

Green Transition: Adapting Markets and Policies

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This policy brief summarizes the discussion at the 8th annual SITE Energy Day conference, devoted to market adaptations and policies necessary to address the green transition. Recent energy trends with ever more green energy-mixes will have consequences for the functioning of related markets as well as implications for appropriate policy responses. New financial solutions, technological developments, international cooperation, and national policy initiatives in both developing and developed countries are examples of adaptations to this transition process. To discuss these issues, the conference brought together a group of distinguished experts from the energy industry, policy community and academia.

In December 2014, world leaders have gathered in Peru (Lima) for the 20th annual meeting of the United Nations Framework Convention on Climate Change. This convention has as an objective to “stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (see UNFCCC’s webpage). Even though the agreement to reduce emissions to a sustainable level may take years to be negotiated, at least 195 countries have ratified the UNFCCC convention. The willingness to reduce environmentally harmful emissions has led to many countries changing their energy profile to include more green energy, a process that is often referred to as “green transition”.

It may be worth mentioning that the label “green transition” consists of two conceptual components. “Green” refers to the ability to generate environmentally friendly energy, which has become a key challenge for our

society. Indeed, a majority of people now recognize the pressing need to cut pollution in the face of climate change and environmental degradation. The wording “transition” acknowledges that a shift toward a greener energy mix seems unavoidable, but this shift may not occur immediately or uniformly around the globe. The required time for change is long and the shift itself may not be smooth. To put it differently, the green transition has had and will continue to have wide-ranging consequences for businesses, governments, and the international community.

As a result, there is a need to carefully address the potential implications for the existing energy and related markets and market players, and for government policies, as well as new markets and new policies triggered by the green transition. These topics were the focus of the [8th SITE Energy Day](#), a half-day conference held at the Stockholm School of Economics on December 2, 2014.

Green Transition and the Energy Markets

The first panel focused on how energy markets have responded to green transition and how they may react in the future. Speakers from electricity companies, regulatory bodies and think tanks discussed how the green transition may affect the use of traditional financial instruments by energy companies; the choice of economically viable technology for producing green energy; and the way markets could be integrated to increase the efficiency of green energy.

As green transition almost always introduces more intermittent production, it is likely that market uncertainty will increase. This is one of the reasons why traditional financial instruments may not be fully adequate. The first speaker **Laurent Cheval**, Head of Nordic and Fuel Origination in the business division Asset Optimization & Trading at Vattenfall discussed this issue extensively. Energy companies face substantial financial risks since both prices and quantities may be highly volatile. To mitigate these risks, market participants may use an array of financial products. In mature energy markets, the products are fairly standardized. However, more complex and tailor-made financial products are required to face the ongoing changes in the sector. For example, the increased share of renewable energy combined with more interconnected markets create specific market risks. To hedge against risks associated with weather changes, future fuel costs, interest rates and so on, more and more energy providers trade customized derivatives “over-the-counter” (OTC) rather than through a centrally-cleared exchange. Another example is the development of decentralized power production and the rise of the “Prosumer” who simultaneously produces and consumes power. So far, the relevant regulation is underdeveloped and there is an additional demand for innovative financial solutions.

Large energy companies such as Vattenfall are for instance offering a range of financial hedging solutions combined with actual physical handling and delivery of energy products.

Green transition should in the long run lead to a domination of environment friendly energy. However it is important that only economically viable technologies subsist. It is therefore necessary to assess the cost of producing green energy. **Lars Andersson**, Head of Wind Power Unit at the Swedish Energy Agency, reported on an extensive study done by the Agency on this issue. Over the last five years, the production cost of wind power has fallen consistently and capacity usage has increased. This dramatic change in the wind power industry likely implies that the existing subsidies for building wind power plants gradually will be phased out. It is unclear how the industry will react to these cuts in subsidies. Furthermore, according to Andersson, wind production faces at least two challenges. Without developing the capabilities for energy storage, electricity markets will face more energy imbalances as the share of wind power increases. Additionally, the support from the local communities is needed to ensure an expansion of wind power. Addressing these issues requires the development of new regulation and defining a common goal which may promote cooperation between stakeholders.

Ultimately the green transition will end when and if the green energies are fully (???) adopted around the globe. One way to accelerate this green transition may be to coordinate action and development of governmental policies. **Martin Ådahl**, Chefsekonom at Centerpartiet, and Daniel Engström, Programchef Miljö och Klimat at Fores, presented the current state of the international climate policy and discussed the benefits of linking carbon emission rights markets. Because of conflicting interests, the likelihood of reaching an agreement within the

current United Nations climate negotiations is rather small.

However, Ådahl and Engström suggested that the focus should instead be on reaching agreements between big polluter countries that contribute the lion's share of global emissions. Indeed, regional emission trading schemes already exist in the EU, the US and China, the three regions which together account for over 50 percent of global emissions. One potential shortcoming of this suggestion is that it may not be enough to stabilize greenhouse gas concentrations in the atmosphere. Thereby, Ådahl and Engström discussed the possibility to link current cap-and-trade markets, as a first step toward an international system with a more formal global agreement. Linking cap-and-trade markets has many benefits, especially in the form of efficiency gains. However, emission caps vary across countries and regions because of different political goals or priorities. When markets are linked, difference in abatement costs (or allowance prices) would lead to a flow of allowances and emissions from countries/regions with low abatement cost to countries with higher ones. Thereby prices would be equalized, benefiting entities with cheaper allowances. To avoid opportunistic behavior, countries would first have to agree *ex ante* on an exchange rate between different countries' emission rights. Second, a clear regulatory framework is required. Both Ådahl and Engström emphasized the need of an international organization devoted to climate economics. Such an institutional body could not only regulate the links between cap-and-trade markets, but also provide concrete solutions and technical models to improve on the market design.

Environmental Policies: International Experience

The second panel focused on how governments may promote green transition.

Anna Pegels, Senior Researcher at the German Development Institute (DIE), reviewed green policy initiatives in developing countries. Pegels argued based on evidence from e.g. India and South Africa that it is possible to combine substantial growth with green energy. This is good news since emerging countries are among the highest polluters. However, to change a country's energy profile, governments need to intervene and develop new industrial policies.

Governments can set long-term goals, which are supported by short- and mid-term targets. However, given the large profits that are at stake, officials may likely be subject to the risk of capture and corruption. To limit such risks, Pegel emphasized the need to introduce competition in the energy sector as a whole. Subsidized feed-in tariffs for renewable energy for example should be only a first step, to reach a certain scale of production. But the technology is mature enough that producers should be able to bear some additional risk in their current activity. This should increase the scope for competition. Finally, it is essential that governments continuously engage in policy revision cycles and learn from other countries' experiences.

Benjamin Sovacool, Professor of Business and Social Sciences at Aarhus University and Director of the Danish Centre for Energy Technologies, talked about the process of low carbon transition in the Nordic region. In spite of large investments into renewable energy, fossil fuels still dominate the consumption in the Nordic countries and considerable measures need to be taken in the decades ahead to make the transition to a greener energy mix. Sovacool highlighted four areas which could help reduce the carbon footprint of the Nordic countries: renewable energy, increased energy efficiency of buildings, transportation, and carbon capture and storage (CCS). In order to be successful, the green transition has to bring about a systemic change engaging actors across the economy, particularly including end-users. There should also be a focus on additional technological

progress. Finally, Sovacool noted that a rapid emission reduction such as the one planned in the Nordic countries is unlikely to be followed on a global scale in the near future due to a lack of political feasibility.

Conclusion

The green transition is expected to have a profound impact on the functioning and structure of energy markets as well as the policies that facilitates this transition.

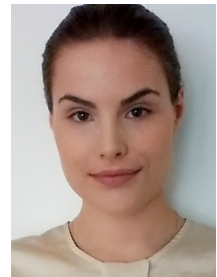
There is an ongoing process of decentralization in the energy sector, with the rise of “prosumer” market places that alter market dynamics. Moreover, market uncertainty is increasing due to more intermittent production (due to renewables) and a stronger interconnectedness between energy markets. It is likely that energy imbalances will be a major concern and that more and more energy trade will take place on real time markets (as opposed to e.g. on the day-ahead market). As markets’ linking becomes stronger, the interdependence between markets in terms of energy type and geographical location will be intensified. The need for coordination and international cooperation will be even more pressing. The uncertainty regarding the development of international cooperation, but also regarding national policy changes, may however disrupt energy markets. Measures such as withdrawing existing subsidies must be handled in a gradual and strategic manner so as not to discourage investment. A key issue for governments is to have a credible green policy in the long-term. Such credibility will also depend on the level of involvement of different actors in the green transition, including the necessity to have a multilevel engagement of the end-users.

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