Integrating Energy Grids: A Must in the Fight Against Climate Change in the Developing World

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Abstract

The United Nations (UN) should host intraregional and interregional dialogue to establish resource-sharing and joint development agreements to facilitate clean energy adoption and sustainable urban development. This addresses the economic and logistical difficulties of the clean energy transition and sustainable urbanism, particularly for developing countries. The findings of this policy brief have indicated that the sharing of clean energy resources and infrastructure between countries is a proven means by which countries can overcome their economic and logistical shortcomings. The UN can achieve this by hosting the energy and environmental ministers of UN member states and achieve UN Sustainability and Development Goals (SDGs) seven and thirteen in the process.

The crises from human driven climate change—stemming from humanity's global dependence on hydrocarbons for energy—are now an increasingly grave reality for nations in all corners of the globe. From rising temperatures to sinking islands, the climate crisis has affected both developed and developing nations alike. Japan, despite standing among the world's most developed nations, was victim to the first undeniable climate deaths. In wake of the unprecedented July 2018 heatwave that claimed 1032 lives. The Japan Meteorological Society eventually concluded that a heatwave of such intensity at that time of the year could not have occurred without global warming (Imada et al., 2019, p. 8).

However, although the majority of greenhouse gas emissions, 92%, come from developed nations like Japan (Tougas et al., 2021, p. 8), it is in fact developing countries that are bearing the brunt of the impacts of climate change. With most of the developing world being primarily situated in latitudes near either side of the equator—already the warmest stretch of the planet—the amplification of this heat from greenhouse gas emissions has significantly increased the duration of droughts and frequency of floods. A prime example of this reality is Bangladesh, where floods—already threatening food security—are expected to displace 20 million of its people by 2050 (Tougas et al., 2021, p. 7). Moreover, these countries' status as developing or middle economies means that their present priority—if they are not in immediate climatic danger—is to raise the quality of life for its citizens as economically as possible, which as noted by Tougas often requires a significant increase in fossil fuel consumption (Tougas et al., 2021, p. 5). This dilemma is only further compounded by a lack of climate research funding within the developing world and a lack of representation within the climate science of the developed world (Winickoff et al., 2015, p.1). With how expensive and expansive climate research and engineering are, most of the understanding around climate change and the remedies against it have been developed by the scientific elite of high-income countries, even though the developing world stands the most to gain with the deployment of clean energy.

Being at such a disadvantaged position individually, it is self-evident that these quadruply-penalized nations—being the most climate-burdened, depressed economically, dependent on fossil fuels, and scientifically isolated—require the aid of each other, seeing as how hesitant the private finance is to commit funds to a portion of the world they view as high risk for investment (IEA, 2021, p. 3). As such, in the interest of resolving this multi-regional set of barriers and in line with UN SDGs seven, Affordable and Clean Energy; eleven, Sustainable Cities and Communities; and thirteen, Climate Action, this policy brief calls for the UN to host meetings between the energy, environmental, and related ministers of the developing world to implement a policy that has already proven itself successful throughout western Europe (p. 8) and being considered in Southeast Asia (p. 22): Interconnections (OECD/IEA, 2016).

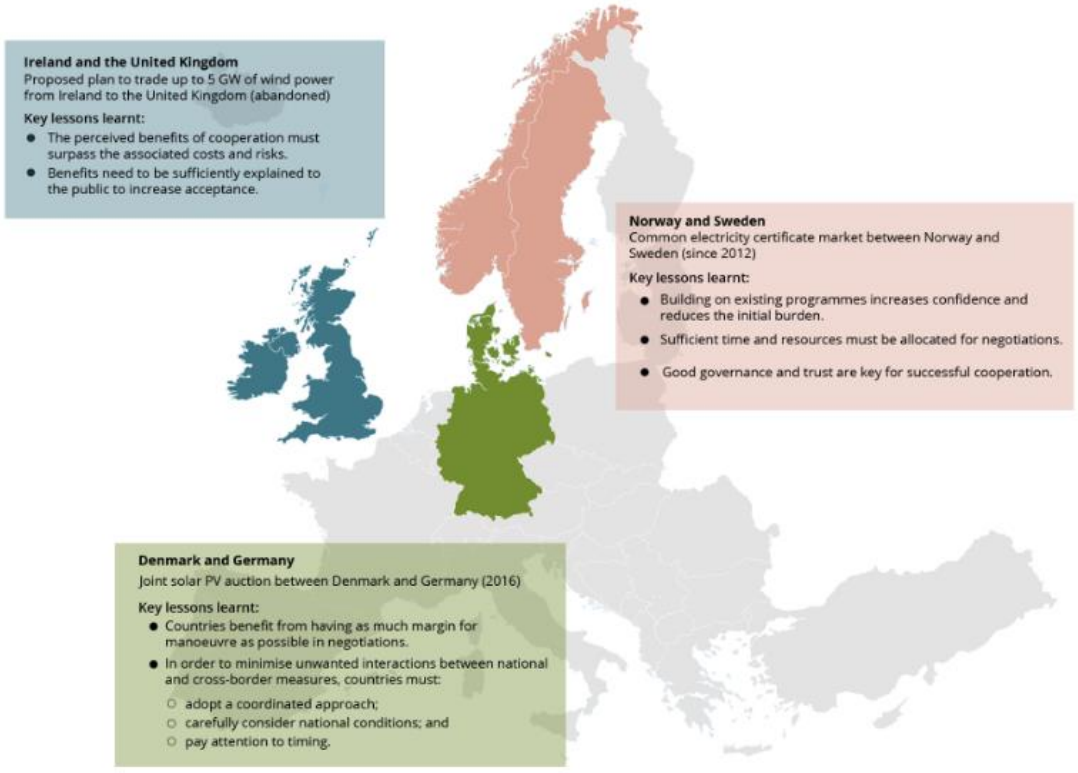
Interconnections in Theory and in Practice

An interconnection, defined by Merriam and Webster as a simple connection between two or more things, has become an increasingly common term in the energy sector, referring to the integration of systems of differing countries. This is not to be confused with simple connections between energy grids, as power lines between countries have existed for as long as there has been electricity. What is new, however, is the deliberate joint production and consumption of electricity by two or more countries, as well as the need

to transition away from fossil fuels. Western Europe has the most prominent network of interconnections by far, but proposals have been made and, in some cases, agreed upon in Southeast Asia and North Africa (OECD/IEA, 2016, p.11, 21). Otherwise absent across the world, interconnections serve as one of the primary avenues by which such independence from hydrocarbons may be achieved as they bring down many of the barriers that countries face in adopting clean energy.

Foremost amongst these is energy availability. Part of what makes fossil fuel a go-to option is its nature as a transportable, storable, and on-demand source of power. As explained by the International Renewable Energy Agency (IRENA) most renewable forms of energy, whether it be solar, wind, tidal, etc. are not consistently available throughout the year let alone throughout the day in any given area (Masri et al., 2023, p. 12). With an interconnection, however, the inconsistencies in the reliability of individual sources of renewable energy is diminish, by expanding the overall pool of renewable energy. A working example of this is the shared energy market between Norway, Denmark, Sweden, and Germany, wherein through various agreements Sweden gets access to Norwegian hydropower, Norway gets access to Swedish wind, and Germany and Denmark share each other's solar photovoltaics (EEA, 2022, p. 2).

Figure 1. Proposed and failed European interconnectors before 2018.



Source: European Environmental Agency (EEA).

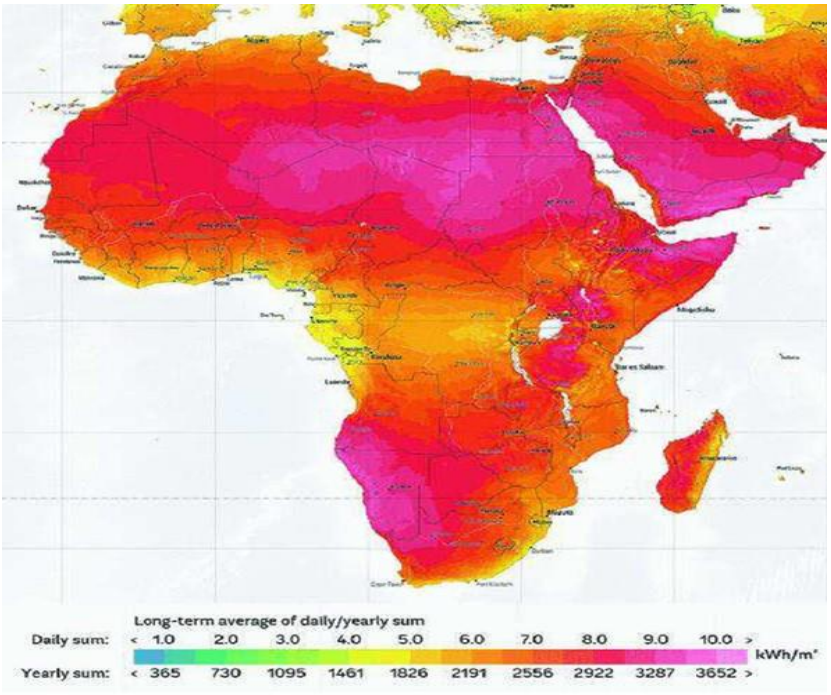
Through these accords, participating countries can tap into surplus renewables that lie outside their borders and cover gaps in energy reliability. For instance, Norwegian hydropower can cover for Swedish wind power when the latter is lower than originally forecasted. Inversely, excesses in Swedish wind power can allow Norwegian natural gas plants to power down and cease emissions for a time.

Another decarbonisation obstacle circumvented by interconnections is the cost of building clean energy infrastructure. The materials and technology that go into wind and solar, for example, have never been considered cheap and have only increased in price since the pandemic (Masri et al., 2023, p. 16). Simply put, by jointly investing in clean energy infrastructure, a cost that would be a dealbreaker for one nation, can be

divided into more manageable costs for several nations. Furthermore, risks associated with such large projects are minimized in the eyes of investors by multinational government support (EEA, 2022, p. 6).

Lastly, the lustre of fossil fuels as a cheap source of energy and driver of economic growth is dulled by the ability of interconnectors to provide clean, green energy. The law of supply and demand dictates that should supply increase for a constant demand of a particular good or service, then the price of that good or service will decrease. Energy, including clean energy is no different. One such project riding on this assumption is the North Sea Power Hub, a joint venture between the Netherlands, Germany, and Denmark that will see the construction of an interconnected wind farm upon a shallow point in the North Sea known as Dogger Bank. In market simulations conducted by the International Journal of Electrical Power & Energy Systems, participating countries experienced a 4-6% decrease in energy prices from the additional 6.3 GW of power given average conditions. (Alvirad et al., 2021, p. 10). It must also be noted that while fossil fuels are a finite resource, renewables are—eponymously—renewable and remains largely untapped, with at least 10,000 GW of untapped renewable energy in Sub-Saharan Africa alone (Du et al., 2021, p. 511).

Figure 2. Solar energy potential.



Source: Global Solar Atlas, owned by World Bank Group.

Political Barriers to Interconnections

Despite the economic and environmental benefits of interconnectors, there is an appreciable political opposition to such projects. Resistance to interconnections most commonly stems from national security concerns. In the same manner that sharing food or a home with someone require trusting another individual and sacrificing part of one's independence, so too does interconnection require trust in and dependence on other countries. Recent history reveals the potential consequences for countries who choose the wrong neighbour to source their energy from, that being energy fallout between the European Union and the Russian Federation in wake of the Russo-Ukrainian War. Prior to the conflict, 38% of natural gas in Europe was imported from Russia (Anderson et al., 2008, p. 5), with some nations like Germany depending on Russia for 55% of their natural gas (Halser et al., 2022, p. 1). After cutting said imports in support of Ukraine against the Russian invasion, Germany and its neighbours saw their respective GDPs drop by 3% and cost of living soared across the bloc (Halser et al., 2022, p. 12). While the EU's importation of Russian natural gas may not be considered an interconnection, having a group of the world most advanced economies stumble due to their reliance on foreign does nothing to encourage the developing, more vulnerable countries of the world to share energy with their neighbours.

Policy Recommendations and Conclusions

With consideration to the obstacles brought down and faced by interconnections, the UN should recognize that the benefits of interconnectors outweigh the potential drawbacks. Nonetheless, the UN must use its mission as a global forum of diplomacy to ensure that a Euro-Russian debacle does not arise from clean energy interdependence. Moreover, it should focus its energy interconnector diplomacy on the regions of the world most affected by climate change, i.e. Latin America, South Asia, and Sub-Saharan Africa (Tougas et al., 2021, p. 7). In talks led by the Economic and Social Council in conjunction with the International Energy Agency, the UN should bring together the five Regional Economic Commissions to identify sources of region-wide clean energy whose potential can be unlocked by intraregional energy interconnections. In addition, this meeting should include the energy and environmental ministers from participating member states to establish an understanding of the technical and logistical specifications of each country's energy needs and capabilities and to ensure transparency between partner nations from the outset. The World Bank and International Monetary Fund should also participate to promote investment into plans proposed at this conference and draw attention to the minimization of risk brought on by multinational support to private investors. Said investors shall also be allowed to participate, so as to create a solid foundation of capital for these capital-intensive projects. With the 2024 United Nations Climate Change Conference or Conference of the Parties of the UNFCCC—more commonly known as COP29—right around the corner, it and future COP conferences provide the UN the perfect platform to host these discussions. Such dialogue—for the sake of this planet and its inhabitants, human or otherwise—hinges on its prioritization and success.

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