

Renewable energy – not always sustainable

October 31 2016, by Börje Dahrén



Salar de Uyuni in Bolivia is the world's largest salt flat. The salt contains large amounts of lithium, which is a key component in modern batteries. Credit: psyberartist, "salt flats" (CC BY 2.0) <https://flic.kr/p/aaF2vC>

In a new thesis from Uppsala University, Simon Davidsson shows that a rapid expansion of renewable energy technology is not necessarily sustainable. To find the best way forward in the coming transition towards renewable energy, we need to take account of the materials used and make sure the industries that emerge are sustainable.

A shift in the global energy supply is crucial to combating human climate impact. Large quantities of [renewable energy](#) technologies, such as [solar cells](#) and wind power, must be deployed globally to replace today's fossil-dominated energy supply. Solar and wind energy are growing rapidly, but while the energy is renewable every solar panel and wind turbine is largely made from non-renewable resources. These energy technologies also have a limited lifespan and the power plants we build today will need replacing in the future.

The thesis "Natural resources and sustainable energy," which is the first thesis in the new field of doctoral education 'Natural resources and sustainable development' at the Department of Earth Sciences, studies the industries and natural resource flows necessary for a continued rapid expansion of renewable energy. It also discusses how these technologies are to be replaced when they reach their end-of-life.

"Renewable energy technology can lead to reduced emission of greenhouse gases, but for a complete analysis we need to make sure the whole production chain is sustainable. For instance, it is not obvious that the production of wind turbines and solar cells is sustainable, that the materials have been sourced in a sustainable way, or that the industries are capable of recycling the technology in the future," says Simon Davidsson, new PhD at Uppsala University.

Energy technology is constantly being improved. In the future, entirely new technology and improvements of today's technology may play an important role. However, to save the climate, renewable energy needs to be scaled up quickly and current technology will have to make up a large part of the expansion. Depending on the technologies we choose, the demand for different materials and elements, which may come from more or less rare resources, will increase. The extraction of these resources creates environmental problems, usually in other parts of the world, and their future availability is often uncertain.

"To assess the feasibility and consequences of a global energy transition, we need to consider material flows and how sustainable emerging industries are with regard to aspects other than climate. Truly sustainable energy systems require the creation of sustainable industries, which not only can produce large amounts of renewable energy technology, but also maintain a working system on a longer time scale, and do so in a resource efficient way," says Simon Davidsson.

More information: Natural resources and sustainable energy: Growth rates and resource flows for low-carbon systems: uu.diva-portal.org/smash/record.jsf?pid=diva2%3A955725&dswid=4560

Provided by Uppsala University

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