

The Issue of Resource Extraction for the Renewable Energy Transition

The extraction of resources refers to the withdrawing of materials from the environment for human use, including fossil fuels (oil, gas, and coal), rocks and minerals, biomass via deforestation and fishing and hunting, and water. The global trend away from non-renewable fossil fuels has led to an increase particularly in the demand for biomass and other biofuels. Biofuels, such as biodiesel and bioethanol are liquid or gaseous transport fuels which are made from biomass. Their usage is particularly prevalent across the EU's transport sector as it helps to reduce greenhouse gas emissions and improve the EU's security of supply.

However, due to the increasing global population and expectation of higher standards of living, the demand for energy (and therefore the extraction of renewable energy resources) has greatly increased. It is therefore imperative that we continue to find and produce larger and more efficient sources of environmentally-friendly energy.

There are many different methods for extracting biomass. One method is liquid-liquid extraction which is carried out using two different solvents (one of which is always water). However, there are great risks attached to this method including cost, toxicity and flammability. Solid-phase extraction is an alternative but also carries many risks such as the relatively large quantities of polluting solvents requires and is also an incredibly time-consuming method.

There are therefore a number of environmental risks linked to all methods of biomass resource extraction. The chemicals used have been known to damage both local ecosystems and harm water supplies (often damaging water balance which can lead to air, soil and water pollution). The clearing of areas to grow crops for the production of biofuels has also been criticised due to issues with hunger and food production in many parts of the world, as biomass crops are known to be grown in place of food resources. This again can also lead to a decrease in local biodiversity.

A similar issue arises when we consider the fact that it is often High-Income Countries (HICs) who benefit from the sale and export of raw materials, yet they are frequently extracted in Low-Income Countries (LICs). Profits of such raw material extraction has been linked to financing for armed conflicts in many regions. Many of those who work in resource extraction report severe human rights abuses. The pollution caused by the extraction of such resources can also lead to severe health problems for which companies have been widely reported to refuse to fairly compensate workers.

Consequences of resource extraction do not stop after the production of raw materials, however. The end of life disposal also carries both social and environmental consequences. The disposal process can lead to toxic emission and illnesses for workers and those living in the local area, many of whom have been reported to be under the age of 18.

A separate element of this issue is related to the extraction of lithium. Lithium is used widely in electronics, toys, wireless headphones, handheld power tools, small and large appliances, electric vehicles and electrical energy storage systems. In particular, as we move towards greater electric vehicle usage, obtaining lithium in large quantities is vital but is becoming increasingly problematic. Lithium is often extracted in LICs such as the Democratic Republic of Congo where there are often few safety restrictions or labour rights for those who work in the mines.

As with other resource extraction, the mining of lithium can result in soil degradation, water shortages, biodiversity loss, damage to ecosystem functions and an increase in global warming. There is also a significant quantity of energy used in this process which arguably counteracts the positive benefits of using lithium batteries to power electric vehicles. It appears increasingly difficult

to strike a balance between the environmental benefits of alternative energy resources and the harm that their extraction can cause.

Points to consider:

- What sustainable options are there for countries wishing to phase out fossil fuel usage?
- How can companies producing renewable energy resources be regulated?
- How can we ensure that the profits of renewable energy production are used to benefit those in local areas and communities?
- What research needs to be done into safer and more environmentally-friendly methods of biofuel production? Should international cooperation be encouraged?

Useful links:

<https://ugc.berkeley.edu/background-content/resource-extraction/#:~:text=The%20extraction%20of%20resources%20refers,fishing%20and%20hunting%2C%20and%20water>

<https://www.britannica.com/technology/biofuel>

<https://www.euronews.com/green/2022/02/01/south-america-s-lithium-fields-reveal-the-dark-side-of-our-electric-future#:~:text=Why%20is%20lithium%20extraction%20bad,an%20increase%20in%20global%20warming>