

## Blog

# Can the electric vehicle revolution solve the climate crisis and create opportunities for developing countries?

by Alan R. Roe

**Electric vehicles (EVs) are confidently expected to decarbonize road transportation, contribute substantially to the net zero agenda, and so help to solve the climate crisis. But as Ben Jones points out in a recent [WIDER Working Paper](#) (<https://www.wider.unu.edu/node/238023>) , a rapid growth of global supplies of minerals and rare metals is a prerequisite. This in turn opens new prospects for mineral-abundant countries, many of which are less developed economies.**

Tony Addison, former Chief Economist of UNU-WIDER, and myself explored these prospects in a series of high-level UN Roundtables over the course of 2021 — an opportunity to communicate our ideas to many critical stakeholders in all continents. Here, and in a related [blog](#) (<https://www.wider.unu.edu/publication/metals-global-energy-transition>) , I lay out the opportunities, and risks, that took centre stage during these discussions.

## Barriers and risks

It is increasingly assumed that EVs are the future of transportation. The International Energy Agency (IEA) reports that there were some 16.5 million EVs on the world's roads by 2022. That number is [projected to increase seven-fold](#) (<https://iea.blob.core.windows.net/assets/24d5dfbb-a77a-4647-abcc-667867207f74/TheRoleofCriticalMineralsinCleanEnergyTransitions>) , by 2040. Annual global sales could rise from 2.5 million to over 30 million (<https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>) by 2030.

But, there are doubters and their doubts do have some substance.

There are several complicating factors that can compromise the promise that EVs are said to offer. These risks should be considered carefully before any country — and particularly any developing country — puts too much skin in the game.

First, there are the high costs of installing sufficient accessible charging points, especially in countries with low levels of electricity access (access levels below 40% are quite common). Second, there are question marks about battery longevity and the costs and technical challenges of both replacements and recycling. Third, the engineering complexities and the task of upskilling mechanics trained on conventional internal-combustion engines (ICEs) need to be considered. Fourth, the greater weight of EVs caused by their heavyweight batteries is a particular concern for low-income countries that already struggle to maintain road infrastructure.

And finally, charging EVs with largely coal-fired power — which would especially be the case in the most populous countries of India and China — will not much reduce carbon emissions.

## Opportunities

These risks notwithstanding, there are [opportunities for several developing economies to benefit](https://www.wider.unu.edu/publication/electric-vehicle-revolution) (<https://www.wider.unu.edu/publication/electric-vehicle-revolution>) from the EV revolution, but mainly as providers of critical mineral inputs into EV manufacturing, rather than as consumers and users of EVs.

Indeed, a substantial share of today's global reserves of the key metals needed in quantity for the transition to clean energy are located in lower-income countries.

[Examples](https://documents.worldbank.org/en/publication/documents-reports/documentdetail/207371500386458722/the-growing-role-of-minerals-and-metals-for-a-low-carbon-future) (<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/207371500386458722/the-growing-role-of-minerals-and-metals-for-a-low-carbon-future>) include 68% of lithium, 47% of manganese, 34% of nickel, 40% of platinum, 70% of titanium, 41% of zinc, 46% of copper, and 68% of cobalt.

A recent [WIDER Working Paper](https://www.wider.unu.edu/publication/extractive-dependency-lower-income-countries) (<https://www.wider.unu.edu/publication/extractive-dependency-lower-income-countries>) by Ericsson and Löf ranks 40 lower-income countries that have some potential to take advantage of their endowments of these and other metals. The deeper analysis of this potential in their study is suggested reading for anyone who wants to learn more.

However, the realization of the alleged potential of EVs for developing countries will be far from plain sailing. Here are some of the risks for developing countries hoping to take advantage:

- The volumes of critical metals required for batteries alone are huge; [especially cobalt, lithium, and nickel](https://www.woodmac.com/news/opinion/cop26-why-battery-raw-materials-are-a-highly-charged-topic/) (<https://www.woodmac.com/news/opinion/cop26-why-battery-raw-materials-are-a-highly-charged-topic/>). If the present supply constraints cannot be addressed, then the price of EVs is likely to remain [prohibitively high for many](#)

### prospective users without huge subsidies

(<https://www.dailyrecord.co.uk/lifestyle/motoring/fears-electric-vehicle-future-20636180>) like those seen, particularly, in China.

- To make EVs renewable, they need to be charged using renewable energy. It is not clear that the additional renewable energy needed will keep pace with demand for EVs, and this will strain global critical metal supplies even further.
- Environmental lobbies and governments might well go cold on EVs, as they did previously on diesel vehicles. The *overall* carbon-reducing credentials of EVs are already under question because of the substantial emissions and other environmental harm associated with the mining and processing of their metallic inputs.
- Some of the countries most richly endowed with critical metals are also well-known for unacceptable human rights practices in their mining sectors. The DRC is perhaps the leading example. It provides almost 70% of the global supply of cobalt — a critical battery metal — with an estimated 15–30% of this produced in small-scale artisanal mines that use child labour and environmentally disastrous methods. The discussions at the 2021 UN Roundtables revealed this to be a matter of universal concern.

## Another word of caution for resource-endowed developing nations

It is a common political assumption that the mere presence of a critical mineral resource justifies large investments in downstream processing to enhance national value-added. But this can be a seriously misleading assumption. Experience confirms [the inherent problems of building viable domestic processing](https://www.wider.unu.edu/publication/extractive-industries) (<https://www.wider.unu.edu/publication/extractive-industries>): certainly no developing country can assume that a rich endowment of any critical mineral will lead inexorably to the eventual emergence of a commercially-sustainable industrial output based on those minerals. In a related blog, I probe more deeply into some of the challenges faced to develop such national value-added, using Bolivia's efforts to capitalize on its extremely rich endowment of lithium as one example.

## Strategies for harnessing the potential in developing countries

Many low- and middle-income countries that [are already highly dependent on extractive resources](https://www.wider.unu.edu/publication/extractive-industries) (<https://www.wider.unu.edu/publication/extractive-industries>) have learned how difficult it is to cope with the inherent instability of the prices and the markets in which these resources are traded. The WIDER working paper by Ericsson and Löf referenced above confirms that a large sub-set of those countries have the potential to significantly increase their mining output to meet the new demands for the global

energy transition. But, partly for the reasons articulated above, prospects for doing so face uncertainties which are probably even more acute than encountered in the past.

## What strategies can help address such uncertainties?

Two modest suggestions can be offered. First, acting on good evidence is vital. High-quality data on mineral endowments is needed — not only their volumes, but also whether they are of marketable quality, commercially viable, and at what price? The geological record underpinning such data is merely the first part of this requirement. Further, all potential supplying countries need to be very well informed about global trends in both EV uptake and above all competing suppliers.

Second, it is important to develop a deep and regularly updated awareness of the market and its uncertainties, and use this to maintain a grounded macroeconomic forecast. This includes the need to be cautious about increasing tax rates on mining products when, in the short term, there are high prices and bullish forecasts of future demand. These are rapidly changing markets; today's competitive positions can easily disappear.

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