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Opinion

Biodiversity in the Age of Electrification, Digitalization and Renewable Energy – Are We Destroying Nature to Save the Climate

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Opinion

The International Energy Agency (IEA) recently published a report calling for large-scale increase in the efforts of reducing climate gases through the usage of renewable energy [1] to replace fossil fuel energy. By the 2040s, they envision that the size of the global market for critical minerals approaches that for coal today. A less debated report, also recently published by the IEA, discusses the required usage of minerals and metals to achieve this energy transition in detail. Here, they claim that Rare Earth Elements (REE) will grow 7 times in volume [2], and furthermore: In climate-driven scenarios, mineral demand for use in EVs and battery storage is a major force, growing at least thirty times to 2040. Lithium sees the fastest growth, with demand growing by over 40 times in the SDS (Sustainable Development Scenarios) by 2040, followed by graphite, cobalt and nickel (around 20-25 times). The expansion of electricity networks means that copper demand for power lines more than doubles over the same period. We can always discuss the realism behind these reports. However, the simple fact is that these numbers and estimates will impact policymaking, investments and ultimately biodiversity particularly through mining- and processing operations (extraction). Unfortunately, the reports are relatively brief concerning biodiversity. For example, only the extraction of iron, copper, bauxite, zinc and lead is discussed at some extent using the research of [3]. The [2] report highlights the issues surrounding copper production in Chile but it is silent on the even greater problems of extracting lithium. In Chile's Salar de Atacama 65% of the water in the region are used by mining and extraction – for every tonne of lithium extracted 1,900 tonnes of water is used [4]. Worse, existing mines and projects under construction is estimated to meet only half of projected lithium requirements by 2030 [2]. When it comes to cobalt, [2] estimates that in a scenario consistent with climate goals, expected supply from existing mines and projects under construction is estimated to meet only half of projected cobalt requirements by 2030. Yet, [5] estimate that by 2030 the cobalt production will be less than demand. In the Democratic Republic of Kongo, about 60% of global volume is extracted with large human suffering and environmental destruction [6]. New batteries are under development without cobalt, but significant challenges remain [7] and a major issue is the low energy density and the resulting problems with range/discharge duration [8]. Thus, there are no immediate solution on the horizon to replace cobalt in batteries. When it comes to REE, however, there is very little discussions related to anything relevant to biodiversity. Unfortunately, habitat loss and degradation currently threaten over 80% of endangered species, while climate change directly affects 20% [9], and the mining required for REE is a major culprit [10]. To make matters worse, the current recycling rates of REE and lithium is less than 1%, cobalt at approximately 30% and copper at roughly 45% [2]. Hence, the outlook portrayed by the [2] requires massive increase of mining and processing. They try to soften their narrative by arguing that the required land area disturbed is really small. Indeed, the area disturbed by mining activities lie between 0.3% and 1% of total terrestrial land surface [11]. However, these researchers do not discuss biodiversity. Biodiversity and land area are two different aspects of environmental impact. When we know that the extraction of minerals and metals exerts major impact on biodiversity, as [10] show, we can only fathom what this level of resource requirements will imply. Furthermore, with the Global Warming Potential (GWP) being the most commonly used tools for assessing environmental impact for renewable energy [12], the current approach seems too narrow. Clearly, there is urgent need for more research on how renewable energy and other technologies for the energy transition impact biodiversity. It is time to realize that biodiversity and other dimensions of environmental performance must be considered on equal terms with GWP in the energy transition. In its current trajectory, it is time to ask whether the energy transition imposes too great environmental damage to offset its benefits?.

If the two aforementioned IEA reports will guide policymaking and investments and ultimately reality, it is time to ask whether the energy transition imposes too great environmental damage to offset its promised climate benefits? Biodiversity, particularly through mining- and processing operations (extraction), will be hit hard. Indeed, a in a recent letter, authored by Natural History Museum Head of Earth Sciences Professor Richard Herrington and fellow expert members of SoS Minerals delivered to the Committee on Climate Change in UK, similar concerns over the resource challenge with the current trajectory is expressed [13].

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