



Renewable energy



Could renewable energy development be hampered by the scarcity of rare metals ?

Some metals used in renewable energy technologies can be considered as rare. Their future availability depends on the level of reserves, as well as trends in use. Concerns have been raised that a significant development of renewable energy could be jeopardised by the lack of these raw materials. How serious is the threat ?



Posted on 19 November 2019
Last modified 14 June 2021

Two main types of assumed rare metals are used to a certain extent in renewable energy technologies. First, rare earth elements (which are metals despite their name), including seventeen elements often mixed in ores. Second, precious metals such as copper or silver, that are also used in many other industrial sectors.

The photovoltaic industry is often blamed for its high consumption of rare earths. In reality, it does not use rare earths, but other rare metals and mostly for thin film panels that represent less than 10 % of the market.

In wind energy, few technologies – mainly in off-shore turbines with permanent magnet synchronous generators, do require rare earth elements. Those are currently also a market niche (about 5 %). Even if off-shore wind was strongly developed to supply 5 % of the world electricity, rare earths would most likely not be a bottleneck, as estimated in a 2014 study by Ecofys.

The scarcity of rare earths and shortage threats are therefore not a big issue for solar and wind energy, even less for other renewable energy sources (such as biomass) that do not require any rare earth.

The only significant threat could relate to copper and silver, that are heavily used in renewable technologies. The potential depletion of these resources would affect a large number of other industrial sectors too. Anticipating this risk can be done by intensifying recovery and recycling of these metals, that are fortunately highly recyclable.

