The significance of social practices and gender relations' 60 *Energy Research & Social Science* 101338, 1, 8 (2020): 'the existing social differentiation along gender lines, where 'modern' technology continues to be perceived as a masculine domain, constitutes a barrier to most women becoming fully engaged prosumers'.

[55] B.C. Neagu et al, 'New Market Model with Social and Commercial Tiers for Improved Prosumer Trading in Microgrids' 12 *Sustainability* 7265, 1, 12 (2020).

[56] S. Milčiuvienė et al, n 48 above, 13.

development in the field of generation facilities could anyway progressively reduce the margin of inequality related to access to renewables.[57]

The energy prosumerism will help more effectively to address energy poverty if several conditions will be met.

Transposing the provisions of the package into national law, not only will the Member States have to ensure subsidies for renewable facilities for low-income consumers, but also to provide adequate support to customers deprived of 'energy literacy', and to categories that (for gender, age, etc) can find obstacles in carrying out prosumering initiatives.

Furthermore, seeking to ensure equality among places with different energy sources, they will have to promote the development of renewable facilities using different energy sources. This way the risk of persistence of energy inequality during and after the energy transition will be minimized.

Finally, it is appropriate that the Member States will lay down national provisions with specific measures related to the electricity market, aimed at allowing energy prosumers to effectively participate.[58]

Once these conditions are met, prosumer will certainly be effective in helping to limit the impact of energy poverty during the energy transition, and could subsequently become one of the imprescindible tools aimed at overcoming this specific kind of poverty.

[57] ibid 13.
[58] ibid 14.

Brief Considerations on the Criminal Aspects Connected to the Figure of the Prosumer, with Particular Regard to the Phenomenon of Energy Poverty and the Theft of Electricity

Antonella Merli

Abstract There is no shared definition of prosumer (in Italian, 'prosumatore') but the importance of a common operational definition has been underlined by the European Parliament. In general, prosumers are citizens who, individually or collectively, without being entrepreneurs, self-produce, self-consume and market goods and services, not without remarking, however, that such activities have not yet been unequivocally identified as rights. In connection with the figure of the prosumer, a plurality of criminal provisions are highlighted, such as those related to the spread of the Internet and, in particular, to the issue of controls on the Internet and the related liability of the provider-prosumer. But the viewpoint of investigation of particular importance in the criminal field, on which - above all - this contribution focuses, concerns the tools to combat the widespread phenomenon of theft of energy, of electricity in particular, which is part of the phenomenon of energy poverty.

The figure of the prosumer (in Italian 'prosumatore') concerns citizens who, individually or collectively, can produce and consume goods (or offer energy services) without being entrepreneurs, as entrepreneurs of themselves.[1] The word derives, in fact, from the fusion of the English words 'producer' and 'consumer'. The European Parliament stressed that it is 'important that the European Union adopt a common operational definition of prosumer':[2] a definition - as claimed by an Italian MEP - 'within which to identify unequivocal rights such as that of self-production, self-consumption and storage of energy produced from renewable sources'.[3]

In connection with the different articulations of the research topic, a plurality of criminal provisions is highlighted, from the classic cases for the protection of assets (fraud), to pivotal offences in the criminal law applied to financial markets (market abuse). The spread of the Internet, and with it the now constantly evoked digital revolution, opens up also in this sector scenarios of reflection until a few years ago unimaginable. The use by prosumers of the platform for the completion of exchanges of goods and services raises the debated issue of the provider's liability ('always oscillating between understandable preventive needs and impending risks of position responsibility')[4] due to the omission of controls on the Network. Even against the prosumers, if the information circulating on the network with the online offer of

[1] M.A. Giffoni, 'Prosumer, il primo passo verso una definizione giuridica (Prosumer, the first step towards a legal definition)' available at Nextville.it (last visited 5 December 2020).

[2] European Parliament resolution of 26 May 2016 on a 'new deal' for energy consumers (2015/2023 (INI).

[3] Dario Tamburrano, coordinator and member of the ITRE parliamentary committee.

[4] So, A. Gullo, 'Nuove tecnologie e Sistema penale (New technological frontiers and the penal system)' 2 *DPC-RT*, VIII (2019).

services relating to the production and consumption of energy is not true, a criminal or extra-criminal liability, similar to that of the provider, can be configured. For the prosumer, all other forms of liability related to the use of the network inevitably remain, for example, that for the online transmission of unfair competition practices, or data that is detrimental to the consumer's reputation.

A separate issue is the creation, and/or integration, of sanctioning regulations (understood in a broad sense, i.e. inclusive of criminal and extra-criminal sanctions, by the principle of strict necessity, which is one of the pillars of the criminal system) for environmental pollution or connected to the offer by the prosumer of services relating to the production and consumption of energy that increase (or do not prevent, in the presence of a legal obligation) energy poverty in individual-specific sectors, with consequent damage to health (and for other goods) of people.

Given that the figure of the prosumer is at the centre of the energy revolution taking place in the market, the prospect of investigation of particular importance, in the criminal field, is that relating to the instruments to fight the widespread phenomenon of theft of energy, of electricity in particular. A phenomenon, as we will immediately see, which is placed in the context of energy poverty, and the connected theme of the use of renewable energies (functional, among other things, to protect the environment), which requires a multiform collaboration that involves energy conversion policies of local governments, in addition to the inevitable technological interventions; the dissemination of the phenomenon awareness, which becomes increasingly crucial in a perspective aimed at empowering the population; the so-called energy citizenship, a network of citizens who produce, consume and exchange clean energy, as an alternative to nationalized sources of energy production, which, as has been observed, 'are mostly in the hands of a few large companies that own huge plants and expensive'[5] and that have energy keys: 'a structure consisting of an economic and social pyramid that towers over the citizens'.[6] A network of citizens organized as prosumers can contribute to overturning this pyramid, moreover by producing, consuming and exchanging clean energy.[7] All this with globalization and harmonization of the basic rules of national democratic systems.

A family is said to be in energy poverty if it has difficulty in acquiring a minimum basket of energy goods and services, or if it has access to energy services that involve a diversion of income above a 'normal value'. Energy poverty depends on the economic crisis, job loss, excessive energy bills, low incomes or poor energy efficiency, and involves, among other things, indeed above all, living in homes without the comfort of heating or air conditioning systems.[8]

[5] M.A. Giffoni, n 1 above.
[6] M.A. Giffoni, n 1 above.
[7] M.A. Giffoni, n 1 above.
[8] M. Cornelis, 'COVID-19 e povertà energetica: è il momento di un diritto all'energia (Covid-19 and energy poverty: it is time for a right to energy)' available at https://www.rivistaenergia.it/2020

As for the 'energy poor' in our country, it is good to remember that the number of families who, according to the latest Istat data, are unable to pay their electricity bills (which are among the most expensive in Europe, about + 30%) is 4, 7 million.[9]

Energy poverty causes poor people the need to procure energy illegally. Therefore, it has strong repercussions on crimes against property; in particular, it is one of the causes of the increase in crimes of theft.

The theft of electricity falls within the provision of Art. 624, paragraph 2, of the Criminal Code, which establishes that electricity and any other energy of economic value are portable (also). It is a crime with a continuing offence (a permanent crime). The event, consisting of the subtraction of energy, once it occurs, continues to occur over time until the subtraction ceases. Despite its persistence, however, the stealth action, which produces the event, is unique, and therefore a single crime is configured.

The offence can be committed through various methods of conduct: 1) through the abusive direct connection to the cables of the distribution network, which leads to the subtraction of energy from the supplier; 2) by connecting to another user's power cable; 3) by tampering with its meter.

In the first case (and also in the second), the dominant jurisprudence considers that the abusive connection of a cable to an Enel junction box integrates the crime of theft aggravated by the use of fraudulent means. And this is because the tampering of the system involves a necessary use of violence against things.

In the latter case, old jurisprudence believed that the crime of fraud should be configured because in tampering with the meter, the artifices and deceptions provided for by the case of the fraud would materialize, more than the aggravating circumstance of the use of the fraudulent means.

Today, the jurisprudence has changed its opinion: it recognizes in this hypothesis the crime of aggravated theft. This is because it considers tampering with the meter, not artifice, but a form of 'violence against things' - the aggravating factor of theft. The 'tampering' is therefore conceived as physical energy on a thing, so that, even if not damaged, the same is transformed, or made unsuitable for its destination. Tampering with the meter therefore falls within the commonly accepted notion of 'violence against things' according to article 624, paragraph 2, Penal Code.

It is interesting to note that, according to the constant jurisprudence of the Court of Cassation on the subject of theft of electricity, a situation of economic difficulty

/05/ covid-19-e-poverta-energetica-e-il-momento-di-un-diritto-allenergia/ (last visited 29 November 2020).

[9] See The report on energy poverty presented by *Oipe* (Italian Observatory on Energy Poverty) in Milan on 4 June 2019 at the headquarters of the 'Autorità di Regolazione per Energia Reti e Ambiente' (ARERA).

cannot be invoked to recognize the cause of justification due to a state of necessity according to article 54 Penal Code. The reason given by the jurisprudence is that the primary needs of a person who is in a state of poverty are provided by the social assistance bodies. It follows, therefore, that those who, to protect themselves from the cold, are forced to steal electricity because they are destitute, cannot invoke the state of necessity.

In conclusion: the subjects who commit the theft of electricity, as they are at the same time in conditions of energy poverty and economic difficulty, cannot be exempt from punishment thanks to the exemption in question. The presence of adequate institutional structures aimed at supporting people in a state of economic hardship excludes the situation governed by article 54 of the Italian Penal Code, which requires that the criminal action is committed to avoiding an imminent danger not 'otherwise avoidable'.

The exclusion of the state of necessity is just as easy, and convincing, when the subject withdraws electricity to enjoy greater 'comfort and opportunities' with the use of the numerous household appliances commonly used in one's home, which are not necessary to avoid the risk of a 'current danger of serious harm to the person', required by article 54 Penal Code.

Therefore, the Court of Cassation[10] has a good game in not recognizing the exemption to those who steal electricity outside of a situation of 'irrepressible necessity', that is to say, all the times when living without electricity does not jeopardize physical safety.

Moreover, it is clear that qualifying the aforementioned conducts, for criminal purposes, as 'acts of necessity', that is, in essence, allowing that, in the presence of the aforementioned situations, it is possible to steal electricity with impunity, to using it to enjoy greater 'comforts and opportunities' would open the doors to widespread illegality, complicating, even more, the management of an energy system that is already very complex in itself. It should not be overlooked, among other things, that the thefts of energy end up in the so-called 'network losses' paid in bills by all users; hence the need for penal sanctions.

These reflections on the criminal law point out that the problem of the lack of electricity goes well beyond the legal aspects: it also affects, and above all, cultural, social and political profiles. It is illusory that it is resolved by law.

If punishing the theft of electricity, in the absence of imminent danger of serious harm to the person, is the unavoidable result of a correct application of criminal law

[10] So, for example, Cassazione penale, sez. IV, 18 January 2019, n. 18329, *Guida al diritto*, 29, 92; Cassazione penale, sez. IV, 11 December 2018, n. 121, available at www.DeJure.it (last visited 7 December 2020); Cassazione penale 31 September 2017 n. 39884 available at https://www.altalex.com/documents/news/2017/09/20/furto-di-elettricita-lo-stato-di-indigenza-non-integra-di-per-se-lo-stato-di-necessita (last visited 7 December 2020).

(since the lack of comfort and opportunities does not put at risk the survival), however, outside the criminal law sphere, it is clear that defining electricity as a 'non-essential' good is very perplexing.

Indeed, energy poverty has enormous negative consequences on other personal goods and other aspects of individual life. Just think of the dramatic condition of multitudes of families living in homes without electricity. It affects almost 50 million people at European level and is exponentially increasing on a global level. In developing countries, there are about one billion people who do not have access to the electricity grid and those who use dirty and polluting fuels for a cooking amount to about 2.7 billion.

The problems related to access to energy to meet the primary needs of life and the material needs of families have emerged overwhelmingly with the current phenomenon of the lockdown determined by Covid 19, which has resulted in an increase in the energy needs of consumers residential buildings, a serious economic crisis and a contraction in the labour market, with a sharp reduction in incomes, and, despite the various emergency policies implemented by governments in Italy and Europe to meet immediate needs, the conditions of vulnerability and pre-existing inequalities.

Energy poverty is a situation that causes very serious inconveniences, connected precisely to the deprivation of those comforts and opportunities considered (and perceived as) essential to make a decent housing and a comfortable life for its occupants. Therefore, energy poverty can affect and have serious consequences over time, therefore not immediately according to Art. 54 of the Criminal Code, on the same physical and mental health of the weakest people. This is due to 'unpleasant temperatures' (which can lead to respiratory and heart disease) and, as regards mental illness, due to the stress associated with the inability to pay bills.[11]

Excluding, on the one hand, a rethinking on the possibility of applying to subjects who are in energy poverty the cause of justification of the state of necessity for the reasons already illustrated, but, on the other hand, considering that the threat of criminal sanction is a fragile instrument to combat the theft of electricity because it is 'needed' (although not in a criminal sense), it is necessary to recognize and ensure the right to the energy of current and future populations ('also to guarantee social cohesion and democracy')[12] through social-economic and environmental support interventions (energy poverty also has environmental and technical roots and in some countries, for example, Nigeria, it is linked not only to the high rate of poverty but also to the spread of corruption phenomena that induce distributors to stop

[11] B. Atanasiu et al, *Alleviating Fuel Poverty in the EU. Investing in Home Renovation, a Sustainable and Inclusive Solution* (Bruxelles, Buildings Performance Institute Europe, 2014), *passim*.
[12] M. Cornelis, n 8 above.

investing in the development of the network).[13] The European Commission, for its part, in the legislative package 'Clean Energy for all Europeans' has started the transition to a new energy system with a new strategy called the resilient Energy Union to provide European consumers with safe, sustainable, competitive and affordable energy.[14]

[13] In Europe, too, people living in energy poverty are generally vulnerable consumers who have low incomes, face high energy costs and live in energy-inefficient homes and, as rapporteur Kata Tüttő (HU/PSE) said, councilor of the XII district of Budapest, today there are over 50 million Europeans forced to choose whether to eat or warm up, and who live in a situation of energy poverty.

[14] See on this point N. Della Valle, 'People's decisions matter: understanding and addressing energy poverty with behavioral economics' 204 *Energy and Buildings*, 204 (2019); H. Thomson and S. Bouzarovski, *Addressing Energy Poverty in the European Union: State of Play and Action* (Manchester: EU Energy Poverty Observatory 2018), *passim*.

Pathologies Related to Fuel Poverty

Giovanna Ricci, Giulio Mannocchi and Ascanio Sirignano

Abstract Fuel Poverty is a phenomenon that interests both warm and cold climatic areas and has a greater influence on the health of households with elderly, children and people with chronic diseases and long-standing illness (LSI). Climate change has worsened health problems for those families living in energy poverty. In particular, in elderly and pediatric population, the main disorders related to insufficient heating and in lack of air conditioning are cardiovascular diseases and respiratory tract infections, respectively. Fatalities related to both hot and cold indoor environments are also linked to cardiovascular and respiratory disorders. Moreover, depressive symptoms may also occur regardless of age, gender, height and smoking habit. In the world's poorest countries, the use of biomass or solid fossil fuels for cooking, heating and lighting is widely practiced leading to severe lung diseases. In conclusion, cardiovascular diseases and respiratory problems are the main pathologies related to fuel poverty.

To ensure everyone's health there is the need to have in the homes where we live a sufficient level of heating, cooling and lighting.

In the EU, more than 50 million households have energy poverty problems and live in energy inefficient buildings, with high energy costs and low household incomes.[1]

According to the World Health Organization (WHO): 'A household is said to be in fuel poverty if it needs to spend more than 10% of its income on fuel to maintain an adequate level of warmth (usually defined as 21 degrees for the main living area, and 18 degrees for other occupied rooms'.[2]

Low income, energy price and energy inefficiency are common factors for evaluation of potential health impact for fuel poor households. It's a phenomenon that interests both warm and cold climatic areas.[3]

Fuel poverty has a greater influence on the health of those people who stay at home for a long time such as elderly, children and people with chronic diseases and long-standing illness (LSI).[4]

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[1] Available at https://ec.europa.eu/energy/topics/markets-and-consumers/energy-consumer-rights/energy-poverty_en?redir=1 (last visited 7 December 2020).

[2] World Health Organization, *Housing, Energy and Thermal Comfort: A Review of 10 Countries within the WHO European Region* (Copenhagen: WHO Regional Office for Europe, 2007).

[3] V. Condemi et al, 'Health Impact of Fuel Poverty' 98 *Bulletin of rehabilitation medicine*, 135, 135-143 (2020).

[4] K. O'Sullivan et al, 'Child and youth fuel poverty: assessing the known and unknown' 10 *People, Place and Policy*, 77, 77-87 (2016). A. Pollard et al., 'Use of Simple Telemetry to Reduce the Health Impacts of Fuel Poverty and Living in Cold Homes' 16 *International Journal of Environmental Research and Public Health,* 2853 (2019).

The elders and rural people are the most exposed to fuel poverty because they are reluctant to show their health trouble and suffering.[5]

Recent epidemiological studies have shown the seasonal variability in morbidity and mortality with winter and summer peaks also due to climate change.[6]

An epidemiological study conducted in 15 European cities, showed that the decrease of 1-degree centigrade between October and March led to an increase total natural deaths of 1,35% and increase in cardiovascular deaths of 1.72%, in respiratory deaths of 3.30% and cerebrovascular fatalities of 1.25%, however, these percentages are higher for the elderly population.[7]

The conclusions of a study conducted on 12 European cities, found an important impact on hospital admissions to respiratory diseases in conditions of high ambient temperatures, particularly in the elderly population. The same study also showed an increase in cardiovascular mortality, however, corresponding to a non-increase in cardiovascular morbidity.[8]

In a more recent study published in *The Lancet* in 2015, 74 million deaths have been observed between 1985 and 2012 in 384 locations in different countries (Australia, Brazil, Canada, China, Italy, Japan, South Korea, Spain, Sweden, Taiwan, Thailand, UK, and USA). This study showed that 7.71% of deaths were related to a non-optimal temperature of the environment, establishing the optimal temperature such as that with minimum effects for various health outcomes.[9]

These climatic effects are probably reflected with a greater impact on families living in energy poverty environments. Fatalities related to both hot and cold indoor environments are also linked to cardiovascular and respiratory disorders.[10]

It has been estimated that 30% of *excess winter deaths* (EWD) is due to inadequate housing conditions with temperatures below 18 ° C.[11]

The result of a study reports that about 50-70% of EWD is related to cardiovascular conditions and about 15-33% to respiratory diseases.[12]

The main cardiovascular consequences observed in both conditions of insufficient heating and lack of air conditioning in the elderly population are increased blood

[5] V. Condemi et al, n 3 above.

[6] A. Analitis et al, 'Effects of cold weather on mortality: results from 15 European cities within the PHEWE project' 168 *American Journal of Epidemiology,* 1397, 1397-1408 (2008).

[7] ibid.

[8] P. Michelozzi et al, 'High temperature and hospitalizations for cardiovascular and respiratory causes in 12 European cities' 179 *American Journal of Respiratory and Critical Care Medicine*, 383, 383-389 (2009).

[9] A. Gasparrini et al, 'Mortality risk attributable to high and low ambient temperature: a multicountry observational study' 386 *The Lancet,* 369, 369-375 (2015).

[10] V. Condemi et al, n 3 above.

[11] ibid.

[12] K.J. Collins, 'Low indoor temperatures and morbidity in the elderly' 15 *Age and Ageing*, 212, 212-220 (1986).

pressure, ischemic heart disease and exacerbations of stroke ulcer. Heart failure, in particular, can be caused by electrolyte imbalances associated with excessive sweating Hydro-salt imbalances in older people lead to a decrease in renal function, reduced renal clearance, calculi urinary, falls, fractures (hypotension) and chronic intestinal diseases with diarrhoea.[13] Other disorders related to inadequate heating in the elderly were arthro-rheumatic effects such as exacerbation of arthritis and rheumatisms with strength and dexterity reduction.[14]

A retrospective observational study conducted between 2007-2010 in Cuneo (Italy), have shown a link between rising summer temperatures and the likelihood of developing urinary calculi. Living the summer period in an environment without air conditioning and with other structural problems has been seen to increase the risk of this pathology.[15]

The main respiratory effect observed in the elderly and pediatric population in hot and cold environments was upper and lower respiratory tract infection. Worsening of chronic obstructive pulmonary disease (COPD) can be a consequence in older people living in energy poverty conditions. A large percentage of childhood asthma cases is attributable to exposure to indoor moisture and mould inside inadequately heated homes.

There are also scientific works that highlight the effects on morbidity and mortality related to heat waves with high humidity levels, frequently due to climate changes.[16]

Health problems due to hot weather are immediate and exponential, while those due to very cold temperatures have a prolonged effect with a linear dose-response ratio.[17]

However, it is necessary to carefully evaluate the observed contexts because atmospheric pollution, active smoking, smoking in pregnancy are confounding factors and risk causing incorrect interpretations of the results of research conducted indoors on subjects in energy poverty with respiratory disorders.[18]

In energy poverty conditions, independent to age, gender, height and smoking habit, is more likely to have depressive symptoms and disorders such as stress, anxiety, irritability.[19]

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[13] V. Condemi et al, n 3 above.
[14] ibid.
[15] V. Condemi et al. 'Association with meteo-climatological factors and daily emergency visits for renal colic and urinary calculi in Cuneo, Italy, A retrospective observational study 2007-2010', 59 *International Journal of Biometeorology*, 249, 249-263 (2014).
[16] V. Condemi et al, n 3 above.
[17] ibid.
[18] ibid.
[19] R. de Vries and D. Blane, 'Fuel poverty and the health of older people: the role of local climate' 35 Journal of Public Health, 361, 361-366 (2013). World Health Organization, *Burden of disease from environmental noise* (Copenhagen: WHO Regional Office for Europe, 2011).

In addition to climate risks, Carbon Monoxide (CO) exposure is the first cause of acute poisoning produced by the gas or solid fossil fuels combustion especially for households living in energy poverty with obsolete or inadequate heating systems.[20]

Another aspect of energy poverty is the use of biomass or solid fossil fuels for cooking, heating and lighting, it is a widespread practice in the world's poorest countries. The use of solid fossil fuels or biomass produces indoor air pollution (IAP). IAP indiscriminately affects the health of women, children, the elderly and people with the cardiopulmonary illness. Acute respiratory infections, chronic obstructive pulmonary disease, pneumoconiosis, cataracts and blindness, pulmonary tuberculosis, adverse effects on pregnancy, cancer and cardiovascular and cerebrovascular diseases are some health effects to indoor IAP exposure.[21]

Recently, a study carried out in Malawi (sub-Saharan Africa) on 16079 subjects with 30 median age and equal distribution of male and female showed that the main fuels used at home were Charcoal (81.5% of households), wood (36.5%), respectively. Only 3,9% of households could afford electricity.[22]

Kerosene is another combustible used for cooking in many poor areas of the world. A study conducted in the city of Pune (India) on 192 families (96 matched couples), showed a link between the use of kerosene indoor and the risk of developing tuberculosis.[23]

In rural and poor areas of Nepal, dung-briquettes are used for cooking. Using biomass as fuel and specifically, dung-briquettes can cause serious damage to health. In 2009, research associated the use of manure briquettes with the onset of related diseases. The use of manure tile increases the risk of developing asthma by 1.5% while the probability of developing eye diseases is 4.7%.[24]

[20] World Health Organization, n 19 above.

[21] A. O. Mocumbi et al, 'Cardiovascular Effects of Indoor Air Pollution from Solid Fuel: Relevance to Sub-Saharan Africa' 6 *Current Environmental Health Reports*, 116, 116-126 (2019).

[22] ibid. See also: K.C. Piddock et al, 'A cross-sectional study of household biomass fuel use among a periurban population in Malawi' 11 *Annals of the American Thoracic Society*, 915, 915-924 (2014).

[23] J.L. Elf et al, 'The association of household fine particulate matter and kerosene with tuberculosis in women and children in Pune, India', 76 *Occupational and Environmental Medicine,* 40, 40-47 (2019).

[24] K.P. Pant 'Cheaper Fuel and Higher Health Costs Among the Poor in Rural Nepal' 41 *Ambio*, 271, 271-283 (2012).

Gig Economy's Workers and Energy Poverty

Federico Pascucci

Abstract The essay focuses on the phenomenon of the 'working poor' and in particular on the working poor in the gig economy, trying to show how workers of digital platforms, that receive a pay so low to force them in the energy poverty, are unable to transform themselves from energy consumers into energy 'prosumers'.

1 Poverty Despite Work

In the fight against poverty, one of the winning pairs - if not the winning one by default - adopted by the modern welfare State has surely been that of access to and protection of employment. The opportunity to enter the labour market and the (relative) security of being able to perform a job properly remunerated and protected against possible abuse have proven to be effective tools for reducing the poverty line.

Sadly today this 'virtuous circle between employment and well-being has broken'.[1] If unemployment was previously the normal situation associated with poverty and social exclusion (for the simple reason that the person who does not work, unless he has alternative sources of income, does not earn money and cannot afford to sustain neither himself nor his family), now the phenomenon of 'poverty despite work' is emerging, that is the social currency given by forms of work that are underpaid or too infrequent to achieve adequate levels of income.[2]

This problem finds its cause in several factors: the asymmetrical technical progress, which has favoured the demand for skilled workers over unskilled ones; the relocation of production, which has allowed the shift of the production phases to greater intensity of job in developing countries, where workers have low wages and low - if not absent - labour protection; continuous reforms of labour law that, in the almost obsessive search for flexibility, have drastically lowered instruments for the protection of workers and brought a progressive deterioration of the working position. Last, but not least, another important factor is given - at last in the most developed countries - by the so-called 'tertiarization' of the economy, i.e. the shift in the economic structure towards services to the enterprises.[3]

Regarding this topic, one of the most used forms of 'tertiarization' - and probably one of the most dangerous from the poor work's point of view - is the gig economy one, namely the work given by and performed in the digital platforms. This type of work usually provides performance for very short times, if not instant, and follows an

[1] M. Borzaga et al, 'La povertà nonostante il lavoro. Introduzione' *Lavoro e diritto*, 3, 3 (2019).
[2] V. Ferraris, 'La povertà nonostante il lavoro. Una lettura economica del lavoro povero' *Lavoro e diritto*, 51, 51-52 (2019).
[3] ibid 55-56.

atypical contractual scheme prepared and regulated by the platform, which presents itself as a mere intermediary between the gig worker and the client who applies to him for the benefit.[4] So we have a worker that is alone facing the bargaining power of the platform, that carries out small or very small jobs to supplement a modest or absent income and is often paid well below the poverty line.

It is so clear that the issue of the so-called 'working poor' (namely a person that work but has low or very low pay), whether it is given by regulated but precarious employment contracts, undeclared or illegal work, or the instant job on demand given by the digital platforms, is one of the key factors of the general poverty, and the energy poverty in particular. If a worker does not earn pay that not only is proportionate to the quantity and quality of the work he performs but always sufficient to guarantee for himself and his family an existence both free and dignified - to recall the article no 36 of Italian Constitution -, he will surely face the classic dilemma of the short blanket. He will be, in other words, forced to choose if to spend the little income it receives for subsistence (food and clothes) or for paying the energy bills.

2 Energy Poverty

'When most people hear the term energy poverty, they think of faraway places: women forced to walk hours to gather firewood bundles that they lug home to cook with, villages with spotty or no access to electricity, or cookstoves filling small huts with dangerous emissions'.[5] All true. The energy poverty problem is indeed endemic – and not by chance - of the world's poorest areas, and finishes to strike in a dramatic way just the weakest subjects, namely women and children. Globally, from one to three billions of people have insufficient or no access at all to an amount of energy that is at least satisfactory to their primary needs.[6] This number is concentrated, not surprisingly, in sub-Saharian Africa and rural areas of Asia, that is to say, areas strongly economically depressed, deeply backward at the infrastructure level and extremely destabilised at the political one.

The access to energy and the political, economic and social development of a country are paired. Energy is a fundamental human need and a basic driving force for increasing progress. The lack of access to energy determines for any subject - be it the individual citizen or the entire society to which he belongs - both the cause and perpetuation of poverty.[7]

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[4] M. Miscione, 'I lavori poveri dopo l'economia "a domanda" per mezzo della rete' *Corriere giuridico*, 815 (2018).

[5] S. Welton, 'Grid Modernization and Energy Poverty' 18 *North Carolina Journal of law & Technology*, 565, 585 (2017).

[6] L. Guruswamy, 'Global Energy Poverty: The Relevance of Faith and Reason' 7 *Belmont law review*, 199, 203 (2020). For the author the four major areas in which energy poverty impacts are: 1) cooking, 2) lighting, 3) drinking water and sanitation, 4) motive or mechanical power.

[7] ibid 201.

But if the lack of access to energy can decree the poverty of an entire nation, energy poverty is not exclusive to the world's poorest areas. Since 'energy poverty' means 'the inability of households to afford energy services for adequate heating and cooling resulting in uncomfortable indoor temperatures, material deprivation, and accumulated utility debt',[8] then there may also be cases of energy poverty in the so-called rich countries. In the USA almost 38.5 million households have been forced to demand assistance from the federal Low Income Home Energy Assistance Program to cover energy expenditure,[9] while in the EU it is estimated that 23,3 million households find themselves in an energy poverty situation.[10]

Moreover, 'energy poverty' is a concept with outlines not yet perfectly defined. Neither the USA[11] nor European Union[12] have yet established a single definition of energy poverty, as such as standard parameters to evaluate it.

The causes of energy poverty can be, in fact, several, just as the ones of the working poor: it goes from the ineffectiveness of the distribution network to the increasing of the energy bills, passing by the poor house's performance in terms of thermal insulation.[13] But on a factor almost all the studies agree: the shortage of household income, that does not allow energy expenditure to be met.[14] Energy poverty usually affects the weakest sections of the population, namely the ones who can rely only on a low income (elders, unemployed young people, precarious workers, single-income households).

This situation ends up creating a circle not virtuous but vicious. The impossibility of accessing energy not only affects the psychophysical well-being of those which are involved but even their possibilities for social and economic improvement. And all this without counting the multiplier effect of the problems about public expenditure on public health and the increase in pollutant emissions given by the use of fossil fuels or highly inefficient systems such as biomass.[15]

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[8] S. Welton, n 5 above, 587. Not very different definition is provided by C. Amenta and L. Lavecchia, 'La povertà energetica delle famiglie italiane' *Energia*, (2017).

[9] S. Welton, n 5 above, 589.

[10] A. Amato et al, 'Elettroni poveri' *Qualenergia*, 32, 32 (2018).

[11] S. Welton, n 5 above, 589.

[12] A. Amato et al, n 10 above, 32.

[13] European Energy Network, 'Energy poverty in the European Union' (5) available at https://www.efficienzaenergetica.enea.it/vi-segnaliamo/enr-position-paper-on-energy-poverty-in-the-european-union-january-2019.html (last visited 22 november 2020).

[14] A. Amato et al, n 10 above, 32; S. Rugiero et al, 'Gli anziani e la povertà energetica' (8) available at https://www.fondazionedivittorio.it/sites/default/files/content-attachment/rapporto_PE_26_11_2018.pdf (last visited 22 november 2020); S. Welton, n 5 above, 600; R. Centurelli, 'Energy Poverty: Can We Make Modern Energy Access Universal – Focus on Financing Appropriate Sustainable Energy Technologies' 22 *Colorado Journal of International Environmental Law and Policy*, 219, 223 (2011).

[15] L. Guruswamy, n 6 above, 204-205.

3 Working for a Digital Platform

As stated before, one of the forms of 'working poor' can be found in the activities channelled or executed via digital platforms, which are one of the most important expressions of the 'gig economy'. With these last terms, sometimes replaced by 'sharing economy' or 'on demand economy', we refer to the activity of persons that use digital applications to earn money from assets that they own or their abilities to perform a certain type of work.[16] Nonetheless, another definition of the gig economy is given by that diverse world of 'chores', namely small precarious jobs, 'where the misery is [...] as much the propulsive thrust to the engagement, as the unavoidable landing place'[17] of the ones who work there.

The gig economy does not show itself as a unitary phenomenon, because it could be divided - even with all the precautions of the case - in two major streams: the 'work on-demand via app', where the worker uses assets in its possession and which is characterized by real-world performance (such as Uber's drivers or Foodora's riders), and the 'crowdwork', when the worker completes his tasks solely through online platforms (such as Amazon Mechanical Turk or Crowdflower).

Even with the undeniable differences, it is still possible to identify some common points between these two forms of work.

The first one is that in the contracts between the platform and the worker, it is always specified that the latter is a self-employed person or independent contractor, without any link of subordination with the first one. This is also expressed with a series of lexical passages designed to cover the working nature of the activities carried out, which are called with equivocal terms such as 'gigs', 'tasks', if not simply 'favors'. Even the expression 'worker' is carefully avoided and replaced with words sometimes subtly disparaging, such as 'turkers', 'taskers' or, worse, 'rabbits'.[18] However, the working autonomy is only assumed, due that the platform's worker has in practice no possibility to negotiate directly with the client who requests his service, be it a person who demands the delivery of food or a translator or a software designer. The worker is always forced to accept the conditions unilaterally imposed by the platform.[19]

The second point refers to the possibility for the platform to shift economic risk to the workers. Putting these ones in competition with each other through the net, the platform takes down the risk of leaving the client's request for performance unsatisfied. In other words, it is the large number of workers ready to do the task that

[16] A. Mandagere, 'Examining Worker Status in the Gig Economy' 4 *Journal of International and Com parative Law*, 389, 389 (2017).

[17] F. Bano, 'La povertà nonostante il lavoro. Il lavoro povero nell'economia digitale' *Lavoro e diritto*, 129, 129 (2019).

[18] Ibid 134; V. De Stefano, 'Crowdsourcing, the Gig-Economy, and the Law' 37 *Comparative labor Law & Policy Journal*, 461, 462 (2016).

[19] A. Mandagere, n 16 above, 391.

provides employability and therefore profit for the platform. In turn competition between workers produces the typical race to bottom in terms of working conditions and remuneration, especially when being put in the competition are developed nations' workers against poor or developing countries' ones.[20] This race to bottom for its part results in a reduction in the level of remuneration sometimes well below subsistence level.

The third common feature is given by the worker's evaluation and dismissal mechanism used by the platform and based on the concept of the client's 'satisfaction' or 'liking'. Often it is the very right of the workers to be paid for his 'hint' (human intelligence task) that is linked to the client's liking. So the customer can give a negative liking without any reason, reject the task already completed but retain it and decline the payment, without the worker being able to contest this rejection. It's clear how this scheme lends itself easily to opportunistic behaviours, that in some cases amount 'to outright wage theft'.[21] Also, the rejection turns itself into a bad review for the worker, who will see its overall position in the platform's ranking lowered, with the impossibility for him to reach the best-paid tasks, or worse will face the real risk to be banned out.

So, net of the 'rhetoric of pin money' that shows gig economy workers as 'neo-craftsmen' or people which tasks are means for obtaining extra money, if not simply acting for leisure, the truth is that, especially after the economic crisis of 2008, for many persons, this type of work has become the main, if not the only, form of income, and that the flexibility and autonomy so much praised are only a corollary of the 'lack of viable employment alternatives'.[22]

In many aspects, the situation of the gig economy workers reminds that of the ones during the Industrial Revolution, in the first half of 1800. A situation that was marked by low or very low wages, total lack of protection both in the relationship and in the workplace, and, most of all, lower price competition among job providers that Karl Marx called 'unemployed reserve army of labour'.[23] A situation from which workers have emerged thanks to trade unions, collective actions, and, most of all, collective agreements and the development of labour law as means of economic and regulatory standards' setting and garrisons of safeguarding their defence.

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[20] F. Bano, n 17 above, 135.

[21] This is the case of Amazon Mechanical Turk. Ibid 138; V. De Stefano, n 18 above, 464-465.

[22] F. Bano, n 17 above, 134; V. De Stefano, n 18 above, p. 466

[23] F. Bano, n 17 above, p. 135; V. De Stefano, n 18 above, 467. On how the 'unemployed reserve army of labour' runs see A. Di Stasi, *Manuale breve di diritto del lavoro e della previdenza sociale*, (Milano, Giuffrè, 10th ed, 2015), 3.

4 Conclusions

The gig economy worker is then a 'working poor' and lives a job situation where the advantages are all on the platform's side, and that can be summarized by the Crowdflower CEO's words: 'Before the Internet, it would be really difficult to find someone, sit them down for ten minutes and get them to work for you, and then fire them after those ten minutes. But with technology, you can actually find them, pay them the tiny amount of money, and then get rid of them when you don't need them anymore'.[24] So a work marked by poverty of content, poverty of professional progression and most of all poverty of pay.

But the poverty of pay means poverty of living conditions because a mere subsistence wage is not sufficient to guarantee a life 'free and dignified' neither to the worker nor, let alone, to his family.

And between the form of poverty, as we said, there is energy poverty too. If it is indeed true that this form of poverty strikes most of all the places where per capita income is less than two dollars per day,[25] it's enough to know the amount of gig economy worker's income for his hints to figure out that the 'state of need', represented by the choice between feeding, getting dressed and paying the energy bills, is behind the corner. Because the hint's income can swing between 60 cents an hour up to 6 dollars, with an average of 2 dollars,[26] and there is always the risk, if the customer rejects the work, not to be paid at all, the calculation is soon done. Gig economy worker is in practice in the most absolute precariousness, and in the material impossibility to know if and how much he will earn from his work and if this supposed income will enable him to provide for the most basic needs.

And it's likewise clear that who lives in such a dramatic situation, and already struggles to be an energy consumer, has almost zero chance of becoming a 'prosumer', namely a person that produces by himself the amount of energy he needs.

[24] M.Z. Marvit, 'How Crowdworkers became the Ghosts in the Digital Machines' available at https://www.thenation.com/article/archive/how-crowdworkers-became-ghosts-digital-machine (last visited 22 november 2020).
[25] R. Centurelli, n 14 above, 223.
[26] M.Z. Marvit, n 24 above.

Barriers and Opportunities of Cultural Heritage in Energy Transition

Mesut Dinler

Abstract The urgent need to change the consumption habits of the world is highlighted in many policy documents. The role of cultural heritage in this transformation is vital because on the one hand, the responsibility for preserving cultural heritage can create a challenge for energy transition and on the other hand, the accumulated knowledge and experience on cultural heritage may facilitate the transition. The most vital challenge is related to the concept of 'authenticity' and the lack of regulatory frameworks (legislation, funding, etc.). However, in terms of energy efficiency, transforming an old building with a new function is more sustainable than demolishing and constructing a new one. Moreover, the energy transition will cause the abandonment of many energy infrastructures that seem indispensable today. The experience in the management of cultural heritage will be helpful in dealing with this change. Therefore, to imagine a better future, it is necessary to carefully consider these opportunities and barriers in an integrated manner.

1 Introduction

In December 2019, the European Commission presented the European Green Deal as a new strategy of the European Union for transforming Europe to a 'climate neutral' continent by 2050 putting the economy and society to a sustainable path for sustainable and inclusive growth.[1] The urgency to take action and transform the human kind's living habits on a global level is also evident in the UN's 2030 Agenda for Sustainable Development which outlines the seventeen Sustainable Development Goals (SDG). Yet, many governments still lack the efficiency to take steps even towards reaching the main objective of the 2015 Paris Agreement, which is to limit global warming to below 2 Celsius degree. As these ongoing international developments show that the climate change no more threats our future but our present day, this contribution to this volume will investigate if cultural heritage (CH) may have a role in the transformation towards a sustainable, economically growing, inclusive and just society in which individuals collectively act for the wellbeing of the others as well as that of the earth.

The role of CH in this worldwide transformation lays on a complicated foundation with a dual motive. On the one hand, energy transition may conflict with the CH conservation goal and on the other hand, it has long been acknowledged that conservation of CH (it can be an object, a building or a historic city - with its both tangible and intangible values) is essential for sustainable development. At the first look, these two aspects may seem as issues in conflict, yet, reflecting on our rich cultural heritage (not only rich for its quantity and abundance, but also its diversity, scale, intangible values, etc.) in terms of its limitations and opportunities present further discussion to understand both issues are integrated.

A similar link can be found in the relationship between CH and Disaster Risk Reduction (DRR). The need to protect CH from natural and man-made disasters and

[1] EC, *European Green Deal* (Brussels, 2019) available at https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF (last visited 10 December 2020).

mitigating the risks are also highlighted as a part of SDGs (Goal 11) and emphasized with the Sendai Framework (Sendai Framework for Disaster Risk Reduction 2015-2030, UNDRR) in 2016. In this perspective, the idea of CH as something fragile that needs to be preserved is underlined, however, CH can act as a resource to learn from since they are embedded with a knowledge that is the outcome of centuries-long trials, errors. Also, the symbolic value of CH can help victims recover from the damage of disasters.[2] Therefore, CH is a means to learn from the past, it is a tool for us to become a sustainable society. With a similar perspective, there is a need for discussing CH in the energy transition in terms of its barriers as well as opportunities it may provide.

2 Barriers

Regarding the barriers of CH in the energy transition, first of all, it should be noted that renewable energy production technology implementations may conflict with the goal of architectural conservation. This conflict mainly arises from the need to preserve 'authenticity' of CH. Several international standards have been developed since the post Second World War global context and these standards outlined that authentic features of a historic structure should not be altered and interventions should concern the fact that these structures are valuable historical documents that should be passed to future generations.[3] However, these standards present a barrier to adopting the installation of renewable energy production.

In fact, for many heritage sites that are inscribed in the UNESCO World Heritage List, 'the gradual shift to renewable energy production (such as wind farms, biomass production, hydro-power plants and photovoltaic power plants), and the increasing number of renewable energy projects, results in considerable challenges for the conservation and management of World Heritage properties'.[4] Yet, these projects create an impact that damages the Outstanding Universal Value (OUV) of the properties. There is still a need for defining guidance tools for the installation of renewable energy transition projects.[5]

The public perception also presents another barrier since the idea of 'sustainable society' is generally attained to the image of entirely new green areas; energy-efficient labels (i.e. LEED, passive house, etc.) is developed and granted to new buildings. Similarly, government funding for upgrading the energy performance of a historic building leads to destructive impacts.[6] Moreover, there is a public view that historic

[2] UNESCO, 2014, *World Heritage,* 74; 4-13: 9-10.

[3] A list of these international documents are compiled by the Getty Conservation Institute. The Getty Conservation Institute, *Cultural Heritage Policy Documents,* 2015, available at http://www.getty.edu/conservation/publications_resources/research_resources/charters.html (last visited 10 December 2020).

[4] UNESCO, *Renewable Energy Transition and World Heritage* available at https://whc.unesco.org/en/renewable-energy/ (last visited 10 December 2020).

[5] See n 4 above.

[6] UNESCO, *Culture: Urban future, Global Report on Culture for Sustainable Urban Development,* 2016.

buildings are not energy-efficient compared to modern buildings.[7] In the urban scale, this situation is reflected in the policies, because 'legislation on energy efficiency encourages the renovation of the existing building stock'.[8]

Also, lack of cooperation between different stakeholders, lack of adaptation policies, lack of assessment tools, and lack of knowledge presents barriers to an institutional level.[9]

3 Opportunities

The European Coalition, which is an unofficial European network of heritage-related sectors and organizations, petitioned a Europe Day Manifesto entitled Cultural Heritage: A Powerful Catalyst for the Future of Europe. This manifesto, which followed the impact of the 2018 European Year of Cultural Heritage, outlined the role of cultural heritage in healing and well-being of society, defining the collective identity, digitally transforming Europe, regenerating the cities and regions, having new experiences, creating new international connections, and making the world a more green space.[10] Even though the scope of the manifesto is focused on Europe, the highlighted aspects are valid for all countries. Among these aspects, especially regeneration (urban regeneration) and green transformation potentials are important for the objectives of this article.

For urban regeneration, it is needed to highlight that a new approach has been developed mainly since 2010. In the last century, urban regeneration and urban conservation were conceived as two opposing poles; the historic core of cities was the focus of urban development and regeneration processes all over the globe to an extent that these processes triggered gentrification projects. However, the experience showed that an integrated approach is needed to achieve sustainable economic development framing urban heritage as a resource.[11] Because more than half of the world population, 55%, is living in urban areas and that this ratio is predicted to reach to 68% by 2050,[12] urban context is particularly important for the energy transition. Because heritage-led urban regeneration process has benefits not only for

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[7] Historic England, *Energy Efficiency and Historic Buildings: How to Improve Energy Efficiency,* 2018 available at https://historicengland.org.uk/images-books/publications/eehb-how-to-improve-energy-efficiency/heag094-how-to-improve-energy-efficiency/ (last visited 10 December 2020).

[8] See n 6 above, 61.

[9] S. Fatorić and R. Biesbroek, 'Adapting cultural heritage to climate change impacts in the Netherlands: barriers, interdependencies, and strategies for overcoming them' 162 *Climatic Change*, 301- 320 (2020).

[10] *Europe Day Manifesto*, 9 May 2019 available at https://www.europanostra.org/wp-content/uploads/2020/05/20200509_EUROPE-DAY-MANIFESTO.pdf (last visited 10 December 2020).

[11] F. Bandarin and R.v. Oers, *The historic urban landscape: managing heritage in an urban century* (London: John Wiley & Sons, 2012), *passim*.

[12] United Nations, Department of Economic and Social Affairs, 2018 available at https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html (last visited 10 December 2020).

the conservation of historic areas but also for economic and environmental benefits[13]. First of all, as opposed to constructing new structures, reuse of old buildings use the resource of 'embodied energy' which is the 'sum of all the energy required to extract, process, deliver, and install the materials needed to construct a building'.[14]

On an urban scale, preservation of historic areas instead of demolishing and constructing new buildings surely consumes less energy. However, urban heritage should be conceived as a resource for economic and sustainable growth and in that sense, it should be perceived as a part of urban infrastructures like transportation or sanitation and for this reason, regularity frameworks are needed to generate an integrated approach.[15] The climate crisis has already necessitated the emergence of renewable energy solutions, and new developments highlight the reuse of existing urban resources rather than new constructions.[16]

The pandemic experience has proved that culture has a vital role in the healing processes and culture-based strategies enhance the resilience of cities. In that respect, implementing heritage and art programmes for citizens may facilitate changing societal habits to achieve the energy transition. These strategies have already been adapted especially for post-disaster regeneration of affected areas.[17] The same strategies can be adapted to heritage planning and policy tools. As highlighted in the joint statement 'A Cultural Deal for Europe' 'A holistic strategy for an inclusive, fair and sustainable development needs to have a strong cultural dimension. This is key for addressing societal, environmental and economic challenges that need the most transversal and multidisciplinary responses. Many components of the European Green Deal, such as building renovation, circular economy or the "Farm to Fork" and biodiversity strategies, are inseparable from cultural values and resources. Thus, culture and cultural heritage can be crucial in achieving its ambitious and vital goals'.[18]

Another opportunity of CH in the energy transition is about the management of change during the transition process. The energy transition is not an easy process, for instance, whale oil (as narrated in the masterpiece Moby Dick) was an indispensable energy resource before it was replaced by kerosene which is cheaper and more efficient. Similarly, many energy infrastructures that seem indispensable today will have to be used with other functions with the energy transition. The experience gained in the CH sector will be beneficial in managing this change. This process has already begun. For instance, Germany converted coal mines to industry museums

[13] A. Orbasli and M. Vellinga, *Architectural Regeneration* (Hoboken, New Jersey: Wiley-Blackwell, 20-20), *passim*.

[14] M. Jackson, 'Embodied Energy and Historic Preservation: A Needed Reassessment' 36 *APT Bulletin: The Journal of Preservation Technology*, 47-52 (2005).

[15] F. Bandarin and R.v. Oers, n 11 above, *passim*.

[16] See n 14 above.

[17] See n 6 above, 21.

[18] European Cultural Foundation, Cultura Action Europe, Europa Nostra, European Heritage Alliance, *A Cultural Deal for Europe: A central place for culture in the EU's post-pandemic future,* 2020 available at https://www.europanostra.org/wp-content/uploads/2020/11/2020 1125-Cultural -Deal-EU-Statement.pdf (last visited 10 December 2020).

which become touristic attractions centres.[19] Moreover, this transition may create new jobs not only for CH sector and creative industries but also for the population which will presumably become unemployed with the energy transition. For instance, in China, a photovoltaic project was constructed over an abandoned coal mine and former workers of coal mines were employed in the solar project.[20] This example shows not only how social justice is an important issue in the energy transition but it also provides a possibility to integrate culture into the energy transition.

4 Further Considerations

Each opportunity may present also a barrier and threat depending on the scope of the assessment. Also for the energy transition, the above-mentioned opportunities pose various barriers and limitations.

As the current developments such as the pandemic or the intense impacts of the Anthropocene force our world to change the way we live, there is an urgent need to integrate culture to this change and use the potential of CH for this transition. In this transition, to conceive of CH as a fragile passive object that needs to be protected from the possible damaging impacts is a misleading perception since the opportunities of CH present a powerful active resource. To imagine a better-balanced future of our world, it is necessary to carefully consider these opportunities and barriers in an integrated manner discussing opportunities as barriers, and barriers as opportunities.

[19] N. Ballinger, *The clean energy transition challenge,* 2020 available at https://www.openaccessgovernment.org/clean-energy-transition-infrastructure-workforce/81534/(last visited 10 December 2020).

[20] See n 19 above.

Energy Transition and E-Mobility: A Difficult Combination

Manuela Giobbi and Giovanni Russo

Abstract The emergence of the sustainable development principle changed the habits and lifestyle. The regulatory framework of the energy market is oriented to the safeguard of the environmental interests and the responsible use of natural resources. It becomes functional to the satisfaction of human needs, and the people' s quality of life. The transport sector constitutes one of the major causes of environmental pollution. Indeed, the E-mobility is a new segment of the energy demand and involves the necessary configuration of an electric system on the whole much more efficiently. In this article, are emphasized the ways to overcome some obstacles to the development of sustainable transport. In this key, are analysed the instruments made available by the Italian Government to encourage the purchase of electric cars and the installation of charging stations. These instruments have contributed to the development of E-Mobility. In this context, both the political planning and the legislator must continue to be proactive, providing incentives to the electrification of vehicles, disincentives to the use of polluting cars, and support to the private and public installation recharging points.

1 Energy Transition, Clean Energy for All European and Climate Change

To promote the energy transition and mitigate the effects of *climate change*, the European Union is committed to developing a sustainable, competitive, safe and decarbonised[1] energy system.

The development of the energy market is indeed more and more oriented towards the safeguard of the environmental interests and the responsible use of natural resources, which pacing themselves in a 'unified experience',[2] become functional to the improvement of life, to the satisfaction of human needs, including those of the future generations.[3]

In balancing the different interests related to the use of energy, it becomes fundamental to innovate the energy system both through the implementation of innovative and sustainable models, and the sharing of 'energy as a good'. The need for preserving and improving the environment, by the protected interest's public nature,[4] goes therefore to enter the register of solidarity between the Member States and of the

[1] The Energy Union should cover five dimensions: the energy security, the internal energy market, energy efficiency, the decarbonisation process, the research, the innovation and competitiveness, see Recital 2, Regulation (EU) 2018/1999 of the European Parliament and the Council, on the Governance of Energy Union and Climate Action, in OJ L 328/121, December 2018; Recommendation (EU) 2019/786 of the Commission of 8 May 2019 on building renovation, in OJ L 127/34, 16 May 2019.

[2] On this matter see, P. Perlingieri, 'Persona, ambiente e sviluppo', in M. Pennasilico ed, *Contratto e ambiente. L'analisi 'ecologica' del diritto contrattuale*, (Napoli: Edizioni Scientifiche Italiane, 2016) 328-330.

[3] See Report of the World Commission on the Environment and Development, so-called Brundtland Report, 'Our Common future, Report of the World Commission on Environment and Development', United Nations, 1997.

[4] N. Lipari, 'Introduzione', in M. Pennasilico ed, n 2 above, 15-18.

development of the human person (article 3 of the Constitution of the Italian Republic).

An energy market aimed at decarbonisation needs an actual transition to productive forms more variable and decentralized which incentivise the use of renewable sources. As highlighted under Recital 3 of the Directive 2018/2001/EU, the rational use of natural sources can be fundamental to ensure sustainable energy to the citizens at affordable prices. Equally, the Directive 2018/2002/EU highlights that the improvement of energy efficiency is functional to the environment, it improves the air quality and public health.

The inclusion of intervention in the matter of energy efficiency in the wide context of redefinition of the energy market constitutes one of the most innovative aspects of the cultural, behavioural and technological transformation.

The correlation between the energy sector and the environment, considered in unitary terms, finds response also in article 194 TFEU in the context of the establishment and functioning of the internal market. The improvement of energy efficiency and the use of renewable energy strengthen, indeed, the link between the internal market creation and the environmental sustainability policies of the European Union, in a perspective functional to the achievement of the aims provided for in the agreements for the attenuation of issues arising from climate change. In this respect, it is entrusted to the Union a specific and autonomous competence for the coordination between the use of renewable sources, the improvement of air quality, public health, and more generally the people's quality of life.

With the approval of the legislative proposals included in the Clean Energy for All Europeans[5] (so-called Winter Package), the European Union introduced a regulation aimed to encourage the use of renewable sources, the energy efficiency of the built environment, market innovation and to ensure the fulfilment of the agreements resulting from the Paris Agreement[6] for the reduction of polluting emissions.

In this regard, the Regulation (EU) 2018/1999 dictated a regulatory framework aimed to promote the achievement, by the Member States, of the binding targets established at European level on the energy and climate, which, however, are necessarily placed

[5] The Clean Energy for All Europeans or 'Winter Package', available at https://ec.europa.eu (last visited 21 November 2020), is the package of legislative proposals consisting of communications, regulations and guidelines Proposals which represents one of the most significative intervention in the sector such as the energy efficiency, the development and integration of renewable energy.

[6] The Paris Agreement is the first-ever universal, legally binding global climate change agreement, adopted at the Paris Climate Conference (COP21), December 2015, in the United Nations, FCCC/CP /2015/10/Add.1, Distr. General 29 January 2016, available at https://unfccc.int/process-and-meetings/the- paris-agreement/the-paris-agreement (last visited 21 November 2020).

within a 'long term strategy'.[7] However, these purposes must also be considered taking into account the provisions of the European Green Deal[8] regarding the prospects indicated for the complete decarbonisation of the system.

The European Green Deal, in reiterating the commitment of the Union towards climate problems, affects the innovation, energy-saving, economic vulnerability of the users[9] and sustainable mobility. In particular, the Commission highlights the need to rethink the policies for the supply of 'clean energy' in each sector of the economy so that the transition to 'climate neutrality' becomes irreversible. Therefore, the productive activities of the green energy[10] supply chain are called upon to play a key role in the realisation of an energy transition model which aims to combine technological innovation with the respect for the environment.

2 Environmental Sustainability and E-mobility

The recent Directives 2019/944/EU[11] and 2018/2001[12] introduced new systems of individual and collective energy self-production to create a market which could satisfy user and climate change requirements. In particular, energy communities[13] are an effective and economically efficient way to satisfy society's needs and citizens' expectations.[14] The energy communities have indeed a specific connotation of solidarity and precisely for the connection with the territory in which they are intended to operate, they are functional to the creation of both social and environmental benefits.[15] Energy communities, through the generation of clean energy, constitute a reasonable answer or however an effective contribution to the reduction of harmful emissions, to the use of renewable sources and the

[7] See 'Memoria dell'Autorità di regolazione per energia reti e ambiente nell'ambito dell'indagine conoscitiva sulle prospettive di attuazione e di adeguamento della Strategia Energetica Nazionale al Piano Nazionale Energia e Clima per il 2030, 513/2019/I/COM', 'Memoria per la X Commissione Attività produttive della Camera dei Deputati', 4 December 2019, available at www.arera.it (last visited 23 November 2020).

[8] See 'The European Green Deal', Bruxelles, 11 December 2019, COM(2019) 640 final, available at https://eur-lex.europa.eu/legal-content/IT/TXT/?uri=CELEX:52019DC0640 (last visited 9 December 2020).

[9] On the users' vulnerability see, L. Ruggeri and M. Giobbi, 'Vulnerabilità economica tra diritto emergenziale e contrattuale. Economic Vulnerability between emergency and contract law' 12 *bis Actualidad Juridica Iberoamericana,* 342-351 (2020).

[10] See, 'Green Energy. Il sostegno alle attività produttive mediante generazione, accumulo e auto-consumo di energia elettrica', '10th Commissione, Industria, Commercio, Turismo, Ufficio Valutazione Impatto', Senate of the Republic, XVIII Legislature, March 2019, available at www.senato.it (last visited 26 November 2020).

[11] Directive 2019/944/EU of European Parliament and the Council of 5 June 2019 on common rules for the internal market for electricity [2019] OJ L 158/125.

[12] Directive 2018/2001/EU of European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L 328/82.

[13] See article 42 *bis*, decreto legge 30 December 2019 no 162, converted legge 28 February 2020 no 8, *Gazzetta Ufficiale* 29 February 2020, no 51, no 10/L.

[14] Recital 43, Directive 2019/944, above 11.

[15] See Recital 67, Directive 2018/2001, above 12. On this matter see M. Pennasilico, 'Sviluppo sostenibile e "contratto ecologico": un altro modo di soddisfare i bisogni' *Rassegna diritto civile*, 1293-1299 (2016); P. Perlingieri, 'La sussidiarietà nel diritto privato' *Rassegna di diritto civile*, 687-689 (2016).

electrification of transports.[16] As indicated in the European Green Deal, the transport sector constitutes one of the major causes of environmental pollution. Therefore, electric mobility, as specified in Recital 87 of the Directive 2018/2001, will be a very meaningful aspect in the matter of energy produced from renewable sources. The need to increase the development and spread of electric mobility is also highlighted in Recital 86 of the Directive 2018/2001. In this regard, the 'Energy-Climate Integrated National Plan' (PNIEC)[17] provides for very quick development of electric mobility which will have a relevant impact on the evolution of the energy system.

The spread of electric vehicles indeed brings along with it not-trivial needs, such as the creation of a charging points network which, as indicated by the 'Autorità di Regolazione per Energia Reti e Ambiente' (ARERA), involves the necessary configuration of an energy system on the whole much more efficient. It is a new segment of energy demand.

To take advantage of the environmental sustainability that vehicles electrification can offer and to optimize the efficiency of the energy system in the mobility, might be particularly important the prediction of smart charging systems which allows guiding the charges towards most suitable time slots and areas.[18] In any case, the charging services installed in inaccessible locations to the public constitute an activity which must take into account and must develop in conditions of competition between the different operators. Recharging energy prices are indeed affected by market dynamics. Moreover, as indicated by the authorities of the sector, it should also be allowed to make transactions through the ordinary payment instruments. Such means of access to the points of withdrawal and payment of prices could allow equal access to the charging services for all users.

3 Obstacles to the Development of Sustainable Mobility

Electric mobility development comes within an even more futuristic project, creating a Smart City of intelligent cities where each technology is interconnected and in a continuous exchange of information. In this perspective, the transition towards electricity is nothing but an obligatory stopover for attaining the European and international objectives. The design of Smart cities allows overcoming difficulties of economic, environmental, and social nature, which dominate the scenarios of the principal European cities. The implementation of new technologies will increase both the use of energy sources and GNP. As highlighted by the doctrine, the GNP does not

[16] The Recital 87, Directive 2018/2001/EU states that by 2030 the e-mobility will be a significant part of renewable sources of energy in the transport sector.

[17] See, 'Piano Nazionale Integrato Energia-Clima (PNIEC)' available at www.mise.gov.it/index.php/it/2040668 (last visited 9 December 2020).

[18] On the point see, 'Memoria 41/2020/I/EEL, Memoria dell'Autorità di Regolazione Energia e Ambiente' about the draft law laying down 'Modifiche al decreto legge 4 June 2013, no 63', converted, with amendments, by Law 3 August 2013, no 90, in matter of tax benefits to encourage the spread of vehicles powered by electric energy (AC 1973), 'Memoria per la VI Commissione Finanze' della Chamber of Deputies, 18 February 2020, available at www.arera.it (last visited 15 November 2020).

depend only on industrial growth but must be functional to people's development.[19] The emergence of the sustainable development principle changed the habits and lifestyle. Today, we discuss sustainability on an environmental, social, and economic key, but the actions and technological innovations should respond to the sustainability principle.

This is because the environment is to be considered as 'life' to protect where the human being develops his personality.[20]

The combination of human needs and sustainability has highlighted the need to change habits.

In this way, it has come to talk about intelligent mobility intended as technologically advanced and sustainable mobility, which reduces the pollution of CO2. The objective of this evolution is the environmental protection[21] promoted from the 70s[22] and from

[19] The process of industrialization began at the end of the last world conflict. The country's exponential growth caused a radical change in habits and, in general, in the lifestyle. Think, for example, about the repercussions in the field of the economy with the increase of the level of employment and the consequent greater per capita spending capability; the improvement of the quality of life; the advantage of producing the same good quantities both in the least time and the minor cost.

[20] In this regard read P. Perlingieri, 'Persona, ambiente e sviluppo', in M. Pennasilico ed, *Contratto e ambiente. L'analisi "ecologica" del diritto contrattuale*, (Napoli: Edizioni Scientifiche Italiane, 2016), 321-324. In another work, the same author underlines that 'the qualitative profile of a society is not measured in proportion to the increase of the GNP but to the increase of the critical capacity, to the study level reached by the people who live in that society, to the way in which they participate to the life of the city, and of the community. It would be desirable that, in the face of a lower GNP, our nation records a qualitative increase of the individual and the community. Hence the necessity to invest in the school, the information, the formation, the structure of other knowledge, as the only way which leads to the direction of the *homo sapiens* more than to the *homo oeconomicus* one', so in P. Perlingieri, 'I diritti umani come base dello sviluppo sostenibile. Aspetti giuridici e sociologici' *Rivista Giuridica del Molise e del Sannio*, 11-17(2000). Still can be read P. Perlingieri, *La persona e i suoi diritti. Problemi del diritto civile*, (Napoli: Edizioni Scientifiche Italiane, 2005), 76; P. Perlingieri, 'Produzione, beni e benessere', in G. Calabresi et al *Benessere e regole dei rapporti civili. Lo sviluppo oltre la crisi*, *Atti del 9th Convenzione Società Italiana Degli Studiosi del Diritto Civile in memoria di G. Gabrielli, Napoli 8-10 Maggio 2014*, (Napoli: Edizioni Scientifiche Italiane, 2015), 509-516.

[21] Nowadays the definition of environment is not defined yet. Anyway, it is possible to find a definition in article 2, (10), of the Convention on the civil responsibility of the damage resulting from activities dangerous for the environment. The convention defines the environment as the set of natural sources both abiotic and biotic, such as air, water, soil, fauna and flora and interaction between the same factors; the property which is part of the cultural heritage and the characteristics aspects of the landscape. To deepen read the Manual on Human Rights and Environment, Council of Europe Publishing, Strasburgo, 2012, 15 available at https://www.echr.coe.int/LibraryDocs/DH_DEV_Manual_Environment_Eng.pdf (last visited 9 December 2020).

[22] Among the many, we remember the Convention on the Long-Range Transboundary Air Pollution of 11 June 1981, 81/462/EEC of the council. Again, the protocol of Göteborg in 1999 to reduce acidification, eutrophication, and tropospheric ozone. The protocol was signed by all member States on 13th June 2003, Decree 2003/507/EC of the council.

which was followed by a variety of regulatory instruments that aim to reduce pollution drastically.[23]

The road transport includes cars, vans, heavy vehicles, buses, and rail transport, contributing three quarters to CO2[24] emissions. Hence the need also arose from the report of the Intergovernmental Panel of Experts on Climate Change - IPCC -, to aim for 'zero emissions' by 2050.[25] Along the path of electric car development, there have been obstacles to its spread[26] in the past as in the present. It would seem attractive to specify that the current electric vehicles represent the prototype's evolution, dating back to the 1800s.

Therefore, the same obstacles continue to exist, such as the lack of appropriate infrastructure, on the one hand, the high cost of the electric vehicle caused, in part, by the price of the battery and its life, on the other hand. It follows that the overcoming of the issues cannot be sectoral, but necessarily multidisciplinary. The required competencies are specific, and the solution is not attributable to a unique. However, it will be the set of transversal competencies[27] - engineering, legal, economic, and sociological - that will offer satisfying solutions.

4 'Eco Bonus' and 'Green Tax': A Right Compromise?

The legislator is uncertain whether to introduce a rule that can regulate the case taken into an exam or wait for better times to evolve the new technologies to support the E-Mobility development. It is certain that waiting for an ad hoc regulation, the legislator is, at least, called to offer a solution to the juridical overcoming of obstacles.

In this regard, several legislative instruments are enacted to encourage the use of electric cars - EV o BEV - and to discourage the purchase of fossil-fuelled vehicles that exceed the threshold of 160 g/km[28] CO2.

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[23] In this sense and to deepen read A. Castelli, 'Riduzione dell'inquinamento e miglioramento della qualità dell'aria: l'impatto della Direttiva Ue 2016/2284' *Ambiente e sviluppo*, 211, (2020).

[24] To deepen read V. Aneris and C. Calvo Ambel, 'La decarbonizzazione del settore trasporti Europeo ed italiano entro il 2050', in A. Donati ed, *Politiche di mobilità e qualità dell'aria nelle 14 città e aree metropolitane 2017-2018*, (2019), 36 available at https://www.kyotoclub.org /medialibrary/Libro MOB2019_digital_sm.pdf (last visited on 22 November 2020). As well as 'The future of sustainable passenger transport' available at www.europarl.europa.eu/RegData /etudes/note/join/2010/431579/IPOL-TRAN_NT(2010)431579_IT.pdf (last visited 8 December 2020).

[25] It refers to the study IPCC which is available at https://ipccitalia.cmcc.it/ipcc-special-report -global-warming-of-1-5-c/ (last visited 8 December 2020).

[26] The decrease of the oil price, on the one hand, the issues related to the inadequacy of the infrastructure and the battery life, on the other, led to a gradual abandonment of the electric car in favour of the combustion engine.

[27] In this sense and to deepen see P. Perlingieri, 'Produzione scientifica e realtà pratica: una frattura da evitare' in P. Perlingieri, *Scuole tendenze e metodi. Problemi del diritto civile* (Napoli, Edizioni Scientifiche Italiane, 1989), 1-25.

[28] In this sense see article 1, paragraph 1042, legge 30 December 2018 no 145.

Given an energy transition that aims to reach high standards of CO2 reduction by 2030[29] and the total decrease by 2050, the individual States must be committed in the front line to encourage the purchase of the new technologies.

Legge 30 December 2018 no 145[30] (so called 2019 budget law) and Decreto Ministeriale no 20 of 2019, article 1, paragraphs 1031-1038,[31] decreto legge 19 May 2020 no 34, article 44, so-called 'decreto Rilancio', signed into law 17 July 2020 no 77,[32] decreto legge 14 August 2020 no 104, article 74,[33] and decreto legge 30 December 2019 no 162 so-called 'decreto Milleproroghe', signed into law 2 February 2020 no 8[34] have foreseen several incentives to purchase electric vehicles, discouraging the purchase of the classic car. The national legislator aims to reduce the EV's purchase price and convince the user to convert to electric. In particular, the sums put at disposal will be distributed according to criteria that consider the CO2 emissions of the vehicle. The Italian legislation has foreseen three different incentives: 50 million have been allocated for emissions from 0 to 60 g/km; 150 million for emissions from 61 - 90 g/km and 100 million for emissions from 91 to 110 g/km. The latter result so far has already sold out. A common element for all the types concerns the purchases from the 1st July 2020 to 31st December 2021. The first category is divided into two subcategories depending on whether a car with emissions is lower/equal or higher to 20 g/km. At the same time, the price must not exceed 50 thousand euros. In the first case, the incentive amounts to approximately 8000 euros if a car registered for at least ten years[35] is scrapped and the dealership applies a discount of 2000 euros; in the second case, the same rules as the first will apply, but the incentive amount to approximately 4000 euros.[36]

In the second and third category, the incentives are provided to purchase vehicles with a maximum cost of 40 thousand euros. Unlike the first, there is no 'eco bonus', but only the 'discount' applied from the dealership can vary from 1750 to 750 euros.

In parallel to the national forecasts, some regions - Lombardy, Piedmont, Sardinia, Trentino-Alto Adige - have provided further 'eco bonus'. Lombardy's[37] incentive was of particular importance as it turns out to be the highest support and equal to 8000 euros for the purchase of fully electric cars.[38] The possibility to take advantage of the regional incentive ended last September. Equally impressive is Piedmont's case, which

[29] It refers to the Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources which amended the directive 27/2012 introducing the objective of reducing CO_2 pollution by 20% by 2020 and by 32,5% by 2018.
[30] See *Gazzetta Ufficiale* 31 December 2018, no 302.
[31] See *Gazzetta Ufficiale* 6 April 2019, no 82.
[32] See *Gazzetta Ufficiale* 21 May 2020, no 128.
[33] See *Gazzetta Ufficiale* 14 August 2020, no 203.
[34] See *Gazzetta Ufficiale* 29th February 2020, no 51.
[35] The lack of a scrap determines a loss of 2000 euros.
[36] Here too the lack of scrap will reduce the 'eco bonus' by 1000 euros.
[37] For further insights see https://www.regione.lombardia.it/wps/portal/istituzionale /HP/aria/incentivi-e-agevolazioni (last visited 5 December 2020).
[38] From 4000 to 6000 euros for vehicles with emissions below 60 g/Km; from 3000 to 5000 euros for vehicles with emissions between 60 and 90 g/Km and from 2000 to 4000 euros for vehicles with emissions between 96 and 130 g/Km.

with a dedicated call last October, provided an incentive of up to 10.000 euros depending on the emission classes of the vehicle.[39]

Conversely, the recourse to the use and purchase of polluting vehicles has been discouraged from introducing the so-called green tax calculated depending on the vehicle's emissions.[40]

Besides, support has been provided for the maintenance of the electric car, aiming to amortize further the cost of purchasing an EV. Think of the free parking spaces on blue lines;[41] in article 1, paragraph 103, of the budget law of 2019, which introduced paragraph 9-*bis* (Gorbino *bis*)to article 7 of the highway code.[42] This provides for the creation of Limited Traffic Zones - LTZ - where both the electrically-powered and the hybrid vehicles are admitted for free.

Further incentives concern the total exemption for the first five years of the road tax and 75% from the sixth year. However, some regions make an exception. Think of the Piedmont region, which provided for the permanent exemption from the payment of the car tax for the BEV vehicles; the Emilia Romagna where the incentive was not foreseen in the form of exemption from the road tax, but as an equivalent three-year contribution and the Tuscany which has not provided for exemptions. The differentiation of the incentives concerning the road tax raised considerable problems, and the issue has come before the Constitutional Court, which, by judgment no 122 of 20th May 2019,[43] declared the regional autonomy on the condition not to increase the tax burden than the state's maximum levels.

Lastly, in some Italian cities, Rome from 2024 and Milan from 2030, total entry blocks for polluting vehicles have been planned. At an international level, instead, the combustion car has been banned by various States: 2025 for Norway and Holland; 2030 for Sweden, Denmark, Germany, India, Brazil; 2035 for Italy, Belgium, Ireland, UK, California (US); 2040 for France, Spain, and Austria. Thus, some car

[39] See https://bandi.regione.piemonte.it/contributi-finanziamenti/incentivi-mobilita-sostenibile-dei-cittadini-piemontesi-prqa (last visited 8 December 2020). The citizens of Piedmont could have submitted an application starting from 28th October 2020 at 9.00, until 30th April 2021 at 12.00. Well, the interesting incentives have made that the regional funds made available are already depleted. The forecast for the renewal of polluting vehicles was equal to 1.100.000 euros. On 19th November 2020, the application received amounted to 7.249.500 euros. For further information visit the website https://www.finpiemonte.it/bandi/dettaglio-bando/contributi-mobilita-sostenibile-piemonte-privati (last visited 20 November 2020).

[40] For emissions between 161 and 176 g/Km the tax will amount to 1100 euros; for emissions between 176 and 201 g/Km the tax will amount to 1600 euros; for emission between 201 and 251 g/Km the tax will amount to 2000 euros and, lastly, for emissions higher than 251 g/Km the tax will amount to 2500 euros. Logically the cars with emissions between 0 and 161 g/Km such as electric cars, the majority of the hybrids, and the city car with low emissions are excluded.

[41] Think, for example, of the monthly cost of a car park in Rome (about 70 euros) which, multiplied by 12 months, can exceed the cost of the automobile liability insurance.

[42] In this sense article 9a states that 'In delimiting the areas referred to in paragraph 9 the municipalities allow, in any case, open access to these areas to electrically-propelled or hybrid vehicles'.

[43] The sentence is available at www.Pluris.it (last visited 8 December 2020).

manufacturers, especially in Europe, have blocked the sale of fossil fuel cars such as Smart, which will only be manufactured full electric.

5 Incentives for buying charging stations. Conclusions

Through the legislative examination just made, the juridical category has undoubtedly made a useful contribution to overcoming the obstacle related to the electric vehicle's cost. However, the encouragement in purchasing electric cars raises another problem concerning the electric infrastructure's electricity supply. Undeniably, there are different legislative instruments provided both by the national and the European legislator. However, the infrastructure presents two problems: the energy supply, on the one hand, and the demand, on the other. For the latter category, for several years, the legislator has foreseen numerous incentives that complement those listed above.

To overcome the obstacles to developing a correct transition, the lawmaker has endeavoured to introduce regulatory instruments to overcome the barriers tied to the infrastructure and, in particular, some charging stations.

The legislator must pay more attention to the charging points in private homes since most recharging occurs in their own homes. In this sense, the budget law 2019, in article 1, paragraph 1039, introduced article 16 ter[44] in the decreto legge 4 June 2013 no 63. This disposition, entitled 'Tax deductions for the purchase and the installation of recharging infrastructures for vehicles powered by electric energy', grants a deduction from the gross tax for expenses documented from 1 March 2019 to 31 December 2021 concerning the purchase and installation of recharging infrastructures for electric vehicles. It is also included in the incentive the cost of the demand to increase the power up to 7 kW. The condition for taking advantage of the 50% incentive concerning the expense incurred concerns the purchase of charging stations which do not cost more than 3000 euros, and which will be divided into ten annual refunds of the same amount. Simultaneously, it has been provided with a tax refund of 110% for the installation and charging stations' implementation. For the tax deduction to take place, the facility must be done together with the provision of article 119, paragraph 1, of decreto legge no 34/2020.

[44] Article 16-*ter* states that 1. It is granted to the taxpayers a deduction from the gross tax, up to its amount, for the documented expenses incurred from 1 March 2019 to 31 December 2021 relating to the purchase and the installation of recharging infrastructures for electrical energy powered vehicles, including the initial costs for the extra power demand up to a maximum of 7kW. The deduction referred to in this paragraph, to be distributed among the persons entitled in ten annual fees of equal amount, is due to the extent of 50% of the expenses incurred and it is calculated on a total amount which does not exceed 3000 euros. 2. The recharging infrastructures referred to in paragraph 1 must have one or more recharging points with standard power not accessible to the public according to article 2, paragraph 1, point d) and h), of the decreto legislativo 16 December 2016, no 257. 3. The deduction is also applied to the documented expenses remaining to the taxpayer, for the purchase and installation of recharging infrastructures referred to in paragraph 1 on the common parts of the condominium buildings of articles 1117 and 1117a of the Civil Code.

Finally, relevant news has also been introduced from the decreto legge 16 July 2020 no 76, so-called 'decreto Semplificazioni', signed into legge 11 September 2020 no 120,[45] where article 57 defines and disciplines the installation of recharging infrastructure in specific parking areas, both public and private, simplifies their realization. In particular, what is new is paragraph 2 bis, which states that 'recharging the electric vehicle, by analogy with the provisions of decreto legislativo 16 December 2016, no 257, for the public charging, is to be considered a service and not a supply of electric energy'.

Next to incentives, the European and national legislator has imposed some obligations, and, in this sense, it is essential the legislation concerning the new construction works. Think of the installation of recharging stations 'for all the newly-built residential buildings with at least ten residential units, for several parking spaces and car boxes not lower than 20% of the total'. The aforementioned legal provision is included in the decreto legislativo no 257/2016.[46] Instead, the following intervened: the budget law 2019; the decreto legislativo 10 June 2020 no 48[47], which transposed the directive 2018/844;[48] the 'decreto legge no 34/2020.

Decreto legislativo no 48/2020 has set the new buildings' obligation, or substantial renovations started since 10 March 2021 to provide for the installation of at least a recharging point for all the non-residential buildings with at least twenty parking places by the end of 2024.[49] Also, article 16 deserves to be mentioned because it forces the municipalities, within 180 days from the entry into force of the decreto legislativo no 48/2020, to adapt the building regulations and to provide, to issue the residential building license, for the obligation both for residential and non-residential buildings, for those newly built or for which a necessary renovation is expected, to respect the technology integration requirements for the charging of electric vehicles in the buildings.

The set of principles enclosed in sustainable mobility development has made the issue increasingly important over the years. Proof of this is the legislators' interest from various countries[50] to promote green mobility and orientate towards reducing

[45] See *Gazzetta Ufficiale* 14 September 2020, no. 228.
[46] For further information see the *Gazzetta Ufficiale* 13 January 2017, no. 10.
[47] It is possible to read the decreto legislativo in the *Gazzetta Ufficiale* 10 June 2020.
[48] The directive is available in the OJ L 156/75, June 2018.
[49] In this sense and for further information see I. Meo, 'Gli incentivi all'installazione delle colonnine elettriche in condominio' *Immobili e proprietà*, 634, (2020).
[50] Also, on the European side incentives aimed to overcome the electric vehicle cost have been envisaged. In this sense please note Germany provided for the period 2016-2019 a so-called environmental bonus which includes the tax subsidy of 2000 euros to purchase an electric car and an incentive of 1500 euros to purchase a hybrid car with emission up to 50g/Km of CO2. In both cases, the cost of the vehicle must not exceed 60.000 euros. From 2020 to 2021 the German Federal State envisaged the doubling of the previously provided incentives. There are two exceptions: the first concerns the cost of the electric car which cannot exceed 40.000 euros, the second, instead, concerns the premium electric models for which a maximum cost of 65.000 euros has been established. Again, the United Kingdom has provided for a discount of up to 4.500 pounds to purchase both fully electric and hybrid cars with an autonomy of at least 113 km in full

CO_2[51] emissions. In particular, the Italian State's effort to encourage both the purchase of EVs and the installation of recharging stations determined growth of the registrations and increasing interest from the users who more and more numerous decided to convert themselves to the electric.[52]

In light of this, although the diversity of the incentives promoted an initial overcoming of the E-Mobility barriers, they are not yet sufficient to achieve the objectives set at the European and international level concerning the reduction of CO_2. In this context, both the political planning and the legislator must continue to be proactive, providing incentives to the electrification of vehicles, disincentives to the use of polluting cars, and support to the private and public installation recharging points.

electric modality and with emissions lower than 50g/Km of CO_2. Regarding instead, the plug-in hybrids with a battery of more than 16 km and emissions lower than 75 g/Km of CO_2, an incentive of 2500 pounds has been provided. Lastly, France provided for a contribution of 6000 euros for electric and hybrid vehicles with emissions lower than 20 g/Km of CO_2 and 1000 euros for vehicles with emissions from 21 to 60 g/Km of CO_2. Further, the French State provided for a scrapping incentive for diesel vehicles, registered for at least 11 years, equal to 4000 euros for the purchase of electric vehicles and 2500 euros for the plug-in hybrids. Other incentives to the transitions are the cancellation of the road tax for the fully electric cars while for the hybrids with emissions lower than 110 g/Km the exemption will last for the first two years. On the other side, which is the incentives to increase the charging stations, Germany in the three-year period 2017/2020 has allocated 300 million intending to stimulate and encourage the installation of recharging infrastructures both in alternating current AC and indirect current DC. The other States such as France have provided a tax credit of 30% for residential installations. Sweden, instead, incentives of 50% and no more than 960 euros, for the purchase and installation of a wallbox.

[51] A study conducted at an international level from the Boston Consulting Group highlighted the increase in sustainable and intelligent mobility in the coming years. The study conducted is available at https://www.bcg.com/it-it/industries/automotive/center-mobility-innovation/default (last visited 1 December 2020).

[52] The outcomes of the pro-mobility policies - 'eco bonus', Eco-tax, LTZ introduction, free parking spaces, and reduction of the road tax - led to the increase of electric vehicles. The National Union of Foreign Motor Vehicles Representatives has developed some data concerning the national registration of EV. The results showed an increase in April, June, and September - when the 'eco bonus' has been introduced - and subsequently in September 2020 - thanks to the strengthening of the same. To learn more, see the report at http://www.unrae.it/files/Book% 20UNRAE% 202019_5e81efee08a c9.pdf (last visited 23 November 2020).

Smart Cities and Renewable Energies: Beyond Traditional Boundaries

Claudia Papa

Abstract Growing population, increasing urbanization and environmental issues pose numerous challenges for urban planning. The development of smart, innovative and sustainable cities is increasingly becoming a necessity in all over the world. These city models are based on the use of innovative technologies to meet the needs of their citizens. In a smart city, through ICT, all the infrastructures are interconnected and integrated in an efficient and functional way by optimizing resource consumption, enhancing the quality of public services. (Government services) through participatory governance and increasing citizens' security as well. However, the digital transformation of cities is one of the main challenges faced by policy makers because of numerous barriers which need to be overcome. Identifying these boundaries that hinder the development of smart cities has become a fundamental challenge.

1 Introduction

The ongoing digital transformation, which is expected to grow up rapidly, is changing economies, societies, and our daily life and it will continue to do so in the future. Several advantages and benefits arise from digitalization and lie ahead to big challenges into modern society. Therefore, digitalization is not only a technology-driven change, but it is something more, representing an opportunity for everyone. It engages policymakers, managers and people from all over the world, also to find new ways of production in a sustainable world. In doing so, it is necessary to identify the right policy mix, which allows to maximize the benefits of innovative technologies and properly address the related challenges to promote inclusive and sustainable growth. In such context, digitalization has a strong impact also on the urban environment making cities more liveable, sustainable, and energy-efficient. 'Cities have indeed a huge role for the future because are the key to addressing societal challenges since they have the critical mass of different communities, people and influences that come together to spark innovation and new ideas' (Boulanger et al. 2012). Nowadays, innovative technologies and digitalization are radically changing urban life and how cities are planned, financed and managed. Digital technologies are indeed becoming a powerful tool to stimulate paradigmatic shifts in urban development-related visions, strategies, implementation and learning. A new urban model known as a smart city is being developed throughout Europe and elsewhere across the world. In a smart city, through ICT,[1] all the infrastructures are

[1] The full implementation of ICT is a way to preserve natural resources, save money and improve quality life, for further information see: H. Yeh, 'The effects of successful ICT-based smart city services: From citizens' perspectives' 34 *Government Information Quarterly*, 556-565 (2017); R.P. Dameri, 'Using ICT in Smart City', in Id, *Smart City Implementation, Creating Economic Value in Innovative Urban System,* (Cham: Springer, 2017) 45-65; M.G. Morand et al, 'How Smart is the Smart City? Assessing the Impact of ICT on Cities' in M.R. Nazami-Rad et al eds, *Agent Based Modelling of Urban Systems*, (Cham: Springer, 2017) 189-207; V. Albino et al, 'Smart Cities: Definitions, Dimensions, Performance, and Initiatives' 22 *Journal of Urban Technology*, 3-21 (2015); M. Cesana and A.E.C. Redondi, 'IoT Communication Technologies for Smart Cities', in V. Angelakis et al, *Designing, Developing, and Facilitating Smart Cities*' (Cham: Springer, 2016) 139-162; A.A. Batabyal

interconnected and integrated efficiently and functionally by optimizing resource consumption, enhancing the quality of public services. (Government services) and increasing citizens' security as well. In such context, cutting edge technologies and connected solutions - such as IoT, Big Data, ICT and so on - are the drivers of economic growth, wellbeing and sustainability, enhancing quality of life.

2 Smart Cities and Sustainable Development

From the sixties onwards, the industrial field has experienced an unpredictable and unprecedented development, which led to a misbalance between available supply and expected demand. The world's population is growing and with it the demand for resources and products. The increasing scarcity of many natural resources over the short, medium and long term will lead indeed to a steady increase in the cost of obtaining and using the worldwide demand. There are no endless resources in the world, and to ensure enough resources for the future, our present must be different by promoting measures towards sustainable development such as climate change strategies, resource efficiency, social inclusion and sustainable urban planning.[2]

The most common definition of sustainable development is the one given by the United Nations in 1987, introduced in the Brundtland Report and also known as 'Our Common Future'. In this report, sustainable development is defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Our Common Future, United Nations 1987).

Furthermore, it specifies, 'sustainable development has evolved as the guiding principle for global long-term development' (Our Common Future, United Nations, 1987). It states that sustainable development consists of three pillars interrelated to each other: economic, social and environmental one. Historically, sustainability had indeed been referred purely to the environmental concerns but nowadays, a new viewpoint is being developed which involves also other aspects and which requires a

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and H. Beladi, 'The optimal provision of information and communication technologies in smart cities' 147 *Technological Forecasting and Social Change*, 216-220 (2019); B. Hammi et al, 'IoT technologies for smart cities' 7 *IET Networks*, 1-13 (2018); F. P. Appio et al, 'Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges' 142 *Technological Forecasting and Social Change*, 1-14(2019); Y. Mehmood et al, 'Internet-of-Things-Based Smart Cities: Recent Advances and Challenges' 55 *IEEE Communications Magazine*, 16-24 (2017).

[2] For further information see: T. Yigitcanlar and S. Teriman, 'Rethinking sustainable urban develop ment: towards an integrated planning and development process' 12 *International Journal of Environmental Science and Technology*, 341-352 (2015); L. G. Anthopoulos and A. Vakali, 'Urban Planning and Smart Cities: Interrelations and Reciprocities' in F. Alvarez et al eds, *The Future Internet: Future Internet Assembly: From promises To Reality* (Cham: Springer, 2012) 178-189; I. Greco and A. Cresta, 'A Smart Planning for Smart City: The Concept of Smart City as an Opportunity to Re-think the Planning Models of the Contemporary City', in O. Gervasi et al, *Computational Science and Its Applications* (Cham: Springer, 2015), 563-576; M. Angelidou et al, 'Enhancing sustainable urban development through smart city applications' 9 *Journal of Science and Technology Policy Management*, 146-169 (2018); X. Bai et al, 'Defining and advancing a systems approach for sustainable cities' 23 *Current Opinion in Environmental Sustainability*, 69-78 (2016).

steady interconnection between these three pillars. If any pillar is weak, then the whole system is unsustainable.[3]

The Environmental pillar concerns the ability or needs to preserve a high level of environmental quality reducing natural resource extraction, energy consumption and disposal. This is one of the world's biggest actual concerns. The Economic pillar refers to the ability of an economic system to generate steady and sustainable economic growth.

In the end, the third, that is the social one, is focalized on social wellbeing, (including education, safety and health) and quality of life as one of the most important priorities as well as broadly distributed across the whole world. The above-mentioned notion of sustainable development is strictly related to the concept of smart cities which promotes interactions between citizens and innovative technologies for a sustainable urban living environment.

In doing so, smart cities are being seen as a way to create a sustainable urban infrastructure development with citizen's engagement in policy decisions by harnessing innovative technologies. Smart cities can be planned to reduce traffic congestion, energy consumption, and environmental pollution, favouring renewable and district energy supply technologies. Moreover, the smart city often requires effective collaboration and support across different stakeholders, both private and public.[4] Indeed, without cooperation, the conflict of interest between local authorities, citizens and business could hinder the smart city development. This also requires visionary leadership and governance able to efficiently communicating the benefits smart technology can bring to avoid communication failure.

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[3] For further information see: B. Purvis et al, 'Three pillars of sustainability: in search of conceptual origins' 14 *Sustainability Science*, 681-695 (2018); R. Hansmann et al, 'Principal sustainability components: empirical analysis of synergies between the three pillars of sustainability' 19 *International Journal of Sustainable Development & World Ecology*, 451-459 (2012); E.B. Barbier and J.C. Burgess, 'The Sustainable Development Goals and the systems approach to sustainability', in W. Rickels et al, *The Sustainable Development Goals-Assessing interlinkages, trade-offs and synergies for policy design* (Economics: Open-Assessment E-Journal, 2017), 1–22; I. Ilic-Krstic et al, 'The Three Dimensions Of Sustainable Development: Environment, Economy And Society' *Conference: The 18th Conference of the series Man and Working Environment At: Niš, SerbiHOV9a,* available at www.researchgate.net (last visited 5 December 2020); A.D. Basiago, 'Economic, social, and environmental sustainability in development theory and urban planning practice' 19 *The Environmentalist*, 145-161 (1998); N, Duic et al, 'Components and structures of the pillars of sustainability' 88 *Journal of Cleaner Production*, 1-12 (2015)

[4] For further information see: K. Paskaleva et al, 'Stakeholder Engagement in the Smart City: Making Living Labs Work', in R. Bolivar and M. Pedro eds, *Transforming City Governments for Successful Smart Cities, Public Administration and Information Technology,* (Cham, Springer, 2015), VIII, 115-145; N.S. Jayasena et al, 'Stakeholder Analysis For Smart City Development Project: An Extensive Literature Review', in E. Mohd Ahnuar et al eds, *MATEC Web of Conferences 266,* (EDP Sciences, 2019); G. Viale Pereira et al, 'Increasing collaboration and participation in smart city governance: a cross-case analysis of smart city initiatives' 23 *Information Technology for Development*, 526-553 (2017); S. Allwinkle and P. Cruickshank, Creating Smarter Cities: An Overview' 18 *Journal of Urban Technology*, 1-16 (2011); R. Wilhelm and S. Ruhlandt, 'The governance of smart cities: A systematic literature review' *Cities,* 81 *The International Journal of Urban Policy and Planning*, 1-23 (2018).

In the implementation of a sustainable urban development model,[5] smart cities represent an ideological solution and play a central role. Nevertheless, local authorities should develop appropriate objectives and strategies to face the challenges and address climatic, urbanization and energetic issues Indeed, although, cutting-edge technologies represent the main driver of smart city development, it could be difficult to realise the full implementation of ICT in smart cities planning. This is due to various obstacles such as institutional, political, social, technical barriers, data integration, and limited funding. Therefore, identifying and overcoming these hurdles becomes important to ensure an optimal and efficient allocation of resources.

3 Smart Cities and Barriers: Strategies to Overcome these Hurdles

While new technologies improve quality of life especially in densely populated areas, local authorities have to face significant challenges in planning and managing carbon-free cities. One of the main obstacles in urban planning is the lack of right skills and competences to manage efficiently smart cities. This entails that many countries should review their governance models and their administrative competences - which needs to be regularly updated - to ensure sustainable urban planning based on the efficient and rational management of resources. The development of smart cities models requires indeed a right policy mix, which allows an efficient, and efficacy coordination and interaction between different stakeholders to overcome conflicts in the decision-making process.[6]

Hardly ever do governments and local authorities recognize the city's key role in the decision-making process and it represents a major obstacle to the development of smart cities.

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[5] For further information see: M. Basiri et al, 'Smart City Solution for Sustainable Urban Develop ment' 6 *European Journal of Sustainable Development*, 71 (2017); A. D'Auria et al, 'Modern Conceptions of Cities as Smart and Sustainable and Their Commonalities' 10 *MDP Journal Sustainability,* 2642 (2018); M. Angelidou et al, 'Enhancing sustainable urban development through smart city applications' 9 *Journal of Science and Technology Policy Management*, 146-169 (2018); T. Lützkendorf and M. Balouktsi, 'Assessing a Sustainable Urban Development: Typology of Indicators and Sources of Information' 38 *Procedia Environmental Sciences*, 546-553 (2017); G. Haughton, 'Developing sustainable urban development models' 14 *Citie, The International Journal of Urban Policy and Planning*, 189-247 (1997).

[6] For further information see: T. Waas et al,' Sustainability Assessment and Indicators: Tools in a Decision-Making Strategy for Sustainable Development' 6 *Sustainability journal*, 5512-5534 (2014); M. Angelidou, 'Smart city policies: A spatial approach' 41 *Citie, The International Journal of Urban Policy and Planning*, s3-s11 (2014); A. Visvizi et al, 'Policy making for smart cities: innovation and social inclusive economic growth for sustainability' 9 *Journal of Science and Technology Policy Management*, 126-133 (2018); W. Castelnovo et al, 'Smart Cities Governance: The Need for a Holistic Approach to Assessing Urban Participatory Policy Making' 34 *Social Science Computer Review,* 724-739 (2016); A. Caraglio and C.F. Del Bo, 'Do Smart Cities Invest in Smarter Policies? Learning From the Past, Planning for the Future' 34 *Social Science Computer Review*, 657-672 (2016); A.J. Meijer et al, 'Smart City Research: Contextual Conditions, Governance Models, and Public Value Assessment' 34 *Social Science Computer Review,* 647-657 (2016).

For these reasons, to offset governance issues, the bottom-up approach,[7] made possible by innovative technologies, is becoming increasingly common among numerous countries by promoting public, private and civil society partnerships. Moreover, in doing so, policymakers have to take into account social economic and environmental issues. Thus, to foster the development of sustainable cities, public authorities should encourage interrelatedness among different sectors such as economic, energetic and technological. Furthermore, administrative barriers represent one of the main hurdles for the development of these integrated and interconnected cities based on a low carbon economy, energy efficiency, and technological development. These administrative obstacles concern in the first place, the numerous authorizations and permits required for the execution and implementation of the projects. This is due to the complexity and length of administrative procedures because it involves numerous stakeholders and different sectors. Indeed, complex bureaucratic procedures can often be inefficient because of a lack of interplay and consultation among different responsible actors, leading to confusion about each body's responsibilities.

Although cities are becoming even more smart and sustainable, these new urban realities require a new data management system. It should be integrated and interconnected by providing access to information and exchange of data among private and public stakeholders and citizens. When technological innovation, policymakers, and citizens come together to improve the quality of life by creating an efficient shared information network, that is when cities truly become smart and sustainable. Moreover, in a smart city, local authorities should not be daunted by the numerous data and cutting-edge technologies used for sharing information to them efficiently and wisely. Collaboration and coordination among various stakeholders by an efficient and wisely use of ICT is the smartest way to manage these new cities. Hardly ever more data and information translate into better policymaking if not transformed into useful and valuable information that can guide policy decisions. Potential hurdles to the implementation of advanced technologies in the decision-making process may include: the weak ability of public authorities and different stakeholders to use innovative technologies in local policymaking incongruence between numerous data and information; the lack of people dedicated to data analysis process - which means collecting, analyzing and transforming the amount of data in useful information and the scarcity data sharing across government

[7] A new model for a Smart City emerge: The Well-Informed City, where information is shared with the agents, the citizens themselves, and change is created from the bottom up as agents self-organize around a new state - using that information, E. Feder-Levy et al, 'The well-informed city: A decentralized, bottom-up model for a smart city service using information and self-organization', (Trento: IEEE International Smart Cities Conference, 2016), 1-4. For further information see: D. Menascé, 'A holistic approach to Smart Cities: articulating technology and citizen engagement' *The Journal of Field Actions* available at http://journals.openedition.org/factsreports/4296 (last visited 6 December 2020); M. Alverti et al, 'Smart city planning from a bottom-up approach: local communities' intervention for a smarter urban environment', in K. Themistocleous et al eds, *Conference: Fourth International Conference on Remote Sensing and Geoinformation of the Environment,*(Bellingham: SPIE, Digital Library, 2016); Z. Tang et al, 'Identifying smart city archetypes from the bottom up: A content analysis of municipal plans' 43 *Telecommunications Policy*, 101834 (2019); V. Albino et al, 'Smart Cities: Definitions, Dimensions, Performance, and Initiatives' 22 *Journal of Urban Technology*, 3-21 (2015).

and stakeholders. Furthermore, the information sharing process could run the risk of a bias. This occurs for instance when citizens are invited to report problems on the city's issues (e.g. urban mobility, urban infrastructures, public lighting etc.) by using smartphone applications. Nowadays, while many municipalities have started to share data and information by involving citizens in the decision-making process, transition and hidden costs or legal issues may arise due to a lack of regulatory framework. Also, to ensure the benefits of innovative technologies, local authorities should make policy decisions in conformity with the community needs. Moreover, while some municipalities are well-equipped to foster innovation development into policy decisions, others are technologically underdeveloped. Hence, policymakers play a key role in the transition towards fully sustainable and technological advanced cities by promoting public-private partnership[8] and by adopting innovative policies and strategies which are needed to address urban issues - such as urban mobility, energy innovation, infrastructures and so on - in an integrated sustainable manner. The second phase of urban planning has begun by promoting smart, sustainable, integrated and interconnected urban systems. In a smart city, less energy is used, people live longer and high levels of productivity are achieved.

However, a proactive approach from local authorities is still absent in many municipalities and this underestimates the numerous opportunities (such as greater economic and employment opportunities, smart grid and smart energy systems, reduction of traffic congestion, costs saving and return on investment etc.) which could be offered by innovative cities also in relation with economic and social transformation. This could be related to a lack of entrepreneurial culture, fear of failure and to the complexity in including different stakeholders in sustainable urban planning. Indeed, different stakeholders may have different views favouring certain issues instead of others, and it often proves to be quite difficult to reach a tradeoff.

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[8] Public Private Partnership is indeed also a valid solution for enabling the development of smart cities. This model provides better and more efficient public services, taking advantage of private sector's competence and benefits all the stakeholders. Indeed, 'One important challenge for smart cities (as it is, for instance, in an emerging industry like renewable energy) is to combine the innovativeness of different parties through the formation and management of partnerships and alliances (public and private partnerships). The resulting interactions as they take hold on a governed platform will combine to create a new, hopefully sustainable eco-system', J. Hoon Lee et al 'Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco' 89 *Technological Forecasting and Social Change*, 80-99 (2014); T. Liu et al, 'Emerging themes of public-private partnership application in developing smart city projects: a conceptual framework' *Built Environmental Project and Asset Management*, (2020); N.S. Jayasena et al, 'A systematic literature review and analysis towards developing PPP models for delivering smart infrastructure' *Built Environment Project and Asset Management*, (2020); J. Ojasalo and H. Kauppinen, 'Collaborative Innovation with External Actors: An Empirical Study on Open Innovation Platforms in Smart Cities' *Technology Innovation Management Review* available at http://timreview.ca /article /1041 (last visited 26 November 2020); A. Caraglio and C.F. Del Bo, 'Smart innovative cities: The impact of Smart City policies on urban innovation' 142 *Technological Forecasting and Social Change* 373-383 (2019); F.D. Sandulli et al, 'How to select the right public partner in smart city projects' 47 *Decision Making and Measurement in R&D*, 609-619 (2017); C.O. Cruz and M. Sarmento, 'Reforming traditional PPP models to cope with the challenges of smart cities' 18 *Competition and Regulation in Network Industries*, 94-114 (2017).

In very few countries governments give priority to the development of smart cities but it is only by giving them more emphasis that energy and climate goals will be achieved. To foster the development of smart cities, sustainable economic growth and social wellbeing need to be taken into account in policy decisions.

After the financial crisis, governments and the private sector have faced numerous financial problems causing a reduction in investment and innovation. Today, financing sustainable cities are one of the most relevant challenges for governments and local authorities.[9] Financial and economic hurdles may indeed hinder the development of energy-efficient and environmentally friendly cities models based on law carbon economies, renewable energies and innovative technologies.

Both the financial costs and economic risks linked to new technologies are hampering access to capital, discouraging both public and private stakeholders from investing in innovative and sustainable solutions. This is mainly due both to the financial risks in the renewable sector and the initial costs, which are often higher than in the traditional one (especially concerning new low carbon technologies solutions). Furthermore, clean energies solutions may have the added hindrance of intermittent production and causing highly regulated market prices dominated by large power suppliers. This has generated numerous challenges for all stakeholders since those models didn't fit these solutions, taking into account also that the lack of knowledge of potential benefits and the scarcity of an adequately skilled workforce could hinder the diffusion of these solutions. Hence, hardly ever lenders can evaluate the numerous potential and benefits of innovative and sustainable solutions.

Moreover, on the one side, public funds are scarce and limited, and on the other private capitals are difficult to mobilise. In such context investors without easy access to capital, have no incentive to invest in renewable energy projects and traditional energy sources appear to be more cost-efficient especially with regards to initial capital investment For these reasons, governments tend to prefer traditional energy sources without taking into account the lifecycle of innovative and low carbon solutions and the broad socio-economic benefits and opportunities. Thus, frequently policymakers favoured the cheapest option ignoring the main goals of both reducing production costs and increasing competitiveness and profits, which can be achieved through sustainable solutions. Luckily, innovative and sustainable financial models are developing rapidly intending to promote more and more the development of smart, low carbon and energy efficient cities. Indeed as mentioned above, among the numerous benefits of renewable energies, - which are one of the main features of the smart cities - in addition to reducing environmental pollution, have a marginal cost is close to zero and the high level of costs are essentially linked to initial capital costs. Hence, the only hurdle is to bear these initial costs, which are higher than in the

[9] For Further information see: S. Hamilton and X. Zhu, 'Funding and financing smart cities' 66 *The Journal of Government Financial Management*, 26-33 (2017); N. Veselitskaya et al, 'Drivers and Barriers For Smart Cities Development' 14 T*heoretical and Empirical Researches in Urban Management*, 85-110 (2019); S. Zygiaris, 'Smart City Reference Model: Assisting Planners to Conceptualize the Building of Smart City Innovation Ecosystems' 4 *Journal of the Knowledge Economy*, 217-231 (2017).

traditional sector per unit of energy produced, but in the long period, these costs ensure a positive return on investment.

To foster the development of renewable energies,[10] policymakers and citizens shall be sensitized both on the positive effects of renewable energy sources and negative impact of the traditional ones. The main disadvantages of traditional energy sources include environmental pollution, greenhouse gas emissions that lead to global warming, and their non-renewable and unsuitable nature. However, despite the numerous disadvantages, people are still using fossil fuel energies because they are cheaper than renewable energies. Renewable energies are the only solution to the reduction of fossil fuels globally and the key to tackling climate change emergency. 'A global energy transition is urgently needed to meet the objectives of limiting the average global surface temperature increase below 2° Celsius. Higher energy efficiency and much a higher share of renewable energy are the two pillars of the energy transition. Renewable energy and energy efficiency measures can indeed potentially achieve 94% of the required emissions reductions by 2050 compared to the traditional ones. The remaining 6% would be achieved by the other options for reduction of energy-related CO2 emissions' (Gielen et. al, 2019). Thus, the creation of awareness of renewable energies among communities and a crucial focus on the communities' socio-cultural customs and habits is of paramount importance.

4 Conclusion

In the current global context, policymakers have to face complex and numerous challenges in achieving sustainable development within the rapid urbanization and industrialization. The world's population is growing and cities will be increasingly condensed in the future. Hence, an emerging necessity of smart cities can be determined. Smart cities are more livable, inclusive, and sustainable towns. However, to promote the development of smart cities models, there are numerous hurdles, which need to be overcome such as institutional and administrative barriers, data integration barriers, the lack of right skills and competences to manage efficiently smart cities, lack of an efficient shared communication network among numerous

[10] For further information see: M. Brenna et al, 'Challenges in energy systems for the smart-cities of the future' *International Energy Conference and Exhibition (ENERGYCON)*, (IEE, Online, 2012) 755-762; C.F. Calvillo et al, 'Energy management and planning in smart cities' 55 *Energy management and planning in smart cities*, 273-287 (2016); S. Pereira et al, 'Optimization modeling to support renewables integration in power systems' 55 *Renewable and Sustainable Energy Reviews* , 316-325 (2016); N. Ouhajjoua et al, 'Stakeholder-oriented energy planning support in cities' 28 *Sustainable Cities and Society*, 482-492 (2017); W. Strielkowski et al, 'Economic efficiency and energy security of smart cities' 33 *Economic Research-Ekonomska Istraživanja*, 788-803 (2020); M.S Hossaina et al, 'Role of smart grid in renewable energy: An overview' 60 *Renewable and Sustainable Energy Reviews*, 1168-1184 (2016); N.P. Garcia et al, 'Sustainable and Resource Efficient Cities platform – Sure City holistic simulation and optimization for smart cities' 215 *Journal of Cleaner Production*, 701-711 (2019); M. Bhattaccharya et al, 'The effect of renewable energy consumption on economic growth: Evidence from top 38 countries' 162 *Applied Energy*, 733-741 (2016); M. Papieża et al, 'Effects of renewable energy sector development on electricity consumption – Growth nexus in the European Union', 113 *Renewable and Sustainable Energy Reviews*, 109276 (2019); J. Mohtasham, 'Review Article-Renewable Energies' 74 *Energy Procedia*, 1289-1297(2015).

stakeholders and limited funding. These and other barriers can be overcome through numerous strategies such as innovative governance models by revising administrative abilities, by involving citizens in policy decisions and by promoting social inclusion and the development of PPP. Doubtless, among urban stakeholders, policymakers play a key role in urban planning by promoting sustainable and efficient management of resources, environmental protection and by fostering sustainable economic growth. In such a context, renewable energies issues should be taken into consideration. These and other strategies could be used in enabling smart cities development, which represents a solution for rising global issue on achieving sustainable development goals.

PART III

FAILURE CASE OF SELF CONSUMPTION AND PROSUMERING: LESSONS LEARNED

Legislative Policies and Jurisprudence on Climate Change: New Tools for Removing the Barriers to New Forms of Energy Consumption

Lucia Ruggeri

Abstract The new EU regulatory framework put the energy consumers at the heart of the energy transition and energy market decentralization. The citizen's involvement is pivotal to enhance the use of renewable energies and to develop self-consuption. For this reason both the EU Directives RED II and IEM introduced specific rules to strenghten energy communities. The massive growth of prosumerism is important to achieve the global goal of accessible and clean energy. The relationship between sustainable energy production and consumption and the fight against climate change impacted on the development of a new juridical culture. The rights of future generations are the new frontier of climate change litigation strategy.

1 Citizenship and Subsidiarity: the Collective Self-consumer and Renewable Energy Communities in RED II

One of the main obstacles to the implementation of energy transition is the inadequate involvement of citizens. Transition requires a decentralisation of energy production resources which, in turn, demands the adoption of tools that make it possible to exploit the energy produced in the most efficient way possible, through 'smart grids'[1] and local tools for the use of energy.

This sensitive transition, from a traditional energy market to one based on decentralisation, is promoted by two new regulatory instruments soon to be implemented in the Member States of the European Union: the Renewable Energy Directive (known as RED II)[2] and the Internal Energy Market Directive (known as IEM).[3]

In both Directives, energy market consumers play a strategic role in the creation of an energy market which is increasingly based on renewables and is becoming less centralised.[4]

[1] S. Galera Rodrigo, 'Changing the Energy Model: Step Back on the Europe 2050 Strategy?' 25 European *Energy and Environmental Law Review*, 65-72 (2016).

[2] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) [2018] OJ L328/82 (RED II Directive).

[3] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) [2019] OJ L158/125 (IEM Directive).

[4] A. Duterque, 'The liberalisation of EU energy markets: A consumer's perspective' 2 *Journal of European Consumer and Market Law*, 80-96 (2013).

The involvement of end customers, including domestic ones, is a key mechanism for European energy policies:[5] to decentralise means, in fact, bringing the production of energy in a capillary way ever closer to those who need it. The proximity of consumption and production requires the adoption of new organisational and management models with forms of alliance between public and private entities.[6] Just consider 'collective self-consumers'[7], referred to in Article 21 RED II, for the protection and development of which Member States are required to carry out an appropriate assessment of the barriers to self-consumption.[8]

The economic conditions of low-income, or otherwise vulnerable, families result in difficulties in accessing energy, and obstacles to forms of subsidised financing reduce family investments in the production of renewable energy. Therefore, no decentralisation of the market can be achieved without the active involvement of citizens and the communities in which they live[9]: from this perspective, energy law can no longer be expressed exclusively as a set of rules intended for the traditional stakeholders of the energy market, but is characterised by new profiles consisting of the adoption of contractual association models capable of managing the production, consumption and sale of energy which is produced locally and is decentralised. Therefore, the involvement of citizens among energy market players requires technological as well as cultural and social change.[10] In fact, if today technologies can make the efficient self-generation[11] and distribution of renewable energy possible, technological opportunities must be promoted by the legislator, but above all they must be understood[12] by the citizens and the communities in which they live.

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[5] K. Cseres, 'The active energy consumer in EU law' 9 *European Journal of Risk Regulation*, 227-244 (2018).

[6] On this topic, see the experiences of an energy community in Roseto Valforte and analyzed by V. Raffa, *Generazione di energia distribuita e comunità energetiche* (Napoli: Edizioni Scientifiche Italiane, 2020), 73-95.

[7] In Italy, the first rules regarding self-consumption and energy communities were introduced by article 42-bis, inserted in the decree law of 30 December 2019 no 162, known as Decreto Milleproroghe, (converted into the law of 29 February 2020 no 8).

[8] See the analysis conducted by Client Earth, 'Prosumer Rights: options for a legal framework post-2020' (2016) 21-37 available at https://www.documents.clientearth.org/library/download-info/prosumer-rights-options-for-an-eu-legal-framework-post-2020-2/ (last visited 3 February 2021).

[9] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Delivering a new deal for energy consumers', COM (2015) 339 final, Brussels, 15 December 2015 available at https://ec.europa.eu/energy/sites/ener/files/documents/1_EN_ACT_part1_v8.pdf (last visited 3 February 2021). On European energy policies, see C. Petteruti, *Diritto dell'ambiente e dell'energia* (Napoli: Edizioni Scientifiche Italiane, 2020), 103-151.

[10] See M. Giobbi, 'Autoconsumo, mercato energetico e protezione del consumatore' *Le Corti Umbre*, 304-319 (2020).

[11] P.M. Rosa Salva, 'Self-generation and energy communities: issues and perspectives', in A. De Luca et al eds, *The European Union renewable energy transition (*Padova: Cedam, 2019), 257-286.

[12] The difficulties in understanding energy policies are the result of multiple factors: the extreme technicality of the contents, poor understanding of the technologies, and the difficulty in understanding the terminologies used. The energy sector constitutes a paradigmatic field of

In other words, in order to work, the transition requires a change of perspective: from policies and top-down approaches, it is necessary to move to a bottoms-up approach, enhancing forms of subsidiarity in the relations between State and citizen, as laid down in Article 118, last paragraph, of the Italian Constitution.[13] This provision identifies in the autonomous initiative of citizens, as individuals or as associations, an instrument for implementing the principle of subsidiarity on which to base the relations between citizens and the territorial articulations of the State.

Therefore, the new energy market players[14] assume a strategic role, imprinting the principle of subsidiarity on the Italian energy market which has for too long been characterised by public-law and management profiles.

RED II provides for the citizen to participate as a protagonist in energy transition in the form of collective self-consumer, or as a member of a renewable energy community (REC). The legal personality of the self-consumer is an important milestone for forms of aggregation between people who live in the same building or condominium. The renewable energy community (REC) is also a form of aggregation between citizens able to interact with the local community by activating 'environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates',[15] with mainly non-profit goals. Pursuant to article 22 RED II, renewable energy communities, owners of installations powered exclusively by renewable energy resources present in a limited area, can be made up of a plurality of natural persons as the final customers of the energy market, small and medium enterprises, local authorities, and they operate by using energy installations located nearby. For renewable energy communities, Member States are also required to adopt a direct support framework aimed at eliminating unjustified regulatory and administrative obstacles, and to introduce specific regulations for these players in energy transition. The barriers that renewable energy communities encounter are the same as those of collective self-consumption, but with some specificities due to the possible participation of local public authorities. For this reason, article 22, paragraph 4, subparagraph h) of RED II appropriately lays down that 'regulatory and capacity-building support is provided to public authorities in enabling and setting up renewable energy communities, and in helping authorities to participate directly'. The European regulatory framework promoting energy

application for a human-centred legal system according to the principles of legal design. See K. Gabel, 'Law+Design=Summit' available at https://law.stanford.edu/organizations/pages/legal-design-lab/#slsnav-legal-design-innovation (last visited 3 February 2021).

[13] According to Article 118 of the Constitution, last paragraph, 'The State, regions, metropolitan cities, provinces and municipalities shall promote the autonomous initiatives of citizens, both as individuals and as members of associations, relating to activities of general interest, on the basis of the principle of subsidiarity'. On the relationship between negotiation autonomy and subsidiarity, see P. Perlingieri, *Il diritto civile nella legalità costituzionale secondo il sistema italo-europeo delle fonti* (Napoli: Edizioni Scientifiche Italiane, 4th ed, 2020), IV, 29-31.

[14] For an accurate description of the new players in the energy market, see the CEER Report, 'Regulatory aspects of self-consumption and energy communities', 25 June 2019 available at https://www.ceer.eu/1740 (last visited 3 February 2021).

[15] Article 2, point 16 of RED II.

transition softens the strict ban on state aid by allowing a model of state intervention to support an economy based on flexibility. The Court of Justice of the EU[16] has recently confirmed this approach by quashing the decision of the European Commission that had sanctioned Germany for introducing a law on renewable energy which provided for forms of support to electricity providers. The adopted regulatory model is even more interesting today, given that the Covid-19 pandemic has made it necessary to abandon regulatory rigidities on state aid. In this new economic context, the regulatory flexibility adopted to promote energy transition can be a useful regulatory paradigm that can also be adopted in other markets.[17]

2 Citizen Energy Communities and the Active Customer in the IEM Directive

The IEM Directive also introduces a new player in the energy market by favouring the direct involvement of final consumers: the citizen energy community (CEC) which, unlike REC, can also include small enterprises, regardless of the proximity of the installations, and can provide electric vehicle charging services or other energy services to its members or shareholders. The IEM Directive specifies that the adoption of a specific statute for citizen energy communities does not preclude the adoption of other forms and types of aggregation between citizens governed by private-law contracts. The European legislator appropriately specifies that the community may include members or shareholders who carry out large-scale commercial activities and for whom the energy sector is one of the primary areas of economic activity, but that in no case could these entities be attributed decision-making power within the communities.[18] There is clear concern that the CEC, foreseen by the IEM Directive as a non-profit entity, could become a tool for controlling the energy market by professional energy market operators. The technological knowledge gap of its members and the fact that they are not professionals could transform a tool designed to help the local community into an entity that serves the business needs of professionals equipped with the technology and organisational skills necessary to activate the production, consumption and distribution of energy. The role of energy market professionals in the development of energy communities is relevant and indispensable. In this regard, the intermediation between customers and the market carried out by independent aggregators, i.e. those not connected to the customer's supplier, is fundamental: national legislation on independent aggregators will

[16] Case C-405/16 P *Federal Republic of Germany v European Commission* [2019] ECLI:EU:C:2019:268. On this topic, see L. Genty and R. Coin, 'Éclairage sur la notion de ressources d'État au sens de l'article 107, § 1 du TFUE et sur la notion de contrôle public du GRT d'électricité' 8-9 *Énergie - Environnement - Infrastructures*, 41-44 (2019).

[17] See Communication from the Commission, 4th Amendment to the Temporary Framework for State aid measures to support the economy in the current COVID-19 outbreak and amendment to the Annex to the Communication from the Commission to the Member States on the application of articles 107 and 108 of the Treaty on the Functioning of the European Union to short term export-credit insurance, C(2020) 7127 final, 13 October 2020 available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020XC1013%2803%29 (last visited 3 February 2021).

[18] See as indicated in Recital 44 of the IEM Directive.

constitute an important testbed for the development of non-profit logic in the energy sector.

The presence of municipalities or territorial authorities in the community is not a firm guarantee against forms of contractual abuse. Emblematic, in this respect, is the story of the municipality entering into derivative contracts: although formally these are negotiations on an equal footing, there has, in fact, been systematic abuse of the technical knowledge gap which has resulted in the stipulation of contracts with unbalanced content. This has led to radical regulatory interventions, such as a ban on concluding derivative financial contracts[19] and major court decisions[20] which declared the contracts entered into by local authorities null and void due to significant contractual imbalances caused by the uncertainty that characterises these negotiations. Therefore, it seems that the adoption of contractual schemes for the creation of citizen energy communities must take into consideration that the presence of a local public authority not only fails to prevent abusive uses caused by technological dependence,[21] but also makes it essential for an appropriate assessment to be made of the structure of interests. Local authorities can achieve public purposes by acting *iure privatorum,* but always respecting the principles with which the activity of public administration must comply in accordance with the provisions of article 97 of the Constitutional Charter. Hence, in implementing the Directive, the Italian legislator must, on the one hand, allow the formation of energy communities that do not regard local authorities as members, and establish whether the forms that can be used to carry out the activity are only those of tertiary-sector entities or that they also include those provided for in the Civil Code. The legislator will, hopefully, have to determine which types of contracts can be used when local public authorities operate within the community. In addition to structural profiles (identification of appropriate types of contracts to fulfil non-profit purposes), it will also be important to combine the regulatory guidelines of public administrations with those specific to energy communities, avoiding invalidities deriving from the application of the specific regulations of public authorities.[22]

[19] See Article 1, paragraph 572 of the law of 27 December 2013 no 147 (known as Legge di stabilità 2014).

[20] See, most recently, the united sections of the Corte di Cassazione 12 May 2020 no 8770 available at https://www.ratioiuris.it/cass-civ-sez-unite-civili-12-05-2020-n-8770/ (last visited 3 February 2021).

[21] The abuse of technological dependence is an increasingly significant problem in various market formats. See F. Lazzarelli, 'Dipendenza tecnologica e dipendenza economica: una "ragionevole" interpretazione della legge sulla subfornitura' Rassegna di diritto civile, 101-142 (2005).

[22] This concerns a consolidated judicial orientation. See Corte di Cassazione 10 June 1981 no 3748, Rivista di legislazione fiscale, 257 (1982), according to which 'The private law capacity of legal persons, except concerning relations incompatible with their nature, is potentially 'general', but for public authorities, it meets the limit of "competence", which is delimited by rules that can certainly be qualified as "mandatory" in the meaning of Article 1418 of the Italian Civil Code, so that their violation entails the radical invalidity of the deed, as it is affected by an inability to negotiate'.

With regard to the consumption of self-generated energy, citizen energy communities are treated as 'active customers'. An 'active customer' is another type of energy player introduced by the IEM Directive. Pursuant to article 2, point 8), it means 'a final customer, or a group of jointly acting final customers, who consumes or stores electricity generated within its premises located within confined boundaries or, where permitted by a Member State, within other premises, or who sells self-generated electricity or participates in flexibility or energy efficiency schemes, provided that those activities do not constitute its primary commercial or professional activity'. The notion of 'active customer' is very broad and generic and can include any form of self-generation, including that from non-renewable sources. The statute of the active customer removes some significant barriers, given that it expressly provides for the right to operate in the energy market directly and/or in aggregate form, to enter into agreements for the purchase of energy, and to entrust the management of the installations to a third party, without the third party being considered an active customer.

The European legal system foresees the obstacles that communities such as new and small entities may encounter: access to the energy market requires support policies that allow not only entry, but also the sustainability of these new entities without succumbing to larger entities. The vulnerability of self-consumption and self-generation actors justifies the adoption of measures such as the provision of information and technical and financial assistance, as well as reduced administrative requirements. RED II itself identifies possible obstacles in the complexity of administrative procedures and in the technical-managerial organisation, and requires Member States to help these new entities by 'creating tailored bidding windows for renewable energy communities or allowing renewable energy communities to be remunerated through direct support where they comply with requirements of small installations'.[23]

However, the development of decentralised technologies for renewable energy generation and storage is based on the adoption of non-discriminatory conditions that do not hinder the financing of investments in infrastructure.

3 The Renewable Energy Community and the Citizen Energy Community as Promoters of Sustainable Local Development

In the new European regulatory framework, local energy-generation communities become instruments for the pursuit of further social and economic goals, such as development and social cohesion. Indeed, by exploiting energy, they manage wealth by generating new sources of income and creating jobs at the local level. In addition, they significantly contribute to energy efficiency by reducing the energy bill, contributing to the fight against energy poverty, a strategic objective of the Energy

[23] Recital 26 of the European Parliament and Council Directive (EU) 2018/2001.

Union[24] specified in the RED II[25] and IEM[26] Directives. Families are often prevented from benefiting from access to subsidised energy due to a lack of adequate information, the presence of barriers to subsidies, and due to disadvantaged conditions. The adoption of forms of citizen aggregations is, therefore, the key turning point for achieving not only European, but also global, objectives such as those listed in the 2020 UN Agenda: the fight against poverty and access to affordable and clean energy. The provisions of RED II[27] dedicated to tenants or, in any case, to those who in any way use buildings they do not own, fit into this context. By surpassing the formal fact of ownership, we look at the needs of those who actually use the property that is required to 'generate energy'. This is the direction where the objective of involving the local authorities is placed: the participation of municipalities or other forms of territorial authorities is, in fact, strategic, not only to intercept forms of private investment at the local level, but also to increase the extent of the 'social buy-in' of forms of renewable energy.

One of the greatest problems posed by energy communities is their 'vulnerability' with respect to the traditional players in the energy market. In fact, the communities, in order to operate, need investment, or, in any case, some form of support and cooperation from the companies operating in the sector, which could be shareholders, or members of the communities. In this context, the defence of the community's autonomy with respect to forms of the 'dominant position' of these entities is beneficial to the achievement of important energy market objectives, such as competitiveness and decentralisation. The balance between the protection of energy communities and the fight against abuses of position constitutes an objective whose methods of implementation are left to the Member States which will be able to choose the forms of legal personality that can best achieve autonomy and, at the same time, ensure that no member of the energy community takes undue advantage of this protection. In this regard, the IEM Directive, with reference to citizen energy communities, specifically establishes the right to arrange the sharing of electricity

[24] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy', COM/2015/080 final, § 2.2.

[25] Based on Recital 67 of RED II 'Empowering jointly acting renewables self-consumers also provides opportunities for renewable energy communities to advance energy efficiency at household level and helps fight energy poverty through reduced consumption and lower supply tariffs'.

[26] There are numerous referrals to energy poverty in the IEM Directive. See in particular Recital 60 which reads 'Where Member States are affected by energy poverty and have not developed national action plans or other appropriate frameworks to tackle energy poverty, they should do so, with the aim of decreasing the number of energy poor customers. Low income, high expenditure on energy, and poor energy efficiency of homes are relevant factors in establishing criteria for the measurement of energy poverty. In any event, Member States should ensure the necessary supply for vulnerable and energy poor customers. In doing so, an integrated approach, such as in the framework of energy and social policy, could be used and measures could include social policies or energy efficiency improvements for housing. This Directive should enhance national policies in favour of vulnerable and energy poor customers'.

[27] See. article 21, paragraph 6 points c) and d). The importance of a hermeneutics marked by sustainability and protection of the rights of future generations.raph 6 points c) and d).

generated by the production units owned by the community 'subject to the community members retaining their rights and obligations as final customers'.[28] In implementing the Directive, Member States will be able to expand the rights of the CEC in such a way as to include the management of the distribution network in the area in which they operate.[29]

4 The Importance of a Hermeneutics Marked by Sustainability and Protection of the Rights of Future Generations.

The provision of energy communities constitutes one of the most important innovations brought about by the European regulatory framework since it introduces a form of direct citizen participation in the implementation of objectives such as the fight against climate change, an objective pursued with increasing frequency through converging legislative policies.

The adoption of regulatory instruments which, through the use of direct and indirect fiscal and social incentives, promote energy production tools that are sustainable and aimed at stimulating energy transition, characterises the action of the European legislator and, consequently, that of the legislators of the Member States.

In this context, oriented towards subsidiarity, the legislative instrument is not the only means to promote the achievement of the objectives described above. The growing importance of the role of citizens in the energy market also requires a change in legal culture, and an altered and renewed approach to rules, in other words, an interpretation that incorporates environmental sustainability,[30] the true substrate of energy policies, among its values. The push towards decentralisation helps achieve the objectives of combating climate change, which, in turn, find their *raison d'être* in the implementation of the full protection of the person and his or her rights. In addition, there is a regulatory barrier that excludes the use of forms of self-consumption for those who are not owners, generating unreasonable discrimination. Both those who own a home and those who live in it as tenants are called upon to contribute to energy transition, but benefits and financing are often limited to the owners. There is a need for a change in strategy that encourages the renovation of buildings to improve their energy efficiency, but decisions are often entrusted to those who own the apartment without the adequate involvement of those who live in it, and actually benefit from it. Those who live in the building must pay the costs of energy: the energy transition process can be better implemented with a regulation that includes and involves[31] those who, although not owners, enjoy the

[28] See article 16, paragraph 3, point e).

[29] Thus article 16 paragraph 4 provides a complete prescription of rules that safeguard customers from discrimination or additional charges that have not been adequately highlighted.

[30] See P. Perlingieri, n 13 above, 254-256; E. Caterini, *Sostenibilità e ordinamento civile. Per una riproposizione della questione sociale* (Napoli: Edizioni Scientifiche Italiane, 2018), 96-113.

[31] For an interesting study on the involvement of owners in the reduction of energy consumption policies, see M.J. Lavelle and F. Fahy, 'Creating context for corridors of consumption: the case of Ireland' 17 *Sustainability: Science, Practice, and Policy*, 62-76 (2021).

building, encouraging their participation in 'collective' forms of energy generation and consumption, with an adequate balancing in distributing the costs incurred to achieve energy efficiency. The reduction of consumption[32] and the progressive abandonment of fossil fuels are socially useful objectives that can justify the complying instruments[33] of contracts and of the owner institution itself[34] so as to reshape the content in such a way that a veto by the owner does not become an insurmountable and definitive obstacle for a tenant who wants to be able to take the path towards energy efficiency. The national legislator will be able to intervene also in these modes of transposition of the Directive, taking advantage of hermeneutical tools, such as the conception of property as a relationship, and the operation of solidarity also within the rental relationship.

A legal interpretation attentive to the promotion of a healthy environment[35] in a diachronic key allows for the proper application of the rules on energy communities. On the other hand, a hermeneutic approach not based on an adequate consideration of the values of sustainability and intergenerational solidarity[36] raises an obstacle to the development of forms of self-consumption or prosumerism.[37]

Encouraging the development of forms of self-consumption characterised by a deep awareness of the importance of adopting renewable energies contributes to the fight against climate change carried out by European energy policies.[38]

This topic is relatively new as it has only recently come to the attention of the high courts thanks to the commitment of activists[39] who, through 'targeted' legal actions,

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[32] See C. Crampes and C. Waddams, 'Empowering electricity consumers in retail and wholesale markets' 19 March 2017 available at http://www.cerre.e/ite/err/ile/70309_CERRE_ EnergyConsumers_Final.pdf (last visited 3 February 2021).

[33] See P. Perlingieri, n 13 above, 293-303 according to which 'there is a clear need to comply with fundamental principles, such as proportionality, solidarity, transparency, and fairness in contractual relations, acting as a bulwark for the fundamental rights of consumers, users, and businesses'.

[34] On this topic, see S. Fanetti, 'Adattamento ai cambiamenti climatici e proprietà edilizia in contesti urbani' *Annuario di diritto comparato e di studi legislativi*, 227-260 (2019); M. Pennasilico, '"Proprietà ambientale" e "contratto ecologico": un altro modo di soddisfare i bisogni' *Rassegna di diritto civile*, 1261-1266 (2018) .

[35] R.L. Lorenzetti and P. Lorenzetti, *Diritto ambientale* (Napoli: Edizioni scientifiche italiane, 2020), 231-247.

[36] The protection of future generations is strictly linked to the fight against climate change. See S. Kravchenko, 'Right to carbon or right to life: human rights approaches to climate change' 9 *Vermont Journal of Environmental Law*, 513-548 (2008).

[37] The development of prosumerism is a fundamental objective for the European energy policy. European Parliament, Think Tank, 'Energy prosumers' November 2016 available at www.europarl.europa.e/egDat/tude/RI/01/9351/PRS_BRI(2016)593518_EN.pdf (last visited 2 February).

[38] See J. Peel, 'Climate change law: the emergence of new legal discipline' 32 *Melbourne University Law Review*, 922-979 (2008).

[39] For a glimpse of the impact of ecological topics on traditional judicial categories, see. F. Capra and U. Mattei, *The ecology of law: toward a legal system in tune with nature and community*, (Oakland: Berrett-Koehler Publishers, 2015), 169-185.

have encouraged the development of 'ecologically oriented' legal hermeneutics by the courts.[40]

At the end of 2019, the Dutch Supreme Court[41] ruled that any violation of the right to life and health must be accompanied by the possibility of using an effective remedy by establishing that, when values such as environmental and health protection are at stake, court protection must be provided even when the violation of these rights is still possible. Although this decision was made by a national judge, the case is remarkably important because the decision was rendered by applying the articles of the European Convention for the Protection of Human Rights which, according to the Dutch judge, attribute an inviolable right to citizens, consisting of the protection of their lives and their health against climate change.[42] The right to be protected against the negative consequences that may derive from climate change enjoys effective protection which, pursuant to Article 13 of the European Convention for the Protection of Human Rights, must be granted, allowing citizens to invoke it against government authorities who have the task of adopting policies aimed at reducing CO2 emissions.[43] The Dutch decision, based on rules that can be invoked by all citizens of the member countries of the Council of Europe, is of considerable importance as it removes one of the barriers that existed up to now in the field of energy and in the fight against climate change. Citizens were denied the right to directly sue government authorities and request the fulfilment of commitments undertaken at international level, where failure to implement potentially causes a threat to the quality of life and health of the population. The Dutch government attempted to block this ruling which has significant consequences: the Netherlands is, in fact, among the countries that more than others pollute and emit carbon dioxide. The consequence of this ruling is that in one year, the Dutch government would have to reach the target set for 2020, which was to reduce carbon dioxide emissions by 25% compared to 1990; it is speculated therefore that coal plants activated between 2015 and 2016 will have to be closed.

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[40] Heather Colby et al, 'Judging climate change: the role of the judiciary in the fight against climate change' 7 *Oslo Law Review*, 168-185 (2020).

[41] *State of the Netherlands v. Urgenda Foundation* [2019] Dutch Supreme Court, no 19/00135. For a case analysis, see E. Barrit, 'Consciously transnational: Urgenda and the shape of climate change litigation: State of the Netherlands (Ministry of Economic Affairs and Climate Policy) v Urgenda Foundation' 22 *Environmental Law Review*, 296-305 (2020); J. Spier, 'The 'strongest climate ruling yet': the Dutch Supreme Court's Urgenda judgment' 67 *Netherlands International Law Review*, 319-391(2020); O.W. Pedersen, 'The networks of human rights and climate change: State of the Netherlands v Stichting Urgenda, Supreme Court of the Netherlands, 20 December 2019 (19/00135)' 22 *Environmental Law Review*, 227-234 (2020).

[42] On the connection between human rights and sustainable development, see P. Perlingieri, 'I diritti umani come base dello sviluppo sostenibile. Aspetti giuridici e sociologici', in Id, *La persona e i suoi diritti. Problemi del diritto civile* (Napoli: Edizioni Scientifiche Italiane, 2005), 73-78.

[43] P. Minnerop, 'Integrating the "duty of care" under the European convention on human rights and the science and law of climate change: the decision of the Hague court of appeal in the Urgenda case' 37 *Journal of Energy and Natural Resources Law*, 149-179 (2019).

In 2020, another Supreme Court also ruled against a government in a legal action aimed at bringing into effect the duty to combat climate change. On 31 July 2020, the Irish Supreme Court, at the request of an environmental association,[44] ruled that the 2017 government plan to implement the Irish Climate Act[45] was not adequately detailed in the description of measures to reach the goal of energy transition. Following this ruling, the Irish Government will have to adopt a new plan that outlines in detail the methods of implementation and the timing of the achievement of the objectives of reducing CO2 emissions and combating climate change, which the Irish Government had also undertaken to achieve at the international level.

On 3 February 2021 the Administrative Court of Paris condemned the French Government for failing to meet its commitments in the fight against climate change: according to the Court it is possible a reimbursement for ecological damage.[46] The French decision has a strong symbolic value because the Court has recognized the damage to citizens caused by this inaction of the French Government.[47]

Thus, the jurisprudence of the courts in Europe,[48] informed by international principles in combating climate change, opens new frontiers[49] for the development of a legal culture that knows how to promote a society where the issue of energy is seen as a key moment in implementing a plurality of policies, all with the aim of delivering

[44] *Friends of the Irish Environment v. Government of Ireland & Ors*, [2019] High Court of Ireland IEHC 747. For a comment, see O. Kelleher, 'A critical appraisal of Friends of the Irish Environment v Government of Ireland' *RECIEL. Review of European, Comparative & International Environmental Law*, 1–9 (2020).

[45] Climate Action and Low Carbon Development Act 2015 available at http://www.irishstatutebook.ie/eli/2015/act/46/enacted/en/pdf (last visited 2 February 2021).

[46] Tribunal Administratif of Paris 3 February 2021 n°1904967, 1904968, 1904972, 1904976/4-1, available at www.osloprinciples.org/ (last visited 10 February 2021).

[47] See Tribunal Administratif of Paris 3 February 2021, ibid 45, § 41: 'In the present case, in view of the shortcomings of the State in implementing public policies enabling it to achieve its greenhouse gas emission reduction targets, the applicant associations may claim reparation by the State for these faulty deficiencies provided that they demonstrate the existence of direct and certain damage resulting for them'.

[48] The fundamental rights to life, health and an adequate standard of living of communities are seriously threatened by climate change in all the world. The concepts of climate justice are used in several climate change litigation cases. See *Leghari* v. *Federation of Pakistan* [2015] W.P. 25501/201. On this decision see E. Barrit and B. Sediti, 'The Symbolic Value of Leghari v Federation of Pakistan: Climate Change Adjudication in the Global South' 30 *King's Law Journal*, 203-210 (2019).

[49] See *Smith* v *Fonterra Co-Operative Group Limited and Ors* [2020] NZHC 419, 6 March 2020. This case opens new boundaries to the climate change litigation strategies. The lawsuit is directed against large emitters, the greenhouse-gas-emitting companies.

a liveable planet for future generations. The concept of justice itself changes,[50] as an appeal is made to the judge to protect the needs of new generations by initiating a kind of intergenerational justice whereby the present generations do not act to protect current interests, but bring to the attention of the judge the need to safeguard the rights to life and health of future generations.[51]

[50] See the People's Declaration for Climate Justice, underwritten by the Philippines, Fiji, Vanuatu, Kiribati Tuvalu and the Solomon Islands. See also the so-called Oslo Charter (Oslo Principles on Global Climate Change Obligations) on the possible legal actions against governments and companies responsible for climate change available at www.osloprinciples.org/ (last visited 2 February 2021). On this topic, see C. Vivani, 'Climate change litigation: quale responsabilità per l'omissione di misure idonee a contrastare i cambiamenti climatici?' *Ambiente e sviluppo*, 599 (2020).

[51] See C. Beauregard et al, 'Climate justice and rights-based litigation in a post-Paris world' *Climate Policy*, (2021) in press; J. Peel and H.M. Osofsky, 'Climate change litigation' 84 *Annual Review of Law and Social Science*, 21-38 (2020).

Analysis of Energy Policies in the Context of Covid Crisis

Lidia-Lenuta Balan

Abstract This material is a brief description and analysis of energy policies and strategies, with suggestions and proposed solutions for relaunching the field and the economy in general, an approach that is made especially for the European Union and includes some of the legal instruments with regional vocation, but also universal in terms of financial crises, challenges and threats to the society in which we live with a strong impact on the environment and humanity, in the context of tragedies experienced by the human factor with the emergence and manifestation of the crisis generated by the virus COVID 19.

1 Introduction

In the spirit of the great challenges and threats of the society in which we live, determined by the evolution of the criminal phenomenon, the spread of viruses and epidemics, the underdevelopment and development of the world's countries and their inequalities, as well as the amplification of environmental degradation in the context of crisis international financial, energy, is and remains a priority component in the evolution and mention of the international relations of the states of the world.

International relations with the countries of the world also represent the existence, assurance and guarantee of energy security, materialized in a strategic goal, in continuous competition for maintaining and capitalizing on natural resources and fulfilling the geopolitical and geostrategic objectives of each state.

Each state of the world can be seen, regardless of its strategic and geopolitical position with other states and its economic power, as the basis of its pyramidal construction, has a fundamental pillar, that of energy security.

When we talk about energy security we consider its fundamental role for the environment and the functioning of society, by carrying out activities that involve: producing goods and performing services, activities that are meant to contribute to increasing the country's income and the well-being of society and humanity, by raising living standards, in general for both present and future generations, but also to eradicate poverty for the areas and countries facing it.

But although it is desired to increase living standards, the current state of the world is worrying and is characterized by a sharp increase in the dependence of world states on natural resources, especially energy, as the situations we face worldwide amid growing disasters, depleting natural resources, limiting water resources, limiting food resources, increasing the phenomenon of global warming, increasing and spreading religious and ethnic conflicts, and spreading viruses, such as, for example, the emergence and manifestation of the COVID 19 virus are processes and realities that endanger and endanger the global security of quality of life and humanity in general.

Given the existing phenomena of growing natural disasters, global warming, the occurrence and manifestation of epidemics and viruses, such as COVID 19 virus, the entire pyramidal construction of the world's states are endangered, and sectors such as energy, health, education and the economy have declined. Decline that must reposition all sectors of society to allow a balance of human health and energy and economic sectors by creating government strategies and programs that include plans for economic recovery and control of the virus, but to enable economically, social development and an improvement in the quality of human life for both present and future generations, and energy must become the key factor in reformulating world policies and European policies of rebuilding society and humanity in the context of new epidemics and crises.

Without a prediction of the emergence of new epidemics, such as COVID 19, the world's leaders at the second United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992[1], under which based on which an agenda on environment and development in the 21st century was adopted, they formulated in the text of the adopted provisions that energy is an essential and triggering factor for the economic and social development of mankind and for improving the quality of life on earth.

This Framework Convention on Climate Change was adopted in New York on 5 June 1992 at the UN Conference on Environment and Development in Rio de Janeiro.

'The Framework Convention is an instrument that sets out the principles intended to serve as a basis for cooperation between States Parties in a given field, allowing them to define by separate agreements the modalities and details of cooperation for this purpose'.[2]

It should be noted that 'the UN has organized three World Conferences on global environmental issues: Stockholm in 1972, Rio de Janeiro in 1992, Johannesburg in 2002, at which the most important international documents for environmental protection were adopted'.[3]

Following the discussions held during the three world conferences on global environmental issues, world leaders and other actors such as the European Union have taken on the role of developing strategies and programs with plans to promote the sustainable development of Europe with policies and objectives. clear and precise solutions that aim to combat several issues related to global environmental issues, such as the efficient and sustainable use of natural resources and global warming.

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[1] Romania ratified the UN Framework Convention on Climate Change, signed in Rio de Janeiro on June 5, 1992 by the provisions of Law no 24 of May 6, 1994. The law was published in the Official Gazette of Romania no 119 of May 12.

[2] A. Kiss and D. Shelton, *Traité de droit européen de l'environnement* (Paris: Ėditions Frison-Roche, 1995), 793-805.

[3] D. Marinescu, *Environmental Law Treaty* (Bucharest: The Legal Universe Publishing House, 4th ed, revised and added, 2010), 711.

Global warming and natural resources seen in terms of the connection between sustainable development and energy is made in the form of four components:

- the first component refers to the relevance of energy for society;
- the second component is the one regarding the availability of resources;
- the third component refers to the consequences on the environment;
- and the fourth component is to facilitate the development and obtaining of economic and social progress for the welfare of society and humanity in general.

At the international level, however, it can be noted that 'the dimensions and trends of global technological developments, supported by increased energy costs after the 2000s, as well as the establishment of public subsidy programs, have led in recent years to increase energy production and at the same time of energy demand and taking relevant efficiency measures in this regard.

International energy markets are at this stage in a phase of dynamic and complex transition in several dimensions: economic, technological, geopolitical and climate. However, these developments and advances have had long-term effects and have profoundly influenced the energy sector, which in turn has led European and national energy markets dynamically'.[4]

Regarding the European construction, we note that since the creation of the Community bloc, energy has been a key factor, by creating a common market for Coal and Steel in 1951 and by the provisions of the Euratom Treaty on the establishment of a European Atomic Energy Community in 1957, increased attention was paid to the energy field, especially to the oil and nuclear energy sector.

Subsequently, by identifying new energy sources as well as by supporting investments in terms of research and exploitation in terms of efficiency, it was desired, sustainable economic development and protection of environmental factors, which prevent the depletion of conventional resources, and all these have been the topics of discussion in Strasbourg and Brussels since 1995, in the context of the publication by the European Commission of the White Paper on a report entitled: An Energy Policy for the European Union.

In the following years, the increased relevance for the oil, natural gas and electricity sectors led to a massive awareness of the role of the energy field for the economy and politics of the community bloc, a situation that has driven an increase in energy activities. regulation at the Community level to establish a European energy market and to achieve and gradually adopt energy policies for the European Union.

But 'the failure to fully meet and fail to achieve the proposed goals, in the context of global threats, challenges and the failure of the European single market, have led

[4] L.L. Balan and A.M. Vijdea, 'General aspects regarding the elaboration of the Romanian energy strategy' 6 *SWS International Scientific Conference on Social Sciences. Conference proceedings*, 103-111 (2019).

European leaders to regulate under the provisions of the Treaty on the Functioning of the European Union (also called the Lisbon Treaty) the requirement that the energy sector plays a key role in the concerns of the European space.

By regulating a new legal basis in the field of European concerns, the provisions of Article 194 (1) of the Treaty on the Functioning of the European Union (TFEU) determine, in the context of the establishment and functioning of the European internal market and the protection and protection of the environment which must follow:

- ensuring and maintaining the functional potential of the European energy market;
- ensuring and maintaining an adequate level of security regarding the energy supply in the European space;
- promoting as well as developing new types of renewable energy.

In addition to these objectives stipulated by the provisions of Article 194, paragraph (1) of the Treaty on the Functioning of the European Union, the scope of regulations on European energy policy is extended and supplemented by the provisions of Article 11 of the Treaty on the Functioning of the European Union. in the sense that the existence and functioning of the European energy market must be achieved following the protection and protection of human health and the environment.

The European Union's energy policy, oriented towards major objectives with long-term approaches, must pursue collaboration with other European policies to protect the collective interests of consumers and environmental protection that will allow the realization in the form of sustainable and efficient development of the European space.

The protection of the collective interests of consumers, the protection and sustainability of the environment in the European space, must seek to combat the imbalances on the economic market generated by the lack of energy or the distribution of energy at increased costs'.[5]

Combating European economic imbalances for the energy market must also be based on a strong configuration of strategies and policies to protect environmental factors.

'The configuration of a bundle of environmental protection policies at the European Union level is a comprehensive process of awareness of the relevance of this field and progressive application of the concerns of European states in the crystallization of regulations, designed to meet environmental challenges. The assertion of a European policy for the sphere of concerns for the protection of environmental factors is conditioned by the appearance of a new stage of regulation of environmental

[5] L.L. Balan, 'General aspects regarding the approach of the geothermal energy policy at European and national level and of the European project DARLINGe, Energy. Operational concepts and tools', in C. Volintiru et al eds, *Documentary book 1* (Bucharest: Club Romania Publishing House, 2nd ed, rev., 2019), 371.

protection and sustainability, located between the level of national protection and international protection'.[6]

This level of protection for promoting environmental sustainability can be established by developing and adopting programs and action plans to increase energy efficiency, support, discover and develop new types of renewable energy and increase the geothermal potential in the European Union, as part of the energy potential.

About increasing the energy potential of the Member States in the Community bloc, the European Union can adopt under various legal instruments (directives, regulations, decisions, recommendations) many areas of major interest to society but which regulate the area of concern of geothermal energy electricity, heat and combined.

Also, before the emergence of COVID 19 virus, the European Union recalibrated its strategic objectives for the years 2030-2050 in the context of the publication of the Green Paper, entitled: A framework for the 2030s on energy and climate policies, and the Strategic Perspective 2050, which includes a series of clear and objective rules and principles that are to be achieved for a clear and lasting implementation of the single energy market and the communist bloc in general.

2 Conclusions

Against the background of increased interests in the business area, politicians, market stakeholders, as well as those in the research area and investment area, it is desired to increase energy efficiency, production, distribution and energy consumption starting from an economy based on fossil fuels to one based on a balanced balance between conventional energy sources and renewable energy sources.

But let us not forget that the major interests of the bloc are to combat climate change, safety, the health of citizens, security, maintenance and efficient and long-term management of energy resources of the Member States of the European Union and ultimately contribute to economic recovery and an improvement of the standard of living for the citizens of these states, both for the present and the future generations.

An approach, let's say, of a realistic perspective, but which unfortunately does not reflect the reality of the times in which we live, although the interests and intentions of European leaders are desirable and represent a great geopolitical challenge for today's Europe that the communist bloc at this time is fragile.

Its fragility results and is dominated by fear and concern that its policies, whether we are talking about environmental, competitive, health, education or energy policies have not been fully effective and sustainable to the reality in which we live, a European reality of a dominated world of religious and ethnic conflicts, of job insecurity, of the increase of the criminal phenomenon, of limitation of natural

[6] L.L. Balan, *Protection of the atmosphere, water and soil at international, European and national level,* (Bucharest: University Publishing House, 2014), 86.

resources, but also of the existence of some inequalities conferred to some member states, have determined and determine that many member states want to leave the European Union, as was the case with the United Kingdom.

As in the case of other sectors of activity and the energy sector, at European level, it was not a favoured one, in the sense that many of its policies and strategies did not have the desired relevance and efficiency, by not achieving a union, an energy markets common to the desired European area.

Against the background of these factual situations, one of the doctrinaires of the moment, the famous professor and director at the Florence School of Regulation and Holder at the Palacio Chair, Jean - Michel Glachant, with a doctorate in economics at the Sorbonne, France, stated in an interview that The European Union by creating an energy union for its member states is a dream, a desire difficult to achieve, if not impossible, and the European Commission to achieve this dream will face many obstacles, as the existing bloc has limited powers internal market and competitive market.

Regarding the construction of the energy market, the famous professor also stated that this unit, in reality, does not exist, it is just a word, a desire and not an organism or an institution that produces legal effects.

Listening to the interview given by the famous professor, we find that the union or the European energy market is an extremely attractive field for its implementation and achievement, giving on this occasion, if it reaches this point, major powers to the European Union and stability for member states and its citizens.

But do the member states of the European Union, as well as its leaders, want such a market, such an energy unit, energy security for its consumers, for its citizens and how prepared are we as European citizens for that? Do we have the necessary tools to achieve and implement it?

Let us not forget, however, that some of the great powers, such as the former Trump administration, did not want a common market and energy union of Europe and a united Europe.

But what we need at the moment is a total rethinking of everything that means the pillars of the construction and functioning of the state, of Europe and the world in general, in the context of the separation of the COVID 19 virus did nothing but make the population of the Earth sick, to wipe out people's lives creating fear and concern for our safety and that of our loved ones, to endanger the jobs of thousands of people working in fields such as tourism, culture and education and to danger to the free movement of goods, services and to humanity in general.

The present situation of the COVID 19 virus has brought to light the shortcomings of the system in which we live, from health to education, upsetting our entire reason to live and survive, although over time both internationally, European and nationally, a series of legal instruments with a universal and regional vocation have been

elaborated and adopted, through which programs have been drawn up with plans and policies to make the society more efficient for all its operating segments, but which over time have proved ineffective.

Its inefficiency has resulted over time due to the existence of a corrupt system in some states, the lack of involvement of governments and the fact that the human factor has exploited nature and natural resources to the fullest, without realizing that they can be depleted in a day.

Against the background of these existing crises, a rapid rethinking and revision must be made, starting from new approaches that are favourable to the environment and human health, and special emphasis must be placed on the scope of making massive investments in research for all fields of activity from health to education, culture and civilization.

All this should be a priority for world leaders, European and national leaders in the sense of implementing programs and strategies designed to deal with crises of limited natural resources and those generated by epidemics and viruses. Investments and endowments for hospitals to prevent situations such as last week's tragedy in Romania, from a hospital in Piatra Neamt, which caused the death of some doctors and a significant number of hospitalized patients to be treated by COVID 19, as the hospital's electrical system was outdated and malfunctioning and did not meet the demands of oxygenation devices to keep COVID 19 inpatients alive.

The patients burned alive, as the oxygenation devices caught fire due to the demand for oxygen on some old and dysfunctional energy distribution facilities in this hospital, a situation that is certainly found in most hospitals in the world, not only in Romania or in Europe.

Among other things, I believe that the European Union has sought to achieve a single European energy market that, in addition to all its uses, ensures and sustains the lives of the inhabitants of the Member States and prevents, where appropriate, human tragedies and natural disasters.

The Cooperative Model Can Clear the Hurdles to Prosumerism

Júlia Martins Rodrigues

Abstract Enabling the establishment and maintenance of decentralized community energy production and distribution relies on a multifaceted approach that combines public policies, social engagement, and entrepreneurial alignment. Facing the inherent challenges of the energy transition towards sustainability requires acknowledging the hurdles, breaking the competitive market paradigm, and adopting a cooperative perspective to ensure that renewables fulfill their promise as responsible and reliable energy sources for future generations. This paper presents a brief overview of the clean energy cooperative cluster consolidated in the state of Colorado, United States. It illustrates the congruence of governmental incentives, a strong cooperative culture, innovative business initiatives, and a crowd of health-minded prosumers working together to overcome the main challenges of prosumerism during the energy transition.

1 Cooperation is Sustainability

The world faces compelling evidence for rapid climate change.[1] The severe repercussions of environmental exhaustion are global in scope and have been advancing at an alarming pace. There is a human fingerprint on the extent of global warming, including glacial retreat, decreased snow cover, sea-level rise, global temperature rise, extreme weather events, shifting wildlife populations and habitats. Solving the most pressing and complex social and ecological problems connected to climate change relies on sustainable models of how energy can be generated, owned, and used.

This paper is an analysis of the renewable energy sector's growing choice in applying the cooperative model, providing insight into the scope and nature of community energy. This study places community-led renewable energy in the public spotlight by structuring reliable data on the clean energy transition, including the role of health-minded consumers and cooperative endeavors to engage in a joint locally-owned renewable energy movement. This work also summarizes a broader case on cooperative efforts among cooperatives, public policies, and society in the state of Colorado, United States. Based on local cooperative businesses' archives, official

[1] J. Cook et al, 'Consensus on consensus: a synthesis of consensus estimates on human-caused global warming', Environmental Research Letters (Environmental Research: Infrastructure and Sustainability, IOP Publishing, (2016), 1-7, available at iopscience.iop.org/article/10.1088/1748 9326/11/4/048002 (last visited 5 November 2020); W. R. L. Anderegg et al, 'Expert Credibility in Climate Change' Proceedings of the National Academy of Sciences, 12107–12109 (2010), available at www.pnas.org/content/pnas/107/27/12107.full.pdf (last visited 5 November 2020); P. T. Doran, M. K. Zimmerman, 'Examining the Scientific Consensus on Climate Change' American Geophysical Union, (2011), 20-22, available at agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2009EO030 002 (last visited 6 November 2020; A. Aschwanden et al, 'Contribution of the Greenland Ice Sheet to sea level over the next millennium' American Association for the Advancement of Science, (2019), 1-11, available at advances.sciencemag.org/content/5/6/eaav9396.full (last visited 6 November 2020).

governmental communications, and literature review, the focus relies on the citizen-led renewable movement and cooperative behavior, covering the solutions found in that clean energy industry to tackle prosumerism main obstacles.

Energy is a fundamental factor of production - the lifeblood of economies -, carrying many geopolitical consequences and territorial disputes over human history.[2] Energy systems are commonly based on centralized production using fossil fuels, which regard citizens solely as passive consumers. Traditionally, energy generation is based on centralized structures with large-scale power plants. Still, the role of a strongly decentralized form of energy supply is increasingly meaningful facing the clean energy transition. As opposed to coal power plants and oil reserves, renewable energy can come from dispersed resources. Instead of a centralized power plant, several smaller energy generating centers can generate and distribute clean energy. There is a growing desire among people to be independent and control the electricity supply.[3] Smart-grid solutions afford new opportunities for managing society's power supply. Distributed energy generation connected directly to its final consumers means people are taking low-carbon energy generation into their own hands, and as a result, becoming prosumers. Consequently, this production-decentralization movement highlights the starring role of decentralized ownership and alternative governance structures as well.

The environment safeguard and rescue must be at the very core of economic planning. For over 25 years, the 'Triple Bottom Line: profit, people, and the planet' business approach aimed to reconcile financial interest with sustainability. However, John Elkington, the father of this challenge for business leaders, recently highlighted that, instead of a systematic change, it mainly became an accounting tool. Many adopters understood the concept as a balancing act, adopting a trade-off mentality, rather than embrace a more in-depth understanding of capitalism's future.[4]

Beyond businesses' efforts, individuals and communities can be the driving force of the urgent low carbon energy transition[5]. 'Community power' refers to citizens

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[2] S. Tagliapietra, 'The geopolitical implications of the global energy transition' *Bruegel* (2019), available at www.bruegel.org/ 2019/03/the-geopolitical-implications-of-the-global-energy-transition/ (last visited 6 January 2021).

[3] S. Ruin, G. Sidén, 'Small-scale renewable energy systems: independent electricity for community, business and home' (*CRC Press*: Halmstad) ISBN: 978-0-429-02039-1, (2020), 202.

[4] 'I hope that in another 25 years we can look back and point to this as the moment started working toward a triple helix for value creation, a genetic code for tomorrow's capitalism, spurring the regeneration of our economies, societies, and biosphere.' See John Elkington '25 Years Ago I Coined the Phrase "Triple Bottom Line." Here's Why It's Time to Rethink It.' *Harvard Business Review* (2018), available at hbr.org/2018/06/25-years-ago-i-coined-the- phrase-triple-bottom-line-heres-why-im-giving-up-on-it (last visited 3 February 2021).

[5] European Commission COM(2016) 500: 'The European Commission is mobilising all our policies towards the competitive, circular and low-carbon economy and expects action from non-state actors as well for delivering change, including businesses, farmers, researchers, investors, educators and social partners', available at ec.europa.eu/clima/news/articles/news_2016072001_en (last visited 10 January 2021).

owning or participating in the production and use of sustainable energy.[6] The concept of community power is associated with the idea that persons are not just passive consumers but can also be renewable energy producers. The low carbon energy transition requires the advancement of a cooperative path towards secure energy systems with communities broadly involved in sustainability.[7] By placing themselves into an active role in power production, prosumers represent well-rounded players in energy policy's political dimension. Hence, they must evolve and promote an extensive vision regarding energy issues, broadly contributing with an effective energy transition towards sustainability.

Businesses from all sectors can also embrace the commitment to be carbon neutral or, beyond that, to achieve net-zero, not just offsetting emissions they directly control but also reducing them. They can be prosumers and manage their own renewable energy resources within the business activities, positively contributing to natural resources protection.

The rise of prosumers is not exempt from challenges, especially for traditional business models. According to the European Parliament, electricity producers and grid operators may lose revenue as prosumerism lowers their demand for conventional energy suppliers, which can reduce investment in the grid, affecting consumers that are not in charge of their energy production.[8] There are concerns about energy price increases. The growing capacity of micro-generated power calls for investment in distribution and transmission systems, which can be costly. Large economic problems can emerge if most of the population leaves conventional grids and operators cannot cover the production cost.[9] Perhaps, supporting the gradual conversion of traditional energy providers into cooperatives may diminish the hurdles already identified within the prosumer transition.

Cooperatives are a keen vehicle to mediate inter-community networking and knowledge exchange, encouraging positive changes. The cooperative business model is about tapping into the collective power and honoring people's intelligence through mutual collaboration. It hosts complex relationships and enables direct benefits for the individuals and organizations involved horizontally. According to the International Co-operative Alliance, cooperatives are essentially an 'autonomous association of persons united voluntarily to meet their common economic, social, and

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[6] The European Union funded the Co-Power project as an European wide Community Power coalition, 'working for a socially fair energy transformation putting people and communities in the center of it. Communities and cooperatives all over Europe are creating projects where they own and are actively involved in running an energy resource.' See *Community Power*, available at www.communitypower.eu/en/about-us.html (last visited 10 January 2021).

[7] B. Schmid et al, 'Energy Cooperatives and Municipalities in Local Energy Governance Arrangements in Switzerland and Germany' *The Journal of Environment & Development* (*SAGE Publications:* Thousand Oaks) (2019), 123-146 .

[8] European Parliament *Briefing* (November 2016), available at www.europarl.europa.eu/RegData/etudes/BRIE/2016/593518/EPRS_BRI(2016)593518_EN.pdf (last visited 10 January 2020).

[9] R. Khalilpour, Anthony Vassallo, 'Leaving the grid: An ambition or a real choice?' *Elsevier*, 207-221(2015), available at www.sciencedirect.com/science/article/pii/S0301421515001111 (last visited 1 February 2021).

cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise'.[10] Energy cooperatives are co-ops that precisely deal with energy production and distribution, one of the most prevalent legal vehicles for community renewables. They operate in the market, prioritizing and facilitating local decentralized smart energy networks to ensure secure, democratic, and sustainable energy systems.

When communities develop collaborative renewable energy projects, the money invested is retained, benefiting the local economic empowerment. Public policies and local investment translate into strength and diversification on local economies, stimulating collaborative behavior and knowledge sharing. The exchange of information and skills is a vital factor allowing communities to establish their sustainability paths, learning from their experiences. The cooperative community-based approach creates social and local benefits above financial benefits, allowing energy access for communities that would not otherwise have it. Addressing communal energy accessibility enables transformative change on a large scale, encompassing broad community development aspirations. Local empowerment means connecting people, projects, partnerships, skills into a collective dynamic that ultimately generates positive externalities beyond energy sovereignty.[11]

Prosumers and local small-scale energy generation play a central role in terms of renewable energy market integration: according to J. Lowitzsch (2019, 13):

Market integration of RES aims at creating competitive energy markets with renewables generally subject to normal market rules. This entails the question of how to align subsidies with normal market rules and how to provide a level playing field for all market participants. Here the ownership structure of the RE sector is crucial. The optimal market design will avoid both concentrated ownership in the hands of a few - an oligopoly detrimental to competition - and a fragmented market with a plethora of small players driving up transaction costs and impeding governance.[12]

According to the International Labour Organization, even though sustainable development and the cooperative movement were born with distinct reasoning, both address a common ground at different levels: harmonizing demand among economic, social, and environmental needs.[13] Considering energy is vital for economic development, access to renewable energy, especially in developing countries, urges a new global effort. The modern challenge encountered by the energy industry is conciliating energy efficiency, stable markets, and climate change.

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[10] International Cooperative Alliance 'The Guidance Notes on the Cooperative Principles' (2017), available at www.ica.coop/en/media/research-and-reviews/guidance-notes-cooperative-principles (last visited 10 December 2020).

[11] International Labour Office (ILO)'Providing clean energy and energy access through cooperatives', *Cooperatives Unit (ENT/ COOP), Green Jobs Program* Geneva: International Labour Office (2013), available at www.uncclearn.org/wp- content/uploads/library/ilo55.pdf (last visited 10 December 2020).

[12] J. Lowitzsch, 'Energy Transition. Financing Consumer Co-Ownership in Renewables' *Palgrave Macmillan*,(2019), 794.

[13] n 11 above.

Community-led renewable energy development requires the appropriate support, funding, and guidance to build a reliable power infrastructure. Beyond financial accessibility, it requires collective engagement and a proper recycling plan to enable long-term sustainability. Those projects' costs and the lack of understanding of their real impact hinder the community's renewable energy production debate. Nevertheless, recurrent economic and environmental crises have raised awareness towards alternative energy plans, pushing the demand for government funding and public policies in this regard. Gradually, people become directly involved in renewable energy projects in their locality, either working by themselves or holding a stake in joint ventures with other parties, seeking alternative governance structures to manage novel endeavors.

2 Coloradan Cooperative Community Renewables

Colorado is the colorful state of river canyons, the Rocky Mountains, sand dunes and green forests, right in North America's heart. The amusing variety of colors and shapes expresses itself beyond its natural landscape. The scenery contrast is the lens through which we can better understand the state entrepreneurial culture, especially in the clean energy and technology industries. There is a high density of entrepreneurs in the state marked by seed/early-stage startups and venture capital activity[14]. At the same time, Colorado has embraced economic democracy through the employee-ownership movement, with contrasting business structures sharing the same market and flourishing in the same geographic region.

In April 2019, Colorado established the Employee Ownership Commission housed within the Office of Economic Development and International Trade, designed to support employee-owned businesses' development and advancement[15]. In October 2020, the employee ownership strengthening efforts led to creating the Colorado Employee Ownership Office,[16] exposing the employee ownership benefits to local entrepreneurs, service providers, and the community. Within this initiative, the government launched a grant, focused on small businesses, to reimburse professional technical services required for the employee ownership transition among several projects. This Employee Ownership Network has encouraged broader use of employee-ownership as a highly cost-effective way to retain and create jobs, increase wealth for workers, secure economic stability, and expand economic growth.

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[14] B. Feld, 'Startup communities: building an entrepreneurial ecosystem in your city' (*John Wiley & Sons, Inc*: New Jersey) (2012), 202.

[15] J. Barnett, 'Gov. Jared Polis establishes commission to support employee-owned businesses' *The Denver Post* (2019), available at www.denverpost.com/2019/04/11/ared-polis-employee-owned -businesses/ (last visited 10 December 2020). Also, Colorado Office of Economic Development and International Trade 'Colorado Employee Ownership Commission', available at oedit.colorado.gov /colorado-employee-ownership-commission (last visited 10 December 2020).

[16] Colorado Office of Economic Development and International Trade'Colorado Employee Ownership Office' available at oedit.colorado.gov/colorado-employee-ownership-office (last visited 10 December 2020).

The State Legislation is also cooperative-friendly.[17] Colorado's Title 7, Article 56, is a general-purpose cooperative statute, the 'standard' cooperative corporation statute used for many cooperative formations. Furthermore, Colorado has other cooperative laws for housing, the renewable energy industry, credit unions, and it adopts the Uniform Limited Cooperative Association Act ('ULCAA') since 2010,[18] allowing outside 'investor-members' to have limited voting rights and a share of revenue or profits in the hybrid entities of LCAs. Additionally, Colorado has mated its Public Benefit Corporation statute (Title 7 § 7-101-503) to its cooperative laws, creating a for-profit legal entity that allows cooperatives to add protections and further benefits.

Colorado has also become a national leader in renewable energy,[19] with investments in wind, solar, biomass, geothermal, small hydroelectric, among other renewable energy resources. In 2004, the state passed the first voter-led Renewable Energy Standard in the nation, creating an ongoing incentive to drive down clean energy costs. Since then, the legislature has increased the minimum requirements three times, and Colorado's electricity from renewable sources has more than doubled since 2010 to 25% of net generation in 2019.[20]

Enjoying Colorado's leadership on employee-ownership and renewable energy, the solar business Namasté Solar was incorporated in 2005.[21] The business combined the construction of solar electric systems to successfully develop a democratic, employee-owned company with a high-engagement culture. In 2009, Namaste solar was chosen by President Obama and Joe Biden to reveal and sign the American Recovery Reinvestment Stimulus Bill emerging from the Great Recession.[22] They spotlighted a solar project Namasté had installed on the roof of the Denver Museum of Nature & Science. Obama signed the stimulus bill in Denver using the state's leadership in renewable energy to highlight his goal of creating jobs by transforming the U.S. energy economy. In four years, Namasté Solar grew from three people to 60 employee-owners. It became one of the leading installers of photoelectric panels in Colorado and was touted as the poster child for the new energy economy.

Since Namasté Solar converted to a cooperative corporation under article 56 Colorado Cooperative Statute, in 2011, it has shown that cooperatives can successfully share the

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[17] J. Wiener & L. Phillips, 'The Delaware of Cooperative Law: Benefits to Incorporating a Worker Cooperative in Colorado' *Fifty by Fifty* (2018), available at medium.com/fifty-by-fifty/colorado -the-delaware-of-cooperative- law-babedc9e88eb (last visited Dec 28, 2020).

[18] J. B. Dean, 'The Colorado Uniform Limited Cooperative Association Act - ULCAA' *Colorado Secretary of State Jena Griswold*, available at www.sos.state.co.us/pubs/business/news/2012/ 20120402_ULCAA_Dean.html (last visited Dec 28, 2020).

[19] Renewable Energy World Report (2009), U.S. solar market soars in Q1 06/18/19.

[20] 'Colorado State Profile and Energy Estimates,' *U.S. Energy Information Administration* (EIA), available at www.eia.gov/state/?sid=CO (last visited 10 December 2020).

[21] A. T. Lawrence, A. I. Mathews, 'Namasté Solar' *Ivey Publishing*, (2010), 12.

[22] 'Obama Signs Economic Recovery Legislation; Solar Industry Poised to Create 110,000 Jobs over Next Two Years' *SEIA Press Release* (2012), available at www.seia.org/news/obama-signs-economic-recovery-legislation-solar-industry-poised-create-110000-jobs-over-next (last visited 10 December 2020).

risks and rewards of ownership, harmonizing ownership and business control.[23] Not only Namasté Solar grew in terms of the number of employee-owners and projects delivered to home-owner prosumers, but it also became a key actor in the consolidation of a renewable energy cooperative cluster in Colorado. After Namasté Solar, multiple other cooperatives were created to strengthen the clean energy landscape. Namasté Solar developed a prominent role in seeding a national-scale cooperative cluster[24] through a series of sibling cooperatives: Amicus Solar, Amicus O&M, Clean Energy Credit Union(CECU) Kachuwa Impact Fund. Namasté contributed a large part to the founding DNA of each of these cooperative structures, directly benefiting Namasté's business.

Despite the overlapping interests and similar business culture among these entities, they were separately built over the years, each with its own stakeholder base. The multiple initiatives' confluence arose either because of a need or due to a market opportunity. Through this process, their positive partnership enhanced the cooperation amongst cooperatives, signaling the necessity of balancing the capital needs with the maintenance of the cooperative culture. A robust cooperative ecosystem in the clean energy sector brought positive externalities regarding broader access to renewable energy, connecting citizens to an active role in producing their own solar power.

Among these innovative endeavors, the Kachuwa impact fund,[25] being an investment cooperative, attracts investors willing to invest in other cooperatives and other mission-centered businesses. The Clean Energy Credit Union,[26] as a non-profit financial institution, supports the growth of the renewable energy movement, attracting members, borrowers, and depositors who have an affinity with that mission. The purchasing cooperative, Amicus Solar,[27] formed a collective unit of solar companies to pool their buying power, to negotiate better pricing, and to reduce administrative overhead. By joining together in the Amicus Operations and Maintenance[28] cooperative, member-companies leverage each other's staff and expertise to provide O&M services for portfolios of PV systems all over the country, increasing their durability and lifespan.

All these entrepreneurial initiatives are mission-aligned and focus on boosting the renewable energy industry through a cooperative approach. Combined with the governmental policies, residential prosumers, and citizen-led energy cooperatives

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[23] 'A better way to do business', *Namasté Solar,* available at www.namastesolar.com/about-us/employee-ownership/ (last visited 10 December 2020).

[24] A large case study on this cooperative network's specific nature has been developed by the author in collaboration with Professor Schneider from the Department of Media Studies, University of Colorado Boulder.

[25] Kachuwa Impact Fund, available at www.kachuwaimpactfund.com (last visited on 19 November 2020).

[26] Clean Energy Credit Union, available at www.cleanenergycu.org (last visited on 19 November 2020).

[27] Amicus Solar Cooperative, available at *www.amicussolar.com* (last visited on 19 November 2020).

[28] Amicus Operations and Maintenance, available at www.amicusom.com (last visited on 20 November 2020).

profoundly modified Colorado state's energy background. According to the Solar Energy Industries Association (SEIA), the state is the 12th largest solar state in the U.S., approaching 1,000 megawatts of cumulative solar capacity installed in 2018.[29]

3 Joint-effort and Collaborative Ideas for Future Sustainability

Cooperative-owned energy generation is a vibrant and growing sector, motivated both by benefiting the community and the environmental benefits of generating renewable energy. Innovation in the energy sector has become pivotal to reducing fossil fuels' predominant use and introducing renewable energy sources. However, it still has to overcome many barriers to be competitive compared to coal, natural gas, and nuclear power. Clean-energy solutions often face inherent challenges throughout their maturation phase when it comes to recycling plans. Notably, manufacturing photovoltaic panels is energy consuming and requires finite Earth minerals that have harsh extraction impacts. Hence, there is a current long-term unknown about the real industrial viability concerning sustainability and proper recycling projects, and thus accounting for the processing of heavy components still used in the production of components.

The ongoing growth and geographical expansion of renewable energy has been driven by the continued innovation and cost reductions in renewable technologies. Despite the efforts to reduce the associated costs of clean energy alternatives in recent years, new technologies have not reached the level of access necessary to expand the customer base, signaling to the market a need for resources and funding tools beyond those available through traditional lenders. Implementing a clean energy project in a business or a house is still expensive.[30] Therefore, the consumers who choose this type of investment, motivated by environmental awareness, expect a durable mechanism capable of generating energy efficiently for a significant period. If, after a few years, the project invested starts requiring expensive maintenance and the substitution of materials with high environmental impact, the industry as a whole begins to face instability, which ultimately discourages new consumers.

A competitive approach oriented towards profit, trying to make money out of selling high maintenance solutions, would eventually succumb to the industry as a whole. As a recurring market pain, hostile competition would only condemn these businesses' long-term viability and question the sector's ability to offer urgent sustainable solutions. On the other hand, sustainable business practices are *sine qua non* conditions to an environmental-oriented business' long-term viability. Standard compliance with the regulation is not enough in this case. It requires a significant shift from old economic concepts towards collaboration among endeavors. A successful entrepreneur must be a community builder through economic activities

[29] 'Solar Industry Commends Colorado for Enacting Pioneering Energy Storage Legislation' *SEIA* (2018), available at www.seia.org/news/solar-industry-commends-colorado-enacting-pioneering-energy-storage-legislation (last visited on 2 November 2020).

[30] 'Barriers to Renewable Energy Technologies' *Union of Concerned Scientists* (2014), available at ucsusa.org/resources/barriers-renewable-energy-technologies (last visited on January 23, 2021).

and innovations that enable a holistic development, not purely financial, but also environmental and human-centered.

A competitive-based approach, abrupt exploitation of natural resources for industrialization, and intensive capital accumulation are the sources of environmental exhaustion. Only by reversing the production logic can we slow down - and eventually overcome - the consequences of the ecological collapse. This requires restructuring the market's internal forces and adopting a new attitude towards modern society's challenges. The combination of public policies, entrepreneurial innovations, novel technologies, modern democratic governance, and prosumers' voices - that currently enables the growth of community renewables - is necessary to guarantee the long-term viability of renewable energy.

Tax Barriers to the Spread of Renewable Energy Sources: The Cadastral Income of Wind Farms between Legislative Resiliences and Application Resistances

Salvatore Antonello Parente

Abstract The regime for determining the cadastral income of wind farms for the production of electricity can constitute a significant tax barrier to the spread of renewable energy sources. In fact, this regime can affect not only the profitability of the plant, but also the entire production process. Hence, the need for adequate attention to hermeneutical issues and the evolution of sources, in light of jurisprudential and administrative practice and legislative resiliences.

1 Sources of Renewable Energy: Diffusion and Resistances

In recent decades there has been, not without obstacles, the spread of 'renewable energy sources',[1] identified by Art 2, decreto legislativo 29 December 2003 no 387, in solar, wind, hydroelectric, geothermal energy deriving from wave, tidal motion or produced by biomass, landfill gas, residual gas, purification processes and biogas.

The 'future of energy' seems to be characterized by the gradual replacement of new ecological sources with traditional fossil fuels, which are in the process of being depleted, with the primary objective of achieving cost savings and pursuing environmental sustainability objectives.

In the EU context, the European institutions, with the directives on the promotion of the use of energy from renewable sources (European Parliament and Council Directive 2009/28/EC of the of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC [2009] OJ L 140 and European Parliament and Council Directive (EU) 2018/2001, of the of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82), have set themselves ambitious goals, consisting of the implementation of clean technologies to favour, in the long term, the production of electricity in a completely decarbonised manner, with a consequent zero climate impact.

Nonetheless, barriers and resistances to the spread of clean energy sources continue to exist, linked to endogenous factors and the contents of the legal system, primarily in tax matters: this is the case of the cadastral income of wind farms for the production of electricity, which has always been a source of criticality, although it is

[1] Corte di Cassazione 6 September 2004 no 17933, *Diritto e pratica tributaria*, II, 1636 (2004); Corte di Cassazione 4 November 2008 no 26441, *CED Cassazione*; Corte di Cassazione 10 April 2009 no 8674, *CED Cassazione*; Corte di Cassazione 28 April 2010 no 10134, *CED Cassazione*; Corte di Cassazione 9 November 2011 no 23317, *CED Cassazione*; Corte di Cassazione 31 March 2011 no 7372, *CED Cassazione*.

now undisputed, compared to the past,[2] the obligation to proceed with the relative registration, as confirmed both by administrative practice[3] and by the relevant jurisprudence.[4]

The cadastral legislation, qualifying the entities of any material permanently secured to the ground as 'urban real estate', does not refer to the substance used or to the assembly systems; therefore, even for wind farms, there is an obligation to declare, even in the absence of a real traditional building (for example, a shed), but in the presence of a complex system of implants.[5]

The doubts, rather, concern the exact identification of the group and the cadastral category in which to report these entities: according to some pronounced[6], the wind farms would be censored in the cadastral category D/1 (factories), such as properties for special use (group D), being functionally intended for carrying out an industrial activity (production of electricity); according to another part of the jurisprudence,[7]

however, the aforementioned properties should be registered in the cadastral category E/3 (buildings for special public needs), such as properties for a particular use (group E), due to the 'ecological' nature of the energy produced.

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[2] M. Cardillo, 'Gli impianti eolici nel sistema dell'imposta comunale sugli immobili' *Giustizia tributaria*, 502, 507-508 (2008); I. Nicolai et al, 'Riflessioni in tema di impianti eolici. Sulla controversa vicenda della classificazione in catasto e della determinazione di valore tra esigenze di gettito locale e incertezza normativa nazionale. Analisi de iure condito e problematiche insolute' *Bollettino tributario d'informazioni*, 1210 (2012); M. Francesca, 'Gli impianti eolici. Iscrizione in catasto e tassazione IMP' (6) available at https://www.odcec.mi.it/docs/default-source/materiale-convegni/Michele_Francesca-IMPIANTI-EOLICI-CATASTO-IMP.pdf?sfvrsn=0 (last visited 7 November 2020).

[3] Circolare Agenzia del Territorio 22 November 2007 no 14/T available at www.agenziaentrate.gov.it (last visited 7 November 2020).

[4] Commissione tributaria provinciale di Foggia 15 November 2006 no 139, *Banca Dati BIG IPSOA*; Commissione tributaria provinciale di Foggia 20 December 2006 no 168, *Banca Dati BIG IPSOA*; Commissione tributaria provinciale di Foggia 9 May 2007 no 85, *Banca Dati BIG IPSOA*; Commissione tributaria provinciale di Foggia 11 May 2007 no 93, *Banca Dati BIG IPSOA.*

[5] M. Del Vaglio, 'La categoria catastale attribuibile alle centrali eoliche' *Rivista di giurisprudenza tributaria*, 920 (2009).

[6] Commissione tributaria regionale della Campania 12 November 2007 no 187, *Giustizia tributaria*, 3, 503 (2008); Corte di Cassazione 14 March 2012 no 4028, *CED Cassazione*; Corte di Cassazione 14 March 2012 no 4029, *CED Cassazione*; Corte di Cassazione 14 March 2012 no 4030, *Diritto e pratica tributaria*, 2, 258 (2013).

[7] Commissione tributaria provinciale di Foggia 20 June 2007 no 45, *Fisconline*; Commissione tributaria provinciale di Foggia 19 September 2007 no 127, *Giustizia tributaria*, 3, 502-503 (2008); Commissione tributaria provinciale di Benevento 17 January 2008, *Fisconline*; Commissione tributaria provinciale di Bologna 10 March 2008 no 183, *Fisconline*; Commissione tributaria provinciale di Bologna 10 March 2008 no 184, *Fisconline*; Commissione tributaria provinciale di Foggia 16 April 2008 no 57, *Fisconline*; Commissione tributaria provinciale di Bologna 28 April 2008 no 103, *Bollettino tributario on-line*; Commissione tributaria provinciale di Bologna 12 January 2009 no 11, *Rivista di giurisprudenza tributaria*, 10, 917 (2009); Commissione tributaria regionale dell'Emilia Romagna 12 October 2009 no 106, *Bollettino tributario d'informazioni*, 795 (2010); Commissione tributaria provinciale di Bologna 21 January 2010 no 7, *Bollettino tributario d'informazioni*, 796 (2010).

2 The Determination of the Cadastral Income of the 'Wind Farms': The Processing Criticalities

The main question consists in verifying whether, to determine the cadastral income of wind farms for the production of electricity, must also be included the steel tower,[8] in addition to the other components of the wind turbine, given that, in tax legislation, the real estate unit, simple or complex, is essentially taken into consideration from the economic profile of profitability and, therefore, from a dynamic perspective.[9]

In the past, the problem has also affected other types of plants, which, using 'non-fossil renewable energy sources', produce 'clean' electricity, such as, for example, hydroelectric power systems and photovoltaic systems,[10] becoming part of the broader question aimed at ascertaining whether, in the direct estimate aimed at determining the cadastral income of buildings for industrial or commercial use, the value of the production plant must be taken into account.[11]

In these types of systems, the common element is found in the final result (production of electricity); the discrete element, on the other hand, concerns the methods used to obtain the result.

The matter has, recently, been affected by a double modification of the sources: first, with a provision of authentic interpretation (Art 1, para 244, legge 23 December 2014 no 190), as a result of which, pending the implementation of the cadastral reform

[8] M. Del Vaglio and D. Bonomo, 'Escluse dalla rendita catastale degli impianti eolici le torri degli aerogeneratori' *Corriere tributario*, 3589, 3589-3591 (2018); S.A. Parente, 'Questioni controverse in tema di determinazione della rendita catastale degli impianti eolici destinati alla produzione di energia elettrica: il caso delle torri eoliche', in M. Angiulli et al., *Annali del Dipartimento Jonico* (Taranto: DJSGE, 2018), 281-305; Id, 'La rendita catastale degli impianti eolici: problematicità delle fonti e trasversalità dei criteri di determinazione' *Rassegna tributaria*, 198, 198-218 (2019); M. Del Vaglio, 'Ancora sui criteri di attribuzione della rendita catastale delle centrali elettriche alimentate da fonte eolica: la questione dello scorporo delle torri su cui poggiano gli aereogeneratori' *Rivista telematica di diritto tributario*, 1, 459, 459-461 (2020); S. Baruzzi, 'Torri di sostegno degli impianti eolici: irrilevanza catastale se infisse al suolo ma funzionali al processo produttivo' *Il fisco*, 4165, 4165-4169 (2020); G. Zizzo, 'La rendita catastale dei parchi eolici: le torri della discordia' *Corriere tributario*, 695, 695-701 (2020).

[9] M. Cardillo, n 2 above, 512.

[10] A. Pacieri and F. Trutalli, 'L'assoggettabilità ad ICI delle centrali fotovoltaiche' *Corriere tributario*, 1803 (2009); A. Vasapolli and G. Vasapolli, 'L'ammortamento degli impianti fotovoltaici e delle centrali elettriche' *Bilancio e reddito d'impresa*, 7 (2010); A. Busani, 'Anche l'Agenzia delle Entrate conferma la natura immobiliare dell'impianto fotovoltaico' *Corriere tributario*, 1423 (2011).

[11] G. Bonardi and C. Patrignani, 'I macchinari sono esclusi dal calcolo della rendita catastale dei fabbricati industriali' *Il fisco*, 2385 (2004); I. Nicolai et al, n. 2 above, 1214; M. Del Vaglio, 'La rilevanza catastale di impianti e macchinari imbullonati' *Corriere tributario*, 271 (2015); A. Nicolella, 'Attribuzione della rendita catastale alle centrali elettriche' available at http://www.rivista.ssef.it/www.rivista.ssef.it/siteb660.html?page=20041026120536497&edition=2010-02-01 (last visited 7 November 2010).

pursuant to Art 2 of legge 11 March 2014 no 23,[12] Art 10 of regio decreto legge 13 April no 652, converted by legge 11 August 1939 no 1249, concerning the determination of the income of buildings for industrial or commercial use, should have been applied according to the instructions provided by the Territory Agency with the circular 30 November 2012 no 6/T,[13] practice document that had tried to remedy the uncertainties concerning the types of systems to be taken into account for the purposes of calculating the cadastral income; subsequently, with a general rule (Art 1, para 21, legge 28 December 2015 no 208), having an innovative nature, it was established that, 'starting from 1 January 2016, the determination of the cadastral income of the special and particular destination, censable in the cadastral categories of groups D and E, is carried out, through direct estimation, taking into account the land and buildings, as well as the structurally connected elements that increase their quality and usefulness, within the limits of ordinary appreciation', and excluding 'from the same direct estimate machinery, devices, equipment and other plants, functional to the specific production process'.

In this way, the legislator has redefined the object of the cadastral estimate of properties for special and particular use, establishing which real estate components are to be taken into consideration and which elements, of a pure plant engineering nature, to be excluded from the direct estimate, as functional to production.[14] Doubts arise, however, whether the listing of these latter components should be considered mandatory or merely exemplary, with the effect of limiting the exclusion only to the entities textually resulting from the law or extending it to others which, even if not expressly provided, are however functional to the production process, as it would seem to deduce from the final sentence of the provision.

3 The Terms of the Legal Question

It is, therefore, necessary to ascertain whether the value of the wind tower must be included in the category of entities (machinery, devices, equipment and other plants, functional to the specific production process) excluded from the direct estimate.

[12] A. Uricchio et al, 'La riforma del catasto nella nuova legge delega di riforma del sistema fiscale' *Gazzetta Forense*, 178, 178-189 (2014); A. Iovine, *La riforma del catasto fabbricati* (Santarcangelo di Romagna: Maggioli, 2014), 161; S.A. Parente, 'Luci ed ombre nella delega fiscale sulla riforma del catasto', in M. Angiulli et al. *Annali del Dipartimento Jonico* (Taranto: DJSGE, 2014), 331, 331-363; P. Zanelli, 'Prime note sulla riforma in itinere del catasto' *Vita notarile*, 1469 (2014); M. Aulenta, 'Flessi inter-istituzionali nelle riforme del catasto' *Rivista di diritto finanziario e scienza delle finanze*, I, 364, 364-422 (2016); A.F. Uricchio, *Percorsi di diritto tributario* (Bari: Cacucci, 2017), 131-134; S.A. Parente, *Il catasto e gli estimi catastali: funzione impositiva e regole di governo* (Bari: Cacucci, 2020), 99-118; A.F. Uricchio, *Manuale di diritto tributario* (Bari: Cacucci, 2020), 175-178.

[13] A. Iovine, 'Macchinari, stop minimo alla patrimoniale' *Il Sole 24-Ore*, 42 (19 December 2014); S. Baruzzi, 'Novità per la rendita catastale degli immobili speciali' *Consulente immobiliare*, 448 (2015); S. Chirichigno, 'La legge di stabilità codifica le regole di accatastamento delle unità immobiliari a destinazione speciale' *Corriere tributario*, 933 (2015); A. Chiarello, 'La questione sui cc.dd. macchinari imbullonati trova una soluzione legislativa che influisce sul contenzioso pendente' *Azienditalia. Finanza e tributi*, 127 (2015).

[14] Circolare Agenzia delle Entrate 1 February 2016 no 2/E, available at www.agenziaentrate.gov.it (last visited 7 November 2020).

Before the modification made by Art 1, para 21, legge no 208/2015 and, therefore, before 1 January 2016, the value of a production plant was included in the determination of the cadastral income is included in the civil notion of real estate provided by Art 812 Civil Code: in short, to solve a tax problem was used a civil law criterion.[15]

In reality, being a power plant powered by renewable sources composed of a plurality of elements, including removable or semi-removable, it was discussed which components should be taken into account to determine the income.[16]

The electricity-producing companies, in the silence of the cadastral legislation, had adopted a solution that was advantageous to them, believing that only the real estate components of the building, i.e. the construction elements and the finishes, should be subject to direct assessment, except for the plants and machinery installed internally, which would have detected only if inseparably incorporated into it to become a real estate plant component, capable of forming an inseparable whole without damage.[17]

Therefore, on the abstract level, during the validity of the previous regime, only by coming to include, at least in a broad sense and through a fictio iuris, the 'bolted' assets (that is, those removable from the buildings constituting the electricity production plant in and of themselves)[18] among the 'properties' it would have been possible to take into account their value, for direct estimation, even if they had been functional to the production process.[19]

Moreover, within the administrative practice, there was no lack of interpretative conflicts regarding the correct identification of the parameters to qualify certain assets as movable rather than immovable: for example, the Land Agency[20] had placed photovoltaic and wind power plants among the real estate assets, provided that they were fixed to the ground, regardless of their possible removal; the same administration,[21] precisely concerning wind farms, had adopted an extensive solution, including in the calculation of the cadastral income all the components suitable to qualify the intended use of the wind farm, even if mechanically detachable from the buildings (pylon and incorporated elements placed on the nacelle; shovels; walkways; streets; fences; plant parts located in the areas included in the real estate units), as elements capable of affecting the ordinary income capacity of the asset.

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[15] G. Guarnerio, 'Valenza catastale delle costruzioni-impianto: il caso delle torri eoliche' *Il fisco*, 1439 (2018).

[16] A. Gaggero, 'Categoria catastale dei parchi eolici ed elementi da computare nella determinazione della relativa rendita' *Diritto e pratica tributaria*, 263, 267 (2013).

[17] I. Nicolai et al, n. 2 above, 1215.

[18] A. Galante, 'Parchi eolici: classamento catastale, base imponibile e sanzioni' *Azienditalia. Finanza e tributi*, 408, 409 (2015).

[19] G. Guarnerio, n 15 above, 1440.

[20] Circolare Agenzia del Territorio 16 May 2006 no 4/T available at wwwt.agenziaentrate.gov.it (last visited 7 November 2020); Circolare Agenzia del Territorio 13 April 2007 no 4/T available at wwwt.agenziaentrate.gov.it (last visited 7 November 2020).

[21] Circolare Agenzia del Territorio 22 November 2007 no 14/T, n 3 above.

The cadastral income, therefore, expressed not only the profitability of the building but also the 'industrial profitability' deriving from the plants and machinery installed inside it.[22]

From this reading, was derived an evolutionary application of the cadastral law, aimed at including, albeit in a broad sense, among the real estate cases that, obviously, for temporal reasons, were unknown to the original regulatory text (regio decreto legge no 652/1939), which, in Art 4, provided the notion of urban property.[23]

The Revenue Agency[24], on the other hand, had arrived at a different reconstruction, qualifying the plants, even if fixed to the ground, as movable property, if any removal had not been such as to significantly alter the functionality of the asset.[25]

4 The Applicative Resistances: The Orientations of the Jurisprudence of Merit and Legitimacy

On the other hand, the orientations formed in the jurisprudence of merit and legitimacy about the turbines of hydroelectric plants appeared to be more varied,[26] but applicable, by the identity of ratio, also to wind plants, being in any case plant components.

In this regard, a first reconstruction[27] excluded from the direct estimate the machinery 'not irreversibly fixed to the ground', including the turbines of the hydroelectric plants, freely removable as they were only bolted to the surface: these components did not integrate an element of the real estate unit, but they represented, rather, a component of the complex of goods organized for the exercise of productive

[22] I. Nicolai et al, n 2 above, 1217.

[23] M. Del Vaglio, 'I parchi eolici devono essere accatastati come le centrali elettriche' *Corriere tributario*, 2269, 2270 (2012); M. Cardillo, n 2 above, 512.

[24] Circolare Agenzia delle Entrate 19 July 2007 no 46/E available at www.agenziaentrate.gov.it (last visited 7 November 2020).

[25] G. Guarnerio, n 15 above, 1439.

[26] G. Marongiu, 'Centrali elettriche: opifici o capannoni?' *Il fisco*, 6160 (2002); Id, 'La rendita catastale delle centrali elettriche' *Il fisco*, 5429 (2005); E. Carrasi, 'La rendita catastale delle centrali elettriche può legittimamente tenere conto del valore delle turbine?' *Rivista di giurisprudenza tributaria*, 1078 (2006); G. Marongiu, 'Le centrali elettriche e l'imposta comunale sugli immobili' *Diritto e pratica tributaria*, II, 1027, 1027-1034 (2006).

[27] Commissione tributaria provinciale di Roma 21 October 2002 no 490, *Diritto e pratica tributaria*, II, 285 (2003); Commissione tributaria regionale della Lombardia 17 February 2003 no 30, *Bollettino tributario on-line*; Commissione tributaria regionale del Lazio 29 May 2003 no 218, *Bollettino tributario on-line*; Commissione tributaria regionale del Lazio 29 May 2003 no 258, *Bollettino tributario on-line*; Commissione tributaria regionale del Lazio 29 May 2003 no 259, *Bollettino tributario on-line*; Commissione tributaria regionale del Lazio 29 May 2003 no 262, *Bollettino tributario on-line*; Commissione tributaria provinciale di Palermo 20 February 2004 no 181, *Bollettino tributario on-line*; Corte di Cassazione 6 September 2004 no 17933, n 1 above, 1636. In doctrine, comp. F. Picciaredda, 'La determinazione della rendita catastale delle centrali elettriche tra contrasti giurisprudenziali e leggi di interpretazione autentica' *Rivista di diritto tributario*, III, 317, 317-342 (2006).

activity. The economic consistency of these elements, even if relevant, was reflected only in the company's valuation.

In reality, using only the ground fixing method as a discrete element, there was a risk of arriving at antinomic solutions, such as, for example, that of recognizing the character of movable property in buildings such as the Eiffel Tower and skyscrapers, as entities merely bolted to the ground and decomposable into individual portions of steel trusses.[28]

A different reconstruction, on the other hand, took into account the value of the turbines, to determine the income, although anchored to the ground by bolting to the turbine stands and, therefore, removable without damage, becoming structural and essential components of the plant, which cannot be separated without a substantial alteration of the complex asset.

In this light, the wind turbines, photovoltaic panels and turbines, while remaining objectively distinct elements from the 'power plant' building, due to their function, presented a structural connection with it, becoming essential components: even in the presence of potential mobility, the destination of these components implied their legal immobility and the relevance to determine the cadastral income of the 'power plant' property, to which they were structurally connected.[29]

Certainly, the relevance of the question cannot be ignored, to spread renewable energy sources, in consideration of the importance assumed by the cadastral income in determining local taxes and land income: including the value of the individual plant components (especially of the 'wind tower') in the calculation of the revenue means increasing the same, creating an excessive tax effect on production activities and an obstacle to the implementation of clean energy;[30] at the same time, however, disregarding it, means omitting the assessment of entities likely to affect, in a specific manner, the intended use of the wind farm.[31]

5 The Legislative Resiliences

To resolve the issue, the legislator intervened with a provision of authentic interpretation[32] (Art 1-*quinquies*, decreto legislativo 31 March 2005 no 44),[33] which

[28] A. Nicolella, n 11 above, 6; A. Busani, 'Ma … la TOUR Eiffel è un bene mobile? (Riflessioni sulla natura immobiliare dell'impianto fotovoltaico)' *Notariato*, 305, 305-315 (2011).

[29] A. Gaggero, n 16 above, 270-271.

[30] G. Guarnerio, n 15 above, 1439; M. Del Vaglio, 'L'iniqua tassazione ICI/IMU aggrava la crisi delle centrali elettriche' *Corriere tributario*, 3286 (2013).

[31] M. Del Vaglio, 'Valutazione di impianti e macchinari per la corretta determinazione della rendita catastale degli opifici' *Corriere tributario*, 1207 (2013).

[32] Corte di Cassazione 7 June 2006 no 13319, n. 29 above, 4099; Corte di Cassazione 21 July 2006 no 16824, n. 29 above, 5190.

[33] L. Salvini, 'Il fisco inciampa sulla rendita delle turbine' *Il Sole 24 Ore*, 24 (15 August 2005); F. Amatucci, 'La legittimità costituzionale del sistema di determinazione della rendita catastale dei fabbricati posseduti da imprese ai fini I.c.i.' *Diritto e pratica tributaria*, I, 1257 (2006); A. Gaggero, n. 16 above, 270.

also passed the constitutional legitimacy test,[34] including, in the calculation of the cadastral income, 'stable buildings' connected to the ground, even temporarily, through any means of union, to create a single complex asset, including the mobile elements necessary for the needs of industrial activity.[35]

In this way, the legislator has tried to resolve the interpretative contrasts outlined above, developing the concept of 'immovable property by incorporation'[36] and giving priority to functional inseparability, rather than to the removability or immovability of the asset.[37]

However, the hermeneutical perplexities, resolved by the legislator of 2005, were partly re-proposed by the Stability Law 2016 (Art 1, para 21, legge no 208/2015), which, in a favoured perspective, showing off of a not excellent legislative drafting technique, excluded from the direct estimate all those assets (machinery, devices, equipment and other plants) directly functional to the specific production process.

Systematically, the new legislation had, however, the merit of recognizing the real estate nature of systems fixed to the ground (so-called bolted), subjecting them to taxation on a cadastral basis, except entities functional to the production process.

In the new regime, however, the logical selection procedure is reversed, as an accretive type parameter is no longer used (what improves the profitability of the asset is included in the annuity), but rather a criterion for the exclusion (it is not taken into account, purposes of direct estimation, of all entities previously included but functional to a specific production, without being relevant the physical nature of the asset itself).

This means that, in the current regulatory context, no relevance can be attributed to the evaluation criteria used during the validity of the previous regime to determine the average ordinary income that can be drawn from the property, given the innovative nature of the new discipline.[38]

6 The Administrative Practise: A Critical Reconstruction

The administrative practice and the first rulings of the case law[39] seem to have minimized the innovative effects brought about by the Stability Law 2016, adopting positions that are not fully shared and often based on jurisprudential precedents that are temporally outdated and no longer relevant.[40]

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[34] Corte costituzionale 20 May 2008 no 162, *Rivista di giurisprudenza tributaria*, 845 (2008), with note of A. Bodrito, 'Tutte le componenti di un opificio che ne assicurano l'autonomia funzionale e reddituale influenzano la quantificazione della rendita catastale'.

[35] G. Guarnerio, n 15 above, 1445.

[36] S. Baruzzi, n 13 above, 452.

[37] F. Parente, 'Il riaccatastamento e le controversie catastali: problematiche attuali' *Rivista del notariato*, 831, 839 (2014).

[38] G. Guarnerio, n 15 above, 1446.

[39] Commissione tributaria provinciale di Matera 12 December 2017 no 368, *Il fisco*, 198 (2018).

[40] G. Guarnerio, n 15 above, 1440-1446.

The financial administration,[41] in a first interpretation, has taken up the previous distinction, within the theory of property, between furniture and real estate, dividing the elements that make up the urban real estate entity into four categories: land; buildings; elements structurally connected to the soil and buildings capable of increasing their quality and usefulness; plant components functional to a specific production process. The value of these latter entities, by express forecast, is excluded from the direct estimate.

Speaking on this point, the Revenue Agency[42] has configured as 'plant components functional to a production process', to be excluded from the estimate, regardless of their dimensional importance, only those that perform a specific function, in the context of production, and that is such as not to confer an appreciable utility to the property, even in the event of a change in the production cycle.

In reality, even before the new legislation, the entities without appreciable utility were peacefully excluded from direct estimation, not being an expression of functional wealth for participation in public expenses and not falling within the so-called 'landed capital'.

Therefore, in the light of the sources, this interpretation cannot be shared, not only to be praeter legem but also because it risks introducing into the system a further requirement, not foreseen by law, to exclude these components from the determination of the cadastral income. On the other hand, from the point of view of the Revenue Agency, these entities, as well as functional to production, must be such as not to give the property an appreciable utility.

Furthermore, the thesis leads to diminishing the scope of the plant components, identified only by exclusion: assets other than the ground, buildings and elements structurally connected to them.[43]

The Revenue Agency,[44] applying its orientation to the electricity production plants, excluded from the direct estimate all the entities functional to the production process (boilers, combustion chambers, turbines, pumps, recovery steam generators, alternators, condensers, compressors, valves, silencers, fluid regulation systems, transformers, wind turbines, including rotors and nacelles, inverters and photovoltaic panels), except for the elements integrated into the structure and constituting roofing or building walls.[45]

[41] Circolare Agenzia delle Entrate 1 February 2016 no 2/E, n 14 above, 4.
[42] Circolare Agenzia delle Entrate 1 February 2016 no 2/E, n 14 above, 5.
[43] G. Guarnerio, n 15 above, 1440.
[44] Circolare Agenzia delle Entrate 1 February 2016 no 2/E, n 14 above, 5; Circolare Agenzia delle Entrate 13 June 2016 no 27/E, available at www.agenziaentrate.gov.it (last visited 7 November 2020).
[45] G. Guarnerio, n 15 above, 1440.

7 The Perplexities Regarding the Inclusion of the 'Wind Tower' in the Direct Estimate

According to the financial administration,[46] the towers and, therefore, the 'wind towers' should be included in the direct estimate, among other components, since they are mere real estate entities included in the category of 'buildings', capable of increasing the market value of the fund on which they insist, 'whose economic contribution would be independent of the specific production process of energy generation from wind power'.[47]

The view of the financial administration is not convincing, since, where the wind tower is made of steel, it is excluded that it can be qualified as a 'building work', included in the 'construction' area, because, despite being fixed to the foundation or base, it does not constitute a whole, lacking real incorporation into the ground; rather, it is a mere plant component, endowed with functional and structural autonomy, removable and susceptible of reuse.

Regardless of the material with which the wind tower is built or its consistency, the decisive argument for excluding its value from the direct estimate is found in its functional vocation, inseparably linked to that of the electricity production plant, located inside, as it constitutes an essential component: tower, rotor and nacelle are entities linked by a functional constraint, constituting a single asset (production plant), so much so that often said nouns are used as synonyms to identify the complete plant, technically defined as a 'wind blade' or 'wind tower'.

Therefore, the components that the new legislation excludes from the direct estimate do not constitute an autonomous category to the land, buildings and elements connected to them, entities whose value is relevant for calculating the rent, being instead of enucleation to transversal character, capable of including both buildings and elements structurally linked to the ground and buildings, capable of increasing their quality and usefulness: the value of these assets is excluded from the rent if and to the extent that their function is directly connected with the process productive.[48]

8 The Evolution of the Jurisprudence

To the restrictive solution, endorsed by the financial administration, has adhered, not without disputes,[49] albeit based on further arguments, part of the relevant

[46] Circolare Agenzia delle Entrate 1 February 2016 no 2/E, n. 14 above, 4; Nota Agenzia delle Entrate 27 April 2016 no 60244, available at www.agenziaentrate.gov.it (last visited 7 November 2020).

[47] G. Guarnerio, n 15 above, 1442.

[48] G. Guarnerio, n 15 above, 1441-1444.

[49] Commissione tributaria provinciale di Isernia 31 October 2017 no 198, *Fisconline*; Commissione tributaria regionale della Campania 16 August 2018 no 7315, *Corriere tributario*, 46, 3591 (2018); Commissione tributaria regionale della Campania 23 January 2019 no 397, *Fisconline*; Commissione tributaria regionale della Campania 23 January 2019 no 398, *Fisconline*; Commissione tributaria regionale del Molise 23 January 2019 no 99, *Fisconline*; Commissione

jurisprudence,[50] which cannot be accepted, since it has referred to precedents of the Supreme Court, guidelines of administrative practice and regulatory references referring to a period before the innovations made by the Stability Law 2016 and, therefore, anachronistic and no longer relevant.

In particular, this jurisprudence of merit has resumed the orientation consolidated within the jurisprudence of legitimacy,[51] which, by combining tax legislation with civil law, has incorporated among the elements suitable for describing the real estate unit and to affect the determination of the annuity all the components that contribute to ensuring, in an ordinary way, a stable functional and income autonomy.

The position appears to be overtaken by the recent legislation that has broken the link between fiscal and civil law, subverting the previous approach: currently it is no longer necessary to assess to what extent the asset participates in the profitability and usability of the property, as it is already assumed that it contributes to it, otherwise it would make no sense to reason 'by exclusion'; rather, to determine the cadastral income, it is necessary to evaluate how much this asset, statutory included among the properties, can be directly functional to production, to be excluded from the income.

The aforementioned jurisprudential address recalls the principle of law expressed in three contemporary judgments of the Supreme Court,[52] which, intervening on the subject, included wind farms among the properties for special use, stackable in group D and precisely in category D/1, such as factories, affirming the need to take into account the value of the wind turbines, to determine the annuity, as the turbines of a hydroelectric power plant, since the same, despite being rotatable and removable, constitute a structural and essential component of the power plant, with the effect

tributaria regionale del Molise 23 January 2019 no 100, *Fisconline*; Commissione tributaria regionale del Molise 8 April 2019 no 286, *Fisconline*; Commissione tributaria regionale del Molise 23 April 2019 no 315, *Fisconline*; Commissione tributaria regionale della Toscana 12 November 2019 no 1576, *Fisconline*; Commissione tributaria regionale del Molise 18 November 2019 no 629, *Fisconline*; Commissione tributaria regionale della Toscana 24 February 2020 no 233, *Fisconline*; Corte di Cassazione 5 October 2020 no 21287, *Il fisco*, 4165 (2020).

[50] Commissione tributaria provinciale di Matera 12 December 2017 no 368, n. 40 above, 198; Commissione tributaria provinciale di Benevento 17 April 2018 no 385, *Fisconline*; Commissione tributaria provinciale di Benevento 17 April 2018 no 419, *Fisconline*; Commissione tributaria regionale della Basilicata 26 November 2018 no 622, *Fisconline*; Commissione tributaria regionale della Basilicata 20 December 2018 no 694, *Fisconline*; Commissione tributaria regionale della Basilicata 20 December 2018 no 730, *Fisconline*; Commissione tributaria regionale della Basilicata 20 December 2018 no 735, *Fisconline*; Commissione tributaria regionale della Basilicata 5 February 2019 no 24, *Fisconline*; Commissione tributaria regionale della Basilicata 11 February 2019 no 60, *Fisconline*; Commissione tributaria regionale della Basilicata 15 May 2019 no 255, *Fisconline*; Commissione tributaria regionale della Basilicata 30 July 2019 no 338, *Fisconline*; Commissione tributaria regionale della Basilicata 30 July 2019 no 345, *Fisconline*; Commissione tributaria regionale della Basilicata 23 October 2019 no 384, *Fisconline*; Commissione tributaria regionale della Basilicata 27 February 2020 no 51, *Fisconline*.

[51] Corte di Cassazione 18 February 2015 no 3166, n 29 above.

[52] Corte di Cassazione 14 March 2012 no 4028, n 6 above; Corte di Cassazione 14 March 2012 no 4029, n 6 above; Corte di Cassazione 14 March 2012 no 4030, n 6 above, 258.

that 'without those it could no longer be qualified as such, remaining diminished in its overall and unitary function and incomplete in its structure'. In this view, the wind tower/blade complex is understood as a unitary one, being used the two phrases as synonyms.

9 Conclusions

Even this last hermeneutic does not seem appropriate, nor in terms of time, as it refers to outdated legislation, which did not provide for any 'exclusion' from the calculation of the annuity and which referred, as the only measurement parameter, to the real estate nature of the asset, nor on the logical one, allowing to conclude opposite to that proposed by the trial judge, who, in an attempt 'to strengthen his motivations, further highlights the fallacy'.[53]

The orientation recalled considers the 'wind blade', an expression presumably referring to the complex consisting of a shovel, nacelle and tower, as a structural and essential component that performs an overall and unitary function of the production plant, like the turbine of the hydroelectric plant, structural and essential component of the hydroelectric system: well, if before the new legislation the total value of the wind blade (or wind tower) was included in the calculation of the rent, being an essential element for the production of electricity, following the innovations made by the Stability Law 2016, aimed at excluding from the annuity the goods that have a direct connection with the production, including the steel tower, in addition to the blade and the nacelle, among the functional components to the specific production process, it must not be taken into account for direct estimation.

Finally, even in the hypothesis in which the steel tower was structurally connected to the ground, through a concrete base, there would be no the further condition of the suitability of this element to provide a transversal utility independent of the production process carried out within the real estate unit, given that the tower, if deprived of its proper function (allowing the wind turbine to operate at an optimal altitude), would lack any further utility related to the building on which it stands: ceased the energy production function, the wind tower could at most be used for a new wind power plant or to be removed, resulting in no susceptibility to a different use; in case of non-removal, the tower could even negatively affect the value of the land on which it stands given the costs necessary for its disposal.

It follows that the steel tower of a wind farm now in disuse cannot constitute a positive element of income for the land, not providing it with any utility, but only costs.[54]

This conclusion is also valid for the hypothesis in which the wind tower is built in concrete in such a way as to form a whole with the ground that acts as sediment since

[53] G. Guarnerio, n 15 above, 1444-1445. In the same terms, comp. M. Del Vaglio, n. 8 above, 459; M. Del Vaglio and D. Bonomo, n 8 above, 3589; G. Zizzo, n 8 above, 701.

[54] Commissione tributaria provinciale di Isernia 31 October 2017 no 198, n 50 above; Commissione tributaria provinciale di Isernia 27 November 2017 no 275, *Fisconline.*

there is the same participation in the production process and does not provide alone any utility to the real estate.[55]

[55] G. Guarnerio, n 15 above, 1446.

Unlocking the Renewable Energy Potential of the Inner Areas in Wales and Italy: Challenges and Obstacles for Energy Communities

Silvia Montecchiari and Karina Zabrodina

Abstract The paper focuses on the main challenges and barriers that have prevented or slowed down the implementation of local renewable energy production projects in the past. In this perspective, the contribution analyses the economic, cultural, social and administrative factors that led to the failure of initiatives to create renewable energy communities in Wales and Italy in order to provide the Italian legislator, in view of the imminent transposition of Directive (EU) 2018/2001, with a useful orientation in the choice of rules that can facilitate the development of local energy communities, with particular attention to the conditions necessary for their success.

1 Introduction

Concern about climate change, energy security and resilience in the face of rising energy prices have been the main motivating factors of the goal of the Directive (EU) 2018/2001[1] aimed to promote the development of fully self-sufficient citizens and communities from an energy perspective by 2030. To some extent, this will require the decentralisation of the energy system and an evolution of the roles of energy producers and consumers, to create new opportunities to generate renewable energy and implement new technologies.

This transition has already led to the more active participation of individual consumers or citizens who act collectively in the energy system to produce renewable energy (RE) or to undertake other activities such as managing local networks. The realities already experienced have generally been prompted by the need to put an end to the private management of energy services and by confidence in a more localised energy generation. There are many experiences of successful energy communities,[2] but there are also many attempts that have been affected by cultural, social, regulatory, and even economic obstacles in the creation of local energy communities.

The following analysis aims to deepen some Italian and Welsh case studies in order to outline a picture of the main barriers that have prevented or slowed down the implementation of local renewable energy production projects. In the light of past failures, the analysis could provide policymakers with useful guidance in the choice of rules that can facilitate the development of local energy communities, with a particular focus on the conditions necessary for their success.

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[1] European Parliament and Council Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82.

[2] E. Heaslip et al, 'Assessing Good-practice Frameworks for the Development of Sustainable Energy Communities in Europe: Lessons from Denmark and Ireland' 4 *Journal of Sustainable Development of Energy, Water and Environment Systems* 307-319 (2016); T. Hoppe et al, 'Local Governments Supporting Local Energy Initiatives: Lessons from the Best Practices of Saerbeck (Germany) and Lochem (The Netherlands)' 7 *Sustainability*, 1900-1931 (2015).

2 The Failure of the Capitalist System in the Creation of Energy Communities in the Experience of the Municipality of Roseto Valfortore

Several models of local energy communities have been tested over the years in different parts of Europe, to experiment with more active participation by individual consumers or citizens and to democratize the energy market.

In Italy, the Municipality of Roseto Valfortore has started some local energy network projects since the 2000s and for this reason, it will be analysed as a case study to understand its effectiveness and the difficulties encountered in the construction of energy communities.

The municipality has established a mixed public/private company together with the Mountain Communities of Monti Dauni and Fortore, which built its first wind farm in 2005. In 2010 this same company established with the Municipality another company, the Aria Diana Srl, which built a wind farm of 4.6MW that went into production in 2013.

The goal was to create a Community plant where the private company would build and manage the plant, and the Municipality would acquire control once the privates would have been repaid of their investment. In fact, in Area Diana, the Municipality entered with a percentage of 35% predicting an increase of 8% every five years of its share in the company until to reach 60%.

With the assumption of the majority of the participation, the Municipality would have then ceded the quotas to the citizens, intending to create a system of exchange within the same community of renewable energy produced by the production units held by that community.

Therefore, the project aimed to create over time a real energy community between the local authority and its citizens that would make it possible to offset the environmental impact of wind infrastructures by creating new jobs, reducing expenditure, and improving the quality of life.

To hinder the acquisition of the majority stake in the company by the Municipality, the deliberation of the City Council no 33 of 21 December 2018 with which the Municipality had resolved to maintain its stake in the company Aria Diana Srl was challenged,[3] starting a judicial case aimed in fact at preventing citizens from entering into the management of renewable energy systems (RES).

[3] The deliberation is available at http://www.comune.rosetovalfortore.fg.it.

The analysis of the case clearly shows how the presence of large private investors in the public-private partnership reveals the weak aspect of the energy community model applied by the Municipality of Roseto Valfortore because it prevents the enhancement of the other benefits related to the local production of renewable energy by tying itself to the exclusive financial profit of the investment.

For this series of reasons, the wind farm-born with the idea of using renewable energy to activate self-sustaining development mechanisms for the benefit of its residents seems far from realizing its original purpose and represents a missed opportunity for the growth and attractiveness of an Apennine area famously on the margins of state investment policies.

It would undoubtedly have been more effective to ensure the participation of res management between local authorities and consumers from the earliest stages of the project, perhaps through the introduction of specific economic incentives for small investors: this would have kept out the logic of financial speculation while maintaining the close link between producer and consumer would have made it possible to create an energy community capable of generating a wealth produced, distributed and reinvested in the territory and, therefore, of fuelling a self-sustainable local development system.

At present, the legitimate expectation that the wind farm will bring tangible benefits to local communities where resources are exploited has not yet been realized: so far, the construction of large RES plants favoured by state incentives has brought minimal benefits to the local population compared to the development opportunities that could have been created by investing large amounts. The advantages for local populations were mainly limited to: (I) use (not always guaranteed) of local enterprises and labour for the construction of the civil works of the plants, ordinary maintenance, and surveillance; (II) some infrastructure work, mainly linked to the improvement of roads; (III) rent of the land affected by the installations (in the case of wind power a few thousand euros per year for each pole installed); (IV) in some cases, there are marginal forms of participation by local authorities in the revenues produced (typically 1 - 1.5%).

The failure of the energy community model, based on the idea of delaying the municipalization in the management of the renewable energy plant, has led the Municipality to launch another initiative aimed at the creation of an 'Energy Community' of collective self-consumption that aims to involve the entire community from the beginning through the exploitation of solar energy. The project, currently in the preliminary phase, provides in a first phase for the creation of small renewable plants for self-consumption; in the second, the creation of systems for sharing and exchanging energy; in the third the production of energy for the market (sale); and finally the construction of a local electricity network.[4]

[4] Available at https://www.provincia.foggia.it/Home/Notizie-e-comunicati/Dettaglio-News/Article

The call for the assignment of the feasibility study and implementation of the project, published in April 2019, has been awarded to a private company that should set up a purpose company in the form of a capital company with participating citizens once a significant number of accessions have been reached.[5]

Once established, the latter should install PV plants (about 750 kWp) on the largest number of buildings (residences or production sites) at its own expense, invoicing self-consumed energy at a price lower than the market price under a contract concluded with the customer.

Although the initiative is now taking its first steps, it seems to be heading in a direction that is not fully in line with the principles of Directive (EU) 2018/2001. The advantage of the transaction will be largely kept by the promoter or investors, who may not necessarily be part of the local community. The so-called Energy Community will not be managed either by the Municipality or by a cooperative of citizens, so that, of the advantages of the Energy Community, legally understood for citizens will remain only the savings in the bill based on the price that the customers-members will have contracted.

3 The Value and Social Impact of Renewable Energies in Directive (EU) 2018/2001

The exclusivity of the economic purpose behind the energy community projects tested by the Municipality of Roseto Valfortore is explained in the wider framework of investments made since the 2000s that has led to the expansion of Apulian wind by large energy and financial groups rarely linked to small national and local companies.[6]

In a regulatory context significantly different from the legal framework established by Directive (EU) 2008/2001, the absence of clear rules and economic incentives has led to difficulties in accessing the energy market for small investors such as SMEs or consumers. Thus, until now the use of renewable energy has benefited large energy market-leading companies which, by exploiting the emerging renewable energy market, have speculated financially on investments in RES (renewable energy sources) without bringing any benefit to local communities, left on the margins of investment, decision-making and management processes in the use of local resources.

ID/238/AAA (last visited 3 December 2020).

[5] The feasibility study presented by the successful tenderer company is available at http://95.110.227.90/friendlypower/Public/MatEsterni/Rosetobando/6.%20Studio%20fattibilita.pdf (last visited 3 December 2020).

[6] For a survey on the subject see the report of the Istituto superiore per la protezione e ricerca ambientale, *Gli impianti eolici nella percezione di alcune comunità Sub-Appennino Dauno* (Italian Higher Institute for Environmental Protection and Research, Wind Farms in the Perception of Some Communities Sub-Appennino Dauno), available at: https://www.isprambiente.gov.it/files/pubblicazioni/quaderni/ambiente-societa/QAS_11_15_Indagine_eolico_Puglia_vol.1.pdf (last visited 3 December 2020).

Is precisely in this aspect that the innovation element promoted by EU Directive 2018/2001 is expressed which, in an attempt to overcome the exclusively speculative role of investment in renewable energies, promotes a democratized energy system open to small investors and aimed at bringing energy production closer to the consumer.[7]

The attention to the social benefit of the renewable energy market is expressed on several occasions in the text of the directive. In its premises, the text calls on national legislators to promote the development of the renewable energy market, taking into account the positive impact on regional and local development, export prospects, social cohesion, and job creation, in particular concerning SMEs and independent energy producers, including self-consumers and renewable energy communities.[8]

In order to bring energy production as close as possible to the consumer, the directive provides to involve even the most disadvantaged entities such as households, vulnerable consumers, and tenants themselves who, without effective support, may not be able to participate in the energy market with their low income.[9]

In this renewed regulatory framework, the two models tested by the Municipality of Roseto Valfortore, on the one hand, the public-private partnerships, on the other a partnership in the form of capital companies, limiting themselves to offering exclusively economic benefits of the promoters, would not be fully replicable. This is not because the directive prohibits models based on generating a return to investors,[10] but because it encourages forms of organization where consumers themselves benefit from the exploitation of renewable energy offered by their localities.

According to the goals of the Onu Agenda for Sustainable Development, Directive (EU) 2018/2001 promotes the direct management of local consumers of the energy produced to enhance the natural resources at their disposal and activate sustainable self-development mechanisms, promoting the elimination of inequalities in the energy system.[11]

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[7] Article 21, European Parliament and Council Directive 2018/2001.

[8] Recital 61, ibid.

[9] Article 18, ibid.

[10] Article 21, ibid. The article talks about the 'aggregator' that refers to a market operator that creates many virtual power plants composed of renewable energy infrastructure and connected storage systems that should be remunerated for their activities. The aim is to enhance on the electricity market the energy produced and consumed by multiple customers through renewable energy plants.

[11] United Nations, Sustainable development Agenda 2030, 25 september 2015, goal n 1, point 1.a com mits the States to ensure adequate mobilisation of resources from different sources, including through development cooperation, in order to provide adequate and reliable means for developing countries to development implementing programmes and policies to end poverty in all its forms; at the point 1.b to create robust national, regional and international policy systems based on on development strategies for the benefit of the poor and sensitive to gender differences, for support accelerated investment in poverty-alleviation actions. See the whole document available at

A clear boost to the need to transform the renewable energy market into an opportunity to achieve environmental, economic, and social benefits for individual consumers can be found in Art 2 where energy communities are defined as legal entities whose shareholders or members are individuals, SMEs, municipalities, and whose main goal is to provide environmental benefits directly to local communities in the territories that offer the natural resources of renewable energy, rather than the financial profits of large investors.

In imagining how energy communities can be structured, in practice, the letter of the standard does not provide any indication so that national legislators in transposing the directive would be free to adopt different legal forms for the organizational structures of energy communities: partnerships (including public-private partnerships with local authorities), community trusts and foundations, limited liability companies, non-profit companies owned by clients, as well as housing associations and municipal property. Each of these types offers different advantages and may be better suited to certain local rules and conditions, but the choice depends on the type of 'community' to which an energy project is to be entrusted.

The experience of the Municipality of Roseto Valfortore allows us to grasp the distinction and the different effectiveness between the model of the 'locality community' with that of the 'communities of interest'. The latter concept refers to groups of people of common interest who are not local citizens or consumers but are for the most part dislocated investors, united in a project to invest in energy from financially profitable renewable sources.[12]

Different is the local community model: in fact, the more the energy community assimilates the locality and its components the more energy ownership models can be inclusive and collective. While investments through equity ownership only benefit those who are able and willing to invest, community trusts or non-profit organizations may act differently in the collective interest of all in a defined area.[13]

This awareness is inspired by the Art 2 letter b that, in requiring the participation of shareholders or members who are in the vicinity of renewable energy production plants, defines the energy community as a legal entity legally characterized by the proximity between production and consumption.

From this perspective it seems crucial for the legislator to discourage the adoption of models tending to centralize large dislocated financial investors and, on the contrary,

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https://www.undp.org/content/undp/en/home/librarypage/sustainable-development-goals/undp-support-to-the-implementation-of-the-2030-agenda/ (last visited 5 December 2020).

[12] This distinction has been taken up by M. Stamford, 2004. Community ownership: the best way forward for UK wind power. M.Sc. Dissertation, University of East Anglia, Norwich available at https://www.researchgate.net/publication/23648596_What_Are_the_Barriers_and_Incentives_for_Community-Owned_Means_of_Energy_Production_and_Use (last visited 7 December 2020).

[13] Ibid 4402.

to lay down rules for inclusive legal models that allow direct access to the renewable energy market of small local consumers as well as to the shared management and distribution of the natural resources from which energy is produced.[14]

On the other hand, the development of renewable energy from the use of the natural resources that the territories offer is a possible path of sustainable development[15] and presents itself as a valuable opportunity to reverse the depopulation and the definitive abandonment of areas such as inner areas that are normally outside the interest of national policies. The ability of the territories of the inner areas to equip themselves with energy communities structured in a way in which each citizen is part of it and responsible, can be linked to the growth and future of the territory, not only in a physical sense but also and above all because concrete commitments will be made through sustainable investments for future local generations.[16]

4 Awel Aman Tawe Wind Farm and Mountain Community of Camerino Wind Energy Project: An Example of Cultural, Social and Administrative Obstacles

The community-led approach based on local collaborative initiatives aiming to facilitate the development of sustainable energy technologies is increasingly perceived as a driving force in the transitional process toward low-carbon energy systems.[17] However, one of the renewable energy sources, although considered among the most technologically viable and cost-effective options,[18] is still hardly accepted and in most cases even obstructed by the communities themselves.

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[14] T. Van Der Schoor and B. Scholtens, 'Power to the people: Local community initiatives and the transition to sustainable energy' 43 *Renewable and Sustainable Energy Reviews*, 666-675 (2015), where is explained how local community energy initiatives contribute to a decentralized sustainable energy system.

[15] In English literature there are several authors who have long reflected on the Community renewable energy as a way of implementing renewable energy technologies, emphasizing themes of self-sufficiency, local determination, engagement and empowerment: P.D. Dunn, *Appropriate Technology: Technology with a Human Face* (London: Macmillan, 1978); S. Hoffman and A. High-Pippert, 'Community energy: a social architecture for an alternative energy future' 25 *Bulletin of Science, Technology and Society*, 387-401 (2005); A. Lovins, *Soft Energy Paths* (London: Penguin, 1977).

[16] M. Raffa, *Energia è Sviluppo. Fare Impresa Salvando la Terra* (Napoli: Edizioni Scientifiche Italiane, 2015).

[17] See, T. Bauwens et al, 'What drives the development of community energy in Europe? The case of wind power cooperatives' 13 *Energy Research & Social Science*, 136-147 (2016); G. Seyfang et al, 'A thousand flowers blooming? An examination of community energy in the UK' 61 *Energy Policy*, 977-989 (2013).

[18] European Wind Energy Association, *Wind energy - the facts: a guide to the technology, economics and future of wind power* (London: CRC Press, 2015). See also, REN21, 'Renewables 2020 Global Status Report' (131) available at: https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf (las visited 2 December 2020); P.E. Morthorst and H. Chandler, 'The cost of wind power. The facts within the fiction' 7 *Renewable Energy World*, 126-137 (2004).

This is the case of the wind energy solutions whose growth does not only depend on financial incentives and clearer regulatory framework but first of all needs a wider consciousness among local actors about energy issues[19] as well as of several social and economic benefits that territory may achieve through the creation of wind energy communities.[20]

Local public acceptance[21] constitutes an important cultural and social challenge for the implementation of wind projects. It is strongly connected to the tradition of landscapes and to the protection of the natural identity of territories which continue to be the main reason for the local opposition to the construction of wind turbines.[22] Moreover, in some cases, the lack of an efficient information policy and the effective participatory involvement of citizens has even led to legal battles which generated huge social gaps between community members rather than encourage them to the adoption of collective solutions.

From this perspective, the case of Awel Aman Tawe wind farm (Wales) and that of Mountain Community of Camerino (Italy) represent an empirical example of the main social, cultural, and administrative obstacles which need to be focused on to understand how they can be overcome in the light of the recent Directive (EU) 2018/2001.

The first one is the case of an energy project that was launched by a community-led initiative of a group of residents in order to realize a wind farm in a particularly poor and marginalised area of South Wales, the Amman and Swansea Valleys.[23] Such an idea would not only be provided for the installation of wind turbines but would also contribute to the development of the involved territories, generating clean energy for its inhabitants and reinvesting profits to respond to social and financial concerns of that area.

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[19] J. Roberts et al, 'Community Power: Model Legal Frameworks for Citizen-owned renewable energy', (2014) available at https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/model_legal_frameworks_2014.pdf (last visited 2 December 2020).

[20] An important overview of the role and benefits of local energy communities has been recently offered by the European Commission for the Environment, Climate change and Energy, 'Models of local energy ownership and the role of local energy communities in energy transition in Europe' (2018), available at https://op.europa.eu/en/publication-detail/-/publication /667d5014-c2ce-11e8 -9424-01aa75ed71a1/language-en (last visited 4 December 2020).

[21] G. Ellis and G. Ferraro, 'The social acceptance of wind energy' *JRC Science Hub* (2016), available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC103743/jrc103743_2016.7095_src_en_social%20acceptance%20of%20wind_am%20-%20gf%20final.pdf (last visited 7 December 2020).

[22] S. Breukers and M. Wolsink, 'Wind power implementation in changing institutional landscapes: an international comparison' 35 *Energy Policy*, 2737-2750 (2007).

[23] E. Hinshelwood and D. McCallum, 'Consulting communities: a renewable energy toolkit' (2001), available at https://www.osti.gov/etdeweb/servlets/purl/20253933 (last visited 2 December 2020).

The Awel Aman Tawe project was gradually disseminated among residents through a deep ten-month consultation and assessment process. It was vital to recognise local people as key stakeholders and acknowledge them as potential catalysts for change, rather than as obstacles, through appropriate awareness-raising actions and above all through listening to their proposal, opinions, and needs. Following the period of consultation, a community referendum was held, which showed the people being in favour of the idea of developing the wind farm.[24]

However, something went wrong. Despite the positive outcome of the referendum, the Awel Aman Tawe had to face a strong opposition of one particular community located in Tai'rgwaith which developed an Action Group to resist the installation of the wind turbines within that area. This group was supported by the Council for the Protection of Rural Wales (CPRW) and by the Country Guardian, both against the idea of turbines, which would have disturbed the peace and the beauty of green mountains, especially of the Brecon Beacons National Park situated near Tai'rgwaith village. The opposition generated a lot of rumours, uncertainties, and a general demoralised atmosphere among residents whose opinions split in half.

The result was that the application for the planning permission, lodged by community group Awel Aman Tawe, was firstly refused by the Neath Port Talbot County Borough Council and by Planning Inspectorate; subsequently, the decision was brought before the High Court where the appeal was turned down again.

Similar reasons, especially those connected to the overbearing visual impact and to the exploitation of mountain areas, marked also the Italian experience of the wind farm project to be realised in the inner areas of the Marche Region.

In particular, the project proposed by the Mountain Community of Camerino[25] included the installation of 17 wind turbines, in an area situated among the Montecavallo, Pievetorina, and Serravalle Municipalities, which would have provided

[24] 'The overall findings from the consultation process were that the majority of local residents were in favour of the project on the basis of the following conditions:
- The wind farm will consist of four or five turbines and will be situated on the Mynydd Uchaf (y Gwryd) between the villages of Rhiwfawr, Cwmllynfell and Tai'rgwaith.
- Anyone aged 16 and over, living in the 12 closest villages and the farms and small holdings on the mountain itself is entitled to become a member of Awel Aman Tawe at the cost of £1.
- All profits from the electricity generated will be held by a charitable trust.
- The charitable trust will be managed by Trustees. Residents in each village elect their own trustee.
- Funding will go to projects that generate local jobs, develop community facilities and services and respond to the needs of all age groups'. E. Hinshelwood and D. McCallum, 'Examining approaches to renewable consultation. Lessons from Awel Aman Tawe community wind farm project', 5 (2001), available at https://www.osti.gov/etdeweb/servlets/purl/20253934 (last visited 3 December 2020).

[25] Mountain Community of Camerino, Delibera di Consiglio 28 June 2007 no 25, available at http://www.comcamerino.sinp.net/delibere (last visited 7 December 2020).

clean energy to the interested neighbouring Municipalities. But it was not just about producing renewable energy. The realisation of the wind farm, supported by an important Italian environmental association Legambiente,[26] was also deeply linked to a big social and economic value.

Although the Mountain Community, unlike the Awel Aman Tawe case, was a local public entity, it was anyway representative of the local Municipalities and this would prevent the risk that other external private societies could take economic advantages of these areas without any involvement of local communities. In this perspective, the Apennine landscapes represent the identity of the Marche Region that needs to be jealousy preserved, but at the same time, they constitute a big energy source that is crucial for the development of the inner areas. Through such a project, all the economic results would be invested in the enhancement of these areas and in the creation of jobs and new services.

However, despite the great support of the regional government and the collaboration of local Municipalities, the idea of the wind farm was strongly hindered by the opposition of Italia Nostra Onlus[27] and by the disagreement of the Superintendence for Archaeology, Arts, and Landscapes of Marche Region because the location chosen[28] for the erection of turbines is an area of significant landscape value. As in the Welsh wind farm case, the dispute was brought before the court, but unlike the first one, it has had a different outcome: the Regional Administrative Court (T.A.R. Marche) upheld the recourse of Italia Nostra Onlus and cancelled the authorisation for the construction of the wind farm,[29] but the decision has been subsequently reformed by the Council of State which upheld the appeal of Mountain Community and rejected the first recourse.[30]

5 A Brief Analysis of the Welsh and Italian Cases in the Light of the Directive (EU) 2018/2001

Both case studies show the persistence of an important unsettled issue, deeply linked to the successful development and promotion of renewable energy, which requires a

[26] Legambiente Marche Onlus, available at http://www.legambientemarche.org/index.php (last visited 4 December 2020).

[27] Italia Nostra Onlus is one of the oldest Italian environmental associations that operates in the field of the protection of cultural, artistic and natural heritage available at https://www.italia nostra. org/ (last visited 3 December 2020).

[28] Marche Region, Delibera G.R. 3 April 2006 no 366, 'Piano energetico ambientale regionale (PEAR); capitolo 6, paragrafo 4.7: individuazione aree idonee alla realizzazione di un parco eolico di 40 MW', available at http://www.norme.marche.it/Delibere/2006/DGR0366_06.PDF (last visited 7 December 2020).

[29] Tribunale amministrativo regionale Marche-Ancona 25 July 2013 no 591, (2013).

[30] Consiglio di Stato, 12 June 2014 no 2999, *Foro Amministrativo*, 1696 (2014).

delicate balancing operation between different interests to be protected.[31] On the one hand, it is necessary to ensure the protection of the natural heritage and cultural identity of the inner areas.[32] While on the other one, it is essential to safeguard a wider right to a healthy and sustainable environment which needs the adoption of renewable forms of energy to reduce greenhouse emissions and prevent dangerous climate change.[33]

In the Awel Aman Tawe case, the protection of the landscape prevailed although there was a great engagement of local communities through public meetings, surveys, and referendums. This result was probably the consequence of the fact that in front of a great initial popular acceptance, there was a lack of confidence and awareness among residents as well as among local governments of the benefits the park would provide for the territory. For this purpose, it would have been crucial, with a view also to community outreach on energy issues, to set up a strong information plan which would have shown benefits and positive impact of the wind turbines and could have helped reach out a more balanced solution.

From this perspective, the Directive (EU) 2018/2001 provides in Art 18 the necessity to ensure that information on support measures, net benefits, cost, and energy efficiency of equipment is made available and accessible to all relevant actors. In particular, it specifies the strategic role of appropriate information, awareness-raising, guidance, and training programs to inform citizens of the benefits and practicalities, including technical and financial aspects, deriving from the developing and using of energy from renewable sources, including the self-consumption of the renewable energy or its usage in the framework of energy communities.[34]

In the second case concerning the Mountain Community of Camerino, the idea of the strategic role of the wind farm and the awareness of the economic advantage for the population had greater success, although the involvement of local citizens was almost

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[31] From this perspective, Consiglio di Stato, 23 March 2016 no 1201, *Rivista Giuridica dell'Edilizia,* 283 (2016) in which it has been highlighted that a strict comparison must be made between the various interests involved in the issue of authorisation to the realisation of a renewable energy power plant. Such comparison can not be reduced to the examination of the ordinary opposition between public and private interest, that generally connotes the theme of landscape compatibility in ordinary building interventions, but requires a more analytical assessment that is charged with examining the complexity of the interests involved. This is because the production of electricity from solar sources is itself an activity that contributes, albeit indirectly, to the preservation of landscape values.

[32] In Italian jurisprudence, see, Tribunale amministrativo regionale Toscana-Firenze 27 September 2011 no 1422, *Foro amministrativo*, 2702 (2011); Consiglio di Stato, 14 luglio 2014 no 3645, *Rivista Giuridica dell'Edilizia*, 995 (2014); Consiglio di Stato 29 April 2014 no 2222, *Foro Amministrativo (Il)*, 1074 (2014); Consiglio di Stato, 14 Novembre 2019 no 7839, *Foro Amministrativo (Il)*, 1790, (2019).

[33] United Nations, The Paris Agreement, signed in Paris on 12 December 2015, available at https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (last visited 7 December 2020).

[34] Article 18, European Parliament and Council Directive 2018/2001.

absent. Such a solution, however, was the result of a long legal battle that only extended the time needed to obtain authorisations, generated legal costs, and a social gap.

Therefore, to promote the creation of new energy communities and to stimulate citizens to become prosumers it is fundamental the adoption of shared administration models based on community-led initiatives aimed at joint planning and mutual resource sharing.[35] From this point of view, the same definition of the energy communities provided by the European legislator,[36] wherever expressly indicates natural persons, SMEs, or local authorities as to the main shareholders or members, recognizes the value of the whole community which is not to be considered only as a passive consumer, but as an actor, able to catalyse and autonomously orient the endogenous resources of the territory to its regeneration.

The analysis of the Italian case revealed a further important aspect which is not only the absence of adequate cooperation with the local population but also a great lack of coordination among administrations involved in the authorisation processes. While the Marche Region welcomed the proposal to create a wind farm and granted the permission, the Superintendence expressed a negative opinion about the chosen location, causing the legal clash.

The lack of administrative harmonisation has to be therefore considered among the main obstacles to the implementation and development of energy production plants. For example, in the case of wind turbines, it would be extremely important for the local authorities to draw up jointly specific projects with the choice of the most suitable natural sites for the construction of wind farms, to prevent legal disputes and speed up authorisation processes. For this purpose, the Directive provides a detailed framework of the necessary administrative procedures, regulations, and specific codes as well as gives some indication of organisation and duration of the permit granting process.[37]

In the light of the analysis of the Welsh and Italian experiences, emerges therefore that in transposing the Directive (EU) 2018/2001 the national legislator should not take into account only economic barriers to the successful promotion of energy communities, but should also pay particular attention to the adoption of appropriate means of information, of participation and coordination among all local actors. Otherwise, there is a risk that in front of multiple economic incentives aimed to encourage the use of renewable energy, some social, administrative, and cultural obstacles may be the cause of the common sense of demoralisation and thus generating opposition and resistance rather than facilitating the energy transition process.

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[35] R. Leal-Arcas, 'Re-Thinking global change: a local, bottom-up perspective' 20 *Seton Hall Journal of Diplomacy and International Relations*, 4-20 (2018).
[36] Article 22, European Parliament and Council Directive 2018/2001.
[37] Articles 15 and 16, ibid.

6 Conclusion

The survey carried out on the causes most hampering the effective success of energy communities has shown how energy production projects can be controversial and disadvantageous at the local level, whether the extent of real community involvement and benefits becomes a problem. The lack of appropriate incentives able to attract local businesses or consumer citizens into energy production; the lack of specific procedures of involving the concerned communities; the lack of environmental culture and awareness-raising on energy issues have often risked, sometimes successfully, wrecking energy projects with appreciable intentions.

This is borne out by the case studies of Wales and Camerino, which show that the difficulties of consensus and the lack of cohesion between citizens and promoters can be an important barrier that energy projects may encounter in the territories. In their epilogue, both experiences show that a deeper knowledge of the needs and peculiarities of local communities could have helped to prevent protests and avoid appeals that have merged into complicated and wasteful court proceedings both for promoters and citizens themselves. Only through investment in active participation, especially in case of the intervention that has a strong impact on the territory, politics, and institutions can rebuild a trusting relationship with citizens and contribute decisively to the acceptance of renewable energy at the local level.

Ensuring the effective participation of local consumers, however, can no longer limit itself only to the implementation of specific consultation methods, but it requires a commitment aimed to guarantee the possibility that small investors and individual local consumers can participate in the economic investment process and thus in its management. The experience of Roseto Valfortore shows in fact that for the construction of a viable local energy community it is necessary to ensure access to the renewable energy market by small local consumers[38] and so to democratically expand the basis of the potential investors.

On the premise that the Directive (EU) 2018/2001 allows maximum freedom in the choice of organisational forms, in a dimension more in line with the democratic spirit and social value that the energy market has increasingly assumed in the age of energy transition it would be desirable to regulate the organization of energy communities with models alternative to the prototype of profit companies which attract the attention and interests of large financial groups. The lack of immediate economic resources, that the exclusion of large private investors would inevitably bring with it, could be resolved by strengthening economic incentives for small investors and by

[38] Although there is no strict definition of 'energy democracy', it concerns the shift of power over all aspects of the energy sector (from production to distribution and supply, from finance to technology and knowledge) to consumers and workers, with increased importance attached to social and environmental goals: see more in J. Angel, *Towards Energy Democracy: discussions and outcomes from an international workshop Amsterdam* (Amsterdam: Rosa Luxemburg Foundation, 2016), 3.

introducing clear rules to regulate models of consumer aggregation as much as possible inspired by no-profit logic.

For example, legal models such as community cooperatives[39] and social enterprises[40] would enable consumers to associate and produce, sell or exchange energy at a local level as well as would offer the territory the opportunity to retain the economic benefits generated by small investments. Only these legal models, based on no-profit, would enable the territories and their resources to be taken away from the speculation that has emerged from the experiences of past years and would effectively meet the need, expressed by the Directive in recital 3, to guarantee sustainable energy at affordable prices, to offer environmental, social and health benefits and to create regional development, especially in rural and isolated areas which have low population density or are subject to partial deindustrialisation.

This is even more valuable if we consider the great vulnerability of the Italian inner areas, in particular the hinterland of the Marche Region, due to the frequent natural disasters, especially the earthquakes, that the communities have to face constantly. In this perspective, the cooperative model plays an essential role in overcoming systemic crises: European Union[41] has highlighted that it undoubtedly represents added value for the regeneration of vulnerable areas since it combines profitability and solidarity through creating high-quality jobs, strengthening social cohesion as well as generating social capital. Many cooperatives proved to be more resilient in times of crisis than traditional enterprises. Because of the closure of the latter's, the cooperatives have helped to increase the employment rate by setting up some community-based enterprises in a wide range of sectors. This is due to their great ability to adapt to changes and to maintain their operational continuity, even in situations of risk, and to their strategic capacity to provide collective solutions to common problems through

[39] 'Cooperatives are the most common form of organizational structure adopted by community energy initiatives. They constitute democratic structures that follow a set of internationally agreed principles and make decisions on a one-member-one-vote basis; day-to-day operation is governed by an elected board'. REN21, 'Renewables 2016 Global Status Report 2016' (137) available at https://www.ren21.net/wp-content/uploads/2019/05/REN21_GSR2016_FullReport_en_11.pdf (last visited 5 December 2020).
However, in the Italian legal system, apart from some legislative interventions on a territorial basis, there is still no specific national regulatory framework that can foster the growth, support and development of community cooperatives. Such organizational models are, therefore, subject to the general discipline of the cooperative societies set out in Articles 2511 et seq. of the Civil Code.

[40] For an overview of social enterprises in Europe, see, European Commission, *Social Enterprises and their ecosystems in Europe* (Luxembourg: Publications Office of the European Union, 2020), available at https://europa.eu/!Qq64ny (last visited 6 December 2020).
In Italy, social enterprises are regulated by Decreto legislativo 3 luglio 2017, no 112, available at https://www.gazzettaufficiale.it/atto/stampa/serie_generale/originario (last visited 6 December 2020).

[41] Committee on Industry, Research and Energy, 'Report on the contribution of cooperatives to overcoming the crisis' available at https://www.europarl.europa.eu/doceo/document/ A-7-2013 -0222_EN.pdf (last visited 5 December 2020).

direct participation of citizens, especially in areas that are disadvantaged or damaged by natural disasters.

In conclusion, in the light of the case studies and the main issues that emerged from their analysis, it seems important to highlight that the energy transition is a complex dynamic process that requires a constant implementation and composition of different interests involved to achieve multilevel sustainability that is, environmental, economic and social, also taking into account local needs and peculiarities. For this purpose, the Directive (EU) 2018/2001 represents a great opportunity for the national legislator to introduce a regulatory framework that can facilitate the process of creating energy communities through existing legal forms, as well as a chance to rethink innovative models as community cooperatives, which currently embody the most complete organizational model able to balance the interests of different nature.

Regionalization of the Italian Legislation on Energy Communities: An Obstacle to Prosumerism

Giuseppina Vella

Abstract This article reports on a particular aspect of the Italian legislation on Energy Communities, namely the publication of several regional laws that in some cases even preceded the first national ones. The common points and differences of the aforementioned laws are briefly summarized showing how, on the one hand, they have been a useful tool for the development of national laws but, on the other hand, they have created a fragmented framework that complicates prosumerism initiatives in Italy.

The scenario that has been emerging in recent years in the energy sector, sees the emergence of a new type of 'active' customer, more informed about consumption and energy prices and more sensitive towards the use of green sources.

The shift to an increasingly decentralised energy production geared to the full exploitation of resources from renewable sources inevitably requires greater customer involvement: by simple 'passive' users taking on the role of 'prosumers'. The user now can produce and to consume his energy, to store it or to sell it to the grid exploiting the availability of renewable sources located throughout the territory and otherwise not usable.

The Clean Energy Package of the European Union for the first time formally recognizes the right of citizens and communities to be directly involved in the energy sector opening up new scenarios and opportunities for consumers.

The right of European consumers to become self-consumers of renewable energy is formally recognised as well as, through two laws, the characteristics and limits of Energy Communities.

European Parliament and Council Directive (EU) 2018/2001, of the of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82 clarifies the regulatory framework of the Renewable Energy Communities (RECs)[1] while European Parliament and Council Directive (EU) 2019/944 of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU [2019] OJ L158/128 defines new roles and responsibilities for the Citizen Energy Communities (CECs).[2]

With a careful look at June 2021, last date imposed by the European Union on the

[1] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82.

[2] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU [2019] OJ L158/128.

implementation of RED II Directive, in Italy the first steps are being taken to define an appropriate regulatory framework in support of Collective Self-consumption and Energy Community initiatives.

With some delay compared to the other Member States, the transposition of the European Directives has taken place with legge 28 February 2020 no 8, Art 42-*bis* on self-consumption from renewable sources,[3] conversion in law, with amendments, of decreto legge 30 December 2019 no 162.

Through some early experimental configurations, the possibility of activating collective self-consumption or creating an energy community from renewable sources has been established; the systems admitted to the experimentation have a maximum power of 200 kW and are powered from renewable sources. The main purpose is to acquire through these installations functional data for the realization of a definitive national regulatory framework.

A peculiar aspect in the Italian legislative scenario has been the emergence in different regional contexts of local regulatory tools to favour the spread of energy communities and to promote the creation of 'oil free' areas. These areas will be independent of fossil fuels thanks to the use of integrated renewable energy sources granted by the construction of the aforementioned communities.

The pioneer Region in this field was Piedmont, whose first law proposal on 'Istituzione delle comunità energetiche', legge regionale 24 July 2017 no 271, dates back to 24 July 2017, well before any national initiative.

The proposal was followed by legge regionale 3 August 2018 no 12 on promoting the establishment of energy communities.[4] This law contains a model for the creation of energy communities with the primary aim of facilitating the production and exchange of renewable energy on a local scale, the promotion of energy efficiency and the reduction of consumption.

This initiative was followed by legge regionale 9 August 2019 no 45 on promoting the establishment of energy communities[5] in Puglia and legge regionale 6 July 2020 no 13 on promoting the establishment of energy communities[6] published on 15 July 2020 on the BUR of Region Liguria.

In Sardinia, proposta di legge 4 September 2019 no 47 of on promoting the establishment of energy communities[7] was published while in Calabria is under discussion another law proposal on promoting the establishment of energy communities.[8]

[3] Legge 28 February 2020 no 8 Art 42-*bis*.
[4] Legge regionale 3 August 2018, no 12.
[5] Legge regionale 9 August 2019, no 45.
[6] Legge regionale 6 July 2020, no 13.
[7] Legge (proposal) no 47 of 4 September 2019.
[8] Deliberazione della Giunta Regionale no 110 of 29 May 2020.

It is interesting to compare regional laws and law proposals on energy communities published in Italy. These initiatives outline a quite uneven framework and an additional critical element to the implementation of homogeneous policies on prosumerism.

The first element to be considered is certainly the very definition of an energy community.

In each region, it is possible for private and public actors to take part in a community project. Community members are involved both in the distributed generation of energy from renewable sources and in the execution of distribution system management activities, supply and aggregation of energy at the local level.

The main purpose of these activities must be the creation of valuable energy rather than an economic benefit and, in fact, the Calabrian law explicitly reports 'the participation of companies in energy communities is permitted if it does not constitute the principal commercial or professional activity'.

It is fundamental the implementation of systems perfectly integrated with the territory as well as an energy production with low environmental impact. The main objective must be, in each context analysed, the self-consumption of the renewable energy produced or, otherwise, its storage.

Furthermore, both the Region of Puglia and Liguria explicitly define energy communities as instruments to fight energy poverty through a reduction in consumption and supply rates. In Calabria, on the other hand, it is pointed out that they can sell the renewable energy produced free of charge to counteract energy and social poverty.

The legislations analysed differ about the status of energy-producing entities. Energy communities acquire and maintain the status of energy-producing entities if the share of energy produced for self-consumption by members is not less than 70% of the total annually in Piedmont and Liguria and not less than 60% of the total annually in Puglia, Calabria and Sardinia; moreover, at least half of this quota shall be produced from locally available renewable energy sources.

The skills recognised to the energy communities are, on the other hand, quite uniform. They can enter into agreements with the Autorità di Regolazione per Energia Reti e Ambiente (ARERA) to promote optimal management of the energy networks, they are required to draw up an energy balance within six months of their establishment and, within twelve months, a strategic document to identify actions to reduce energy consumption from non-renewable sources and actions for the efficiency of energy consumption.

Municipalities and local authorities interested in setting up an energy community, in each initiative analysed, adopt a specific 'Protocollo d'intesa', whose criteria, to date, have only been defined by Piedmont and Puglia. In these two regions, regional laws

were followed by deliberations of the Regional Council[9] on the implementing provisions and financial support for energy communities.

The protocols clarify the role of municipalities that can propose or join an existing energy community; a non-homogeneous context emerges, mainly since the Piedmont provisions preceded the first national ones.

Some minimum technical requirements for the establishment of an energy community are different: in Piedmont, for example, annual electricity consumption must be at least 0.5 GWh while in Puglia it must be 0.02 GWh.

The criteria for drawing up the energy balance are the same as well as the quantities to be quantified; however, the Puglia Region also requires the calculation of the community's energy storage capacity.

As far as the criteria and characteristics of the strategic document are concerned, the way it is drawn up is common to the two regions, as are most of the objectives to be identified. In Puglia, it is also necessary to identify an energy cost reduction target for the members of the community; this is an element consistent with the greater social orientation of the law in this region. The bureaucratic process for the approval and evaluation of the above strategic document is essentially the same.

A peculiarity of the Sardinian regional proposal is interesting. In this case, financial support is planned especially for those energy communities that will be built in internal areas characterised by infrastructural problems as well as depopulation.

In this way, new off-grid installations are promoted to meet the energy needs of isolated users; it opens the way to a completely different logic on the management and implementation of energy communities that must be implemented at the national level by exploiting primarily the existing network.

It is underlined that in every regional law there is the provision of a 'Tavolo Tecnico' whose role is purely advisory. It is attended by representatives of the energy communities, representative associations of the environmental and energy sector and the heads of the regional institutions concerned.

The environmental purpose of the energy communities is clearly and continuously emphasized in all laws considered while the social and economic ones are in the background. They are considered as a useful tool to involve citizens in the energy transition but, above all, as a means to achieve greater energy independence at the local level and to exploit locally available resources.

Any economic benefits generated are secondary to the achievement of the environmental standards established in each regional and national context.

Concerning the social aspect, and more specifically the fight against energy poverty,

[9] Deliberazione della Giunta Regionale del Piemonte 8 March 2019, no 18-8520 and Deliberazione della Giunta regionale della Puglia 9 July 2020, no 1074.

the regions that explicitly define energy communities as an opportunity are Liguria and Puglia whose laws define the possibility for members of communities to save on energy costs through subsidized tariffs and energy savings.

Sardinia, on the other hand, faces this problem from another point of view describing energy communities as a useful tool for electrification and energy sustenance of citizens living in isolated areas poorly served by the national service.

Although the presence of regional regulatory initiatives has also been a stimulus to the definition of a national framework, the different legislative provisions between one region and another result in a rather fragmented scenario that further complicates the role of the prosumer citizen in the Italian context.

Consideration must also be given to the possibility of installations that go beyond regional borders, something that is difficult to propose and to realize at present. The real turning point for the involvement of citizens in energy communities' initiatives will be the overcoming of these regional provisions and the definition of an overall regulatory framework at the national level. It will be essential to proceed with the definition of national laws such as those issued in recent months; bureaucratic procedures too complex need to be simplified and it will be necessary to avoid inconsistencies between one territory and another because they could be reflected in unequal treatment for prosumer citizens.

Japan's Renewable Energy Law at a Turning Point

Junichiro Kusumoto

Abstract The FIT system in Japan, which started in 2012 to procure renewable energy for a certain period of time at a fixed price, succeeded in increasing the number of participants in the electric power business, but on the other hand, the burden on the people due to the levy increased and the problem of non-operation after the operator acquired the right of higher procurement price became clear. The problem of non-operation has already been resolved to a certain extent by Revised FIT Law in 2016. Therefore, the highlight is the introduction of the FIP system, which abolishes the feed-in tariff system for large-scale solar and wind power generation companies and incorporates the principle of competition by bidding. In addition, for small-scale power generation companies, it is the utilization of local production for local consumption type renewable energy. This is also expected to be useful to strengthen resilience in the event of a disaster. It can be said that the drastic review of the FIT system and enactment of FIP law in 2020 will support the conversion of renewable energy into a main power source. The efforts to make renewable energy main power source also brings by-products such as reducing the burden of levy on renewable energy, creating innovative technologies such as storage batteries, producing new industries in the region and disaster countermeasures.

1 Introduction

Renewable energy is a promising, diverse and important low-carbon domestic energy source that does not emit greenhouse gases, can be produced domestically and can contribute to energy security. It includes solar, wind and geothermal energy, small and medium-sized hydropower and biomass.[1]

Since the Great East Japan Earthquake in March 2011, greenhouse gas emissions have increased in Japan, reaching a record high in FY2013.

Under the Paris Agreement, which came into effect in 2016, it was agreed (ⅰ) to keep the global average temperature rise well below 2 ℃ compared to before the Industrial Revolution and make efforts to keep it at 1.5 ℃, and (ⅱ) to control greenhouse gas emissions of the world as soon as possible in the latter half of the 21st century, and to balance greenhouse gas emissions and absorption by forests, etc. Because renewable energy does not emit greenhouse gases, it can contribute to the realization of the Paris Agreement.

In Japan, where resources are scarce, fossil fuels such as oil, coal, and natural gas account for more than 80% of the energy supply, and most of it depends on foreign

[1] The Act on Promotion of Utilization of Non-fossil Energy Sources and Effective Utilization of Fossil Energy Raw Materials by Energy Supply Providers (Energy Supply Structure Advancement Act) states that 'renewable energy sources' are 'solar, wind and other non-fossil energies'. Of the sources, those specified by the government ordinance as those that can be used permanently as energy sources are defined in the government ordinance, and in the government ordinance, solar power, wind power, hydraulic power, geothermal power, solar heat, heat in the atmosphere, and other natural worlds. It defines the heat and biomass that exists in.

countries. Especially after the Great East Japan Earthquake, the energy self-sufficiency rate has fallen below 10%, and it is important to improve this from the viewpoint of stable energy supply. Since renewable energy is a domestic energy source, it can also contribute to improving the energy self-sufficiency rate.

The Japanese government expects a renewable energy ratio of 22 to 24% in 2030 and has positioned renewable energy as its main power source to achieve this level.[2]

As a policy for that purpose, Japan imitated other countries, and at first, in August 2011, 'Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities' was enacted and came into effect in July 2012.

This is a feed-in tariff system for renewable energy and is called the FIT system (Feed-in Tariff). The purpose of this system is to popularize renewable energy and promote the business, and this purchase is characterized by being covered by a levy imposed on electricity users.

As of November 2020, this FIT system is undergoing a major overhaul, and in particular, there is a high possibility that the FIT system for medium-sized and larger solar power generation facilities will be abolished, and solar power sales will replace it.

The purpose of this system is to make renewable energy business self-reliant and promote free competition in the market.

This paper introduces the situation in Japan at the transition period from the FIT system to the new system including the FIP system.

2 Overview and Problems of the FIT System

2.1 Outline of the FIT System

The FIT system is a system in which an electric power company (retail electric power company) purchases electricity generated by renewable energy for a certain period at a certain price. Japan's FIT law was enacted in 2011, enforced in 2012.

As of 2020, it has been decided to purchase household solar power generation (less than 10kW) for 10 years, geothermal power generation for 15 years, and commercial solar power generation (10kW or more), wind power, hydropower, and biomass power generation for 20 years.

Although the purchase price is fixed for a certain period, it is reviewed every year when the business is started and is reduced every year.

[2] See the Agency for Natural Resources and Energy website of the Ministry of Economy, Trade and Industry available at https://www.enecho.meti.go.jp/category/saving_and_new /saiene/renewable /outline/index.html (last visited 2 December 2020).

In this way, the fixed purchase unit price decreases year by year. This is to dissolve the gradual diminution of the market price of facilities such as sunlight panels, the unfairness of the general user by the burden increase of the money of re-energy levy.

And this fixed price wholesale purchase system makes the end (the expiration) sequentially after November 2019 because a purchase period of the photovoltaic power generation less than 10kW was ten years.

The purchase expense by the electric company is added to an electric bill in proportion to use electricity, and the nation bears it. Renewable energy generation promotion levy (money of re-energy levy) means this. The unit price of the money of re-energy levy is regulated to be national flat unit price, based on purchase prices, the Minister of Economy Trade and Industry sets it every year.

If the scale is less than 10kW here, it is residential photovoltaic power generation, and while industrial photovoltaic power generation is the entire purchase, this is to have the surplus electricity purchased after consumption in the house.

And since the purchase period of solar power generation of less than 10kW is 10 years, this feed-in tariff system is to be terminated (expired) sequentially from November 2019.

The unit price of the renewable energy levy is adjusted to be a uniform unit price nationwide and is set by the Minister of Economy, Trade and Industry every year based on the purchase price.

2.2 Problems of the FIT System

Under the FIT system, which guarantees the purchase of electricity at a fixed price for a certain period, renewable energy companies will be able to secure long-term profits, which has the advantage of making investment decisions easier.

Therefore, the amount of renewable energy introduced has increased significantly four years after the start of the FIT system.

However, issues such as the burden on the public due to the levy and the increase in non-operating projects have become clear.

The total levy amount was about 130 billion yen in 2012 when the feed-in tariff system started, but it has increased to 330 billion yen in 2013 and 650 billion yen in 2014, and 2.4 trillion yen in 2019.[3] The renewable energy levy will continue to increase moderately in the future and is expected to reach approximately 3 trillion yen in FY2030.[4] This inevitably increases the burden on people's electricity bills.

[3] Material 8 of Agency for Natural Resources and Energy Japan in 2019/05/30 available at https://www.enecho.meti.go.jp/about/special/tokushu/saiene/saienecost.html (last visited 2 December 2020).

[4] Available at https://www.enecho.meti.go.jp/about/special/tokushu/saiene/saienecost.html (last visited 2 December 2020).

About 70% of the total purchase cost in FY2019 under the FIT system is for commercial solar power generation, more than 10% is for biomass power generation, and less than 20% is for other power generation. It can be seen that most of the purchase costs are biased toward solar power generation.

The fixed purchase price is lowered every year, but a power plant that has previously secured the right to a high fixed purchase price but is not yet in operation is called an unoperated project. Under the FIT system, the cost of photovoltaic power generation for business use has been rapidly reduced due to the rapid expansion of certification and introduction amount, and the cost of solar panels has been reduced rapidly, so the procurement price has dropped to less than half.

The non-operation problem is a problem in which the operation of power generation is not operated while being certified at a procurement price as high as possible because the purchase price decreases every year under the FIT Law. To deal with this problem, the Revised FIT Law 2016 states that (ⅰ) the certification will expire for projects for which a connection contract has not been concluded with the power system by the end of March 2017, and (ⅱ) after FIT certification, if power generation does not start even after the year has passed, the purchase period will be shortened by the amount that exceeds the deadline. After that, on December 5, 2018, the Agency for Natural Resources and Energy announced new rules.[5]

2.3 Revised FIT Law 2016

Based on the above issues of the FIT system, the FIT Law was revised in 2016 and came into effect in 2017.

In the new system under the revised FIT Law, a new certification system will be created, and the certainty of business implementation will be high by changing from 'equipment certification' to confirm the equipment so far to 'business plan certification' to confirm the business plan. It was a mechanism to certify projects. Also, the business operator was obliged to carry out appropriate maintenance.

Furthermore, for solar power generation companies that have received certification and do not start power generation even after a certain period, the purchase period is shortened, and the operation start deadline from the approval of the business plan to the actual installation work and operation is provided.

In particular, as a general rule, projects for which a connection contract could not be concluded by the end of March 2017 were revoked, and as a result, approximately 17 million kW was revoked. In the connection contract after August 2016, the operation start deadline of '3 years from certification' was set, and the procurement period (20 years) was shortened for the excess.

[5] Available at https://www.meti.go.jp/press/2018/12/20181205004/20181205004.html (last visited 2 December 2020).

Also, a bidding system has been introduced for solar power generation facilities of 2,000 kW or more, and the purchase price for three years will be set except for some categories (solar power of 10 kW or more, wind power of less than 20 kW). This is a method in which the upper limit price is set in advance, the bidders with the lowest prices are accumulated up to the capacity to be recruited in order without exceeding the price, and the winning bidder is determined until the upper limit is reached. The purchase price of the successful bidder is adopted as the bid price, and the purpose is to further reduce the purchase price and levy by this mechanism.

3 Drastic Review of the FIT System and Introduction of the New System Including FIP System

3.1 Background of the Drastic Review of the FIT System

More than a couple of years have passed since the revised FIT Law was enacted in 2016, and the situation regarding renewable energy is changing.

Originally, Supplementary Provisions Article 2(3) of Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities in 2011 stipulates that the government is to radically review this Act during the period from the time after the enforcement of this Act until March 31, 2021, taking into consideration the status of the enforcement of this Act, etc.

Based on this regulation, since September 2019, the Reform Subcommittee on Renewable Energy Main Power Supply System has started to consider a drastic review of the FIT system from the point of view of (ⅰ) Support system according to power source characteristics, (ⅱ) Promotion of introduction of renewable energy rooted in the region, (ⅲ) Next-generation power networks in renewable energy era. After that, in December 2019, deliberation was held for the interim report, and the procurement price calculation committee has started to consider the procurement price.[6]

The keywords are 'competitive power source' and 'regional utilization power source'.

3.2 Competitive Power Source

Large-scale commercial photovoltaic power generation, wind power generation, etc. can steadily reduce power generation costs and can be used as inexpensive power sources. Therefore, to further promote cost competition in the future, we will separate them from the FIT system and create a new FIP system. Under the system, we position it as a 'competitive power source' to reduce costs through bidding in the electricity market.

FIP (Feed-in Premium) system is a mechanism that entrusts the selling price to the market principle, sells directly in the wholesale electricity market, and receives the

[6] Takayuki Kawarabayashi Norinchukin Research Institute, *Report,* No. 79 (2020), 17 available at https://www.Nochuri.co.jp /report/pdf/nri2007re8.pdf (last visited 2 December 2020).

total amount of the price sold in the wholesale electricity market plus a certain premium.

The merit of the FIP system is that renewable energy power generation companies can increase their profits by being aware of the market price that fluctuates according to the supply and demand of electricity and selling electricity when the market price is high.

On the other hand, the disadvantage is that the revenue from selling electricity in the wholesale market of renewable energy power generation companies is unpredictable for investment recovery due to market fluctuations depending on the time of day and season, as well as long-term climate change and long-term decline in market prices.

Renewable energy power generation companies will be able to secure profits by taking measures such as regular maintenance of power generation facilities and utilization of storage batteries during the season when the market price is low.

By entering the wholesale electricity trading market through the FIP system, renewable energy power generation companies will be a major step toward the early realization of Japan's goal of becoming the main power source for renewable energy.

In Japan, in addition to this FIT system, a market-linked FIP system will come to effect ef in 2022.

3.3 Regional Utilization Power Source

Small-scale power generation (residential solar power generation, small-scale business solar power generation, geothermal power generation, hydroelectric power generation, biomass power generation, etc.) can be installed to the place near the demand area flexibly, and it is positioned as a demand-integrated 'regional power source' and is being used to strengthen resilience in the event of a disaster.

In this regard, the basic framework of the current FIT system will be maintained and two requirements, 'self-consumption type' and 'community-integrated type', are being considered for regional power sources.

3.4 Self-consumption Type

In the future, 30% of the self-consumption plan will be required as information necessary for FIT certification. Also, even after the start of the operation, it is expected that the crackdown will be carried out based on the self-consumption ratio of 30%.

Confirmation is required for self-consumption. At the time of FIT certification, we will be required to submit a 'Self-consumption plan' for self-consumption with a self-consumption ratio of 30% or more. Furthermore, it will be confirmed based on the wiring diagram etc. that the equipment can be consumed in-house based on the 'In-house consumption plan'.

After the start of the operation, it is necessary to prevent the occurrence of renewable energy power generation companies whose self-consumption is decreasing and virtually all electricity is sold. For this reason, measures have been taken to systematically ensure the continuation of self-consumption after the start of the operation.

Specifically, for projects that are suspected of not being able to structurally meet the in-house consumption ratio assumed by the system based on the amount of purchased electricity, after confirming the specific status of the renewable energy power generation business, strict measures such as revocation of FIT certification will be taken if deemed necessary.

3.5 Community-Integrated Type

'Regional utilization requirements' are required to include 'utilization of electricity and heat in the event of a disaster (power outage)', 'regional microgrid', and 'projects that local governments take the initiative in'.

It is estimated that the scale of geothermal power generation that can be a regional power source (regional utilization requirements can be FIT support requirements) in at least 2022 is less than 2000 kW. Similarly, it is less than 1000kW for small and medium-sized hydropower and less than 10,000 kW for biomass power generation.

For farm-type photovoltaic power generation, on the condition that 'strict requirements are confirmed in the field of agriculture, forestry and fisheries administration', even if the project is not self-consumed, if it can be utilized in the event of a disaster, 'regional utilization requirements' will be met. It is accepted as satisfying. For this reason, it is considered that FIT certification will be carried out for farm-type photovoltaic power generation without self-consumption.

Also, on the premise that a black start in the event of a disaster (restarting power generation without an external power source in the event of a power outage) is possible, it is possible to have a power supply outlet and utilize it in the event of a disaster.

3.6 Revised FIT Law 2020 for Introducing FIP system.

On June 12, 2020, Act of Partial Revision of the Electricity Business Act and Other Acts for Establishing Resilient and Sustainable Electricity Supply Systems was enacted.

It is scheduled to be forced in 2022, and renewable energy power sources such as large-scale solar power and wind power, which are expected to improve competitiveness, will shift from FIT to FIP. As a result, FIT and FIP will coexist in the domestic renewable energy promotion system.

4 Conclusion

The FIT system in Japan, which started in 2012 to purchase renewable energy for a certain period at a fixed price, succeeded in increasing the number of participants in the electric power business, but on the other hand, the burden on the people due to the levy increased and the problem of non-operation after the operator acquired the right of higher purchase price became clear. The problem of non-operation has already been resolved to a certain extent by Revised FIT Law 2016.

Therefore, the highlight is the introduction of the FIP system, which abolishes the feed-in tariff system for large-scale solar and wind power generation companies and incorporates the principle of competition by bidding. Also, for small-scale power generation companies, it is the utilization of local production for local consumption type renewable energy. This is also expected to be useful to strengthen resilience in the event of a disaster.

On July 3, 2018, the Japanese government decided to aim for the main power source of renewable energy,[7] and on October 26, 2020, Japanese new Prime Minister Suga declared in his statement of belief that he would aim to realize a carbon-neutral, carbon-free society by reducing greenhouse gas emissions to zero as a whole by 2050.[8]

It can be said that the drastic review of the FIT system and enactment of FIP law in 2020 will support the conversion of renewable energy into the main power source. The efforts to make renewable energy main power source are to produce by-products such as reducing the burden of levy on renewable energy, and producing epoch-making electricity storage technology, streamlining power transmission, creating new industries in the region and disaster countermeasures.

As Prime Minister Suga stated in his statement of belief, measures against warming are not constraints on economic growth, but rather bring about changes in the industrial structure and economic society, and innovations in storage batteries and carbon recycling technology. I also think that it is important to change the way of thinking that leads to growth.

At the time of submitting the manuscript of this paper, the full details of the drastic review have not yet been clarified, but certain concrete policies would be announced by the end of December 2020.

[7] Available at https://mainichi.jp/articles/20180703/k00/00e/020/301000c (last visited 2 December 2020).

[8] Available at https://www.kantei.go.jp/jp/99_suga/statement/2020/1026shoshinhyomei.html (last visited 2 December 2020).

Prospects of Transactive Energy in Colombia in Light of an Innovative Project

Riccardo Perona and Joe Caballero Hernández

Abstract The article aims to highlight the main prospects of the energetic situation in Colombia, focusing on some innovative proposals and in particular presenting the transactive energy project carried out at the EIA University in Medellín.

1 Preliminary Remarks Concerning the Actual Situation and Conceptual Perspectives of the Energetic Situation in Colombia

In Colombia, the fundamental sources that contribute to the production of electrical energy are two: (i) the hydroelectric source, which constitutes the largest source of electricity production in the country representing 63.9% of the energetic capacity and provides a major part of the energy distributed in most cities; (ii) the source of natural gas, that contributes to the 26.3% of the energetic capacity.[1]

These data immediately lead to a couple of relevant observations: firstly, that the water capacity for the creation of electricity in the Country shows a lot of potentials, but also, secondly, that depending on this capacity could be somehow risky in light considering the hydrological cycles that characterize the Country and the variability of its climate. In this sense, although hydroelectric sources provide electricity to the majority of the population, in perspective it would be preferable to avoid the expansion of this source and find other viable alternatives for generating electricity to recover from the environment, avoiding dependence of sudden changes in hydrological cycles that can harm energy supplies.[2]

Another important aspect to highlight is related to the energy generated resorting to natural gases: indeed, Colombia shows some shortages in this regard, compared to other countries, although some refineries have been expanded and some important oil sources have been discovered throughout the Country.[3]

In turn, the opportunity to expand the generation of energy through new alternative forms has been largely underlined and not only in Colombia, together with the needs

[1] UPME, 'Plan energético nacional Colombia. Ideario energético 2050' (2015).

[2] M. Rothman, 'Measuring and Apportioning Rents from Hydroelectric Power Developments. World Bank Discussion Paper No 419' (2000), available at https://openknowledge.worldbank.org/ handle /10986/15187 (last visited 7 December 2020).

[3] Available at https://www.oilchannel.tv/ noticias/la-ampliacion-de-la-refineria-de-cartagena-en-manos-de-la-anla (last visited 7 December 2020).

related to the reduction of the respective costs.[4] In this regard, the legal possibility of such developments within a society can be considered according to Bradbrook as the allocation of rights and duties regarding the exploitation of energy resources between individuals, between individuals and the government, and between governments and between states.

However, more recently, this definition has been broadened and aims to link environmental sustainability and greater participation of private initiative, that is, to ensure the protection of the environment at the same time as providing a social service.

This means that new alternatives must be found, different from the use of gases or water sources that produce electricity but that directly harm the environment.[5]

The paradigmatic and conceptual changes that have been taking place on the matter[6] opened to the notion of environmental sustainability and the consolidation of a collective conscience on the issue.

Due to this and the growing acceptance of the idea that alternative and decentralized energy sources are to be found, several initiatives have appeared, at the public level as well as involving the private sector.

2 The Reform of 2014 (Law No. 1715): The Integration of Non-conventional Renewable Energies into the National Energy System

In this regard, the first step taken in Colombia in the direction of the development of these proposals is Law no 1715 of 2014, dedicated to the 'integration of non-conventional renewable energies into the National Energy System'.[7]

This reform aimed to encourage the development of unconventional sources of energy, such as wind plants, photovoltaic solar generation, geothermal energy, biomass and all other initiatives that can be developed in the country that can contribute to the recovery of the global climate.

More particularly, Law 1715 of 2014 contemplates a series of tax incentives for alternative energy generation, such as the reduction of income tax by 50% of the

[4] Cf J. Benavides et al, *Mercado eléctrico en Colombia: Transición hacia una arquitectura descentra lizada* (Bogotá: Fedesarrollo, 2018). See also: H.P. Chao, S. Oren, R. Wilson, *Alternative Pathway to Electricity Market Reform: A Risk-Management Approach*, Proceedings of the 39th Hawaii Interna tional Conference on System Sciences (2006), available at https://www.researchgate.net/ publica tion/4216480_Alternative_Pathway_to_Electricity_Market_Reform_A_Risk-Management_Approach (last visited 7 December 2020).

[5] IRENA, *Peer-to-peer electricity trading. Innovation landscape brief* (Abu Dhabi: International Rene wable Energy Agency, 2020).

[6] Cf G. Frigo, 'Energy ethics, homogenization, and hegemony: A reflection on the traditional energy paradigm' 30 *Energy Research and Social Science*, 7, 7-17 (2017).

[7] Ley 1715 de 2014, that regulates the integration of non-conventional renewable energies into the National Energy System.

investment for 5 years following its completion; also, it establishes that all equipment and services that are developed in the middle of any project are exempted from paying VAT; all equipment, machinery, materials and supplies that are imported for alternative energy projects are also exempted from paying fees; finally, the Law establishes the depreciation of the project assets with a maximum of 20%. All of the above, to promote new initiatives and realize them throughout the national territory, especially in those areas that are far from urban areas.

The mentioned reform complies with the international principles that develop energy law, such as the principle of security of supply, the principle of accessibility and affordability of modern energy services, the principles of resilience, economic efficiency, freedom of business and environmental sustainability.[8] These same principles serve to build different possibilities of alternative energy production without the State being directly involved.

3 The Transactive Energy Project of the EIA University in Medellín

In light of the mentioned reform, several proposals have been presented and developed in Colombia. Among them, the project *Transactive Energy Colombia Initiative* and its pilot plan for the implementation of a model of transactive energy in the city of Medellín appears of particular interest for our analysis.[9]

In the framework of the researches carried out by the research group EnergEIA, under the leadership of Juan Manuel Spain (EIA University, once known as *Escuela de Ingeniería de Antioquia*), the innovative notion of peer-to-peer electricity trading has been applied to a project aiming to implement the concept of transactive energy (*energía transactiva*); this refers to the development of concrete energy models where users sell energy among themselves.[10]

In Latin America, this is the only proposal that has been advanced on transactive energy and has the support of the University College of London, in addition to the EIA University and the EPM (*Empresas Pública de Medellín*). The project has been included in the most recent report of the International Renewable Energy Agency (IRENA) and is one of the world's leading projects on the matter.[11]

The main idea of the project is to install photovoltaic solar panels in several houses of families with limited resources, so that they can produce electrical energy from the

[8] Í. del Guayo Castiella, 'Concepto, contenidos y principios del derecho de energía' 212 *Revista de administración pública*, 309, 309-346 (2020).

[9] See the presentation of the main focuses of the project available at https://www.energycolombia.org/wp-content/uploads/6.TEIC-UPB-Agosto_v2.pdf (last visited 7 December 2020).

[10] On the issue, cf S. Chen and C.C. Liu, 'From demand response to transactive energy: state of the art' 5 *Journal of Modern Power Systems and Clean Energy,* 10, 10-19 (2017). See also, E. Cazalet et al, 'Trans active Energy Models', prepared by NIST Transactive Energy Challenge: Business and Regulatory Mo dels Working Group' (2016), available at http://www.temix.net/images/Trans active_ Energy_Mo dels_Paper.pdf (last visited 7 December 2020).

[11] See IRENA, n 5 above.

sun, both for their sustenance and to sell the energy surpluses that these panels produce to a micro or medium-size company in the sector: a company that also produces solar energy but does not reach a level which is sufficient for the development of the business activity.

In this perspective, both the families and the company would be *pro-consumers* or *prosumers*: i.e., producers and, at the same time, consumers of (alternative) energy. Therefore, small-scale local consumers would sell their surpluses and generate resources based on business support.

In practice, to develop the project, it would be necessary to create a network of consumers to distribute the electrical energy produced by the photovoltaic panels with control of the power and kilowatts (Kwh) of the energy produced, to reach its adequate distribution.[12]

The main focus of the project is not only the implementation of a model that could help the generation of alternative energy and contain climate change: also, the project intends to suggest the creation of new business models that may be contributing to improving the quality of life of families with limited resources. Indeed, having the possibility to generate energy through photovoltaic solar panels for one or several families with limited resources and being able to sell this energy to a consolidated company in an urban sector close to the vendors allows to create resources for the promotion of small or medium-sized companies, and, at the same time, generate clean or alternative energy.[13]

In this sense, the project also focuses on the social value of the proposal, in the perspective of social development and the improvement of the condition of the families participating in it. The goal is to allow the decentralization of the energy sector and the creation of business models based on the flexibility, de-carbonization and user participation.[14]

4 Conclusive Remarks

In a contest in which the importance to improve the initiatives that would help the transition toward more sustainable forms of society is globally recognized, at least in theory, the search for alternative ways of energy production is one the best bets from many points of view: science, technology, industry, economy.

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[12] The project refers to another experience in Denmark: Y. Yang et al, 'Value seeking, price sensitive, or green? Analyzing preference heterogeneity among residential energy consumers in Denmark' 6 *Energy Research & Social Science*, 15, 15-28 (2015).

[13] On these and related issues, cf C. Long et al, 'Feasibility of peer-to-peer energy trading in low voltage electrical distribution networks' 105 *Energy Procedia*, 2227 (2017).

[14] On these and related issues, cf E. Mengelkamp et al, 'Designing microgrid energy markets' 210 *Applied Energy*, 870 (2018).

In this perspective, the initiative presented in this paper offers, in our opinion, a very interesting example. Not secondly, this proposal would also have an impact on the socio-economic condition of low-income people, what makes the project one of particular relevance not only in the specific context of Medellín, Colombia and Latin America.

Transition to Renewable Sources of Energy: Identifying Legal Barriers to Mass Prosuming Consumption in Spain. Early Approach, Challenges and Perspective

Aura Esther Vilalta

Abstract The failure of self-consumption (SC) of renewable energy among consumers is due to a number of reasons: some renewable sources of energy need complex and expensive infrastructures and are subject to socio-economic limitations; in others, the cost of technical solutions for storage, coupled with the lack of incentives and financial support, is limiting the expansion. The European Union Strategic Framework in Renewable Energies 2020-30 contains an ambitious EU strategy in renewable energies. The aim is to facilitate consumers, households and businesses, with secure, sustainable, competitive and affordable renewable energy and promoting energy efficiency. The energy efficiency first principle means to consider cost-efficient alternatives that include measures to make energy demand and energy supply more efficient. In Spain, a number of practical barriers to an open electricity market, with SC-including fiscal disincentives incorporated by law, coupled with the lack of green policies or incentives for self-consumption - along with other collateral downsides - are undermining the transition to clean energy.

1 Introduction. Self-producing Energy

Renewable Energy Sources (RES) are clean energy derived from the earth's not finite or exhaustible natural resources -such as wind and sunlight- functionally endless and not relying on fossil fuels. They all are environmentally-friendly, which help to improve public health and environmental conditions, therefore becoming alternatives to the traditional energy for consumers.[1] There are several renewable energy systems and mechanisms to self-produce energy to cover heat, electricity and hot water, that include: i) solar energy, from sunlight through the use of photovoltaic systems and solar cells that can convert sunlight into electricity; ii) wind flow energy, through turbines in wind farms that can capture it - also a form of solar energy because it is produced by differences in temperature in the atmosphere combined with the rotation of Earth -; iii) hydroelectric energy through water flows and turbines (hydropower); iv) geothermal energy through the steam produced by the heat that is trapped beneath the earth's crust from the formation of the Earth or radioactive decay and the turbines; v) the ocean thermal and wave energy, that relies on warm water surface temperatures and tides created by the earth's rotation and gravity. Unlike other forms of renewable energy, wave energy is predictable, more consistent and abundant; vi) hydrogen energy when it is separated from another element, which can be used as a clean-burning fuel or batteries for powering; vii) biomass energy (bioenergy) coming from recently living plants and organisms or harnessing methane gas produced by the natural decomposition of organic materials.

[1] RES neither pollute the air nor produce carbon dioxide or release any harmful products that can cause environmental degradation or negatively affect human health like smog, acid rain, or other heat-trapping gases. See Just Energy, '7 Types of Renewable Energy: The Future of Energy', available at https://justenergy.com/blog/7-types-renewable-energy-future-of-energy/ (last visited 3 February 2021).

Yet, all these renewable sources of energy need sometimes complex and expensive infrastructures and, therefore, are subject to socio-economic limitations. To name a few: i) solar energy undertakes unrealistic expenses for most households at an individual level which need to have the ample sunlight and space to arrange solar panels; ii) wind farms generate noise and need to be built in rural or remote areas - far from where electricity is needed - and transported; iii) hydroelectric and ocean energy need storage systems and it disrupts waterways, water levels and currents producing negative effects in ecosystems; geothermal energy infrastructure is costly and vulnerable to earthquakes; iv) hydrogen is inefficient when it comes to preventing pollution; and biomass energy needs carbon dioxide and time to grow plants.

Regularly, the main reasons for the failure of self-consumption (SC) among consumers and into residential buildings are the following: the diverging needs during peaks of production/demand - particularly high in morning and evening hours -. The cost of technical solutions for storage, coupled with the lack of incentives and financial support; the residual load and overall costs of locally produced RES that need to be lower than the retail electricity price; the lack of economic ways of energy storage; and the lack of clear grid information to SC and the volume of network costs - charges, taxes, levies -.

2 European Union Strategic Framework in Renewable Energies 2020-30

In October 2014 the European Council agreed the 2030 Framework for Climate and Energy, reaffirming the Union's long-term commitment to the ambitious EU strategy in renewable energies (a target of at least 27% for the share of renewable energy consumed in the EU in 2030). Current Member States and EU policies, if no new policies are put in place, would only lead to, approximately, 24.3% of renewable energy consumption in 2030. Therefore, there is a need to refresh the EU legal framework - an updated regulatory framework - leading to EU, national and regional level measures. The European Parliament's resolution of 15 December 2015 entitled 'Towards a European Energy Union' called for the governance mechanism of the Energy Union to be ambitious, reliable, transparent, democratic and fully inclusive of the European Parliament and to ensure that the 2030 climate and energy targets are achieved. The Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018, on the Governance of the Energy Union and Climate Action sets out the foundation for reliable, inclusive, cost-efficient, transparent and predictable governance of the Energy Union and Climate Action (governance mechanism), which ensures the achievement of the 2030 and long-term objectives and targets of the Energy Union in line with the 2015 Paris Agreement on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (the 'Paris Agreement').

The Energy Union covers five dimensions: energy security; the internal energy market; energy efficiency; decarbonisation; research, innovation and competitiveness. The aim is to give consumers, households and businesses, secure, sustainable, competitive and affordable energy, to foster research and innovation, to preserve, protect and improve the quality of the environment and to promote the

prudent and rational utilization of natural resources, in particular through the promotion of energy efficiency and energy savings and the development of new and renewable forms of energy. Parallel to this legal framework the Commission has adopted many initiatives in renewable energy, efficiency, energy performance of buildings, market design, under the overarching theme of energy efficiency, and ensuring a fair deal for energy consumers, addressing energy poverty and promoting fair competition in the internal market.

While the Member States need the flexibility to choose policies that are best-matched to their national energy mix and preferences, that flexibility should be compatible with further market integration, increased competition, the attainment of climate and energy objectives and the gradual shift towards a sustainable low-carbon economy. The transition to a sustainable low-carbon economy requires as well as changes in investment behaviour, as regards both public and private investment, and incentives, taking into consideration citizens.

Member States should assess the number of households in energy poverty, taking into account the necessary domestic energy services needed to guarantee basic standards of living and procure in its plan a national objective to reduce energy poverty. Also to ensure that the public is given early and effective opportunities to participate on the preparation of the national energy and climate plans and ensuring involvement of social partners, local authorities, civil society organisations, the business community, investors and other relevant stakeholders to discuss the different options envisaged for energy and climate policies, taking into account the 'Aarhus Convention'.

Plans should be stable to ensure the transparency and predictability of national policies and measures to ensure investment certainty. Also, the land use, change and forestry (LULUCF) sector can contribute to climate change mitigation reducing emissions and providing bio-materials that can substitute fossil or carbon-intensive materials. Therefore, stable long-term strategies and stability are essential.

Cost-effective deployment of renewable energy is one key objective criteria for assessing Member States' contributions. As the cost structure of deploying renewable energy is complex - it includes not only the costs of support schemes but also the connection costs of installations, system backup, providing system security and costs that need to be borne when complying with environmental restrictions - final consumers or project developers should be accounted for.

For the 2030 targets on renewable energy and energy efficiency measures can also include voluntary financial contributions by the Member States to a Union renewable energy financing mechanism managed by the Commission, which would be used to contribute to the most cost-efficient renewable energy projects across the Union. In the area of energy efficiency, additional measures may be put in place to improve the energy efficiency of products, buildings and transport.

Member States should use the 'energy efficiency first' principle, which means to consider, before taking energy planning, policy and investment decisions, whether

cost-efficient, technically, economically and environmentally sound alternative energy efficiency measures could replace in whole or in part the envisaged planning, policy and investment measures, whilst still achieving the objectives of the respective decisions. Such cost-efficient alternatives include measures to make energy demand and energy supply more efficient, in particular using cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission and distribution of energy. Member States should also encourage the spread of that principle in regional and local government, as well as in the private sector.

3 State of the Art in Spain

The bulk of renewable energies in Spain is 38% and the main contribution is made by wind energy (19%), followed by hydro (13.1%) and photovoltaic (3%).[2]

The Spanish current legal framework in renewable energy sources was first been settled with the enactment in 2007 of the Royal Decree 1028/2007, which established the administrative procedure for the authorization of electricity generation facilities in the territorial sea. In 2013, Law 24/2013 of the Electricity Sector established the foundations for the regulation of the economic regime of renewables; and The Royal Decree-Law 9/2013 approved urgent measures to guarantee the financial stability of the electricity sector. Later, the Royal Decree 413/2014 regulated the activity of electricity production from renewable energy sources, cogeneration and waste. Yet, it established the obligation to be connected to the grid and to pay tolls access and other charges.

More recently, in 2018, the Royal Decree 15/2018, established urgent measures for the energy transition and the protection of consumers. And immediately after, the Royal Decree 244/2019, regulated the administrative, technical and economic conditions of the self-consumption of electrical energy. Today, the Royal Decree-Law 23/2020 aims to eliminate administrative barriers and establish a legal framework conducive to promoting renewable projects and the competitiveness of the sector to achieve the energy transition in the best conditions and that it reactivates economic activity, digitization, decarbonization and sustainable mobility. To do this, it adopts, among other measures, the following: provisions related to storage - includes the definition of storage facilities, which may be owned by different subjects of the electrical system - independent aggregators, renewable energy communities, hybridization, high-speed recharge infrastructures capacity >250kW simplified authorization of R & D & I projects, regulatory test benches, simplified authorization of mobile network installations, as well as optimization of the use of the granted access capacity. Yet, current unclear fiscal regulations coupled with fiscal and legal burdens from the past have discouraged investments in renewable sources and continue to have negative consequences today, due to the judicialization and legal uncertainty on the current and future legal framework in Spain.

[2] See national energy balance of 2018 in APPA, 'Estudio del Impacto Macroeconómico de las Energías Renovables en España', Asociación de Empresas de Energías Renovables (2018) available at https://www.appa.es/wp-content/uploads/2019/10/Estudio_del_impacto_Macroeconomico_de_las_energias_renovables_en_Espa%C3%B1a_2018_vff.pdf (last visited 3 February 2021).

4 Production and Distribution Network Monopolies in Spain

Energy production and distribution networks are highly penetrated and controlled by

corporations. In Spain, the electricity sector grew in the hands of Regional Monopolies from 1944 to 1976. At this stage, the intervention of public powers in the electricity sector was encouraged through the emergence of public companies. In response to this state intervention in a sector that until then was self-regulated, the seventeen largest production companies were grouped under the coordination of Unión Eléctrica (the current Spanish Association of Industria Eléctrica, UNESA) to develop the exploitation of the national electricity system in the different areas of the country at a regional level. Electricity companies maintained an industrial oligopoly structure, operated in regional spheres with a high degree of vertical integration (regional monopolies) and self-regulated activity of transportation through high voltage lines. It was a system that was barely interconnected and therefore based on regional markets. Through an organ of central control called 'Central Freight Repartidor' (RECA), regulated the energy generation and consumption process of the General Peninsular Network.[3] In 1997 the liberalization process begins into the electricity sector, intending to redefine the fields of action of the different agents involved based on basic principles: price liberalization and deregulation of generation and consumption activities. This process was promoted from the European Union and put in place through the Spanish Law 54/1997 (hereinafter LSE). Each company could decide what type of technology and in what quantity installed production units, meeting their market expectations. In theory, remuneration associated with generation activity would no longer be regulated -the generation of electrical energy is one of the most expensive activities of the National Electric System since it represents around 50% of electricity costs-. Transport and distribution constitute a natural monopoly and their liberalization occurs to the extent that generalizes third-party access to networks. As of the entry into force of the Royal Decree 485/2009, the power supply activity is now carried out by five companies Energía XXI, SL; Iberdrola Comercialización de Último Recurso, SAU; Union Fenosa Metra, SL; Hidrocantábrico Energía Último Recurso, SAU y Elcogás, SA.

Today there are two competitive markets: the energy production (wholesale market) and marketing (retail market). There are as well two types of marketers into play: i) free market trading company with the function of supplying energy to consumers who have decided to contract this supply in the free market: the marketer bills the customer for access to the network and the energy consumption according to the contract; ii) last resort marketer (Tarifa de ultimo recurso, TUR), responsible for supplying energy to the consumers who are covered by a regulated tariff: the marketer bills the customer for access to the network and energy consumption according to the rate established by the Public Administration. Today, most consumers continue to receive this TUR rate as they did not choose to deal with the

[3] See M.R. Flores Jimeno and M. Santos Cebrián, 'El mercado eléctrico en España: la convivencia de un monopolio natural y el libre mercado' *Revista Europea de Derechos Fundamentales*, primer semestre, 25, 257-297 (2015).

free market. The Spanish Energy Market Operator (OMIE) is the body responsible for managing the purchase and sales of electricity in organized markets.

As per Royal Decree 216/2014, the regulation of self-consumption identified three specific modalities and established the obligation for each one to be totally or partially connected to the grid and to pay tolls access and charges associated with the costs of the system. Moreover, the trimming of the aids to the RES generation leads to the closure of many companies. The Association of Renewable Energy Companies (APPA) sued against the Royal Decree 413/2014 and Order IET/1045/2014, which established a new system of incentives for renewable energies and new remuneration parameters suddenly and unilaterally undermining RES producers.[4]

5 Traditional Barriers in Spain

The lack of willingness to effectively open the electricity market to SC coupled with the lack of incentives for self-consumption and a laconic institutional investment in green policies in Spain hinder the apparent will to implement the transition to clean energy. Fundamental obstacles to self-producers have been to get around institutional and fiscal disincentives incorporated by law: the establishment of a tax on the production of electricity - of 7% - has deterred many initiatives during the past decade and is still preventing competition and investment on equal terms at European level due to the legal uncertainty generated.

Other collateral downsides and barriers of RES and SC in Spain are the following:

i) **Changing climatic conditions.** Spain enjoys optimal weather conditions - Mediterranean and Atlantic winds and hours of sunshine above the world average. Yet, given that the generation of electricity from renewable energy sources depends mainly on climatic conditions, this makes it difficult to predict in advance the amount of energy produced - drought, lack of wind or sufficient solar radiation can abruptly and drastically reduce production.[5]

ii) **Traditional legislation penalizing schemes on self-consumption (SC) and investments on RES projects**. The Royal Decree-Law 23/2020 with measures in the field of energy for economic reactivation is been enacted to advance in the necessary decarbonization process and in the energy transition to make it possible to achieve the objectives of reducing greenhouse gas emissions and of renewable capacity to 2030 of the National Integrated Energy and Climate Plan (PNIEC). It adopts measures so that investments in renewable energy projects could be viable in the short, medium and long term and become innovative mechanisms for economic recovery at the same time. To name some measures, the current system offers the developer a long-term price for energy in a way that guarantees predictability and stability of income for investors and allows them, whatever their size, to participate on equal terms. The new auction system has

[4] See M.R. Flores Jimeno and M. Santos Cebrián, n 3 above, 41.

[5] Vid. Red Eléctrica de España, *El suministro de la electricidad. Un equilibrio entre generación y con sumo* (2009) available at https://www.ree.es/sites/default/files/downloadable/el_suministro_de_la_electricidad.pdf .

been adapted to the current reality, in which generating 1kw/hour renewable does not cost more than the price at which it is then sold on the market. Yet, fiscal policies are not clear in the short, medium and long run, which is crucial to foster RES and SC. The incoherence of a great number of environmental taxes that only tax renewable energy sources, coupled with taxes levied on any source of electrical energy - not taking into account the origin and nature of the energy - and the cost of electric self-consumption of RES along with the prohibition of collective self-consumption have been deterrent causes of the current state of the Art.

iii) **Agreements between service providers and big business concentrations** that reduce effective competition in the market. The high concentration of market power in the hands of large companies in the sector that undermines free competition. Although it is not allowed for the same company to simultaneously carry out the activities of generation and distribution, in reality, different companies from the same business group can proceed to undermine competition and discouraging the entry of potential competitors.[6]

iv) **The slowness in granting permits** for access and connection to the electricity transmission and distribution networks in renewable projects, which seriously delay the start of their commercial exploitation. The current Royal Decree-Law 23/2020 seems to improve connection permits to electricity grids by establishing a mandatory schedule of five milestones that every developer must meet or, otherwise, their connection permit will immediately expire.

v) **Traditional technological gap**. Yet, today, the renewables sector is consolidated and has the capacity for growth: it is capable of manufacturing almost all the elements of a wind turbine, 65% of the components necessary for a solar installation to function and 90% of the Capital goods necessary to digitize the networks and guarantee the integration of renewables in the entire energy system.

vi) **The lack of an adequate financing system** for renewable projects. Most banks do not offer project financing and require a guaranteed long-term return obtained at auction. In this sense, the new Spanish regulation lays the foundations for the establishment of an 'Economic Regime of Renewable Energies for Electric Power Production facilities'. This new framework will be granted through auctions that may be both for energy and installed power and will recognize a long-term fixed price for the energy generated. In these new auctions, the price to be received for the energy will be offered and it will be possible to distinguish between different generation technologies, paying special attention to the particular needs of renewable energy communities and smaller facilities so that they can compete on equal terms.

[6] See M.R. Flores Jimeno and M. Santos Cebrián, n 3 above, 296.

vii) **The need for an energy transition plan to be carried out to promote sustainable mobility**. Spain claims the need for renewable energy projects to reach those areas where the closure of coal plants that are no longer economically sustainable will take place, for which actions are planned to promote this transition. These measures go hand in hand with others that promote sustainable mobility. To this end, it will strengthen infrastructures in the coming years and create ultra-fast charging stations for electric vehicles on roads, highways and highways that are declared of public utility. Likewise, local entities will have a budget to purchase low-emission vehicles and to provide aid to individuals who buy electric motorcycles. On the other hand, the *Institute for Energy Diversification and Saving* provides aid for photovoltaic solar energy installations.

viii) **Finally, the lack of clear information to the consumers**. The information provided is complex and not transparent and certain abusive practices derived from the concentration of market power in a small number of large companies.[7]

6 Potential Solutions

i) **Clarifying legal and fiscal policies** in the short, medium and long run, providing legal certainty on the legal, technical, and particularly fiscal conditions for RES by SC investments and energy exchanges. Coupled with tax incentives to consumers-producers of RES. There is still too much complexity on the legal framework, on the different levels of competence and entities with shared competences existing in Spain - International, European, State, Regional and Local -, on the legal terminology applied to self-consumption of energy in the Spanish regulation, a term umbrella that covers many different modalities, some of them not included in the Law and more importantly, taxed differently.[8] Furthermore, the diversity of taxes that affect not only the electricity sector but also the self-consumption of electricity from renewable sources, along with the profit-seeking tax collection activity from the State that undermines any incentive policy for the energy transition.

ii) **Promoting collective self-consumption of energy**. Removing any prohibition to collective self-consumption initiative. The article 4.3 of Royal Decree 900/2015 established that in no case may a generator be connected to the internal network of several consumers. Therefore, it was impeding the so-called 'collective self-consumption' as is the case of generation equipment installed in communities of owners, a provision that violated the European Union policies - European Commission Recommendation on the 'best practices of self-consumption' - and was recently declared null and void by the Spanish Constitutional Tribunal (TC 68/2017, of 25 May).

[7] See M.R. Flores Jimeno and M. Santos Cebrián, n 3 above, 297.

[8] See L. Martín Santana, 'Fiscalidad del autoconsumo eléctrico de fuentes renovables' Universidad Carlos III de Madrid (2017) available at https://e-archivo.uc3m.es/bitstream/handle/10016/26446 /tesis-laura -martin-santana .pdf? sequence=1&isAllowed=y.

iii) **Maintaining an adequate generation, distribution, accumulation and reuse system**. Systems must constantly balance generation and consumption to avoid having to store it, which is difficult and expensive. When an excess of energy is produced, it is also possible to use it to generate more at another time - as is the case on the island of El Hierro, where a hydraulic system uses this excess energy to pump water to a higher level and then take advantage of it. its fall -.

iv) **Supporting and promoting the usage of cost-efficient energy storage solutions.** This measure can contribute to balancing measures on the grid and may promote the development of new technologies to produce energy and self-consumption habits. It will also allow to accumulate the excess of energy in a distributed way in batteries in medium-sized batteries near the pro-consumer - electrical devices, cars, homes, etc.

v) **Maximizing self-consumption through direct battery charging strategies** and storage until needed when there is a surplus of electricity, avoiding the need of resorting to the grid with the use of proper battery charging algorithms. Also, grid-scale storage technology which has the potential to become more widespread at the distribution level through electric vehicles and in-home batteries.[9] All of which coupled with financial grants and support for storage capacities and solutions.

vi) **Management centres and information transparency for SC.** Given that the generation of electricity from renewable energy sources depends mainly on climatic conditions, this makes it difficult to predict in advance the amount of energy produced by drought, lack of wind or sufficient solar radiation can abruptly and drastically reduce production. Also, the need for synchronization is given by the fact that the wind power plants have to work synchronized with the generators of the network because they need to go through turbines. On the other hand, the energy generated with photovoltaic plants goes directly to the electricity grid. Consequently, it is appropriate to carry out adequate management of this variability and integrate it into the general electrical system. In Spain, a specific Center was created for the management of renewable energies - Centre, from Red Eléctrica, which manages the generation of renewable energy producers - enterprises. This Center is integrated into the Electrical Control Center (Cecoel) from where all the electrical energy produced in Spain is managed and controlled. These Centers continuously receive information regarding the renewable power available - primarily wind power -. In this way,

[9] A. Hajos et al, 'Supporting investments into renewable electricity in context of deep market inte gration of RES-e after 2020: Study on EU -, regional-and national-level options, Final Report', 238 (2015) available at https://ec.europa.eu/energy/sites/ener/files/documents/cepa_final_ report_ ener_c1_2015-394.pdf.

clean energy is incorporated, it makes it possible to calculate at any moment the amount of renewable energy that can be incorporated into the electrical system.[10] Yet, there is a lack of continuous feedback with producers and SC.

vii) Increasing interconnections. The more interconnected the electrical systems are the greater the energy exchange capacity, the security and the quality of service of renewable energy supply. Also increasing capacities of local distributed generation (DG) and coordination over distribution grids for the surplus of energy.

viii) Designing efficient local energy transport. Since electricity has to travel from its point of origin to the consumer through power lines, it must be taken into account that energy is lost in the transport process due to the resistance offered by the electrical conductors. Consequently, power lines should be of a thick diameter and increase the voltage, use highly conductive materials and avoid long distances and high temperatures. Then, later on, it needs to be transformed to medium and low voltage to bring it closer to the final consumer through distribution networks.

ix) Clarifying and providing fairness of network cost allocation -charges, taxes, and others. National Regulatory Authorities should be independent bodies setting tariffs and obliged to make the methods and cost components used for the calculation of the network charges publicly available. Also, they should design tariffs for all consumers, so that they reflect the costs and benefits to the system and the real use of the grid. Tariffs should not unduly increase the financial burden for households, particularly for those with a low level of consumption or living in remote areas. Also, undue financial burdens such as taxes or fees imposed on self-generated electricity should be removed. Finally, long-term national self-generation strategies to facilitate consumers with small scale renewable projects.[11]

x) Training citizens to adopt certain practices is undoubtedly another helpful mechanism to reduce consumption. To name a few: i) acquiring efficient appliances, taking into account the energy label that informs about their energy behaviour; ii) adequately regulate the temperature of the air conditioning systems, using appropriate clothing for each season of the year; iii) disconnect equipment that is not being used, since in standby mode they continue to consume energy; iv) use timers to run during off-peak hours; v) take advantage of solar light and heat as sources of natural lighting and heating; vi) and take

[10] See n 6 above, 11.

[11] BEUC, 'Enabling the European Consumer to Generate Power for Selfconsumption. Policy Recom mendations' 8 (2011) available at https://www.beuc.eu/publications/beuc-x-2018-002_ rene wable _self-generation_-_policy_recommendations.pdf.

advantage of air currents and solar protection systems (awnings, blinds ...) to reduce the temperature in the home and the use of air conditioning.

xi) **Providing direct support schemes such as a premium (feed-in premium tariff, FIT) on self-consumption (SC) and developing support schemes on energy efficiency efforts.** These measures may foster the generation and self-consumption of RES.

xii) **Complemented with the introduction of fixed tariffs (feed-in tariffs, FIT) on the market price for electricity to promote RES**. Payment level remains independent from the market price, offering a guaranteed payment for a specific period of time. This mechanism brings transparency and a higher level of cost efficiency, due to lower investor risk. The premium can either be constant, or it can vary based on a sliding scale and be built with a design that includes payment caps and/or floors.[12]

xiii) **Hybridization of renewable technologies** in the same location to save network costs and minimize environmental impact. It allows access to the same point of the network of facilities that use different generation technologies whenever this is technically possible. To this same end, it is helpful to allow the authorization of facilities with an installed power greater than the access and connection power granted, whenever the evacuation limits are respected in the operation of the plant. Regulatory restrictions that prevented the efficient design of the facilities for optimal use of the renewable resource needed to be eliminated. In this way, it is possible to install more power than can be evacuated at any given time, whether it is done by hybridizing technologies or if it is done with the same generation technology. Since the resource does not have to coincide temporarily, it will allow optimizing the evacuation of energy, thus achieving greater use of the existing network, better use of the renewable resource and greater environmental synergies. Both measures will allow the development of more renewable projects, optimizing the network already built and minimizing the cost for consumers.

7 Early conclusions

Energy prerequisites, markets and state of development of renewable energy sources (RES) sector in each MS of the EU are all diverse. Therefore, there is a need to introduce specific policies and energy efficiency measures to each country to foster and promote RES that includes wind, solar, aerothermal, geothermal, hydro, ocean energy sources, biomass and the biodegradable fraction of waste.

[12] See Dehler, J. et al, 'Self-consumption of electricity from renewable sources' 7 (2015) available at http://www.insightenergy.org/system/publications/files/000/000/016/original/RREB6_self-consumption_renewable_electricity_final.pdf.

Several solutions may be considered to overcome the current existing barriers to RES SC. At a more general basis, ensuring that the costs of locally produced RES are lower than the retail electricity price. To this end, measures on the grid side -enabling the grid to provide necessary information back to prosumers- energy storage – providing economic ways of storing- and fair allocation network costs -charges, taxes, levies- need to be taken.[13]

In Spain, more in particular: i) maintaining an adequate generation, distribution, accumulation and reuse system; ii) supporting the usage of energy storage solutions; iii) diversifying the managing centres of renewable energies; iv) increasing interconnections; v) efficient energy transport design; vi) training citizens to adopt certain cost-efficient practices to reduce energy consumption; vii) continuing with direct support schemes such as a premium (feed-in premium tariff, FIT) on self-consumption (SC) and developing support schemes on energy efficiency efforts; viii) complemented with the introduction of fixed tariffs (feed-in tariffs, FIT) on the market price for electricity to promote RES; ix) hybridization of renewable technologies.

[13] T. Telsnig et al, 'Self-consumption of electricity from renewable sources. Rapid Response Energy Brief to the European Commission' (2015) available at https://www.researchgate.net/publication/ 279191583_Self-consumption_of_electricity_from_renewable_sources.

PART IV

TESTIMONIALS

Energy Communities of Prosumer as a Solution to Overcome Financial Barriers to Energy Poverty Providing Financial and Non-financial Support

Marina Varvesi

Energy poverty is a European growing social phenomenon where it can be descriptively assessed as the lack of access to electricity to satisfy basic energy needs. Energy poverty is a multidimensional problem which needs to be tackled in a holistic and multi-actor approach.

Although roots of energy poverty lie mainly in low incomes and poor thermal efficiency of buildings, energy efficiency measures at the household level is key in addressing energy poverty and can bring energy savings, leading to lower energy costs and improved living conditions. It can be argued that energy efficiency and the housing quality of energy-poor consumers are the primary causes of energy poverty. Several studies demonstrate that these causes could be alleviated through technological interventions to improve the housing quality through energy efficiency (EE) measures and/or enable access to small-scale renewable energy (RE) systems (often referred to as hard methods in the literature). While such measures contribute to mitigating energy poverty, the high up-front investments required are a major economic barrier for EP/V consumers.

The need to assist EP/V consumers in taking up EE/RE measures by implementing effective financial support schemes is well recognised as the non-financial support schemes fall short of delivering significant or lasting improvement with satisfying the energy needs of EP/V consumers. However, non-financial support schemes can stimulate behavioural change (known as 'soft methods') that can, at least in the short term, relieve the financial burden of energy expenditures.

It can therefore be assessed that a two fold dimension solution is needed to assist EP/V consumers based on (1) effective financial support schemes to support and (2) non-financial support schemes to stimulate behavioural change. However, there are numerous barriers faced by various stakeholders which need to be taken into account in the process of depicting and implementing a holistic financial and non-financial support mechanism. The table below summarises the key barriers which different stakeholders face related to financial and non-financial schemes.

Table 1 - Existing financial and non-financial scheme support barriers

Barriers related to financial support schemes to tackle energy poverty
Consumers' perspective
● Lack of knowledge about existing financial support schemes. ● Split incentives: tenant-landlords have misaligned incentives.

- Lack of capacity to undertake the bureaucratic work associated with traditional financial support schemes[1] - quality underwriting: difficulties.
- Lack of capacity to 'follow-up' the investment and initiate take-up of EE/RE measures.
- Lack of financial availability to co-fund the EE/RE investment; high initial costs for structural measures.
- Lack of confidence and trust on actual energy and economic savings associated with EE/RE investments; fear of incapacity of repayment, which could result in disconnection. Risk perception.
- Debt aversion: even if they qualify to take a loan, low-income households tend to be reluctant to do so.
- Long payback times.

Market actors' perspective

- Lack of economic return in implementing financial support schemes for the uptake of EE/RE solutions.
- Lack of specific financial products/services adapted to both EE and EP/V consumers (eg soft loans, on-bill payment, on-tax payment, etc)
- Lack of guarantees for debt repayment.
- Residential sector perceived as less profitable than others (e.g. industry, SMEs).
- Risk assessments by financial entities do not take into account EE/RE particularities that imply the production of savings, which could be considered a sort of guarantee of repayment.
- High transaction costs.
- Management of uncertainty: at present, little data on EE/RE investments in the residential sector are available and open for financial institutions to use in assessing the economic viability of investments.

Policy actors' perspective

- Lack of knowledge on needs of EP/V consumers and on how to address/engage/support them (also due to the lack and difficulties of proper dialogue and communication flow).
- Lack of capacity to set up financial schemes (also due to lack of knowledge and capacity on funding schemes).
- Poor policy for EE/RE investments (tax incentives, facilitation of administrative permits, lack of standardization).

Barriers related to non-financial support schemes to tackle energy poverty

Consumers' perspective

- Lack of a 'one-stop-shop' to receive information and support.
- Lack of trusted advice and support.
- Personal barriers such as unwillingness to admit difficulties.
- Lack of awareness of the multiple benefits of energy renovation and renewable energies.

[1] In Italy, France and Spain, only 30% of eligible consumers request the social bonus for energy and also in Poland the rate of the EP/V consumers accessing funds is low.

Market actors' perspective
● Lack of economic return in implementing non-financial support schemes. ● Residential sector perceived as complicated because of high segregation.
Policy actors' perspective
● Lack of knowledge on needs of EP/V consumers and on how to address/engage/support them (due also to lack and difficulties of a proper dialogue). ● Low flexibility for implementing some measures; administrative and policy barriers.

Recognising this dual dimension of EP support schemes - financial and non-financial - and the above-mentioned barriers there is the need to 1) shed light on efforts carried out through financial schemes to support and complement the non-financial schemes to tackle EP, 2) develop a better understanding of stakeholders' perspectives on EP financial schemes, including consumers' direct experiences and overall approach 3) promote the dialogue and networking of European stakeholders and 4) demonstrate innovative financial solutions to address EP using different and complementary approaches: public/private/public-private schemes.

Points 1 to 3 are related to the wider European energy union and energy transition based on knowledge building and a strong multi-actor approach with the engagement of all stakeholders.

Related to knowledge building, to effectively tackle EP and contribute also to the political and social concept of leaving 'no-one behind' in the just transition non-financial support schemes must be supported by financial schemes. However most projects to date have had a narrow scope, in that they either: a) analyse and test non-financial support schemes without including financial support schemes (eg STEP,[2] ASSIST,[3] SMART-UP);[4] or b) analyse financial support schemes but not focusing on EP (eg E-FIX,[5] EnergInvest,[6] CITYnvest).[7] Only recently, three projects have been activated which take into account the dual dimension (POWERPOOR,[8] EnergyMeasures[9] and ENPOR)[10] but still with a very limited focus on the financial dimension. As such, past research has had no (or very low) impact on the economic-financial situation of EP/V consumers. There is a need for more research into innovative holistic financial and non-financial schemes. More generally there is

[2] Available at https://www.stepenergy.eu/ (last visited 7 December 2020).
[3] Available at https://www.assist2gether.eu/ (last visited 7 December 2020).
[4] Available at https://www.smartup-project.eu/ (last visited 7 December 2020).
[5] Available at http://www.energyfinancing.eu/en/ (last visited 7 December 2020).
[6] Available at https://ec.europa.eu/energy/intelligent/projects/en/projects/sf-energy-invest (last visited 7 December 2020).
[7] Available at http://citynvest.eu/ (last visited 7 December 2020).
[8] Available at https://cordis.europa.eu/project/id/890437 (last visited 7 December 2020).
[9] Available at http://energymeasures.eu/ (last visited 7 December 2020).
[10] Available at https://cordis.europa.eu/project/id/889385 (last visited 7 December 2020).

the need to increase awareness, knowledge and competencies and engagement of different types of actors. Different actors are involved in building and running support schemes for energy poverty and it is important to address them to empower and enforce them in playing a more active role.

The empowerment and training of stakeholders on a holistic model based on the financial and non-financial solution to tackle energy poverty include the need to learn the new financial mechanisms included in the coming Multiannual Financial Framework 2021-2027[11] to take advantage of the foreseen funding and create synergies with the European funding programmes as the new MFF is characterised by a growing role of private actors. Therefore, there is a significant need to support EP stakeholders to increase their knowledge and competencies on the financial mechanisms - the ones within the European MFF, the national/regional structural funds and also new innovative funding mechanisms.

Whereas up to now, low or weak commitments have been set up to integrate knowledge and perspectives of different actors/stakeholders dealing with EP financial and non-financial issues and launch synergically strategies to mitigate EP as concluded also by the JRC[12] 'Future research initiatives and pilot projects could investigate new and innovative ways of overcoming the lack of the financial resources needed to act on the energy advice received …. Future research initiatives and pilot projects could focus more on energy poverty to provide all stakeholders involved with a clearer picture of the social dimension of energy retrofit operations'.

Wider multi-actor participation would also contribute to design and implement innovative financial solutions to address EP using different and complementary approaches: public/private/public-private schemes (point 4). Specifically, consumers can play a key role in the design and set-up of innovative holistic financial and non-financial schemes to tackle energy poverty where consumers can take up the role of prosumers and consumers and create an energy community. In Europe, several energy communities (or similar initiatives) have already been launched and RESCoop (the European federation of citizens energy cooperatives)[13] is strongly engaged as reported in their position paper on 'Local Energy Communities: a way to bring "all Europeans" along in the energy transition'.[14] Other examples of similar initiatives can be found on their website.[15]

It is also worth reporting about renewable energy communities (REC), where energy communities formed by citizens own renewable plants and can generate the energy to satisfy their own needs. Renewable energy communities have a long history, with one

[11] Available at https://ec.europa.eu/info/multiannual-financial-framework_it (last visited 7 December 2020).
[12] F. Gangale and A. Mengolini, 'Energy poverty through the lens of EU research and innovation projects' (3) available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC113953/kjna29785enn.pdf (last visited 7 December 2020).
[13] Available at https://www.rescoop.eu/ (last visited 7 December 2020).
[14] Available at https://uploads.strikinglycdn.com/files/23778f72-b5b5-47b8-98cd-dbbea3db3eb3/LECs%20-%20a%20way%20to%20bring%20all%20europeans%20along%20in%20the%20energy%20transition.pdf (last visited 7 December 2020).
[15] Available at http://www.rescoop-ee.eu/energy-solidarity (last visited 7 December 2020).

of the first being the Tvindkraft project, a wind turbine which was built and installed in 1978 by hundreds of people from the community of Ulfborg, in Denmark. Since then, energy communities have grown especially strongly in Denmark, Germany, as well as in parts of the United Kingdom.

Whilst the EU has strongly supported renewable energy generation, it had not made explicit reference to them until the recast of the Renewable Energy Directive (RED II) which gave greater power to citizens for self-generation and consumption of electricity, with 'renewable energy communities' being defined for the first time and given new rights. The 2018/2001/EU directive on the promotion of the use of energy from renewable sources (RED II) establishes that access to energy communities has to be granted also to vulnerable customers to fight energy poverty. Moreover, according to the RED II, the participation of local citizens and local authorities in renewable energy projects through renewable energy communities results in substantial added value in terms of local acceptance of renewable energy and access to additional private capital which results in local investment, more choice for consumers and greater participation by citizens in the energy transition. Similarly, there are energy communities with the participation of cities for the co-ownership of the renewable plant which further financially supports the citizens facing energy poverty.

Similarly, there are also small local funding schemes to support energy-poor such as the 'Social funds to help energy management works' (FSATMEs)[16] in France to assist and subsidise the households which are not eligible to the national funding programmes in the realization of emergency works in their home. 'Emergency works' include a range of small-scale interventions that very low-income households cannot afford, such as fix and insulate a leak in the roof, install a programmable thermostat, insulate the pipes of a boiler, install or repair a hot water tank, install or repair mechanical ventilation, etc. Answering the urgent needs of these households can also be the very first step to put them on tracks towards a longer-term strategy for retrofitting their home. An FSATME is generally set up voluntarily by a local authority, often at the county level (Conseil départemental). It usually gathers a variety of local stakeholders (social workers, housing and energy operators, consumer associations, etc.) in a local committee, who decide altogether which solutions should be proposed to each household. Accordingly, when it exists, an FSATME helps not only the very deprived households of the territory but also the professionals that have a complementary tool to use in their day-to-day activities, the main attribute of these local funds being their flexibility. However, French local authorities often lack the necessary money and political support to design, launch and entirely finance a local FSATME.

Another example of a holistic financial/non-financial and consumer/prosumer approach is represented by the Self-Funded Energy Communities in Spain[17] which is a sustainable and empowering way to overcome the challenge of energy poverty. Self-Funded Communities are self-organised and self-financed citizen groups that use

[16] Available at https://www.ademe.fr/expertises/batiment/passer-a-laction/outils-services/fonds-sociaux-daide-travaux-maitrise-lenergie (last visited 7 December 2020).

[17] Available at http://www.winkomun.org/en/content/about-us (last visited 7 December 2020).

their own savings' capacity to provide financial help to other members in the community through a microfinance scheme. It has been demonstrated that communities of people suffering a situation of vulnerability can fund themselves and have access to credit, without any external help. The model integrates people into society, both socially and economically in a self-sustainable way because every SFC relies upon its members. New members mean more investors and more borrowers, which in turn mean higher return. In Spain, more than 50 SFCs operate regularly and, according to their records, half of the loans are offered to cover energy costs. Therefore, working with these self-organised communities on implementing structural EE measures has several benefits:

- It allows taking advantage of already organised groups with an on-going dynamics of mutual support.
- It facilitates the access of vulnerable households to new financial resources/schemes they don't have access to through the traditional financial institutions.
- It mobilizes the community's own savings through the shared commitment of achieving social impact in their closest environment.
- It can provide loans to other members of the SFC for structural energy efficiency measures, to reduce their exposure to energy vulnerability and break their dependence to subsidies.

Unlike similar alternative funding models such as microfinance, SFCs are informal groups that do not depend on an external entity that provides loans. The funds, generally in cash so belonging to the informal economy, are generated through the contributions from SFC members only, who are simultaneously shareholders and customers of the community funds. To ask for a loan, members have to comply with some conditions previously decided by each SFC in their rules, such as having previously saved ¼ of the credit amount or having two guarantors that answer with their funds in case of non-payment. If they comply with the rules and there is enough money in the common fund they can ask for the loan and pay it back in several monthly quotas.

Finally as reported by the JRC policy report on 'Energy communities: an overview of energy and social innovation'[18] 'engaging citizens through collective energy actions can reinforce positive social norms and support the energy transition. Community energy can foster citizens' participation and control over decision-making in renewable energy. Its social innovation potential also resides in the ability to integrate consumers independently of their income and access to capital, ensuring that the benefits of decentralisation are also shared with those that cannot participate. In parallel, innovative social policy and revisited regulatory structures are needed to address the potentially regressive effects that could arise when some societal groups might be impaired by an inability to invest in renewables projects while having to pay the socialised costs of policy support and grid fees. Ensuring that as many people as possible can participate in community energy can release the creative forces of social innovation and sustainable lifestyles across different social groups. The report reports

[18] A. Caramizaru and A. Uihlein, 'Energy communities: an overview of energy and social innovation' available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC119433/energy_communities_report_final.pdf (last visited 7 December 2020)

the results of an EU-wide exercise assessing the potential of energy communities in reducing energy poverty and one of its conclusions is that 'Citizen participation and community co-ownership schemes play an increasingly societal role by fostering citizens' participation in energy matters and rising acceptance of renewable energy. They can bring tremendous benefits for citizens and communities by placing them closer to the energy transition and fulfilling Europe's decarbonisation goals. Energy communities show both a commitment to place by bringing benefits to the local communities and interest by connecting people through a common bond. Unlike in a commercial enterprise, the aim is to maximise community benefits rather than profits. Collective energy initiatives investing in renewables can provide local income and investments, and keep financial benefits from local resources within the community. Energy communities are a type of social innovation that can promote more socially fair models of energy prosumership. They enhance citizens' democratic decision-making and control over renewable energy, which is placed in the hands of communities and people. …. Several case studies show projects that help address energy poverty - for instance, by offering cuts in energy bills and cooperating with local councils to improve social conditions. … In terms of energy provisions, members of an energy community can benefit from financial gains on their energy bills because of reduced grid fees and energy costs'.

Discovering the Potential of Prosumer Beyond Problems and Obstacles

Stefano Monticelli

1 Introduction

The transition from a system in which the Producer of Electricity is different and distinct from the Consumer, to a system in which, Producer and Consumer are the same thing is something revolutionary and at the same time so obvious that it can, on reflection, be considered. something already possible. On the other hand, that of energy is only one of the fields in which this coincidence is possible. In the great ocean of E-Commerce, for example, from the model known so far, which, simplifying a lot, provided, almost in a linear trend, the company that produces based on a project, a predetermined distribution, a physical sales network and a final consumer who seeks, buys, and consumes, has passed so-called service-oriented models, governed by service-dominant logic, in which resources, understood as skills and abilities, generate the benefits. In this new model, Company and Consumers are no longer such and distinct, but beneficiaries of services, because all are integrators of resources in the generation of value and service, exchanged, in turn, for other values and services. The consumer at the center of the whole is outdated, because the result of this new system is not a shop, understood in the double meaning of sale and physical place, but an ecosystem, in which the 'co-creation' of value prevails, a simultaneous operation between the parties involved. Nothing could be more exact to apply also in the ideal model of Producer and Consumer of Energy, that is to say of the Prosumer.

There are, to hinder this passage, several limits that we will define as 'structural' and that we could summarize in three macro aspects:

1. Nature of the network in which Prosumers and energy communities can settle;
2. Economic incentives to support the system;
3. Technical development and regulation.

We will briefly develop these three elements, because they are decisive for the realization or otherwise of this system, and therefore not entirely negligible in a treatment that provides for the analysis of the obstacles to the expansion of the phenomenon; but on our part, that is, on the part of the subject who knows, protects and represents the needs of consumers, we would like to reflect more broadly on limits and opportunities that are not only technical and linked to the system, but above all of the elements more directly related to the subject consumer and with its economic-social structure.

1.1 The Nature of the Network in which Prosumers and Energy Communities Will Have to Settle

The self-production of energy to best express its potential must be able to count on a complete integration of production and distribution systems. It will therefore be

necessary to revolutionize the system's infrastructures, choosing between a privatization of the network (which could lead to an increase in costs) or a public monopoly which will have to provide for the complete reform of the current concession regime. In any case, the consumer who produces energy, in order to benefit not only from savings but also from an economic advantage, must be able to count on a network that will allow him to interact with other private subjects with whom to exchange the energy produced, simultaneously lowering the costs of installing renewable energy production plants. A necessary condition for the development of prosumerism will also be the development of smart grids, as an integral part of the network infrastructure, including the widespread diffusion of smart meters, small energy storage systems, and the creation of district heating systems, always without regardless of the protection of personal data that will be collected. Given the small scale of production of individual energy prosumers, they will not have to encounter any limitations in accessing the network and this will be possible with adequate and transparent legislation.

1.2 The Economic Incentives to Support the System and the Costs of Accessing and Using the Network

Although support and openness to new configurations of self-consumption from renewable energy sources can be accompanied, in the short term, by a clear and firm disincentive to the use of fossil fuels, the prerequisite for the dynamic development of prosumerism cannot be based on the provision of sporadic investments or incentives, such as forms of tax savings. The development of energy production will see a share in the costs resulting from the adaptation of the distribution and transmission networks, but this participation must also be governed by transparent rules. For example, the regulation of the costs of system charges will be relevant, which must allow for a clear determination of the criteria aimed at the unitary definition of the same emoluments.

1.3 Technical Development and Regulation

According to many observers, technical regulation must remove the inefficiencies of the system, while remaining extraneous to the interests that animate the stakeholders in such a way that everyone can benefit from it. Self-consumption is a technical aspect independent of the source of generation. Since it optimizes the efficiency of the network, tariffs should be constructed in such a way as to allow for the separation of the costs incurred to produce energy from the revenues (or utilities) obtained to sell it. The evolution of the electricity market, then, will see the transition of centralized energy, hinged in a unidirectional electrical system, to a widespread generation based on the production from renewable energy sources within a flexible and bidirectional electrical system. To make this happen, it is necessary to have devices that manage and integrate the energy produced by the different generation and distribution systems with storage systems and consumption centers.

That said, there is the aspect that most closely concerns the consumer as a subject and individual that is by no means negligible and indeed, in our opinion, is as relevant as

the structural limits we have highlighted. Here too, in schematic form, we propose two tracks:

1. Consumer's awareness and awareness;
2. Familiarity with new technologies.

1.3.1 Consumer's Awareness

The consumer must be well aware of what his advantages may be in the passage that leads him to be a Consumer and at the same time Producer of Energy. And when we refer to the advantages, we do not refer only to those, albeit important, of an economic nature. Of course, these too must be clear and payable. For the Prosumer, for example, it must be very clear the relationship, on the one hand, between personal consumption and surpluses to be reintroduced on the market and, on the other, between own production and large-scale energy distribution. In general, the economic relationship that binds the Prosumer to its consumption and production must be clarified with legislation that does not exist today or is incomplete; to whom, how and under what conditions the surplus production can be resold. In the same way, however, the knowledge is important, which today the consumer has only in part and for the most part according to a personal propensity of this or that individual consumer, to know the collective effects, not only in terms of impact. environmental, that this transformation can bring. Awareness and awareness are important elements in this step and if non-existent, they can become impassable limits. To clarify this thought. Unlike a consumer navigating the ocean of E-Commerce, for whom a connection and a smartphone are enough to become a Prosumer, an Energy consumer, he must have very different reasons to collect adhesions from others who think like him, to establish energy communities; must make infrastructure investments, make changes to their condominium or community; build an accounting or reporting system; find buyers or subjects to whom 'turn' their advantage or their production surplus. All 'barriers to entry' which, in our opinion, can be overcome not only by a clear reference legislation but also by a necessary dose of awareness and training, for which, we are not naive, the prospect of a gain or at least saving is the essential driver, although it is a necessary but not sufficient condition.

1.3.2 Familiarity with New Technologies

In addition to the technical implementation of the transmission network and regulation, it will be necessary to lead the Prosumer towards an ever greater familiarity with artificial intelligence: The future of electricity, the future of consumption is largely in data management. It will not be possible to ignore efficient systems such as the Blockchain which will allow the distribution of electricity peer to peer, verifying production and consumption using encrypted algorithms; just as it is impossible not to use this technology applied to the sale, by resorting to smart contracts, it is not, in fact, far from the idea that the individual Prosumer can have, thanks to the Internet of Things, real, small 'branches company', represented by end-users such as household appliances that will be able to buy the necessary electricity on the network, at the most convenient prices, just as the possibility of 'selling' energy is not far off, identifying and adhering, through the same recourse, to

cheaper conditions at the moment. Furthermore, the role of the Prosumer will be facilitated and strengthened by the digital revolution also through the possibility of having effective and immediate communication tools, to directly sensitize other individuals or the communities to which they belong, by sharing their experience and knowledge. An automatic information-sharing activity that takes into account the usage habits of individuals and that automatically collects Prosumers for groups of propensity to consume will be a development driver.

2 Conclusions

The Prosumer faces many problems to face and some obstacles to overcome. As in any circumstance of change, the limits that are encountered represent at the same time the opportunities that are offered. For its part, in our opinion, the Prosumer has only one great advantage, namely the inevitable transformation of the system which can only represent the engine of this change. For our part, however, from that of those who represent and protect Consumers, we will have to do our part, representing not a further obstacle, but a vigilant companion of this transformation, without excluding, also, a more active role in helping the small and not so small Prosumers in terms of training, organization and support for communities in the process of formation.

Community Energies: The New Frontier of the Policy on the Production of Energy

Maria Rosa Conti

On 30 November 2016, the European Commission adopted a legislative package called the Winter package or Clean energy package,[1] which includes various legislative measures in the sectors of energy efficiency, renewable energy and the internal market of electric energy; on 4 June 2019 the Council of Ministers of the European Union adopted the latest legislative proposals included in the package: the Regulations and Directives of the Clean Energy Package establish the regulatory framework for the governance of the Union for energy and climate functional to achieving the new objectives by 2030 and above all decarbonisation (low or zero-carbon economy) by 2050.

Based on this legislation, each Member State must contribute to the achievement of common objectives by setting its own 2030 targets through the Integrated National Energy and Climate Plans - PNIEC, which cover periods of ten years starting from the decade 2021-2030: the Italian State adopted its PNIEC for the decade 2021-2030 in January 2020,[2] while the Directives of the Winter package are being implemented.

The European Institutions have established precise and punctual obligations that the Member States will have to pursue, aimed at overall achieving a real transformation of the European energy sector in the direction of total de-verticalization and decentralization of electricity production, enhancing the so-called distributed generation (DG) to fully achieve full and effective liberalization of the energy market.

Of specific interest for this exhibition is Directive (EU) 2018/2001 (21/12/2018) (Promotion of the use of energy from renewable sources), according to which the Member States must collectively ensure that the share of energy from renewable sources in the Union's gross final energy consumption in 2030 is at least 32%. At the same time, starting from 1 January 2021, the share of energy from renewable sources in the gross final consumption of energy of each Member State must not be less than given limits: for Italy, this share is equal to 17%.

Again, the Directive (EU) 2018/2001, in articles 21 and 22 introduces and outlines for the first time the figure of the Prosumer and the so-called, REC (Renewable Energy Communities), as citizens with the dual nature of producer and consumer and with the recognition of the right to self-produce, consume, store and releasing energy in

[1] The complete 'Clean energy for all Europeans' package is available at https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en (last visited 22 May 2019).

[2] The Italian PNIEC is available at https://www.mise.gov.it/index.php/it/2040668 (last visited 7 December 2020).

both single and associated forms. The REC, in particular, is a sort of non-profit self-consumer/aggregator, always having a collective dimension, established to achieve a generic environmental/economic/social benefit to its members precisely by sharing energy from renewable sources.

The National Energy Strategy (SEN), adopted by the Government with the Interministerial Decree of 10 November 2017), had already sanctioned the 'centrality of the consumer as the engine of the energy transition, to be declined in a greater involvement of demand in the markets through the activation of Demand Response, the opening of markets to consumers and self-producers (also through aggregators) and the regulated development of Energy Communities'.

This planning and guidance document in the energy sector, which also moves within the framework of the energy policy objectives outlined at European level, has been somehow surpassed by the more ambitious objectives contained in the PNIEC for the years 2021-2030.

Even recently, article 42-*bis* of the decreto legge, so-called, Milleproroghe (converted into law 28 February 2020, no 8) has given entry into our system to the figures entitled 'collective self-consumption' and 'energy communities', giving a mandate to the regulatory authority to identify ways to encourage the direct participation of municipalities and public administrations in renewable energy communities.

However, and as has already rightly been pointed out, this is a partial implementation by the national legislator with a whole series of limitations, which on the other hand are absent in the European directive: let's say, therefore, that in this interlocutory phase it seems to be a matter of a sort of experimentation regarding the use of this new tools[3] by our national legislator.

It is now clear, however, that the fight against global warming has progressively taken on an increasingly central footprint within the European Agenda, to the point of inducing the European institutions to embrace the thesis according to which the traditional energy model of development of industrial societies is neither generalizable to the whole planet, nor (by now) sustainable in the long term: in this historical phase of transition, urban agglomerations and individual citizens must play a leading role, taking advantage of new technologies to reduce costs and actively participating in a market that protects vulnerable consumers.

Institutions that want to make an effective energy transition in the direction of the 'zero carbon emissions' objective should therefore encourage their community of citizens towards the new era of a sustainable economy without this implying an economically unsustainable burden for them: they must undertake a bottom-up action, without waiting for the transformations of the large companies, which still occupy the scene in the energy market.

[3] M. Meli, 'Autoconsumo di energia rinnovabile e nuove forme di energy sharing' *Nuove leggi civili commerciali* 3, 630-656 (2020).

But encouraging sell self-generated electricity (the right to produce, store, use and, above all, sell self-produced electricity)[4] means implementing all the regulatory indications of the Winter package. First of all, we need to start with administrative simplification in this sector, ensuring that the nascent figure of the producer-consumer of electricity is not subject to excessively burdensome procedures (and charges) or that the entire amount of authorization and tariff instruments in force today is subjected to a clear simplification, so that the Prosumer has a single interlocutor with whom to interface; that active customers in possession of a private energy production and storage facility can have the right to access the grid within a reasonable time, without being subject to any double charging, including grid costs, for the electricity stored; nor be subject to disproportionate concession requirements and rates or be entitled to provide several services at the same time.

Therefore, the change of pace and the overcoming of cultural 'barriers' towards the liberalization and democratization of the energy market must take place now, with the creation of European and national governance on Energy and Climate that knows how to overcome the Green Capitalism approach and with a real 'ecological revolution' that presupposes the end of the centrality of the market: in other words, it is necessary to interpret future crises in the environmental field as it was done for the Covid-19, understanding that it is a real 'climate pandemic', And therefore and right from the start, alternative market models must be put in place, not only for health but also for the environment, bringing environmental value back to the centre; for example, let's start using the Green Procurement tool in every area and not just for public administration purchases.[5]

It is, therefore, necessary that the Energy and Climate Policy, also nationally, supports and facilitates all those who can self-produce the electrical and thermal energy they need or support projects that allow families, businesses, production districts and condominiums to produce and exchange energy.

Consequently, legislation is required that concretely and immediately:

1. increase the shares of electricity from RES, at the same time reducing those imported from non-EU countries, without the need to make large mass investments in the industrial sector of energy production;
2. decrease public investments towards policies in favour of fossil fuels;
3. incentive programs for domestic photovoltaic storage, as already happens in Germany and in the Lombardia and Veneto regions, as well as incentives with a social bonus for energy and gas to reduce the initial costs of the plants;
4. adopt suitable information tools on the issue of distributed generation, RES (as Renewable Energy Sources) and RES (as Renewable Energy Communities) as

[4] In particular, RED II directive (EU) 2018/2001 of 21 December 2018 and directive (EU) 2019/944 of 14 June 2019 [2019] OJ L 158/125.

[5] See 'Ecologica' magazine no. 2 October - December 2020.

accessible tools for citizens, who must be considered the central pillar of the nascent structure of the energy market.

In the same terms, the national legislator is called upon to build golden bridges to Prosumers and RES, both in terms of cost reduction and in terms of incentives, especially for investment costs, since today the cost of technologies has particularly reduced, to the point of making the incentives for RES no longer essential as in the past: on the other hand, if we compare the new national law with the provisions of the European directive, we understand that this is still very little, compared to to the potential that this new sector offers, because even if the new figures introduced are physiologically destined to perform the functions of self-production/consumption/ sharing, the further but fundamental possibility of introducing the surplus of energy produced and not consumed into the grid is still lacking, according to a new mechanism that should replace the current on-the-spot exchange.

But the investment in RES is not, however, only a green choice as such in terms of a real investment capable of generating a considerable income (direct, or in the form of savings): through the development of Renewable Energy it is possible to build solidarity, resilience and health at the grassroots community level.

We are first of all facing a real process of democratization of the energy system, despite the crisis of participatory democracy and serious inefficiencies in the responses given by politics to social problems: the benefits deriving from these new participatory forms of the market must be accounted for within social spending.

Secondly, there is also a futuristic social purpose assigned to the energy community, in which every political-administrative institution must invest, that is to contribute to combating energy poverty with the introduction of social aggregation mechanisms that will allow even the less well-off groups to be able to enter the energy market as active components, thus overcoming the limits deriving from any economic difficulties that characterize some regions of Europe.

Energy communities can give life to local welfare projects, for example by supporting urban regeneration programs, the creation of green areas, et similia. For this reason, for example, in Italy, there are regions such as Piemonte which with regional law no. 12 of 3 August 2018 promotes 'the establishment of energy communities, such as non-profit entities, set up to overcome the use of oil and its derivatives, and to facilitate the production and exchange of energy generated mainly from renewables, as well as forms of efficiency and reduction of energy consumption'; in the same terms the Puglia region, with the regional law no 45 of 9 August 2019.

In summary, the consequences and benefits, including collective ones, of the express recognition of the Prosumer as an active consumer are:

- production of additional income (electricity production and savings for energy efficiency);

- solution to energy poverty thanks to the mutuality provided by energy communities and the low price of self-consumption electricity;
- social aspect of aggregation for specific interests in support, for example, of ethical and environmental issues as a fundamental behavioural aspect for the future in the fight against climate change.

In conclusion, energy communities represent the true frontier of a sustainability policy, with the main objective according to the European legislator to provide environmental, economic or social benefits at the community level to its shareholders or members or to the local areas in which it operates, rather than financial profits.

The European legislation about the Energy Communities Transition is the last occasion that highlights the way to Energy sustainable development. The new Energy communities will be renewable, managed from the local citizens and with very chip costs. If they will gain value inside the market, they will become more advantageous for the citizen's service and it will be the try for a new real re-definition to the way of social, economic and environmental sustainability.

The Protection of the Energy Consumer: A Difficult Path

Mariastella Diociaiuti

1 Energy Education

Energy education is the teaching of rational, sustainable, environmentally friendly and waste-free energy consumption. Consumer sustainability is a virtuous interaction between consumer and business, in assuming responsibilities towards a sustainable market. Consumer sustainability could therefore be defined as the tool that, by reorienting the individual interests of consumers and businesses, achieves the goal of building a fair and balanced market in which both the consumer and the business take on collective objectives. Some possible goals are:

1. The balanced relationship between price, value and quality of the product or service also through compliance with the rules of the competition and the refusal of counterfeiting.
2. Particular attention to the less aware consumer, child, elderly person, a foreigner.
3. Encourage reuse, sharing, avoid the waste of goods and resources.
4. A useful, non-aggressive, unambiguous, non-invasive commercial communication.
5. Respect for the privacy of the consumer, made aware, free and responsible in his choices for the transfer of his data.
6. The amicable, extrajudicial settlement of consumer disputes.
7. Rethinking cities, infrastructures and public services in terms of efficiency and sustainability.
8. The dissemination of knowledge of the consumer code.

Consumer Forum, an association that associates various companies, businesses and consumer associations, has drawn up a Memorandum of Understanding between business and consumer associations on Consumer Sustainability.

2 The Energy Consumption and the National Consumers Union

The National Consumers Union is the first consumer association, founded in Italy in 1955.

In 2013, on the occasion of the Dona Award, he addressed, in particular, the theme of sustainability and the Green Economy.

The National Consumers Union, Committee of Umbria, has always been sensitive to the subject (most recently, a recent ‘webinar’ on environmental education on recycling and reuse).

The National Consumers Union also deals with energy: gas and electricity.

Many people turn to the association and complain about the problems of a different nature. Excessive amounts of energy bills, disservices in supply, undue disconnections, non-existent arrears, energy bonuses for people with economic hardship, charges for undue charges, failure to supply.

The energy consumer is the citizen, the user of the service, both private and public. The National Consumers Union, with various dissemination and promotion campaigns, has among its objectives, energy education, aimed at the consumer.

In fact, in 2017, the Smart up project outlined the consumption of Italians, providing useful and simple advice for users in economic difficulty; the Stop Climate Change campaign, promoted by Cremonesi Srl and sponsored by the Ministry of the Environment, and the UNC, aimed at spreading the need and methods of energy-saving, sustainable consumption; the conference, held in 2017, 'The consumer of electricity in Europe, how it is and how it will be', addressed all the players and stakeholders of the energy market, to analyze and deepen the Italian and European market, starting from point of view of the main actor: the consumer. In 2018: 'Energy: rights to Viva Voce', a project funded by the Electricity and Gas Authority, aimed at making consumers more informed and more aware of electricity and gas by engaging with consumer associations. There were 26 information and assistance desks, activated throughout the national territory, in which the operators of the associations, in addition to providing answers and solutions, have tried to promote responsible consumption.

The energy expert, Dr Marco Vignola, of the National Consumers Union, with press releases, articles, videos, on television, explains and illustrates how to read the electricity and gas bills, and also, the reasons for the most recent increases, provides the useful tips to avoid excessive costs and how to save.

3 Energy Consumption and Energy Issues

Energy consumption is still linked to electricity and gas. The critical issues are excessive costs, pollution, non-coverage of certain areas of the Italian territory, unfair commercial practices, the inadequacy of certain companies in the market, the inadequacy of supply systems, concerning technological developments and needs. of modernization and the territory, the non-participation in the joint conciliation tables by some companies, the failure to respond to complaints from citizens, who turn to the consumer counter. Arera is the guarantor of electricity and gas. Regulatory Authority for Energy, Networks and the Environment, which carries out regulation and control activities in the electricity, natural gas, water services, waste cycle and remote heat sectors.

Established with legge 14 November 1995 no 481, is an independent administrative authority, which works to ensure the promotion of competition and efficiency in public utility services and to protect the interests of users and consumers. Functions performed by harmonizing the economic and financial objectives of the subjects

providing the services, with the general objectives of a social nature, environmental protection and efficient use of resources.

Arera carries out consultative and reporting activities to the Government and Parliament on matters within its competence, including to define, implement and implementing EU legislation.

The resources for its operation do not come from the state budget, but a contribution to the revenues of regulated operators.

A portal of offers has been provided, for the comparison of prices, managed by the Single Buyer for useful consultation for the consumer.

4 Europe and Renewable Energies

To eliminate or at least reduce the problems deriving from energy consumption and energy sources, usually used, the European Parliament and Council Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L 328, aimed at promoting renewable sources. This Directive has not yet been implemented by the Italian law.

The increased use of energy from renewable sources can play an indispensable role, including in promoting the security of energy supplies, in guaranteeing sustainable energy at affordable prices, in fostering technological development and innovation, in addition to technological leadership. and industrial, while offering environmental, social and health benefits, as well as creating renewable energy, by 2030, with an upward revision clause by 2023.

The European Union proposed an increase in the percentage of 'renewable energies' by 1.5%, on a global scale until 2010. The result to be achieved is to cover 20% of consumption with renewable sources by 2020 total energy.

The framework, for climate and energy, sets three main objectives, to be achieved by 2030: a reduction of at least 40% of greenhouse gas emissions (compared to 1990 levels); a share of at least 27% of renewable energy; an improvement of at least 27% in energy efficiency.

5 Energy Self-consumption

The Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources defines:

a) the self-consumer of renewable energy as an end customer who, operating on its sites, located within defined borders or, if permitted by a Member State, on other sites, produces renewable electricity for its consumption and which it can store or sell self-produced renewable electricity provided that, for a self-consumer of renewable energy other than households, such activities do not constitute the main commercial or professional activity;

b) self - consumers of renewable energy, who collectively act as a group of at least two self - consumers of renewable energy who act collectively and are located in the same building or condominium.

The resolution of the Arera of 4 August 2020 318/2020/r/eel 'Regulation of Economic Batches relating to electricity shared by a group of renewable energy self-consumers who act collectively in buildings and condominiums or shared in a renewable energy community'(Coordinated with the conversion law legge 28 February 2020, no 8), reports the Authority's provisions on the regulation of economic items, relating to electricity, subject to collective self-consumption or sharing within the renewable energy community.

Self - consumption is the mechanism through which a citizen who owns a production plant consumes energy that he has produced with his plant.

For this 'transfer', the citizen producer obtains economic benefits (incentives or exchange on the spot).

In Italy to date, self-consumption has been based on the basic principle that production and consumption must be on the same site. And that in a self-regulation system there cannot be more than one consumer and one producer (resolution Arera 578/2013).

The transition to forms of collective self-consumption overcomes the problems posed by the individual one (non-self-consumable renewable energy causes grid loss), increasing the consumption of renewable electricity, as well as the efficiency and stability of the system.

Thanks to Art 42-*bis* of the Milleproroghe decree, approved in February 2020, it is now possible to authorize two forms of collective self-consumption, which can be framed in two large experimental configurations:

1. self-consumers of renewable energy acting collectively (eg multi-user buildings such as condominiums);
2. renewable energy communities.

From now on, it will therefore be possible to create system configurations aimed at maximizing self-consumption, which will be able to usefully integrate storage systems and charging systems for electric mobility. Always with this aim, it will be possible to imagine communities where it will be possible to produce and exchange energy in condominiums, between companies, between public buildings and commercial activities, etc. to exchange the excess energy produced locally.

The Arera will have to adopt the regulations for the technical aspects of the forms of collective self-consumption. It will have to identify the modalities of participation of consumption and public administrations, a particularly important factor for implementing local projects in the Municipalities adhering to the Covenant of Mayors.

6 Developments towards Intelligent Consumption

Unfortunately, Covid 19, this global pandemic, if on the one hand, today, hinders interpersonal relationships and the related project exchanges, aimed at the construction and implementation of common projects, on the other, at least in Italy, has allowed the proliferation of new regulations, including the eco-bonus 110, which aims not only to encourage economic recovery but to improve and improve energy efficiency, to protect the consumer and saving energy and sustainable energy.

What is certain is that if the European funds do not arrive, this opportunity will also be a missed opportunity.

Between various attempts and experiments, we slowly move towards this process of modernization, which, however, is still gradual.

In my humble opinion, the difficulties are determined by cultural, economic reasons and by particularistic and sectoral interests, which hinder this evolutionary process.

Consumer associations can do a lot, continuing to educate consumers and protect them.

1. Become aware: it is essential to learn and read your bill and meters. The bills are full of very important information such as the annual consumption, the monthly distribution of consumption (for electricity), the average price at which we are paying for electricity and gas, the share that belongs to the sales company and that it is the only one that can vary between the different offers.
2. Learn to compare: many different offers on the market can adapt to our needs but it is essential to learn to compare them, which is often not easy! To save money, therefore, it is possible to look for better offers on the market, but always after a very careful analysis (this is why we strongly advise against using channels such as door-to-door or telephone contracts).
3. Monitor consumption: both thanks to the information present in the bill and to simple monitoring tools we can at any time know how much we consume, consequently, change our habits to become more efficient. For example, reducing the temperature set for heating by one degree (or increasing it by one degree in the case of summer cooling) allows immediate savings.
4. Reduce consumption: using modern equipment (LED bulbs, induction hobs, heat pumps, etc.) is essential to obtain savings on electricity consumption. Using the new smart thermostats can lead to significant savings (from 15 to 20%) in gas consumption without intervening on the systems.
5. Redevelop our homes: once you have done all the previous path to drastically reduce your consumption forever, it is essential to plan energy redevelopment interventions in our homes such as replacing the boiler, installing solar panels, the thermal insulation of walls and windows, the use of modern solutions such as heat pumps.

The experience in the field, albeit limited, as head of the National Consumers Union of Rieti and Terni, has taught me that even in this sector a lot of professionalism is needed.

Madrid, March 2021