MICA
Minerals Intelligence Capacity Analysis

LINKSHEET

Energy Transition

Energy transition is a concept that is widely accepted in society, in circles of science, business, government and citizens alike. It is viewed as a necessary step towards solving the global climate change problem. It is now seen as an unavoidable development. The energy transition is relevant for all aspects of our (physical) economy. The specific significance for mining and minerals is that renewable energy technologies generally have a higher demand for metals per produced unit of useful energy. As a result of the energy transition, therefore, the demand for both bulk and specialty metals is expected to increase.

From Wikipedia: “Energy transition is generally defined as a long-term structural change in energy systems. These have occurred in the past, and still occur worldwide. ….. . Contemporary energy transitions differ in terms of motivation and objectives, drivers and governance. ……..

Solving the global warming problem is regarded as the most important challenge facing humankind in the 21st century. The capacity of the earth system to absorb greenhouse gas emissions is already exhausted, and under the Paris climate agreement, current emissions must be fully stopped until 2040 or 2050. Barring a breakthrough in carbon sequestration technologies, this requires an energy transition away from fossil fuels such as oil, natural gas, lignite, and coal. This energy transition is also known as the decarbonization of the energy system. Available technologies are nuclear fuel (uranium) and the renewable energy sources wind, hydropower, solar power, geothermal, and Marine energy.

A timely implementation for the energy transition requires multiple approaches in parallel. Energy conservation and improvements in energy efficiency thus play a major role. Smart electric meters can schedule energy consumption for times when electricity is available abundantly, reducing consumption at times when the more volatile renewable energy sources are scarce (night time and lack of wind).

After a transitional period, renewable energy production is expected to make up most of the world's energy production. A 2011 projection by the International Energy Agency expects this to occur by 2060, dramatically reducing the emissions of greenhouse gases."

Scope

Contexts of use, application fields	-> contexts (e.g., environmental, economic, social assessment) -> which types of stakeholder questions are concerned? -> link to published studies that implement the method

► Not applicable

Input parameters	-> which parameters are needed to run the method

► Not applicable

Type(s) of related input data or knowledge needed and their possible source(s)	-> which types of data are needed to run the method, from which sources could they come… -> could be qualitative data or quantitative data, and also tacit knowledge, hybrid, etc.

► Not applicable

Model used (if any, geological mathematical, heuristic…)	-> e.g., geological model for mapping -> e.g., mathematical model such as mass balancing, matrix inversion, can be stepwise such as agent -based models, dynamic including time or quasidynamic specifying time series… -> can also be a scenario

► Not applicable

System and/or parameters considered	-> **the system can be described by its boundaries**. These can refer to a geographic location, like a country, or a city, the time period involved, products, materials, processes etc. involved, like flows and stocks of copper, or the cradle-to-grave chain of a cell phone, or the car fleet, or the construction sector, or the whole economy… -> **parameters** could possibly refer to geographic co-ordinates, scale, commodities considered, genesis of ore deposits and others…

► Not applicable

Time / Space / Resolution /Accuracy / Plausibility…	-> to which spatio-temporal domain it applies, with which resolution and/or accuracy (e.g., near future, EU 28, 1 year, country/regional/local level…) -> for foresight methods can also be plausibility, legitimacy and credibility…

► Not applicable

Indicators / Outputs / Units	-> this refers to what the method is actually meant for. Units are an important part but that is most of the time not sufficient to express the meaning. For example, **the indicators used in LCA express the cradle-to-grave environmental impacts of a product or service**. This can be expressed in kg CO_2-equivalent. But also in €. Or in millipoints. Or in m^2year land use. -> for foresight methods the outputs are products or processes

► Not applicable

Treatment of uncertainty, verification, validation	-> evaluation of the uncertainty related to this method, how it can be calculated/estimated

► Not applicable

Main publications / references	-> e.g. , ILCD handbook on LCA, standards (e.g. , ISO) -> can include reference to websites/pages -> references to be entered with their DOI

https://en.wikipedia.org/wiki/Energy_transition
https://www.iea.org/topics/climatechange/
https://www.weforum.org/agenda/2018/01/were-getting-closer-to-completing-the-energy-transition/
http://www.ren21.net/wp-content/uploads/2017/06/170607_GSR_2017_Highlights.pdf
https://ec.europa.eu/commission/priorities/energy-union-and-climate_en
http://www.resourcepanel.org/reports/green-energy-choices-benefits-risks-and-trade-offs-low-carbon-technologies-electricity
http://www.oecd.org/environment/renewable-energy-catalyst-clean-energy-transition.htm
http://www.energy-transitions.org/

Related methods	-> List of comparable methods, their particularities…

	-> link to one or several other existing fact sheet(s)

► Not applicable

Some examples of operational tools (CAUTION, this list is not exhaustive)	-> e.g., software… Only give a listing and a reference (publication, website/page…) -> **should be provided only if ALL main actors are properly cited**

► Not applicable

Key relevant contacts	-> list of relevant **types** of organisations that could provide further expertise and help with the methods described above.

► Not applicable

Glossary of acronyms /abbreviations used	-> Definition