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Implications of the Energy Transformation for Fragile States

Evelyn Dietsche with Fabian Hofmann

Introduction

Access to fossil fuel-based energy has tremendously benefited many countries and many people. Over the past two centuries, fossil fuels have shaped the global energy system that has fed the Industrial Revolution and given rise to the economic and social development that we associate with modern living standards.

But, at least since the early 1990s, humankind has had to recognize that this system has also delivered a tremendous global challenge. The fossil fuels burned to power the global economy have released CO2 and other greenhouse gases (GHGs) to an extent where these are driving a dramatic rise in average global temperatures. Scientists warn that if global temperatures reach 2°C above the pre-industrial level, the resulting changes in global climatic conditions will existentially threaten humanity and life as we know it.

The problem is not emissions *per se*, but *excess* emissions released above the level and at a pace where the natural world cannot keep up with neutralizing these through photosynthesis and other natural processes. Excess emissions can be seen as unmanaged hazardous waste, where the remediation cost has not been paid for by those who have caused the damage. Moreover, in achieving and maintaining modern living standards, they have left a liability for the present youth and future generations.[1]

As the global community is coming around to understand that it needs to fundamentally redesign how it produces and consumes energy, it is also forced to consider the economic, political, and social implications of the transformation. Historically informed observers reckon that the energy transformation will reshape the world, just as the first Industrial Revolution had done.[2]

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Climate policies and clean energy technologies

In 2015, the United Nations' *Climate Change Conference of Parties* held in Paris (the COP21) succeeded in progressing the global climate debate from the question of *whether* nation-states ought to reconsider how they produce and consume energy to *how* they are going to achieve transforming the global energy system within just a few decades. This marked a key milestone for climate policies and investments in clean energy technologies.

Key leaders of the global community grasped that they need to work together to limit global temperature rises, ideally to no more than 1.5°C above the pre-industrial level. This requires transforming the fossil fuels-based system to an extent where, by 2050, it achieves net-zero emissions, i.e., the emissions released balance with those that the natural world can absorb and neutralize at the same time. Whether this is achievable depends not on what governments promise to do by 2050 but on what they get done within the next decade.[3]

The COP21 concluded with 196 nation-states plus the European Union signing the *Paris Agreement*.[4] It sets out a process where each signatory determines within its own borders and based on its own assessment what it believes its people and industries are politically willing to contribute to reducing global emissions. In addition, governments are periodically assessed on how well they are meeting in practice the commitments they have spelled out on paper. The logic is that with every round of assessment, governments will become more ambitious about their national commitments and the climate policy measures that they can implement.

Unsurprisingly, the sum of all national commitments put on the table in the aftermaths of the COP21 has fallen well short of the reductions needed to keep global temperature rises anywhere near the 2°C benchmark. This gap between commitments and the required emissions reductions reflects the extent to which signatory governments have not yet convinced their national constituencies on the scale and the speed of the structural transformation needed.

The financial sector has been at the forefront of warning about the risk of 'stranded assets', as is bracing itself for potential losses to arise from (a) the physical impacts of more frequent extreme weather conditions, (b) climate policy-related changes in regulation and taxation, and (c) changes in relative costs and prices influenced by the uptake of cutting-edge clean energy technologies and associated market innovations.[5] These expectations influence the sector's decisions on the the types of investments it is going to fund going forward, and from which it is to withdraw.

The positive news about the Paris Agreement is that it sent a clear message to climate technology research and the international energy business on the direction of travel now set. Although not fully aligned on timing, their projections of the future have since followed a common pattern: they are predicting a near-term peak of fossil fuels demand followed by a long-term decline and a rapid development and uptake of clean energy technologies. Accordingly, they have started to factor this outlook into their decision-making.

The surprise that has come from this is that the prices of solar and wind-produced electricity has dropped much more dramatically, and clean energy technologies have evolved much faster than had been thought possible in 2015.[6] The speed of this development caught out even the most ardent experts. For example, in 2014, the *International Energy Agency* (IEA) predicted that the average price of solar-generated power would take until 2050 to fall to a level which, in fact, has already been achieved. In May 2021, the same organization released a flagship report outlining the technical feasibility of achieving net-zero CO2 emissions by 2050.[7] It has even gone as far as to suggest that, theoretically, there would be no need to develop new oil and gas projects beyond those already prepared for investment.

Others have cautioned that the technical feasibility of meeting the 2050 benchmark target should not be equated with the socio-economic plausibility of the transformation happening before or by this date.[8] They see governments dithering about the domestic policies needed to deliver on the commitments they set out in their respective national climate strategies and action plans. Governments are struggling to get the buy-in from national constituencies worried about losing out on the living standards they have got accumstomed to and would like to take for granted. Hence, the most significant risk to missing the benchmark would appear to lie with the governments of those countries whose citizens consume a lot of energy. It is not yet clear if these governments will be able to pursue in time the types of policies needed to build the markets that enable financially viable investments in scaling clean energy technologies.

In this context, attention is drawn to the next generation of 'green industrial policies', where governments are seen to step up and put in place regulatory and financial support in the expectation that scaling will deliver further cost reductions and place renewables in a position where they can outcompete fossil fuel-based energy on price as well as security of supply.[9] For example, this is the topic of the ongoing debate about hydrogen and other synthetic gases produced through electrolysis using excess renewable energy. This is seen as critical technology for addressing the seasonal and long-term storage challenges associated with the intermittency of solar and wind power, as well as for decarbonizing energy-intensive industries.[10]

Differences, challenges, and opportunities

Those who reckon that the energy transformation will fundamentally reshape the world as the first Industrial Revolution did, are aware that the fossil fuel-based energy system could not have emerged, had it not been for how property rights regimes and policies have evolved to stimulate and optimize fossil fuels production.

The common view held is that fossil fuels are assets stocked underground that need to be found before they can be produced and sold for profit as *private goods*. However, at the beginning of this process, fossil fuels hold the characteristics typical for *common pool resources*.[11] Such resources are characterized by *high rivalry* but *low excludability*.

High rivalry simply means that if one person consumes such a good, another person cannot do so. Low excludability is more complex. It refers to the situation where each person who seeks to own or use such a good is interested in preventing others from doing so. But, because this is difficult and costly, everybody grabs their own chance to use such goods for private gain. The collective outcome is a tragedy for everybody. The only way to avoid this are effective social rules that prevent this behavior from happening.

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Nation-states have addressed the problem of low excludability by turning *common pool resources* into *private goods* that can be sold and traded in markets. And hence, the legal rules and property right regimes that modern nation-states devised for developing and trading sub-soil natural resources were key to the rise of fossil fuel-based technological and market innovations from the middle of the 19th century.[12]

Throughout the 20th century, many political and economic power battles have been fought over who could set the rules for producing and trading fossil fuels. This is the reason why the fossil fuel-based energy system has been intimately linked to the geopolitical map and conflicts of the 20th century. But, the rules on who could explore, exploit, and trade fossil fuels have been designed ignoring the collective costs of burning these fuels. And this has left humankind with the unfolding global tragedy of the average global temperature rising at an unprecedented pace. Eminent researchers have pointed out that the climate change challenge presents the greatest market failure the world has ever seen.

In contrast, the power of the sun is not a *common pool resource*. Its characteristics are those of a *genuine public good*. Such goods exhibit not only low (or no) excludability but also low (or no) rivalry. This means that if one party harvests the sun's power to generate electricity, it does not preclude other parties from also harvesting that very same power. Moreover, this power comes in abundance and is available for free whenever the sun shines and wherever its power generates movements of air and water or supports the growth of plants.

Several consequences follow from this:
First, for an energy system based on renewables, it is no longer necessary to capture a stock of carbon molecules stored below the ground. What matters is to hold or at least have access to the knowledge and other inputs needed to profitably harvest the sun's power in whatever form it can be captured. This harvesting happens predominately in the form of electricity and involves transmitting a flow of electrons to where these are used and/or temporarily stored.

The underlying shift in how energy is carried means that energy producers are no longer chasing a 'natural' comparative advantage bestowed upon those locations where fossil fuels are found. Therefore, the predicted decline in fossil fuel demand should also diminish the 'resource rents' that such comparative advantages bestow on producer countries. Seen positively, opportunities will fade for unproductive 'rent-seeking' and 'rent-capture' by political and economic elites who are unaccountable to the people over whom they hold power. Past research has identified such behavior as a key driver of conflicts and political oppression in fossil fuels-rich developing countries.

On the other hand, a rapid decline of resource rents arising from falling demand and prices poses a threat to producer countries' macroeconomic and fiscal stability as foreign exchange earnings and revenue collection shrink. Bad news not only for developing countries but also middle-income countries that have relied on complex patronage and clientelist networks to achieve stable political settlements.

Not only are the fossil fuels resources, and the infrastructure, the skills, and the policy efforts that have been invested in producing and marketing them at risk of losing their value and becoming 'stranded assets'. There is also the risk of additional environmental and social liabilities, if more reputable and publicly listed companies sell them to less accountable and publicly unknown privately funded companies or hand them back to state-owned enterprises.

Second, as the focus shifts from natural comparative advantages to just 'ordinary' comparative advantages, the institutional infrastructure of a country and the policies its government designs and implements become more critical for its economic success. The consequence for fossil fuels exporting countries is to look beyond the narrative of the assumed possibility that they can build diversified economies on the back of transforming sub-soil assets into productive assets above ground. Moreover, there is hardly any country that has succeeded in achieving such asset transformation unless it has also at least to some extent paid attention to its non-fossil fuels and other non-resources sectors.

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In addition, there is also the question of what other natural resources endowments a country holds and how it manages these. This includes how it assigns and upholds rights to above-ground natural resources, including land and topsoil, water, forests, and biodiversity, and what obligations it associates with such rights to ensure sustainable resources management. Not least, these above-ground natural resources are among the key inputs required to harvest the sun's power and they share with fossil fuels the characteristics of *common pool resources.*

Third, the deteriorating state of the world's natural capital has drawn attention not only to CO_2 and GHG emissions, but also to the consequences of unstainable resource governance and management more generally. Conceptually, rehabilitating natural capital requires limiting the rights to resources by increasing rightsholders' legal and regulatory obligations to avoid, mitigate, and remediate environmental harm.

Fourth, China is the country that leads on holding the knowledge and ability to scale clean energy technologies. Not only has China become the world's unchallenged manufacturer of clean energy products. It is also a global leader in the upstream and midstream mining and metals industry, sourcing the minerals and producing the materials that are required for scaling clean energy production and transmission.

China's leadership has put the US, the EU, and other OECD countries on the backfoot. In the context of announcing their post-pandemic economic recovery plans, OECD countries are stepping up their efforts to regain traction in the race to push the technology frontier and to develop markets and business models that can connect the supply and demand of clean energy in a financially viable manner. Introducing green industrial policies under the banner of 'building back better', they strive for greater control over the value chains of clean energy technologies and their national and regional deployment.

Fifth, the intermittency of solar and wind power poses an energy storage challenge in the short term, but also in relation to seasonal and annual variations. Advancing battery technology and producing green hydrogen and other synthetic fuels from excess green electricity are the proposed solutions. Yet, there are unanswered questions on the scientific, policy, and business developments that still need to be tested before these technologies can be deployed at scale and safely. And not to forget, the main driver is to achieve the transformation without compromising modern living standards in those countries where people have come to enjoy and take these for granted. At least over the short to medium term, it is less clear

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how these technologies benefit those global constituencies who do not yet have any or reliable access to electricity.
A key question also remains where the minerals and materials will come from that are needed for the large-scale deployment of all forms of clean energy generation, transmission, and distribution, especially in the context of the trend towards electrification that solar and wind power generation has prompted. Several reports have alerted to the material intensity of clean energy systems. In short, for the energy transformation to succeed, it needs more production of minerals and more efficient recycling of those minerals and metals that were produced in the past and are embodied in the built environment of urban and industrial settings.[13]

Sixth, the global abundance of renewable energy suggests that fossil fuels importing countries gain more options on where to source energy from. They can become more energy independent and, therefore, also rethink their foreign policy goals. This is poised to diminish the power of fossil fuels-based global alliances, such as OPEC, but may also give rise to new alliances and geopolitical cooperation. Moreover, energy systems are expected to become more decentralized and diversified because more small-scale producers are involved. This brings a change in the role of the nation-state and its authorities, where these should regulate to enable and manage decentralized and diversified energy production and consumption. This new role may be especially hard to accept for those countries and political regimes that are wedded to exercising centralized control.

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Finally, large-scale clean investments in electricity production, including mega solar plants, wind farms, and hydro dams, confront environmental, social, and governance challenges that are very similar to those associated with fossil fuel and mining investments.[14] Thus, the energy transformation should not be expected to take the heat of the fundamental question of how nation-states and international companies ought to go about to ensure all natural resources are used in ways that do not undermine the sustainability of the world's natural capital across and beyond national borders.

Implications for fragile states

If the peacebuilding and humanitarian community focuses primarily on the environmental impacts of climate change in fragile contexts, any actions aimed at limiting CO2 and GHG emissions and helping vulnerable communities mitigate and adapt to the impacts of global warming are viewed as positive. One might also want to take comfort in diminishing fossil fuels-based resource rents undermining the unproductive rent-seeking behaviour that has been identified as a cause for the poor socio-economic performance of many resource-rich developing countries. But progressing towards a fundamental transformation of the global energy system based on clean energy technologies harbours additional challenges for the situations that fragile states face.

First, many fragile states export fossil fuels and are heavily reliant on the sector's revenues. Losing this income undermines investments in the provision of public goods and services. At the same time, the track record for the governments of fragile states to invest in this manner is not convincing.

The more significant risk may well be that permanently declining revenue collection from the fossil fuels sector will undermine those elite alliances and patronage relationships that have delivered at least some level of political and economic stability in some countries. Suppose more regimes collapse as their legitimacy falters. In that case, drama is likely to follow: if they can forge a new and more inclusive social contract among opposed parties, some countries may come out better at last. However, internal collapse could also lead to more diffused and localized forms of organized power that use the threat of violence to exercise control over people and the physical movement of economically valuable natural resources across borders, including trading these with neighbouring countries and across regions.

If fossil fuels reserves become 'stranded assets', some fragile states may well turn into 'stranded nations'.[15] South Sudan is a case where it is hard to imagine what alternative source of domestic revenue should become available to bankroll its government, other than the country becoming even more reliant on external assistance.

For some fragile states, declining revenues are having a devastating effect on their public debt situations. From a multilateral perspective, helping fragile states regain fiscal stability is especially challenging when they have incurred debt from private lenders, including international commodity trading companies.

Second, there is a potential opportunity for those fragile states that hold the mineral resources needed for scaling investments in clean energy technologies. For example, Guinea (Conakry) holds nearly 30 percent of the global bauxite and alumina reserves, and the DRC holds more than half of the world's cobalt reserves.[16] These resources are located in fragile states that are also highly exposed to climate-related environmental vulnerabilities poses an operational and reputational challenge for publicly listed international companies that want (or need to) work in compliance with international principles, guidelines, and standards on responsible business conduct (RBC) and environmental, social, and governance (ESG) performance. Thus, there is a potential bias of fragile states attracting geopolitical interests and investments and companies that care least about their operations' negative environmental and social impacts and legacies.

Third, where fragile states hold potential for investing in large-scale solar or wind power projects or biomass harvesting, similar RBC and ESG challenges arise. For example, these projects also face conflicts over rights to land, land use, and water and a similar investor bias arises.

In addition, most fragile states have made little to no progress on expanding access to energy (let alone sustainable energy) to their citizens. This poses a conundrum: small-scale clean technologies such as mini-grid and off-grid systems, could help alleviate the access to energy problem and offer the potential for localized improvements in livelihoods. But this requires that state authorities enable investments in decentralized and diversified energy production and consumption and focus their own attention on investing in the systems aspects that enable scaling and security of supply, e.g., electricity grids and storage technologies. To date, international public and private financers have found it quite challenging to identify bankable projects that can deliver such solutions in fragile contexts.

In conclusion, while climate mitigation and adaptation measures help ease the environmental vulnerabilities that fragile states face, the energy transformation poses new risks that are poised to increase their economic, political, and social vulnerabilities. To enable peacebuilders, humanitarian relief agencies, and development organizations to also bear these risks in mind, it is necessary to take a close look at the specific fragile contexts and understand and capture the specific challenges and opportunities each faces.

[1] The same applies to all other non-recycled forms of modern human waste, for example, discarded plastics washed out into the oceans.

[2] Global Commission on the Geopolitics of Energy Transformation (2019). *A New World. The Geopolitics of the Energy Transformation*. International Renewable Energy Agency (IRENA). Available at https://www.irena.org/publications/2019/Jan/A-New-World-The-Geopolitics-of-the-Energy-Transformation.

[3] See here for the most recent assessment by the Intergovernmental Panel on Climate Change (IPCC): https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/.

[4] United Nations Framework Convention on Climate Change (2015). *The Paris Agreement*. Available at https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

[5] See Carbon Tracker - Stranded Assets. Available at https://carbontracker.org/terms/stranded-assets/.

[6] Systemiq (2020). *The Paris Effect. How the Climate Agreement is reshaping the Global Economy*. Available at https://www.systemiq.earth/paris-effect/.

[7] International Energy Agency (2021). *Net Zero by 2050. A Roadmap for the Global Energy Sector*. Available at https://iea.blob.core.windows.net/assets/405543d2-054d-4cbd-9b89-d174831643a4/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.

[8] Stammer, Detlef et al. (2021). *Hamburg Climate Futures Outlook 2021. Assessing the plausibility of deep decarbonisation by 2050*. Hamburg: Cluster of Excellence Climate, Climate Change and Society. Available at https://www.cliccs.uni-hamburg.de/results/hamburg-climate-futures-outlook/documents/cliccs-hamburg-climate-futures-outlook-2021.pdf.

[9] See several recent articles in the *Financial Times*.

[10] See several articles published in the *Hydrogen Economist*. Available at https://pemedianetwork.com/hydrogen-economist.

[11] For those unfamiliar with these terms, a fuller introductory discussion can be found in Dietsche, E. (2017). 'New industrial policies and the extractive industries. Annex A.' *WIDER Working Paper 2017/161*. Helsinki: UNU WIDER.

[12] Daintith, T. (2010). *Finders Keepers? How the Law of Capture shaped the World Oil Industry*. London: RFF Press/Earthscan.

[13] International Bank for Reconstruction and Development/The World Bank (2020). *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition*. Available at https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf.

[14] See for example the Initiative for Social Performance in Renewable Energy raising awareness and building capacity about this issue. https://1avvvd2bh7go2tpwjt2gkeek-wpengine.netdna-ssl.com/wp-content/uploads/2021/06/inspire-intro-brochure.pdf.

[15] Manley, D. and J. F. Cust and G. Cecchinato (2017). *Stranded Nations? The Climate Policy Implications for Fossil Fuel-Rich Developing Countries*. OxCarre Policy Paper 34, Available at SSRN: https://ssrn.com/abstract=3264765 or http://dx.doi.org/10.2139/ssrn.3264765.

[16] Lèbre, É., Stringer, M., Svobodova, K. et al. (2020). *The social and environmental complexities of extracting energy transition metals*. Nat Commun 11, 4823. https://doi.org/10.1038/s41467-020-18661-9.

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About this brief

This policy brief offers some thoughts on the implications of the energy transformation for those who work on building peace, preventing conflicts, and providing humanitarian aid to vulnerable people in fragile states. Well appraised of the negative consequences of climate change, this community of practitioners has already stepped-up efforts to help people cope with the "*double front line of climate change and conflict*". However, the people living in fragile states will not only be impacted by changes in climatic conditions. They will also be affected by the climate policies and investments in energy efficiency and renewable energy technologies undertaken to reduce global emissions and contain global temperature increases with the aim to preserve modern living standards.

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