

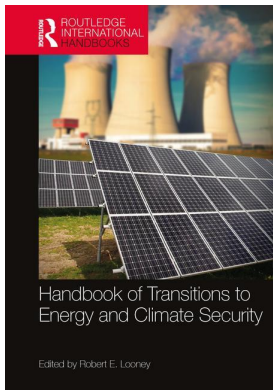
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Regional coordination in energy systems and its impact on energy security

Julia Nesheiwat

Regional coordination in energy systems is not a zero-sum game, but can benefit the national interest of all parties. There are challenges and risks involved, but given the mutual problems of climate change and energy security, there is good reason for countries to cooperate. The integration of regional energy markets increases diversification of supply and delivery, cost-savings, and energy efficiency. Working together, countries can reduce climate change effects while promoting sustainable energy solutions and global energy security for the future.

Regional integration of electricity markets and renewables

Renewable energy is a key component of plans to reduce carbon emissions. However, renewable sources such as wind and solar must supply large geographic areas to be cost effective due to variable weather conditions and the difficulties of electricity storage. In the coming years, the issue of energy storage may play a less significant factor due to emerging powerwall technologies.¹ Until that time, though, such constraints must be taken into account. Electricity markets in some regions are stressed, and integration can improve reliability and costs by facilitating demand aggregation and a broader range of power plants. A complementary mix of generation capacity and differing peak usage times in neighboring countries promotes the utilization of the cheapest and cleanest generating sources whenever available, while ensuring an uninterrupted supply.²

Sharing of energy knowledge and technologies

With particular emphasis on renewables, energy efficiency, and clean technologies, the sharing of such knowledge amongst countries is needed to help promote responsible energy policies. Given that a state's greenhouse gas emissions can negatively affect the climate shared by neighbors, it is beneficial for all to share the knowledge that can help reduce pollutants.³

Challenges to regional integration

Energy security risks make some countries reluctant to embrace the import and cross-border trade of electricity. Dysfunction between system operators or geopolitical changes could result in blackouts. Thus, some governments still prefer to generate power locally rather than import at cheaper costs. A lack of transmission lines and inefficiencies in current infrastructure are a further constraint. There is need for a standardized regulatory framework and government commitment. Moreover, some countries that benefit from a resource endowment of cheap energy may be reluctant to integrate their markets due to the potential price disruptions.⁴

Regional coordination in Africa

In 2011 the UN began the Sustainable Energy for All initiative (SE4ALL). Africa had 42 of its countries opt into the initiative, which emphasized expansion of energy access to universal levels, increasing energy efficiency, and doubling the global energy mix's portion of renewables.⁵ These objectives are especially critical for the continent, which has 600 million inhabitants who have no access to electricity. Even of those that do, 700 million must rely on solid fuels for basic electricity needs.⁶ Such numbers are even more shocking when the potential of the continent is considered, as it has a largely untapped renewable energy capability. Due to the huge benefits involved for Africa and its overwhelming participation in the initiative, the African Development Bank hosted in May 2013 the SE4ALL Africa Hub, to manage the program's implementation throughout the continent. The Hub is supported by the Sustainable Energy Fund for Africa (SEFA) and the Pilot Africa Climate Technology and Finance Center.⁷ SE4ALL is not the only energy initiative for Africa. Many have come up recently, such as the African Renewable Energy Initiative. While such a surge in efforts appears to be a positive step, it underscores the need for regional coordination even more. The African Development Bank's Kurt Lonsway has tried to stress this importance by stating, "There is a need for a coordination framework that is able to ensure coherence and avoid duplication of effort, and maximize reach and impact across the continent."⁸ To facilitate this regional coordination, the Africa-EU Energy Partnership has begun mapping initiatives to maximize the effectiveness of all programs.

Regional coordination in South America

Energy resources in South America are vast and vary greatly, yet many countries struggle to maintain an adequate energy supply. Though it would greatly benefit from regional coordination, there has been reticence due to political differences as well as a mismatched vision of the energy future within the region.⁹

Countries with massive fossil fuel deposits, such as Venezuela, appear content with their current energy mix, which is heavily reliant on major CO₂ emitters. Bolivia, Ecuador, and Peru cumulatively invested \$40 million in fossil fuel subsidies. Others, such as Uruguay, envision a greener future and have invested much of their energy sector in renewables. It is expected that demand for energy in the region will double by 2030, and a coordinated effort will be the best chance it has to meet consumer needs. For years, it has been suggested that the best approach to regional coordination would be a South American Energy Treaty. The South American Union South American Energy Council (UNASUR) has made several attempts to draft a treaty, but issues, such as the energy mix, have been too divisive for them to make progress.¹⁰

Regional coordination in Europe

To achieve an integrated, interconnected, resilient, secure, and sustainable energy market system, the European Union has plans for an “Energy Union.”¹¹ In 2006, the European Regulators Group for Electricity and Gas (ERGEG) introduced seven regional electricity markets to start the electricity market integration process. By 2014 the power grids in southern and northwestern Europe were also linked, accounting for an annual consumption of roughly 2400 TWh to cover approximately 70% of European customers. Slovakia, the Czech Republic, Hungary, and Romania likewise plan to link to the rest of Europe. An underwater line to Sweden also connects Poland with the northwestern region of Europe. Leaders of the EU expect energy trading through electricity connectors to increase 10% by 2020. Its renewables and energy market integration cost €94 billion for the upgrades and new power lines. The EU found 100 power bottlenecks that presented a challenge to integrating national grids, with 80% relating to renewables such as wind and solar. Interconnection goals for each country equate to 10% of generating capacity to achieve the trans-EU electricity infrastructure. By 2020, the common EU goal is a 20% reduction in greenhouse gas emissions, a 20% renewables share in energy consumption, and a 20% improvement in EU energy efficiency.

Connected electricity and energy markets reduce costs, emissions, and improve supply and interdependency. Ukraine, Georgia, and Belarus are important transit countries in the region, and their stability is paramount to energy security. However, Russia’s annexation of Crimea has made it apparent that new transit countries are needed.

Turkey: coordinating multiple regions

Crimea is located in Ukraine. However, it was annexed by Russia after Ukraine underwent a change in government due to mass riots on March 18, 2014.¹² This move was met with sanctions and condemnations from the international community. It also damaged Ukrainian–Russian relations. The Russian annexation of Crimea and subsequent political ramifications have led to the exploration of Turkey as a possible new transit hub. While Turkey lacks abundant fossil fuel reserves, its position in Europe’s southern corridor and Asia gives it the potential to draw from many oil producers, while bypassing Russia.¹³

At the time of invasion, Russia supplied 31% of Europe’s oil and Europe accounted for 71% of its crude oil exports.¹⁴ While some European countries are less dependent on oil, such as France, others, such as Germany, are highly dependent on it to meet energy needs. Oil to Western Europe from Russia was mostly transferred via pipelines in Ukraine. With the new developments, though, the stability of that oil supply was called into question. Further, it gave pause to many countries who are dependent on Russian oil but disagree with Russian policy. This left an opportunity in the market to supply oil to Europe.

Turkey has been steadily rising as an energy transporter to Europe, largely due to Europe’s shift away from Russia. Russia supplies 3% of the oil that Turkey imports. However, that is down from 12% in 2010. The crisis in Syria, which has created tension between the two countries, could be seen as a motivating factor for this change. Iran used to supply most of Turkey’s oil. Its share, though, has been reduced from 51% to 26%.¹⁵ This is because Iran and Turkey have an increasingly unfriendly relationship. Fearing what would happen if the Kurdistan Workers Party (PKK), a Marxist Kurdish group within Turkey that is designated as a terrorist organization, stops fighting in Turkey and the Kurdish struggle were to focus on the Kurds in Iran, Iran has given weapons and encouragement to the PKK. Regionally, Turkey and Iran have been on opposing sides on important regional issues like the Syrian Civil War. Much

of this has to do with the increasing importance of the Sunni-Shia divide in the Middle East, as Iran is Shia and Turkey is Sunni and it causes them to pursue opposing policy. They are also both competing to be major regional powers. Further, due to sanctions, Iranian oil is more difficult to export.¹⁶ In order to reduce dependence on Iran and Russia, Turkey has looked to other oil suppliers in recent years, which is in line with Europe's diversification goals.

Two major pipelines have contributed to Turkey's ability to move away from Russian and Iranian oil. First, the Baku-Tbilisi-Ceyhan (BTC) pipeline has allowed Turkey to import oil from Azerbaijan and Kazakhstan. While it only accounts for a small portion of Turkey's oil imports, it is still significant. Next is Turkey's pipeline with Iraq. It has two branches. Its first branch is the Kirkuk-Ceyhan pipeline, which is administered by the Iraqi government. The second line is connected to the Kirkuk-Ceyhan pipeline, but begins in Taq Taq oilfields and is overseen by the Kurdish Regional government. This pipeline significantly reduced the need for Iranian oil and helped Iraq overtake Iran as the main exporter of oil to Turkey. These instances of regional energy coordination though, have not been without their complications.¹⁷

First, there are some obstacles to the success of the Kurdish pipeline. Disputes with the Iraqi government over profit sharing and the legality of the pipeline itself caused it to have a slow initial start after it became active in 2013. However, it was a major contributor to Turkish oil imports this past year, mostly due to a deal struck in December 2014 between the KRG and Iraqi government.¹⁸ Much of that, though, was born of necessity.

Two important developments have occurred recently: the rise of Daesh and the escalation of hostilities between the Turkish government and the PKK. Daesh's seizure of portions of Iraqi territory has greatly disrupted the flow of oil from the main Iraqi pipeline since 2014. Turkey's pipeline with Iraqi Kurdistan was able to offset that disruption. However, rising antagonism between the PKK and Turkey has led the PKK to sabotage the Iraqi-Kurdish pipeline. It also puts the safety of other pipelines in jeopardy, as many of Turkey's pipelines flow through its Kurdish areas, leaving them vulnerable to PKK attacks.¹⁹

These issues are notable, but not insurmountable. They do, however, highlight a major challenge of regional energy coordination, which is its interaction with regional politics, especially in areas that suffer from instability. Even so, opportunities present themselves in such situations that further reinforce the need for regional coordination. Turkey's newfound stature as an alternative transit hub incentivizes it to make political decisions that maintain or advance its position. One of the decisions it may be forced to grapple with is how to deal with its eastern question, possibly pushing it to seek a peaceful resolution with the PKK. Though no recent behavior has indicated that will be the case, the opportunity is there, and it would be an instance of how regional energy coordination can affect security issues outside of the energy sector.

Oil is not the only resource Turkey can enable Europe to diversify on. Natural gas is another fossil fuel that Turkey could potentially act as a transit hub for through increased regional energy coordination. Currently, Europe remains reliant on Russia for its natural gas needs. Turkey's geography opens the possibility of an influx of natural gas from the Middle East and Central Asia instead.

In 2009, under the title "Southern Corridor-New Silk Road," the European Commission (EC) launched the Southern Gas Corridor (SGC) policy initiative to diversify its energy away from dependence on Russia.²⁰ In March 2015, construction began on a key portion of the SGC, which is the Trans-Anatolian Pipeline (TANAP).²¹ By the time of completion, the pipeline is expected to move 16 billion cubic meters (bcm) of gas per year. The gas from the pipeline is projected to reach Turkey in 2018 and Europe by 2019, after the completion of the Trans Adriatic Pipeline (TAP).²² Currently, Azerbaijan is the sole supplier of natural gas through the

pipeline, but the opportunity for others throughout the Middle East and Central Asia to contribute is open.²³ If more suppliers are not added and the project is not expanded beyond the projected 16 bcm of gas, the SGC will do little to diversify Europe's gas consumption. Improved regional cooperation would bring on board more suppliers and allow the SGC to reach its diversification goal. Further, it would be a mutually beneficial situation for all parties. Turkey would be an important transit hub, Middle Eastern and Central Asian countries would be able to expand their export market, and Europe would have more autonomy over its affairs vis-à-vis Russia. Expansion of suppliers is easier said than done, however. Some countries, like Turkmenistan, can be thrown into the mix more immediately. Others, such as Kazakhstan and Iran, have extenuating political conditions surrounding their export of natural resources. Emerging sources of natural gas, such as Israel, Cyprus, and Iraq, still need to be established and have the added hurdle of complicated political problems.²⁴ Again, the great benefits of regional energy coordination can be seen with the SGC, as can the barriers for progress associated with the pursuit of widespread collaborations.

Regional coordination in Southeast Asia: prospects of the Trans-ASEAN Gas Pipeline (TAGP)

As Southeast Asian economies and populations grow, regional energy demand will likely increase 80% by 2035 from 2011 levels.²⁵ TAGP is a regional effort to respond to this energy demand by interconnecting electricity and natural gas networks in ASEAN countries, with the end goal of increasing regional energy security and sustainability. Thus far multilateral pipelines have not been constructed, but 13 bilateral links spanning 3,631 kilometers have been built. The rising interest in LNG in recent years has put the TAGP's relevance into question. Following a re-evaluation in 2012, the project now includes LNG regasification terminals (RGTs).²⁶

Benefits of regional cooperation on TAGP include greater energy security, diversification, and less reliance on coal. Working together as a region, individual countries will be less vulnerable to volatile markets. Further they will receive the benefits of solidarity as a larger energy consumer and will be able to pool resources for the exploration and development of untapped resources.

Challenges and drawbacks to the project include the enormous infrastructure and development costs and inherent difficulty of harmonizing regulations, standards, and legal frameworks.²⁷ Moreover the wide diversity of regime types and market structures among ASEAN countries will hinder coordination and add the risks of a potentially unstable geopolitical situation.

Regional coordination in the global context: COP21

Regional coordination is extremely important, not just for the immediate benefits it provides to countries, but because it is the foundation of international progress. Climate change is a global issue, and to be tackled properly everyone must be involved. It is easiest to approach when countries are already involved in some kind of external framework to limit moving parts.

In December 2015, the 21st session of the Congress of Parties (COP21) unanimously agreed to prevent global temperatures from rising up from pre-industrial times more than 2 degrees Celsius. Further, they seek to limit it to 1.5 degrees, if possible. A long-term goal of emitting no more GHG than can be absorbed naturally by trees, oceans and oil has been set to be accomplished between 2050 and 2100. Every five years a review will take place to evaluate whether or not countries hold true to their pledge. Additionally, developed countries will provide

monetary aid to developing countries to enable them to cope with climate change. Criticisms of the deal exist.²⁸ Many take issue with the fact that it is not legally binding. Some view the goal of limiting climate change to 2 degrees Celsius while endeavoring to cap it at 1.5 degrees Celsius as not ambitious enough. Developing nations have voiced concern that the monetary aid being pledged is insufficient, while some developed countries were reluctant to provide even that amount.²⁹ Even with these concerns, a global climate change initiative that was unanimously passed, involving 195 countries, is a major step in global reform. It is also a larger scale reminder of what regional coordination is key. In order to meet the objectives laid out by COP21, a lot of regional coordination will have to be implemented so that countries are given the tools to meet their pledges.

One example of regional coordination that will most likely occur on the heels of COP 21 is the re-emergence of Japan as an energy leader to enable emerging economies to implement their pledges. In its submitted pledge, Japan affirmed its commitment to its Joint Crediting Mechanism (JCM). Japan's JCM enables Japan to develop greener energy technologies and distribute them to emerging economies. This could enable countries throughout the region, and beyond, to enhance their energy security while satisfying their role in the international framework.

Concluding remarks

Regional energy coordination is an integral part of efforts to mitigate climate change, increase the global energy supply, and increase energy efficiency while reducing costs. It will not be easy. There are risks associated with undertaking such an endeavor, and they should be acknowledged. However, the payoffs of regional cooperation will only increase in the future, and outweigh the associated concerns. Thereby, regional coordination should be encouraged and supported whenever feasible.

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Part II

Energy transitions in the carbon producing countries

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