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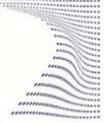
Dipartimento Interateneo di Scienze, Progetto e Politiche del Territorio  
Eccellenza MIUR 2018-2022



**UNIVERSITÀ  
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Doctoral Dissertation

Doctoral Program in Urban and Regional Development (34th Cycle)

# **The future of energy transition between critical materials and geopolitics.**

## **Lithium and the South American context**

By

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Politecnico di Torino

2021

## Abstract

The energy market is changing: new policies, technologies and sources are prompting us to embark on a long journey towards a new world, an “energy transition” to achieve a sustainable consumption model and solutions to tackle global warming and climate change.

Battery sector is one of the pillars of the low-carbon energy transition with a huge economic impact in the decades ahead.

The issue of energy transition in the automotive sector and battery production is not only technological. The geopolitical aspects are relevant if it is considered the relations between Europe, United States, Russia and China and the geographical division of the world, high-income countries (benefiting from the technology), and low-income countries but depositaries of the raw materials needed for that technology.

Nickel, Cobalt, Manganese, Lithium, Aluminum, Graphite and Copper are the most important elements implied for cells units battery (Huisman et al. 2020) and lithium is undoubtedly a central element in the production of electric batteries, one of the fundamental materials in the process of ecological transition, particularly in the transport sector. The careful analysis of the geopolitical dynamics around this material are crucial also for the support of ecological and sustainable urban regeneration processes, i.e. “smart cities”.

Half of all lithium reserves on the planet are located between Chile, Argentina and Bolivia, the so-called “lithium triangle” but what should be of greatest concern, however, is not the amount of lithium present on the Earth's crust, but its global distribution. The social impact and the lack of information and consultation with the local population, together with a difficult industrialization on site (due to poor technological preparation), are issues directly related and consequent to the “geopolitics of extractivism”.

The ‘Sustainable and Smart Mobility Strategy’ together with the proposed “Batteries and Waste Batteries Regulation” published by the EU Commission on 10 December, 2020 stating: ‘It is a fact that improving the design of batteries – making them more sustainable, readily removable and easily recyclable – is a pre-condition to transition towards a circular economy. It is also part of the solution to tackle acute problems faced by recyclers linked to the ever-increasing battery fires during the collection, transport, and treatment of the booming end-of-life products containing batteries, which pose major problems’.

The EU strategic document underlined the urgent need we have in Europe to improve our knowledge on battery and the whole life cycle, including raw materials. That assumption is confirmed by the

evidence that the EU is sourcing primary battery raw materials mostly from third countries such as Democratic Republic of Congo, Russia, Chile and Brazil with a strong geopolitics implication and of course a strong technological dependency by extra EU Countries.