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RELATING
SYSTEMS
THINKING
AND
DESIGN
7th
SYMPOSIUM

CHALLENGING
COMPLEXITY BY
SYSTEMIC DESIGN
TOWARDS
SUSTAINABILITY

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BOOK OF ABSTRACTS





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CONTENTS

KEYNOTE SPEAKERS

- 10 | **Bistagnino Luigi** - Systemic Approach generates a new cultural paradigm
- 11 | **Bunnell Pille** - With a Grain of Salt
- 12 | **Govera Chido** - The Future of Hope: Social care for sustainable living
- 13 | **Iñiguez Flores Roberto** - Advanced Design cultures, a learning system perspective
- 14 | **Mauldin Chelsea** - Policy Design & Decision Making
- 15 | **Pauli Gunter** - Re-designing the framework: think natural, think local

PLENARY SPEAKERS

- 17 | **Jones P., Monastiridis S., Ryan A., Toye V., Van Ael K., Vandebroeck P.** - State of the Art Practice: Are we Ready for Systemic Design Toolkits?
- 20 | **Sevaldson Birger** - Systemic Design Association
- 22 | **Simon Widmer** - Circular Economy Toolkit

1 | POLICY DESIGN AND DECISION-MAKING

- 24 | **Bellefontaine T., Soliman M.** - Integrating Systems Design and Behavioral Science to Address a Public Sector Challenges from Within
- 27 | **Faiz K., Faiz P., Adha Binti Nordin N., McDonagh D., Woodcock A., Binti Shamsul Harumain Y. A.** - Permeating the barriers between the individual and policy designers in Pakistan: a cross-cultural study of women's mobility
- 32 | **Fassio F., Tecco N.** - Turin Food Atlas. Sharing knowledge towards urban food policies to develop circular cities
- 35 | **Feast L.** - Constitutional Realism and Sustainability: Lessons Learned From a Systemic Design Investigation of New Zealand's Democratic System
- 37 | **Mastroeni M.** - Smart specialization in non-metro canadian regions
- 40 | **Mehta N., Richard C., Raut S., Nahar P.** - A Systems Approach to Sustainability in Space
- 43 | **Metzner-Szigeth A.** - Eco-Social Transformations: Leading Principles and Generative Forces
- 45 | **Muirhead L., Mosse R., Hachey A., Scott N.** - Integration of multiple approaches into the Social Lab practice. A case study from a Social and Public Innovation Lab in New Brunswick, Canada.
- 47 | **Paulsen A., Wildhagen B., Sevaldson B.** - Gearing up the level of systems oriented design in public sector. Case, experiences and learning from Stimulab innovation program
- 50 | **Peter K., Kerr H.** - Alternative Narratives on Economic Growth: Prototyping Change at the System Level
- 53 | **Stamatopoulou A.** - Mapping-and-Designing (in) relationally composed fields

- 62 | **Taverna A., Mortati M.** - A reflection on connecting complexity theory and design for policy
- 66 | **Wildhagen B.**- Understanding variations of entanglement and complexity: A way to influence expectations of Service and Systems Oriented Design in public sector

2 | INDUSTRIAL PROCESSES AND AGRI-FOOD SYSTEMS

- 70 | **Dal Palù D., Coraglia V., Lerma B.** - The dark side of high tech precious materials recovery. Overview on the critical issues, opportunities and best practices from a material library point of view
- 73 | **Darzentas J., Darzentas J., de Bruin A., Power M., Prado P., Carmien S., Hobbs E.** - Systemic Design in Food Security and Resilience: Building A Holon
- 77 | **Giordano R., Montacchini E., Tedesco S.** - Building the fashion's future. How to turn textiles' wastes into ecological building products
- 80 | **Konietzko J., Bocken N., Hultink E. J.** - Business Experiments for Circular Urban Food System
- 82 | **Savio L., Thiebat F., Bosia D., Pennacchio R., Manni V.** - Natural fibers insulation panels: an adaptive production
- 85 | **Van der Velden M., Geirbo H. C.** - Repair = Care : Systems stories from Norway and Ghana

3 | SOCIO-TECHNICAL SYSTEMS IN THE DIGITAL AGE

- 88 | **Das B., Nahar P.** - Circular Economic Service System Design for Community Based Flood Resilience. Designing a Collaborative Grain Storage and Service System for the Annually Flood Prone Communities of Assam, India
- 92 | **Fiore E.** - New strategies for the refrigerator in the transition towards a circular economy
- 95 | **Germak C., Giuliano L., Abbate L.** - Co-design processes for cleaning and facilities services system
- 98 | **Lomas J., Patel N., Forlizzi J.** - Continuous Improvement: How systems design can benefit the data-driven design community
- 100 | **Tamborrini P., Remondino C., Marino C.** - Data, Fashion System and Systemic Design approach: an information flow strategy to enhance sustainability
- 103 | **Valpreda F., Cataffo M.** - Participatory Design for Service Robotics

4 | TERRITORIAL METABOLISM AND FLOURISHING ECONOMIES

- 107 | **Ambrogio F., Comino E., Dominici L., Rosso M.** - The use of water for technical development or technical development for the use of water?
- 110 | **Battistoni C., Barbero S.** - Systemic design for territorial development: ecosystem to support autopoietic local economies
- 114 | **Bofylatos S., Kampasi I., Spyrou T.** - Designing resilient creative communities through biomimetic service design
- 116 | **Bozzola M., De Giorgi C.** - Packaging reconditioned household appliances
- 119 | **Bucci D., Franconi A., Piovesan F., Tagliazucchi S.** - Analyzing OvestLab's collaborative regene-

ration process through a systemic design lens

- 122 | **Cattozzo L., Marotta L.** - Landscapes and systemic design: Po river Delta (Italy) case
- 125 | **Giraldo Nohra C., Barbero S.** - Post-industrial areas on the lens of systemic design towards flourishing urban resilience
- 129 | **Lambiase N.** - Mapping the Circle. Systemic analysis of the experiences of circular economy in Italy through an app
- 132 | **Lemos Oliveira Mendonca R. M., Ribeiro de Mello E. M., de Oliveira Nery S., Horacio M. P., Ro-meiro Filho E.** - Systemic network around education and community gardens
- 135 | **Schaus M.** - Narrative and Value: Authorship in the Story of Money
- 138 | **Toso D., Luthe T., Kiss T.** - The Systemic Design approach applied to water treatment in the alpine region
- 143 | **Varanasi U.** - Life conservation; A study into systemic design for wildlife

5 | SOCIAL CARE AND HEALTH SYSTEMS FOR SUSTAINABLE LIVING

- 145 | **Campagnaro C., Ceraolo S., Di Prima N.** - Systemic and participatory design processes in care systems
- 149 | **Eriksson D., Turnstedt L.** - The Nordics as World Leaders in Sustainable Healthcare and why it Matters to you
- 155 | **Gharavi N., Hozhabri M.** - @Home in Transition. Encouraging asylum seekers towards more self-driven approaches to navigate the unknown they are surrounded with.
- 157 | **Kumar A., Wagle P., Bandarkar V., Nahar P.** - Design for the taste-makers: System oriented social innovation for improving the living condition of salt pan labourers
- 160 | **Kumar G. N., Gupta I., Ruchatz J., Nahar P.** - Ethos Design for a Good Quality Life : Building an innovation framework for individuals and organizations towards resilience and cognitive flexibility
- 163 | **Landa-Avila I. C., Escobar-Tello C., Jun G. T.** - Holistic outcome-based approach towards sustain-able design healthcare: aligning the system purpose through system visualisation
- 165 | **Nie Z., Zurlo F.** - Human-centered Approach for Flourishing: Discovering the Value of Service Ecosystem Design in Psychosocial Career Counselling Service
- 167 | **Rygh K., Støren Berg M., Romm J., Morrison A.** - Pre-fuzzy front end alignment of multiple stakeholders in healthcare service innovation - unpacking complexity through service and systems oriented design in Strategy Sandboxes
- 171 | **Savina A., Vrenna M., Menzardi P., Peruccio P. P.** - The Impact of Food Production on Public Health: Systemic Strategies for a Diffused and Transversal Prevention Plan

6 | MODELS AND PROCESSES OF SYSTEMIC DESIGN

- 176 | **Barba E., Osborn J.R.** - Measuring Sophistication in Systemic Design and Computing
- 179 | **Besplemennova Y., Tassi R.** - Systems Thinking for Service Design
- 182 | **Boehnert J.** - The Visual Representation of Complexity: Sixteen Key Characteristics of Com-plex Systems
- 185 | **Chaplin H., Christopherson K.** - Re-Defining Journalism Education: Using Systems Thinking and Design to Revolutionize the Future of Storytelling

- 187 | **Chung Y., Renaux J., Chikermane V., Rajani J. J.** - Co-Designing a Social Innovation Model for Changemakers
- 190 | **Darzentas J., Darzentas J.** - Perspectives on Systemic Design: examining heterogeneous relevant literature to provide a historical and 'systemically inspired' review
- 194 | **Davidová M.** - Trans-Co-Design in Systemic Approach to Architectural Performance: The Multi-Layered Media and Agency in Creative Design and Its Processes
- 198 | **Jamsin E.** - Computational Models in Systemic Design
- 203 | **Jones P.** - Evolutionary Stakeholder Discovery: Requisite System Sampling for Co-Creation
- 205 | **Lockton D.** - Old Rope: Laing's Knots and Bateson's Double Binds in Systemic Design
- 208 | **Luthe T.** - Systemic Design Labs (SDL): Incubating systemic design skills through experiential didactics and nature-based creativity
- 210 | **Maessen C., van Houten S., van der Lugt R.** - Future Probing for Proadaptive Organizations
- 215 | **Marines Hernández L. E.** - Mapping disciplinary mobility for tackling complex problems
- 217 | **Matic G., Matic A.** - Design for Emergence – Enabling Stakeholder Liminal Transitions and Innovation Value Pivoting through Complex Systemic Transformations
- 220 | **Murphy R.** - Finding the emic in systemic design: Towards systemic ethnography
- 223 | **Murphy R., Jones P.** - Give me the place to stand: Leverage analysis in systemic design
- 226 | **Passia Y., Roupas P.** - The Contingent City: decoding the possibilities of the city's sociospatial metabolism
- 234 | **Perera D.** - Wicked Problems, Wicked Humor: Fun machines as a Method to Frame Wicked Problems in Architecture
- 236 | **Real M., Lizarralde I.** - A constructivist and soft view of systemic design. A tribute to Jean Michel Larrasquet's work
- 239 | **Sevaldson B.** - Beyond User Centric Design
- 242 | **Silverman H., Rome C.** - Distinctions and Analogies: Mapping Social System Identity
- 245 | **Snow T.** - Regenerative Value Systems – Model(s) illustrating flows and transformations of value within production systems
- 252 | **Sweeting B.** - Radically Constructing Place
- 254 | **Tekogul I.** - Design as adaptation
- 257 | **Thompson W. T., Mesquita Da Silva F., Steier F.** - Binocular vision of designing process for whole systems design crossing boundaries
- 260 | **Van Alstyne G., Skelton C., Nan Cheng S.** - Systemic Design and Its Discontents Designing for Emergence and Accountability
- 263 | **Van Gessel C., Van der Lugt R., De Vries R.** - Socionas: Bringing the systemic view into the design for health and sustainability
- 269 | **Vargas Espitia A., Guataquira Sarmiento N. A., Álvarez Quintero C. D., Rugeles Joya W. R.** - Integration of methodologies through an academic toolkit for the design of products services systems for sustainability - SPSS - in Colombian contexts
- 274 | **Vezzoli C., Basbolat C.** - System Design for Sustainability for All. S.PSS Design applied to Distributed Economies
- 278 | **Zivkovic S.** - The Early Stage Analysis of a Systemic Innovation Lab

The use of water for technical development or technical development for the use of water?

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KEYWORDS

Urban ecology;
Systemic water management;
Clean blue energy;
Local resource.

Nowadays in the global context, the use of water resources for daily activities is one of the main topic discussed by the international community. This paper presents a required reflection on paradigm shift toward an aware water management. As we know, in the past, especially during the 18th and 19th centuries, water power plays a crucial role in early stages of industrialization. Waterwheels was applied in many industrial sectors, as in textile, iron and wood production, improving manufacturing processes and affecting economic, environmental, social and cultural structure of societies. Water power is one of the most known renewable energy and scientific and technological innovations lead toward the introduction of new machines. Many industrial sites and cities were developed near rivers, lakes and other watersheds and citizens improved technical solutions to manage water resources for producing hydroelectric power.

Considering the global goals of the Agenda 2030, especially the SDG 6, focused on providing sustainable management of water and on fighting water scarcity, and the SDG 7, focused on ensuring renewable and clean energy, we need to tackle some of main current issues to move toward sustainability. Many other examples suggest that we need to consider that the development of human communities depends by the availability of water resources and also to undertake considerable actions for a sustainable use.

Water power is considered one of the most ancient type of clean and sustainable energy and it provides many benefits for local citizens, as reducing water and air pollution and enhancing local resources. Hydroelectric power includes both large-scale hydroelectric dams and small run-of-the-river plants and the construction of hydroelectric power stations depends by the topography of the land. On the other hands the construction of new hydroelectric facilities might impact the environment in land use changing and also in preserve aquatic wildlife's ecosystems. In some cases in large water reservoirs the amount of nutrients and sediments might increase, changing habitats and conditions for animal and plant life and increasing greenhouse gasses emissions. On one way some targets expressed by the SDG 6 (e.g. 6.6) regards the protection and the restoration of water-related ecosystems, as rivers and lakes, and on the other way some of them focus on the development of innovative technologies for wastewater treatment (e.g. 6.A). We need to look at these issues in a systemic view and to apply the systems thinking approach in water management practices to sustain local communities.

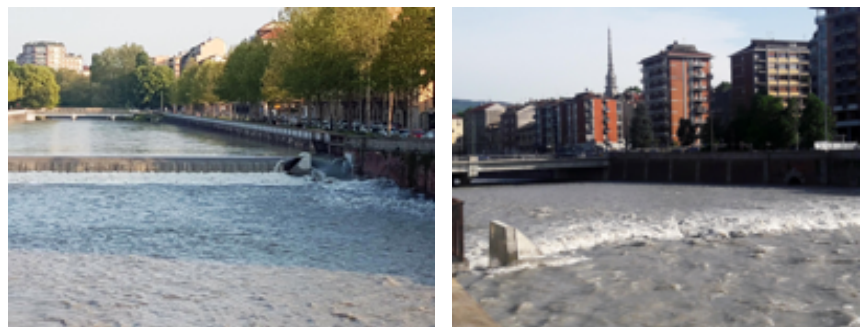
A systemic approach to hydroelectric power considers the impact in design practice of dams on natural ecosystems and urban contexts and it tries to reduce negative effects through the application of ecological principles. Ecological Engineering practice works to provide benefits for humans, to preserve natural ecosystems (Bergen, Bolton, Fridley, 2001) and it designs integrated systems (Mitsch & Jørgensen, 1989; Mitsch, 1996). In the ecological and systemic thinking, we shouldn't consider water only like a resource for human benefits, but it is also habitat for other species of plants and animals. In this paper we would present benefits provided by small-scale hydroelectric facilities through a case study made in the urban context. It underlines how a natural and local resource, as water of urban river, can be used in order to "produce" systemic services for human being, in a sustainable way. Some of these benefits are the protection of biodiversity of riparian ecosystem and the reduction of environmental impact and noise and air pollution.

Mini-hydro power presents many advantages as the dependence by natu-

ral flow of watercourse, the low relative cost of the system and possible applications in remote areas. It creates new opportunities for rural and isolated communities but also reduce the environmental impact in urban and suburban areas. The use of this local and natural resource for micro hydroelectric power contributes to increase urban metabolism, producing clean energy that can be used in the local context.

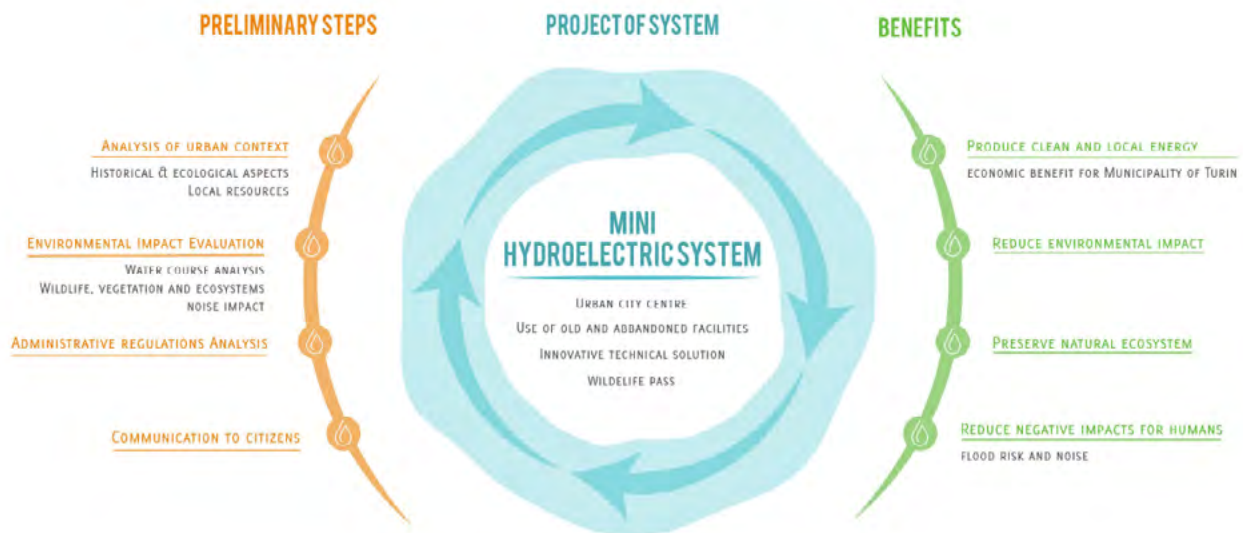
The case study here presented is a low heat hydroelectric power plant that was developed in Turin urban city center, in Regio Parco district, an historical interest area. During the 20th century in this district were established one of the oldest Italian manufacture, Manifattura Tabacchi, and the main lighting company of Turin. The small scale hydroelectric power plant is located in the Dora Riparia river, known for its importance, in 20th century, in generating hydroelectric power for local manufactures in Vanchiglia and Dora districts. The aim of the project is to recover the existing weir intake structure, that in XIX century was used to deflect a part of water's course into Regio Parco canal for energy supply of local manufactures. It was technically transformed in a inflatable weir used to produce hydroelectric power, placed in electric grid of the city, and to reduce the urban flood risk.

Figure 1: Location in the middle of the city of the mini-hydroelectric power plant. In this photos the system is completed and on the right side we can see the fish ladder.



Considering the purpose to preserve river ecosystem, the project has planned to establish a fish ladder in vertical slot to facilitate fishes' natural migration. It is also designed to reduce the environmental impact on landscape, local vegetation and urban noise. We need to apply systems thinking for providing benefits for humans and at the same time preserving ecosystems and enhancing historical pre-industrial heritage. Managing local resources and providing benefits for the whole context is important to promote sustainable urban metabolism, through the application of the holistic viewpoint. Urban context and natural river ecosystem are complex systems and design in-for-with them is a practice to undertake in a systemic view. Finally this paper's purpose is to show how systems thinking and ecological principles can be applied to face one of the most important challenge of our time: produce clean and sustainable energy in site and reduce its ecological footprint.

Figure 2: Graphical Abstract that shows main steps of research study and practical application.



REFERENCES

Arnold, R. S., Wade, J. P. (2015). A definition of Systems Thinking: A Systems Approach. Elsevier: Computer Science 44, 669-678.

Bergen, S. D., Bolton, S. M., Fridley, J. L. (2001). Design principles for ecological engineering. Elsevier: Ecological Engineering 18, 201 - 211.

Decker, E., Elliot, S., Smith, F., Blake, D., & Rowland, F. S. (2000). Energy and material flow through the urban ecosystem. Energy Environment, 25, 685-740.

Mitsch, W. J. (1996). Ecological Engineering: A New Paradigm for Engineers and Ecologists. In P. C. Schulze (Ed.), Engineering with ecological constraints. Washington, D.C.: National Academy Press.

Tischner, U. (2015). Design for sustainability, strategies, methods and tools. In P. Stebbing, U. Tischner (Ed.), Changing Paradigms: design for a sustainable future. Cumulus Think Tank. Publication No 1 of the Think Tank Series from the Cumulus Association of Universities and Colleges of Art, Design and Media. Aalto University School of Arts, Design and Architecture.

Violet, P. L. (2017). From the water wheel to turbines and hydroelectricity. Technological evolutions and revolutions. C. R. Mécanique 345, 570-580.