European Commission

Science for Environment Policy

What affects battery recycling rates? Political, social and cultural factors examined

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Extended producer responsibility (EPR) and other regulatory influences are essential to battery recycling in Finland, a new study finds. The researchers compare this with the situation in Chile, where a lack of appropriate legislation prevents recycling companies from overcoming the technical and financial challenges of battery recycling. The study helps policymakers understand how political, social, and cultural factors can support companies in their move towards circular-economy business models.

The transition to a circular economy will gradually unfold through a series of changes to company business models. But what causes companies to make these changes? This study argues that 'institutional structures' are highly influential; these are defined as a set of 'rules' in society which determine what different actors, including businesses, can and cannot do. These rules may be formally defined in legislation, or they may be informally understood through cultural and social practices.

Using this theoretical basis, the researchers explored battery recycling in Chile and Finland as a case study in institutional influences on circular economy business models. They focused on the recycling of portable batteries and accumulators, as defined in the EU's Batteries Directive. Both countries promote recycling in general, but, whereas Finland recovers around 50% of portable batteries for recycling, Chile recovers none.

The researchers interviewed key representatives of the only battery recycler in Finland, and an electronic waste recycler in Chile – both national forerunners in recycling – plus relevant stakeholders including environmental authorities, producers, and researchers. They also observed the activities of the companies in person and analysed relevant documents (such as company reports).

They categorised the institutional factors that either enable or hinder battery recycling into three groups:

1. **Regulative institutions**. These are formally defined coercive rules, such as laws and regulations.
2. **Normative institutions**. These are rules based on social obligation, such as routines or ways of doing things.
3. **Cultural-cognitive institutions**. These include shared beliefs and logics.

The researchers say that this framework can also be used to analyse the complex relationship between institutions and circular economy business models in other sectors. In the case of battery recycling in Finland and Chile, it suggests that regulative institutions are the most powerful in shaping business models, especially in terms of making recycling financially viable.

In Finland, EPR regulations (in-keeping with the EU's Waste Framework Directive) are the main enabler of recycling; these require battery producers and importers to return their products for recycling. Half of the recycler's income comes from fees paid by producers to sort, recycle, and dispose of battery waste, with the other half from the sale of recovered materials. This is significant given that the volatile and falling value of metals hinders recycling; low nickel prices prevent the Finnish firm from recycling nickel metal hybrid (Ni-Mh) batteries, for instance.

Continued on next page.

Source: Levänen, J., Lyytinen, T. and Gatica, S. (2018). Modelling the Interplay Between Institutions and Circular Economy Business Models: A Case Study of Battery Recycling in Finland and Chile. *Ecological Economics*. 154 pp. 373–382. DOI:10.1016/J.ECOLECON.2018.08.018.

Contact:
jarkko.levanen@lut.fi

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Batteries Directive targets, implemented in Finland through the 2008 Decree on batteries and accumulators, are also a major regulative enabler. Companies are only authorised to be recyclers if they collect at least 45% of batteries at end-of-life and extract at least 50% of their materials for recycling.

In contrast, there is little regulatory support for battery recycling in Chile. It falls under hazardous waste management legislation, but this provides little technical guidance or financial incentive for battery recycling. This lack of incentive makes the complex and expensive process of battery recycling unprofitable — and so none occurs. However, recent EPR legislation in Chile has established formal battery recycling targets, which may be a future enabling factor.

Addressing normative and cultural-cognitive barriers could further promote battery recycling rates in Finland. For instance, low public awareness of battery recycling's importance, a major cultural-cognitive issue, means many householders do not sort their recycling appropriately. Lack of an efficient collection system for lithium-ion batteries, which are too hazardous for public collection points such as those in supermarkets, represents a key normative barrier.

The Finnish recycler suggests that a lack of global battery regulation also hampers recycling. Importers of electronic devices effectively control which batteries are in Finland, but the recyclability of these batteries is not among the importers' considerations. An increasing variety of battery types are entering the market through imports, creating technological and financial challenges for recyclers. The study also notes that there are presently no incentives for manufacturers to develop easier-to-recycle batteries.

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