

Energy Transition: Facing Reality

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“People only accept change when they are faced with necessity and only recognize necessity when a crisis is upon them.”

Jean Monnet

The conclusion of COP28 in Dubai led to the usual mix of satisfaction with the progress made and disappointment stemming from unmet expectations. There is today a broad consensus on the reality of climate change, its causes and the need to accelerate the energy transition.

The repeated calls from the International Energy Agency to rapidly reduce fossil fuel consumption are facing major technical and financial challenges in many parts of the world. At the same time, the target of keeping the rise in global temperature below 1.5 degrees is rapidly slipping away or has already been exceeded.

This is the first shock resulting from the need to take stock of reality, beyond theoretical aspirations or government targets. This paper does not call into question the obvious need for an energy transition, but it highlights certain important aspects people and their governments must consider when it comes to costs, equity, modes of transport and infrastructure. The ambitious objectives of some are inevitably confronted with technical and socio-economic realities. Whether we like it or not, the energy transition requires changes to our lifestyles, compromises and a clear vision of what is possible, acceptable and necessary.

The Transition Will Be Expensive

The reality is that the costs of the energy transition will be high, especially for those who already lack resources. Replacing well-established technologies that have been integrated into supply chains for decades will have an inevitable and prolonged inflationary impact. The fact that not everyone will be equally affected will be a source of persistent tension. In the absence of compensatory measures, some households, and even some countries, will have to make a choice: “the end of the month” or “the end of the world”.

This choice highlights the inequalities exacerbated by the transition. After nearly three years of high inflation, concerns related to the cost of living have made many individuals less willing to accept new environmental measures if they affect their financial means. At the same time, wealthier people do not seem to suffer as much. At the political level, we can already see this reality being exploited by populist movements on both the left and right of the political spectrum.

As one of the main challenges associated with the energy transition, the issue of inequality is set to grow in importance. Internationally, the enormous costs and the tools needed for the transition are out of reach for the majority of developing countries. Many of these countries depend on carbon-intensive energy sources, while wealthier countries are able to move away from them.

Looking at Africa, researchers at the International Monetary Fund highlight that « the current energy mix in Africa is based mostly on burning coal, oil, and traditional biomass (wood, charcoal, dry dung fuel). This reflects the energy resources of the continent, but also the use of technologies of the past” (Schwerhoff and Sy, 2020, p. 54).

The new fund announced at COP28 to help developing countries cope with climate-related losses and damage is of course good news. However, looking at the entire scope of climate-related issues and costs, the financial support promised in the past did not always materialize. We can question whether the outcome will be different in the future.

It Will Take More Than Electric Cars...

Governments are betting on the electrification of transport to support the energy transition. In addition to sales targets for zero-emission vehicles, generous incentives are in place to incentivize potential buyers. Encouraging signs are visible. In the third quarter of 2023, battery electric, hybrid-electric and plug-in hybrid-electric passenger cars accounted for 25.3 percent of new passenger cars registrations. Five years earlier, this proportion stood at just 8.1 percent in the third quarter of 2018 (Statistics Canada, 2024).

Despite this improvement, the example of Norway shows that the electrification of private cars is not enough. According to Rystad Energy, a business intelligence firm, the total fuel consumption for road vehicles is relatively stable in Norway, even though more than half the cars on the road are electric. This stems from the fact that fuel consumption by buses and trucks has increased, thus mitigating the reduction in demand coming from light-duty vehicles (RystadEnergy, 2023).

Beyond passenger cars and the electrification of public transit, greater attention must be paid to the entire mobility and transportation sector.

The transition of marine and air transport faces challenges due to their fuel needs. According to the International Energy Agency, international shipping and [aviation](#) each accounted for two percent of global energy-related carbon dioxide emissions in 2022. However, aviation’s emissions have grown faster than road, rail and shipping in recent decades (International Energy Agency, 2024a, 2024b). Air transport risks being among the last modes of transport to make a complete transition.

For both marine and air transport, technical innovations and sustainable, synthetic or low-carbon fuels will be part of the solution once they are available in sufficient quantities and at an affordable price.

The Transition Requires Minerals and Energy

The energy transition requires mineral resources and greater power generation capacity.

Many critical minerals are needed to produce electric cars. For example, an electric vehicle can contain up to 80 kilograms of copper, four times the amount found in a traditional gasoline-powered car (Nguyen, 2023). The ever-increasing demand for these minerals and the desire of Western countries to not depend entirely on Chinese supplies represent an opportunity for a producer country like Canada. However, mining developments often face fierce opposition from local communities. Combined with red tape, this often slows down or even cancels projects.

The transition and electrification of the economy will have to rely on large quantities of constant and reliable sources of low-carbon energy. While renewable energies such as solar and wind power are part of the solution, they cannot reliably power large electricity grids on their own. Canada has a world-renowned expertise in hydroelectricity, but the consequences of projects on the territory and populations (e.g., flooding and relocation) are often criticized by certain groups.

Nuclear power should also be added to this list. At COP28, more than twenty countries, including Canada, announced their intention to significantly increase nuclear power capacity by 2050 (Department of Energy, 2023). Ongoing technological progress (beyond fusion, which is still only a promise) is encouraging. This includes fourth-generation reactors and small modular reactors. However, many people are opposed to nuclear energy. This opposition stems in part from the Chernobyl and Fukushima disasters. Many refuse to consider it green energy, despite the fact that a nuclear reactor generates no carbon emissions.

Conclusion: The Uncompromising Quest for Perfection Will Slow Down the Transition

As it is often the case with most major societal changes, calls for perfection in the execution of the energy transition threaten to sow the seeds of its failure or, at the very least, its mixed success. The quest for perfection and the succession of unattained targets risk causing widespread demotivation among the public. We can already see political players trying to instrumentalize this for electoral purposes.

We need to consider the significant gap between our aspirations and the real world. We must accept to increase our estimates of the cost and time required to complete the transition. As Vaclav Smil (2022) points out, the transition is more likely to take place over the course of this century than over a few decades. Accounting for social and political resistance to major changes is crucial. We need to ensure fairness for individuals and countries during this transition, while being realistic about the costs and timelines for anticipated progress.

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