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Institutional Transition Towards Energy Autonomy

United Nations Environmental Agency (UNEA)

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Introduction

It is well known in any field of policy analysis that energy politics have been and will always be a key aspect for societies, so that they can function effectively. However, when it comes to energy dependency, it is crucial to understand the difference between relying on non-renewable and on renewable sources. To cover their needs, most societies up to now, have been relying on non-renewable sources, such as burning fossil fuels, i.e., gas and/or oil. In the past few years however, climatic change has made clear to all that renewable energy sources, such as solar, tidal or wind energy are effectively a one-way road and one of the pivotal strategies to assess sustainable development (Rae & Bradley 2012).

The current challenge, which policy-makers have to deal with, goes mainly into the direction of 'pushing' governments to shift their legislative and/or institutional framework, so that it can adapt to the new societal needs for carbon-free, sustainable energy autonomy. In some cases, especially in MEDCs (more economically developed countries), this transition may be achieved quite easily, without causing turmoil in economies and societies, as the structural basis to deeper societal changes are already present and well-equipped into constitutional frameworks (Binder et al. 2016). But what happens with less developed or developing countries, including but not limited to LEDCs (less economic developed countries)? Since they will almost inevitably have to adapt in this new 'era' of sustainable energy autonomy, appropriate institutional and regulatory transition will be required to minimize the effects.

As main talking points in the mainstream media and in academic debates, the negative aspects of the usage of renewable, carbon-free energy have been focused around three main issues, which are considered to be the most acute. Firstly, the cost of production for renewable systems in the short-term is much higher than that of non-renewable, carbon-based energy (Damgaard et al. 2022). Secondly, in contrast to carbon-based energy production, renewable energy always entails a gap of uncertainty, as the sources are usually weather dependent (i.e., tidal energy, wind energy, solar energy). Lastly, even if one can manage to control – at least up to a certain extent – the way of managing the resources and their storage, their capacity is still limited compared to the demand, meaning that the energy produced may not be enough for specific activities, that demand the constant usage of energy, such as production in factories or in IT systems (González & Rendon 2022).

Considering these negative perspectives, why should we then become dependent on non-renewable energy sources? Wouldn't that be too great of a risk to take? As we will see, the advantages of investing in renewable energy outrange non-renewable sources in all possible aspects, constituting the best option the world has right now. To go deeper into this debate, it is essential to grasp the points which claim that non-renewable, carbon-based energy is harmful to the environment and produces even bigger costs in the long-term. It is also fundamental to investigate the political and societal impacts, such as employment, public health etc. that are directly correlated with energy autonomy policy making. It is clear to all that in the long-term, renewable energy sources will benefit societies as well as governments,

and that is why it is so relevant to discuss under which circumstances and frameworks this transition shall take place. Hereby, it is imperative that all Nations understand that there are now simple solutions for complicated problems and one should use all the means necessary to develop a comprehensive yet attainable set of measures that can and shall be implemented all over the globe.

Definition of Key Terms

1. Energy Autonomy

Defined as, the ability to independently produce energy sources indefinitely without needing to rely on other nations. (Juntunen & Martiskainen 2021)

2. Less/More Economically Developed Country (LEDC/MEDC)

Defined as a nation whose general population lives below the poverty line. The opposite being a More Economically Developed Country

3. Carbon neutral

Defined as, the ability to either produce zero carbon or recycle as much carbon from the atmosphere as is being produced (carbon offsetting). (Grainger & Smith 2021)

4. Sustainable/green energy

Defined as, energy from a renewable source, eg. solar power, hydrogen power, hydroelectric, etc.

5. Energy Transition

Defined as, the shift from fossil-based energy sources to carbon-neutral ones. (Su & Urban 2021)

6. Greenhouse gasses

Defined as, the gasses that naturally occur in the atmosphere to keep the environment livable but which, in excess, cause climate change. These include, for example, methane (CH_4) and carbon dioxide (CO_2).

Background Information

Institutional transition towards energy autonomy can be broken down to mean the large-scale shift from internationally provided unsustainable energy to energy produced & maintained within an organization or nation. Preferably carbon neutral. This is an issue that has increased in relevance as the climate crisis facing the world has worsened, the pandemic has made international shipping more difficult and costly, while the geopolitical conflicts, such as the

war in Ukraine have raised energy prices.

Recently most nations and coalitions have taken stronger stances in regard to green energy transitions. Especially with the urgency of the climate situation being highlighted in COP 26 last year. As of 2021, the EU aims to reduce its greenhouse gas emissions by 55% by 2030 and many other countries have followed suit; however as of COP 26 only one country has met the climate goals set out in the Paris Agreement (Rees 2021). The pandemic has emphasized the situation by increasing the demand for energy & simultaneously making it harder to access. This has spurred many nations & organizations to look into producing their own energy to prevent shortages, high energy costs, redundancy of businesses & political blackmail (Binder et al. 2016).

Lastly, the conflict in Ukraine has increased energy prices by enormous amounts; thus pushing many countries to reassess their positions on energy autonomy. Due to their reliance on eastern European shipping routes, energy and trade (Russia & Ukraine border the baltic sea, the sea of Japan and the arctic ocean; they are two of the world's largest oil and natural gas producers, while they produce over 25% of world grain) (Weil & Zachmann 2022) many nations have struggled to recover from the deterioration in relations. Some good examples that highlight this exact point are the dip in international stock markets, how Germany stopped the construction of the Nord Stream 2 natural gas pipeline and how the US has recently tapped into its oil reserves in an effort to lower gas prices. This last example is particularly important given that the US reached oil autonomy under the Obama administration but despite that is still suffering extra-ordinarily high gas prices; this turn of events has further emphasized to the international community that complete energy autonomy is necessary to avoid a similar economic hit in the future (Karim & Faissal 2022) .

Furthermore, this does pose a problem for energy producing nations all over the world as losing what might be a major part of their economy will doubtless have repercussions. Countries like Saudi Arabia, for whom oil is their main export would lose the ability to sell oil which supports the country's entire economic & political system. Moreover, LEDC's like Uganda, Nigeria & Angola, for whom oil sales bring in billions of dollars annually could suffer humanitarian crises as a result of too abrupt a change to energy autonomy & a resulting economic collapse.

A. Environmental perspective

An institutional change towards energy autonomy would likely have great benefits for the environment as it would reduce the need for gigantic trans-national pipelines, greenhouse gas emitting shipments/transports & massive environmental clearing operations in order for energy producing nations to frac oil or extract natural gas. An example of this would be the recent deal made between the Ugandan Government & a French-Chinese oil company to drill

for oil under a Ugandan natural park & endangered wildlife reserve (Greenmatch 2021). However, were the change not to autonomous green energy sources, the environmental bonus would be negligible as nations would still be clearing natural areas to extract fossil fuels, transporting it across countries and building pipe networks. Thus greenhouse gasses would still be produced and the world would remain on its current path towards a climate catastrophe.

Amongst so many technologies that have been developed in recent years, autonomous green energy includes solar panels, hydroelectric plants, wind farms etc. At the moment there is a global movement towards further development of these devices which are able to harness renewable, sustainable resources to produce energy. These would be effective substitutes for fossil fuels in most cases, however, to substitute plastics or steel, other sustainable alternatives would have to be discovered, enhancing the role of Research & Development (R&D) in this area. The issue with all nations becoming energy autonomous in a green way would be the cost and distribution issues, such as logistics. To produce solar panels or set up hydroelectric plants on an industrial scale, enough to power a country, is an ambitious goal considering that, currently, to power a 2000 ft^2 home with solar panels alone would cost ≈20,000 USD. This is further complicated when one considers the current roadblocks in energy transportation to rural places. Connecting weather & animal resistant energy cables to houses in the Siberian tundra, an area ≈13,000,000km^2, from their 'local' wind farm is vastly more complicated than connecting cities to a sustainably powered electric grid (Valdivia & Balcell 2022).

B. Economic perspective

As aforementioned, the production cost of renewable energy is still much higher than conventional carbon-based production, despite the significant investments in the renewable sector during the last decades, and the associated drop in production costs. This cost premium that also relates to the "uncertainty gap" described above, will only be addressed when industries are able to manage and foster effective storage systems to counterbalance peaks and valleys in the renewable production process (sunlight, wind). Regulatory and institutional transition and reregulation will have to carefully follow the technical developments in these areas so as to ensure that incentives are provided to accelerate the cost reduction in a widespread, renewable energy global production scheme. (Arent et al. 2022)

On the other hand, the "rise of renewable energy" along with the implementation of the corresponding infrastructure also has several advantages in terms of the economy. First of all, new jobs can be created, counterbalancing the loss of jobs in carbon-based production, therefore supporting the economic life of less developed and developing countries. Secondly, renewable energy increases the economic independence from hydrocarbon-producing countries. This way, economies will become more independent, thus mitigating tensions between countries. Thirdly, renewable energy resources are practically inexhaustible, as opposed to fading hydrocarbon reserves, which eliminates the risk of a global energy deficit.

Finally, in terms of infrastructure, the one used for renewable energy production has much less maintenance and life-cycle cost than non-renewable energy production. In the first case, there is just an “initial investment” (the one concerning the actual machinery), however, in the second one, there is a constant need to refuel and resupply the resources used (i.e. fossil fuels). (Kumar 2020)

C. Social and Geopolitical perspective

It will certainly not be easy especially for LEDCs to shift their viewpoint from non-renewable to renewable energy dependency. From a social perspective, if this transition is not done smoothly and carefully, meaning that if the transition in the legislation is not done gradually, it will certainly create upheaval in societies. In addition to the cost parameters described in the economic sector that relate to the technical development and the institutional transition, the less developed countries will face the cost-impact in a more severe way (Binder et al. 2016). Therefore, institutional transition will have to be backed by external economic aid from organizations and the MEDCs in order to address the potential adverse impacts to their societies (i.e. class polarization).

In terms of societal matters, the new job opportunities mentioned in the economic sector, as well as the economic independence, will increase welfare and improve the life standard in societies, especially the ones of less developed and developing countries (such as but not limited to LEDCs). Furthermore, it is well known that renewable energy is much less harmful in terms of health, compared to carbon-based energy. Thus, the usage of renewable energy instead of carbon-based energy will further increase the life expectancy and standard of people in a given society. Subsequently, stronger bonds will be created within communities, and as described by the United Nations under the term “community development”, “their members will come together to take collective action and generate solutions to common problems” (The Energy Progress Report 2022).

Questions for further research

- How to ensure the maintenance of international relations following the implementation of energy autonomy?
- How to ensure there is no economic backlash for energy producing countries?
- How to promote green energy autonomy?
- What are the best tools to reduce the costs of renewable energy sources?
- Is offsetting an efficient way to tackle carbon-based energy sources?
- Which impacts will Covid play in the transition toward energy autonomy?
- How to encourage institutions to become energy autonomous?
- How would LEDCs adapt to this new ‘transitional era’ towards renewable energy autonomy?
- How far will energy autonomy play a role in the area of security, for example the EU & Russia relationship after the invasion of Ukraine?

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