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Forging the ties that bind

Comparing the factors behind electricity market integration in the EU and ASEAN

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Photo: European Union, 2003

ABSTRACT

This paper examines the political forces that drive electricity grid expansion in the European Union (EU) and the Association of Southeast Asian Nations (ASEAN). Although there are a number of short-term political and economic barriers to electricity market integration, there are also compelling economic, environmental and energy security benefits of establishing large-scale and dynamic electricity markets in the long-term. By considering the conceptually unique aspects of the incentives for regional electricity market integration in the EU and ASEAN, the contrast in progress made in establishing regional electricity markets in the two regions is explained. The most important factor accounting for this difference is the fact that there are contrasting energy scenes in the EU and ASEAN. Being a single market consisting predominantly of net energy consumers, and with institutions at the European level to coordinate the decision making process on energy matters, it is relatively easy for the EU to pursue efforts in electricity market integration. In ASEAN, the existence of both energy importers and exporters within the same regional forum makes the establishment of a regional energy grid, which has the ability to increase the production of renewable energy in Southeast Asia much more complex. Moreover, concerns regarding the loss of national sovereignty are a further factor that continues to hamper ASEAN efforts to establish an effective regional electricity market in ASEAN. As the EU member states have already pooled a degree of their sovereignty, and in particular since the Lisbon Treaty made energy a core competency of the European institutions, significant resistance to external intervention in national affairs has largely been avoided.

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Forging the ties the bind: Comparing the factors behind electricity market integration in the EU and ASEAN

GUSTAV BOËTHIUS[1]

Introduction

Dynamic electricity markets with regional energy grids are emerging as one of the most effective means of enhancing energy security and reducing the emission of dangerous greenhouse gases by facilitating the increased use of renewable energies. Initiatives to construct regional electricity markets are major political and financial undertakings, and the factors that affect their initiation and outcome should be analysed in order to ensure the success of future electricity market integration projects. This paper compares the political, economic and social origins of electricity market integration in the European Union (EU) and in the Association of Southeast Asian Nations (ASEAN). It argues that there are several factors which have made European electricity market integration more successful than ASEAN's. These include the central role played by the EU institutions in promoting the integration of the European energy markets, successful public-private partnerships and the unity of the EU nations on energy matters due to the fact that they are almost all energy importers. The obstacles to ASEAN's energy grid expansion include the defence of political and economic sovereignty within the region and the resultant lack of a central authority to provide leadership in grid expansion. Moreover, the role that the fossil fuel industries continue to play in the Southeast Asian economies provides a strong disincentive for some ASEAN member states to establish a functioning electricity market in the region.

In order to compare the origins of energy grid governance in the EU and ASEAN, this paper will begin by highlighting, firstly, why regional electricity markets are important to a region's energy security, in terms of both security of supply and the environmental impact of energy consumption, as well as the improvements within the energy industry resulting from increased competition in the regional market. This paper will then outline the sources of political resistance to electricity market integration, which include local economic disincentives and difficulties in overcoming the technical intricacies of regional energy grid governance.

Next, the paper will provide an overview of the current state of the European electricity market. To date, the EU has the most ambitious and advanced plans to establish a regional electricity market. There are several lessons to be learnt from this case, which will serve as this paper's example of a relatively successful effort to integrate electricity markets. The potential for large scale renewable energy generation, and therefore for the establishment of regional electricity markets, is also considerable in Asia. In Asia, where regionalism is often impeded by issues such as nationalism and protection of sovereignty, ASEAN is an example of a regional organisation that has the potential to promote a common electricity market. Therefore, ASEAN represents a case where the institutional foundations for establishing an effective regional electricity market exist, but where real progress on the issue has not yet been forthcoming. Finally, this paper will analyse the factors which have resulted in the major differences between European and Southeast Asian progress on building regional electricity markets and their approaches to energy grid governance.

1. Why electricity market integration is necessary

The world economy is currently faced with two serious crises. The first pertains to the lack of affordable and reliable energy supplies. With rising demand, the global energy system is becoming increasingly strained, resulting in higher oil and gas prices, which in turn have a negative effect on the global economy. Increased competition for diminishing energy resources also heightens the risk of international conflicts over energy resources, posing a threat to global security. Moreover, continuing political and social instabilities in the Middle East, the world's most important energy producing region, highlight the risks of continued reliance on oil and gas imported from this region to power the global economy.

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The second crisis of the global economy is environmental. The increasing concentration of greenhouse gases in the earth's atmosphere is causing global warming which threatens long-term security of the international community. There is an increased awareness both of the severity of this problem and of the immediate need for the construction of a sustainable energy future if the dangerous effects of global warming are to be avoided in the future.
The solution to the above problems is to phase-out fossil fuels from the global energy system and replacing them with renewable sources of energy. Renewable energies have the potential to satisfy global energy demands and renewable energy products are becoming increasingly available on the global market. The renewable energy sector is experiencing impressive growth and the use of renewable energy technologies has emerged as a mainstream means of energy production. Between 2009 and 2010, investments in renewable energies grew by 32 per cent and reached a level of $211 billion by the end of that year.[2] Today, a number of countries utilise clean energy to a significant degree, and 118 countries have some form of legal mechanism in place to encourage the growth of renewable energy consumption.[3]

However, the increased global use of renewable energy sources generates its own set of problems. One of the most significant drawbacks is that many renewable sources have a much lower energy density than conventional sources of energy. Renewable energy must therefore be harnessed across large geographical areas, for instance in large wind parks or solar installations. Secondly, locations rich in renewable energy are not necessarily the ones that are today used for conventional power generation, and the global energy infrastructure must therefore be adapted to this new energy generation pattern. For small countries, or countries with limited renewable energy resources, this presents a problem when seeking to satisfy the national demand for energy using sustainable technologies. A third drawback is the intermittency of renewable sources of energy. Wind power generators and solar and hydroelectric power installations, are prone to fluctuations in their energy generating capacity. Therefore, the future energy system must be able compensate for these fluctuations. A further problem with the large scale use of renewable energy is that these technologies are today more expensive than conventional sources of energy,[4] and a market structure needs to be established that enhances the competitiveness of renewable energy technologies.

The solution to the above issues is to provide the physical infrastructure to facilitate the flow of sustainably generated electricity over large geographical areas. This is achieved by constructing very large energy grids and interconnecting existing electricity markets. Expanded energy grids enable previously stranded renewable energy assets to be brought to energy markets. Larger energy markets also increase the flexibility of the region's energy system by enabling more dynamic balancing when the load and production fluctuate across the grid. Moreover, an expanded electricity market also gives emerging technologies a greater chance to compete with traditional energy industries. This will, over time, lower the cost of renewable energy. In the case of the EU and ASEAN, integrated regional electricity markets have the potential to solve long term energy-related problems facing these regions.

2. The sources of resistance to electricity market integration

Notwithstanding the economic potential and energy security benefits of regional electricity markets, these projects face considerable political, economic, legislative, and technical obstacles. A very high degree of political will and determination on the part of the regions' decision makers is therefore required for their success.

One of the most significant political obstacles to electricity market integration is the short-term economic impact that these projects have on the participating parties. The construction of transnational energy grid infrastructure requires considerable amounts of economic capital and is often a sunk cost which might only be repaid over a very long period of time. At a more fundamental level, the merging of two energy markets is always problematic as it inevitably results in winners and

[2] REN21. "Renewables Global Status Report 2011." p. 7. Available at <http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR2011.pdf>
[3] Ibid.

[4] The argument that conventional sources of energy are cheaper than renewable energy only holds true if one chooses to ignore the significant long-term costs which are associated with the consumption of energy that increases the concentration of carbon in the earth's atmosphere. Were such externalities included in the final cost of fossil fuels, their relative competitiveness against renewable energy sources would drop significantly.

losers. As the conditions on a market are products of that market's unique characteristics, no two energy markets are ever identical in terms of supply, demand, and consequently, price. Therefore, their interconnection results in lower prices for energy in the market that previously had a lower level of supply, and higher energy costs in the market that now has to share its relative excess with its neighbour. This disincentive for the losing party must be addressed through some appropriate mechanism, especially if the markets are merged across national boundaries.

The market design of an integrated energy market is a further potential obstacle to energy grid expansion projects, especially in markets which seek to favour the consumption of renewable energy. Such electricity markets have to be designed to minimise the disadvantages of renewable energy technologies relative to traditional fossil fuel consuming technologies. Although renewable energy technologies have close to zero fuel costs, their installation per unit generating power is often more capital intensive than those of fossil fuel power stations.[5] Therefore, a market situation that puts a higher price on fuel usage than on down-payments on energy infrastructure is desirable. Moreover, and more fundamentally, this also involves abolishing established energy market monopolies and creating liberalised, deregulated energy markets. Such measures will be firmly opposed by both those market actors with vested interest in the status quo, and political groupings that enjoy their financial support.

A further electricity market design issue pertains to the sale of energy futures on the market. Due to uncertainties regarding the production of renewable energy as a result of its dependence on specific weather conditions, there is a limited time scale on which reliable estimations can be made about how much renewable energy installations can generate during a certain period of time (usually a couple of hours ahead of time).[6] The market must therefore be able to facilitate the sort of short-term trading that renewable energy technologies require. Finally, due to potential fluctuations in energy supply and consequent fluctuations in the price of energy, the provision of effective risk management tools is also essential for promoting acceptance of the newly created energy markets. All of this requires a high level of coordination between the participating parties in the energy market integration project, which may be difficult to achieve.

Effective energy grid interconnection also requires a high degree of technical standardisation, which might both be costly to achieve and bureaucratically difficult to coordinate. These technical difficulties will be overcome more easily in a region where a solid framework for technical cooperation is already established. As regards electricity market integration projects where the provision for renewable energy production is a key aim, the incorporation of smart grid technology is another factor that poses a technical obstacle. A further technical issue that must be addressed is of course the physical reach of the energy grid. First of all, in order to fully utilise the energy generating capacity of a region's renewable resources, the grid must physically reach the areas that have abundant renewable resources. Secondly, these resources must also be able to reach the region's electricity consumers. Due to the physics of electricity transmission, and the geography of Europe and Southeast Asia, the absolute grid coverage of both regions is economically unfeasible. Here, a balance needs to be found between these two opposing factors, which may precipitate political conflicts.

Finally, international electricity market integration projects have also some significant security implications for the participating countries. As such projects involve the pooling of energy resources which are fundamental to a country's economic and social well-being and military might, a significant level of trust between the parties is required as they are potentially exposing their security to external actors.

3. European electricity market integration

It is a notable fact that the European Union was initially founded as an energy governance body. The European Coal and Steel Community (ECSC) was created in 1952 and sought to pool the coal and steel industries of its six members in a single market to prevent the future outbreak of war in Europe. With the exception of the creation of European Atomic Energy Community (EAEC/Euratom) in 1957, further efforts to establish common energy governance in Europe had been mostly sterile until the first decade

[5] Karsten Neuhoff. "Large-Scale Deployment of Renewables for Electricity Generation" in Dieter Helm (ed) "The New Energy Paradigm." pp. 298-300.
[6] Ibid.

of the 21st century.[7] However, the adoption of "An Energy Policy for Europe" in 2007, a broad action plan for European energy policy, marked the beginning of a revival of regional energy politics in the Europe.[8] When the Lisbon Treaty entered into force two years later, energy policy had become a core competency of the reformed European institutions. Today, the EU plays an important role in a number of energy issues, including energy market legislation, environmental legislation, the provision of financial frameworks for infrastructural development, technology and innovation and external energy relations. Although electricity market governance is today part of a larger European drive to integrate energy policy in the union, its centrality to the European drive to increase its share of renewable energy must also be acknowledged.

In order for the EU to achieve its stated goals within energy sustainability, competitiveness and security of supplies,[9] the integration of the European electricity markets has become one of the EU's core political and economic projects. Although European electricity transmission infrastructure is advanced compared to the global standard, and while some progress on the creation of regional energy markets in Europe has already been made, there is still a limited degree of interconnection within the union as a whole.[10] The northern European electricity market, Nord Pool,[11] is the world's largest regional electricity and electricity derivatives, trading hub.[12] It was established in 1996 by Norway and Sweden and today also covers the electricity markets of Denmark and Finland. It also trades EU emission allowances and globally certified emission reductions.

A further example of a regional electricity trading hub is the European Energy Exchange (EEX).[13] The EEX trades electricity, natural gas and EU emission allowances in markets in Austria, France, Germany and Switzerland, but does not constitute an integrated market for energy in these countries. Several other regional energy transmission projects are also under development in the EU. One of these is the North Seas Countries' Offshore Grid Initiative (NSCOGI), which will facilitate the transmission of renewable energy generated, predominantly by wind power, in the North Sea. A memorandum of understanding was signed by the heads of state of Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, Sweden, and the United Kingdom in 2010 to set the foundations of this project.[14]

Another project concerning inter-regional power transmission is the Desertec Industrial Initiative (DII).[15] The vision of the DII is to facilitate the importation of electricity generated by solar technologies from the Middle East and North Africa (MENA) region. Although the EU has been playing a role in the project, for instance in the form of bilateral talks between representatives of the European Commission and ministers from the MENA countries,[16] the DII is an industrial consortium and its main drivers have been the European private sector. A demonstration project, which will see the export of solar energy from Morocco to the EU, is currently being planned.[17] Further agreements between the DII and other MENA energy actors have also recently been signed.[18]

There are today a number of legal instruments that drive the electricity market integration process in the EU, which do so either directly or indirectly. One of the key EU laws on regional electricity market creation is the renewable energy directive 2009/28/EC.[19] This directive outlines the 2020 targets for renewable energy generation in the EU member states, with the overall goal of generating 20 per cent of the EU's energy through renewable energy

[7] Birchfield, V. L., Duffield J. S. (eds) "Toward a Common European Union Energy Policy". 2011 Palgrave Macmillan. pp. 2-6.
[8] European Commission/Energy. 10 January 2007. "An Energy Policy for Europe." Available at <http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf>.
[9] Ibid. pp. 3-4.
[10] D. Helm. "European Energy Policy: Securing Supplies and Meeting the Challenges of Climate Change" in Helm, D. (ed) "The New Energy Paradigm". 2007, Oxford University Press. p. 443.
[11] For more information, see <http://www.nasdaqomxcommodities.com/>.
[12] In November 2010, Nord Pool changed its name to NASDAQ OMX Commodities Europe. However, for the intents and purposes of this paper, its previous name will be used.
[13] For more information, see <http://www.eex.com/en/>.
[14] <http://ec.europa.eu/energy/renewables/grid/doc/north_sea_countries_offshore_grid_initiative_mou.pdf>.
[15] See <http://www.desertec.org/>
[16] Reuters. 20 June 2010. "EU sees solar power imported from Sahara in 5 years." Available at <http://www.reuters.com/article/2010/06/20/us-energy-eu-renewables-interview-idUSTRE65J1ZO20100620>.
[17] See the Moroccan Agency for Solar Energy announcement, available at <http://www.masen.org.ma/upload/news/PressRelease_Feedback%20Dii_final.pdf >. See also Reuters. 29 October 2011. "Desertec to start work on first solar plant in 2012." Available at <http://www.reuters.com/article/2011/10/29/us-desertec-morocco-idUSTRE79S29120111029>.
[18] See, for instance, the agreement of future collaboration between the DII and the Algerian energy consortium Sonelgaz, signed on 8 December 2011. Available at <http://www.dii-eumena.com/home/news-single/article/300.html>.
[19] Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:01:EN:HTML>.

technologies by 2020. Article 16, paragraph 1, of the directive deserves to be cited in its entirety:

> Member States shall take the appropriate steps to develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system, in order to allow the secure operation of the electricity system as it accommodates the further development of electricity production from renewable energy sources, including interconnection between Member States and between Member States and third countries. Member States shall also take appropriate steps to accelerate authorisation procedures for grid infrastructure and to coordinate approval of grid infrastructure with administrative and planning procedures.

A further example is the renewable energy directive. This is part of the 20/20/20 targets, a larger EU goal which seeks to reduce overall greenhouse gas emissions by the EU by 20 per cent and increase the overall energy efficiency of the EU by 20 per cent with respect to the 1990 levels by 2020.[20] The EU has also pledged to reduce its emissions by 80-95 per cent by 2050. European environmental policies are further underpinned by the EU's continued participation in the Kyoto protocol and the European cap and trade system for greenhouse gas emissions (emission trading system - ETS). This all serves as a background incentive to facilitate the increased use of renewable energy by integrating the electricity markets in the EU.

However, much work needs to be done before a common European electricity market is realised. According to the European Network for Transmission System Operators for Electricity (ENTSO-E), the EU needs to construct more than 35,000 km of new transmission lines, of which 23,000 km will be new high-voltage AC lines, and refurbish 6,900 km of existing transmission lines in order to meet the EU's 2020 interconnectivity targets.[21] This constitutes a tremendous economic and political challenge to European decision makers. Moreover, as no centralised European energy market regulator or grid planning authority exists today, the EU's role in driving the expansion of the European energy grid is limited.

The interconnection and expansion of the regional energy grids are dependent on the private sector whose role it is to build the grid, and which does so in response to the market conditions established by the EU. The EU directly engages the European private sector through public-private partnerships (PPP) and several of which exist in the field of energy research and clean energy production. One PPP is the European Energy Efficiency Fund (EEEF) which aims to make strategic investments in European energy infrastructure.[22] PPP mechanisms are therefore an effective tool for the EU to integrate the region's electricity markets. The European private sector also plays an important role in itself by lobbying for the integration of the EU's electricity markets. As seen in the case of the DII, the role of the private sector was paramount to its creation and progress. The DII is supported by a range of European manufacturing, utility and investment companies like ABB, Deutsche Bank, E.ON, Siemens and RWE. Moreover, the European private sector plays an essential role in developing grid and other technologies that improve the performance of regional energy grids. One notable example is the European Association for Storage of Energy (EASE), which seeks to find economically viable methods of addressing the intermittency of electricity generated by renewable energy technologies.

One key challenge is to highlight the profitability of these investments to outside investors. The construction of merchant transmission lines, where the energy generated in one low-cost area is transported to an area with higher energy prices and a fee is charged by the transmission system operator (TSO), is one standard financial framework for the construction of energy grids. Examples of such schemes are the North Sea and the Desertec transmission projects. The EU has also introduced an innovative investor framework for its infrastructural projects. When the European Commission recently announced its €50 billion Connecting Europe facility, which aims at increasing European connectivity in the areas of transport, energy and digital networks,[23] it also announced the Europe 2020 Project Bond Initiative.[24] This bond is specifically designed to

[20] Europe 2020 targets. Available at <http://ec.europa.eu/europe2020/pdf/targets_en.pdf>.
[21] ENTSO-E's Pilot Ten-Year Network Development Plan: Executive Summary. p. 9. Available at <https://www.entsoe.eu/fileadmin/user_upload/_library/SDC/TYNDP/100630_TYNDP_Executive_Summary.pdf>.
[22] European Commission. "European Energy Efficiency Fund." Available at <http://ec.europa.eu/energy/eepr/eeef/eeef_en.htm>.
[23] European Commission. 19 October 2011. Available at <http://ec.europa.eu/commission_2010-2014/oettinger/headlines/news/2011/10/20111019_en.htm>.
[24] European Commission. 19 October 2011. Available at <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/707>.

facilitate investments in European infrastructural projects and to overcome the short-term financial constraints of the projects.

As has been illustrated in the above examples, it is difficult to clearly define European energy grid governance. It is based on a large body of laws, directives, regulations, contracts, partnerships and networks that together form their respective parts of the EU's energy grid policy. The components of the EU's energy grid governance are spread across the formal/informal spectrum of multilateral cooperation and pertain to the governance of a large number of qualitatively different issues. The main conclusion that can be drawn from these observations are that there is a considerable political will to realise electricity grid integration, and that European decision makers are using a wide range of policy tools to integrate the European electricity markets.

4. Electricity market integration in ASEAN

The case of Southeast Asia's electricity market integration differs significantly from the European example, in terms of both actual progress made and in terms of the governance structures driving its development. First of all, there is currently a limited degree of energy grid coverage within many ASEAN nations. Moreover, there are few examples of cross-border electricity trading in ASEAN. Some examples include Laotian sales of hydroelectric power to Thailand, and Singapore's recent announcement that it would consider importing electricity from neighbouring countries.[25] However, these examples do not constitute actual examples of electricity market integration and are better described as cases of electricity market expansion across national borders where energy is sold by an external actor to a foreign electricity market. There is a very limited degree of sharing regional electricity markets at the ground level. Instead, inter-regional trade in energy is mainly in fossil fuels.

Due to the lack of regional plans on energy grid expansion in Southeast Asia, ASEAN has not directly engaged with the private sector to integrate the region's electricity markets like the EU has done. Since the general development of the Southeast Asian economies, including the private sector, is also lower in ASEAN than in the EU, the differences seen in public-private partnerships may to some degree be commensurate. A further hindrance to regional energy grids is the developmental disparity within the ASEAN member states. Whereas some Southeast Asian states have achieved relatively high levels of development, other states, like Cambodia and Laos, are economically underdeveloped and have limited economic capacity to carry out extensive infrastructural projects.

The lack of concrete regional energy grid plans in ASEAN has meant that no investment mechanisms have yet been designed by ASEAN to fund energy grid expansion projects. However, international development banks, such as the Asian Development Bank (ADB), have a long history of supporting infrastructural projects in the region, some of which include the expansion of electricity infrastructure.[26] There are also important factors that are likely to make private investors wary of energy grid investments in Southeast Asia. Ongoing intra-state conflicts in Southeast Asia are likely to cause concern for private investors in ASEAN's regional energy grid. The civil conflicts in southern Thailand, Myanmar and the Philippines increase the political uncertainty regarding long-term infrastructural projects in ASEAN and serve to make them less attractive to foreign investors.

Despite the lack of electricity market integration in Southeast Asia at this point in time, there is nevertheless a vision within the ASEAN community of establishing a regional energy grid at some point in the future. In the 2007 memorandum of understanding on the ASEAN Power Grid, ASEAN ministers confirmed their intention to work towards the creation of a regional electricity market.[27] The 2010 Master Plan on ASEAN Connectivity further consolidates regional plans for the transmission of energy where energy grids play an important part in enhancing the infrastructural integration between the ASEAN members.[28] Moreover, support for the establishment of a regional electricity market is frequently expressed by Southeast Asian leaders.
S. Iswaran, the Singaporean second minister for home affairs and trade and industry recently stated during a seminar discussion:

[25] Speech by Singapore's Second Minister for Trade and Industry, S. Iswaran, at the Singapore International Energy Week. Available at <http://siew.sg/siew-news/speech-mr-s-iswaran>.

[26] Available at <http://beta.adb.org/sectors/energy/main>.
[27] Memorandum of Understanding on the ASEAN Power Grid. Available at <http://www.aseansec.org/20918.htm>.
[28] Available at <http://www.aseansec.org/documents/MPAC.pdf>.

> If you think of [energy grid infrastructure] as a big Asean-wide proposition, it can be quite overwhelming and daunting. But if you think of it as a connection between geographically contiguous Asean member states in order to serve each other's needs, then the logic is quite compelling.[29]

The ASEAN member states would be able to generate a greater portion of their own energy by increasing the production of renewable energy, which in would be aided by the establishment of a regional electricity market. This would be beneficial as ASEAN as a whole is a net energy importer which relies heavily on imports from the Middle East. Similar uncertainties regarding the long-term supply security of energy from these countries to those affecting the EU also apply to some ASEAN member states, and a decreased dependence on these countries would result in greater energy security for Southeast Asia. Reduced expenditure on energy imports would also of course have long-term economic benefits for the region as a whole.

5. The sources of the political support for electricity market integration in the EU and ASEAN

As indicated by the contrasting cases of electricity market integration and energy grid governance in the EU and ASEAN, there is a significant difference in the degree of political support for electricity market integration projects in the two regions. This section will compare the different motives for an integrated electricity market in the EU and ASEAN. It will start by looking at the energy security benefits of an integrated electricity market. Then the economic incentives for an integrated electricity market in the two regions will be considered. Thirdly, this section will look at how concerns about climate change motivate the EU and ASEAN to reduce their emissions by integrating their electricity markets. Finally, this section will analyse how issues of national sovereignty are affecting electricity market integration in the EU and ASEAN.

5.1. Energy security

At the core of the European project to establish a regional electricity market is a strong political determination in the EU to tackle the union's energy security challenges, which have emerged as a core concern of the EU. In light of the risks associated with Europe's dependence on Russia for its gas supplies[30] and the recent unrest in the Middle East region,[31] the incentives for facilitating the production of indigenous renewable sources of energy are compelling for European decision makers. There are therefore strong incentives for European nations to develop a unified electricity market to facilitate the full use of the region's renewable energy potential.

A notable fact which constitutes the foundation of the EU member states' willingness to cooperate on energy matters is the position of the European states in the global energy system. With the exception of Denmark, all EU member states are net importers of energy,[32] and the fact that the majority of the EU member states face the same energy-related problems is a strong incentive for unity on energy issues within Europe (see Figures 1 and 2). This serves to focus European efforts on energy related initiatives which seek to improve the common energy security within the EU, such as electricity market integration.

Moreover, a common energy market is also an important source of external influence for the EU at the global level and a single electricity market in Europe will strengthen the EU's position on energy matters internationally. Youngs writes that:

> Europeanised internal rules are what provide foreign policy leverage and unity. European policy-makers have readily acknowledged that completing the internal market in energy is necessary for external influence and unity. The rules and regulations of the internal energy market are defined as the key foundation to the EU's international projection in energy matters.[33]

[29] Eco-Business. 1 November 2011. "Asean ministers discuss energy grid." Available at <http://www.eco-business.com/features/asean-ministers-discuss-energy-grid/>.

[30] See for instance, BBC. 13 January 2009. "Russian gas to Europe blocked." Available at <http://news.bbc.co.uk/2/hi/europe/7826142.stm>.

[31] Darbouche, H. and B. Fattouh. September 2011. "The Implications of the Arab Uprisings for Oil and Gas Markets." The Oxford Institute for Energy Studies.

[32] Eurostat: Energy production and imports. Available at <http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Energy_production_and_imports>.

[33] Youngs, R. 2009. "Energy security: Europe's new foreign policy challenge." New York: Routledge. p. 48.

Figure 1[34]

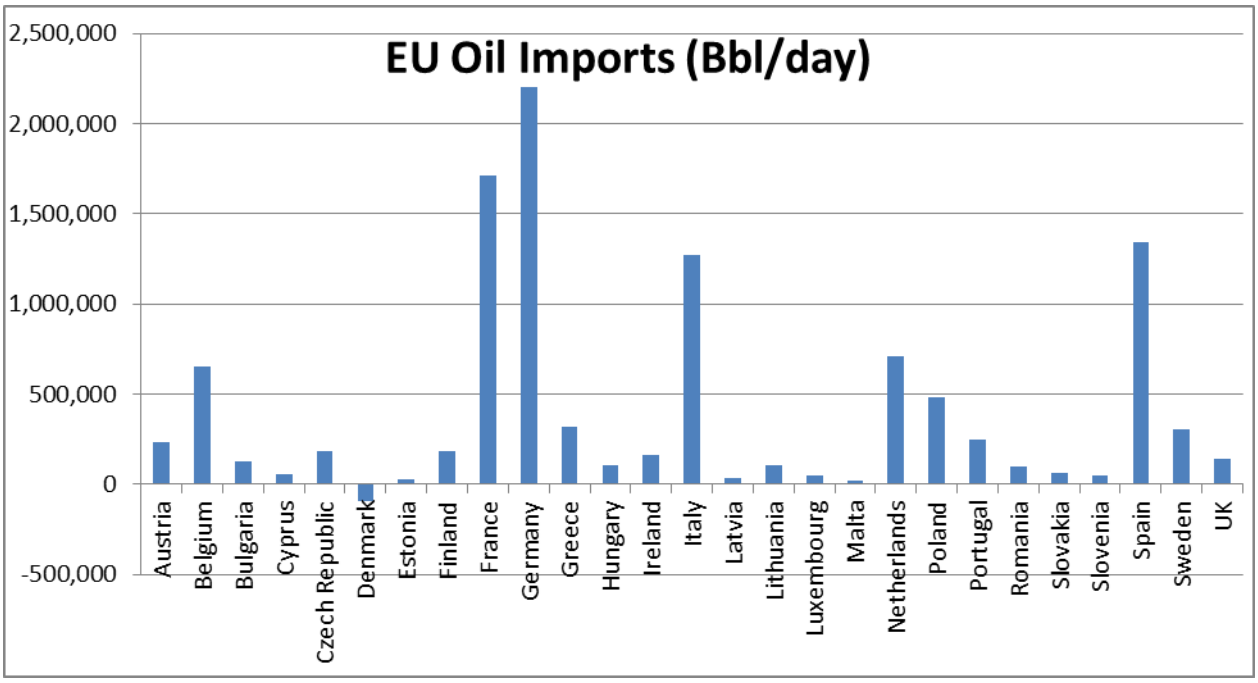
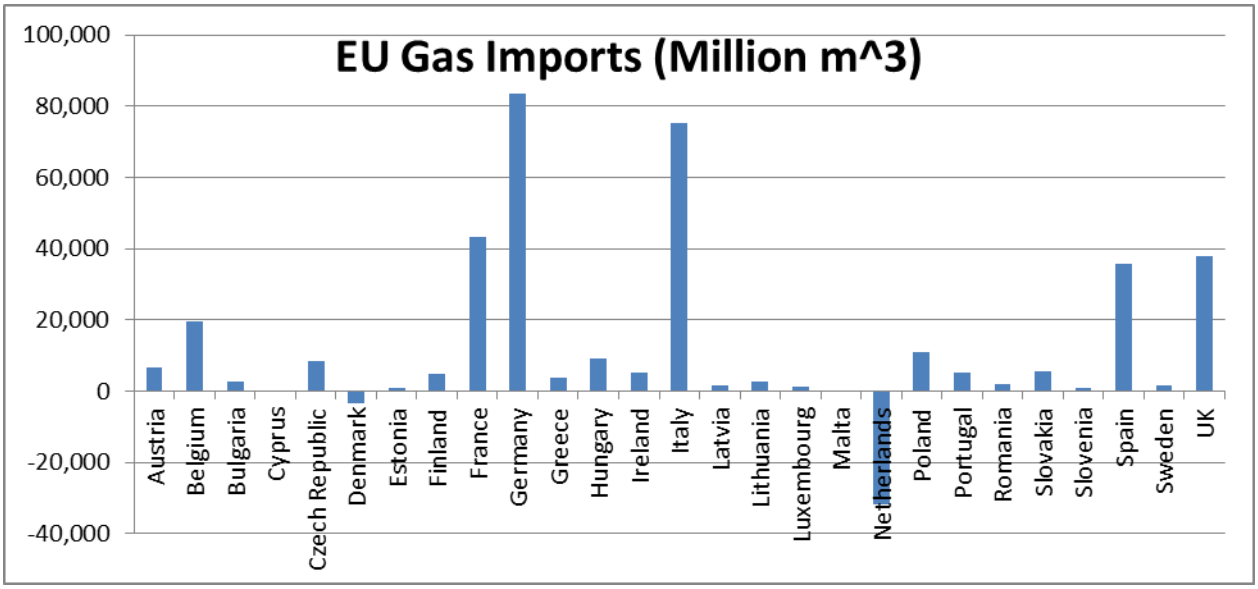


Figure 2[35]



[34] CIA World Factbook, available at <https://www.cia.gov/library/publications/the-world-factbook/>. BP Statistical Review of World Energy June 2011, available at <http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2011/STAGING/local_assets/pdf/statistical_review_of_world_energy_full_report_2011.pdf>.

[35] Ibid.

This implies the potential to make the energy game a matter of demand security for the energy exporting states rather than that of energy security for the EU.[36] This creates a further incentive for Europeans to cooperate on energy matters, including electricity market integration.

As a region, ASEAN is facing similar energy security challenges to the EU. Although the region is a net gas exporter, it is also a net oil importer and most of ASEAN's oil is imported from the increasingly unstable Middle East. Thus far, the development of a single electricity market to advance the use of regionally generated renewable energy seems like an appealing proposal to Southeast Asian decision makers. However, it is inappropriate to look at the net trade figures in energy when it comes to the ASEAN member states, as the decision making on energy in the region is governed by the interests at the state level. Therefore, a significant impediment to effective energy grid governance in ASEAN is the diversity of energy consumption and production within Southeast Asia. Although some ASEAN nations, and the region as a whole, are net energy consumers, some Southeast Asian states are net exporters of oil and gas, as shown in Figures 3 and 4. This makes it impossible to distinctly locate ASEAN in the international energy system as either an energy producer or an energy consumer. ASEAN member states' interests consequently diverge when it comes to energy. The interest in an expanded renewable energy sector therefore varies significantly within ASEAN, and is a significant obstacle to a coherent regional drive to create an effective electricity market in the region.

5.2. Economic incentives

The economic benefits of reducing the EU's energy imports are considerable and there is therefore a strong economic incentive to facilitate the greater use of renewable energy by integrating the European electricity markets. Moreover, investments in renewable energy and electricity transmission technologies have the potential to give European companies a competitive advantage against other non-European industry actors. These are additional factors that augment the European drive to establish a functioning regional electricity market.

As was illustrated in Figures 3 and 4, an integrated electricity market is not in every ASEAN country's favour. Even though some ASEAN nations clearly stand to gain from an increased level of renewable energy consumption in Southeast Asia, countries like Brunei, Indonesia, Malaysia and Myanmar stand to lose significant sales revenues from a fall in demand for fossil fuels. Moreover, it can also be argued that it would be hard for the private sector in ASEAN to catch up with the European companies' technological advantage in the renewable energy field, and that it would therefore be in the ASEAN nations' interests to avoid a regional growth in demand for renewable energy products.

5.3. Climate change

European concerns over the consequences of climate change are a further factor that drives the development of Europe's renewable energy infrastructure, including its regional energy grid. This point is illustrated by a recent speech given by the European Energy Commissioner Günther Oettinger:

> Frankly, we do not have much choice. The cost of not having an internal energy market is simply too high. We need an internal energy market in Europe to […] be able to reform our energy sector in the next decades to combat climate change effectively.[37]

ASEAN member states also have an interest in preventing the harmful effects of climate change. The region has been affected by a number of catastrophic weather events, including the recent Bangkok floods[38] and a cyclone in the Philippines.[39] Expanding the regional energy grid in Southeast Asia would enable the region to reduce the environmental impact of its energy infrastructure, thus increasing the security ASEAN member states.

[36] See, for instance, Boethius, G. 2011. "Demand Security – The GCC's Side of the Energy Security Coin." Middle East Institute, National University of Singapore. Available at http://www.mei.nus.edu.sg/publications/demand-security-%E2%80%93-the-gcc%E2%80%99s-side-of-the-energy-security-coin

[37] Available at <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/11/614&format=HTML&aged=0&language=EN&guiLanguage=en>.

[38] Financial Times. 31 October 2011. "Thai PM warns flood impact will last three months." Available at <http://www.ft.com/intl/cms/s/0/3a030b56-038f-11e1-864e-00144feabdc0.html#axzz1jZrbaCuv>.

[39] Business Week. 19 December 2011. "Philippine Death Toll Rises in Worst Cyclone in Three Years." Available at <http://www.businessweek.com/news/2011-12-19/philippine-death-toll-rises-in-worst-cyclone-in-three-years.html>.

Figure 3[40]

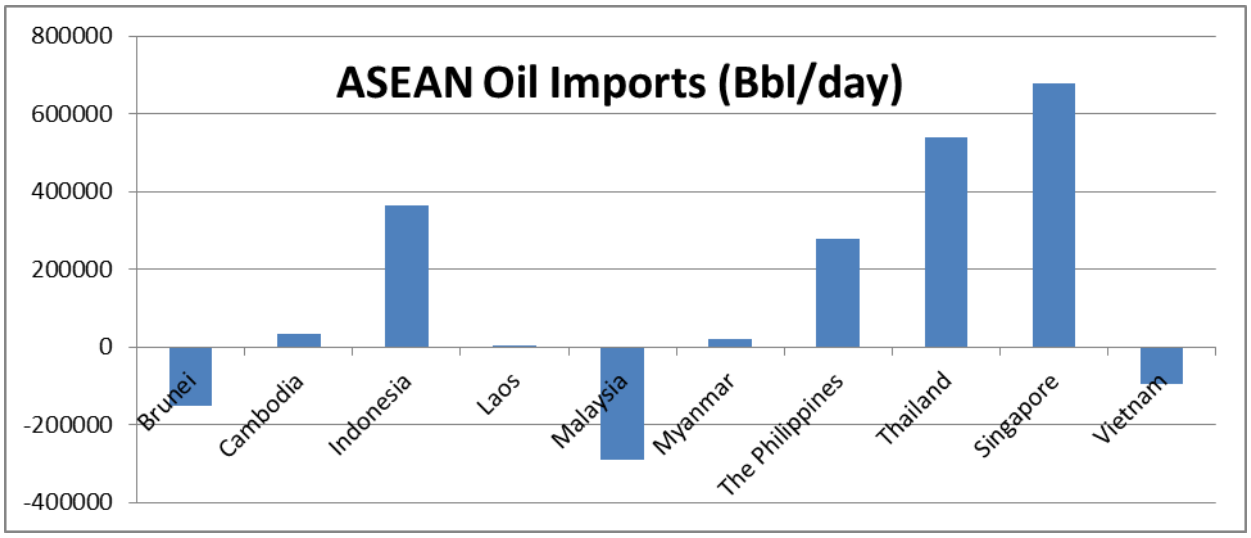
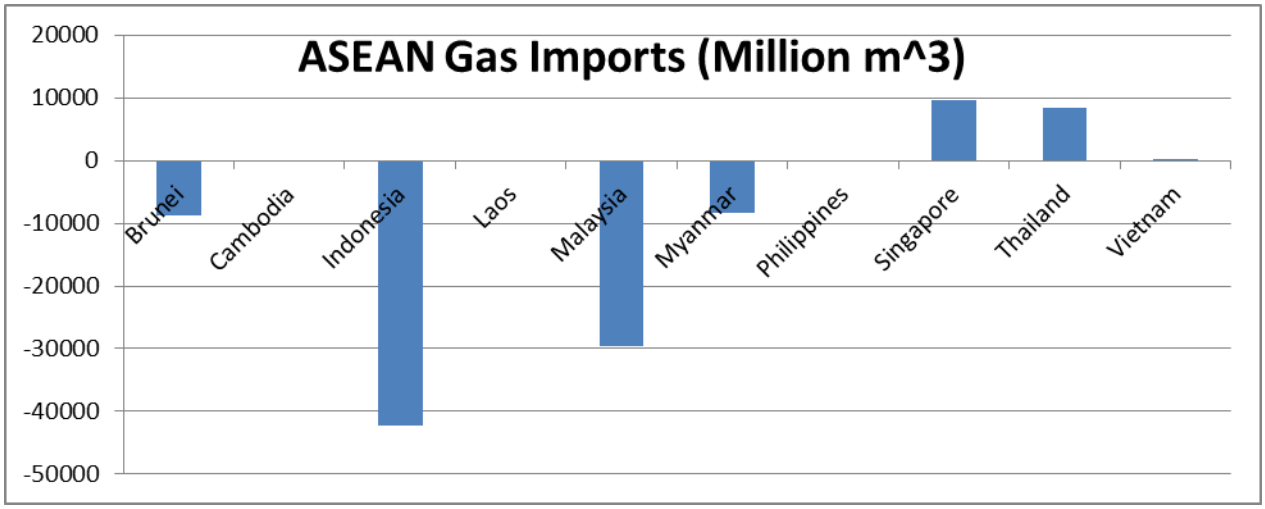


Figure 4[41]



[40] CIA World Factbook, BP Statistical Review of World Energy June 2011.
[41] Ibid.

5.4. The role of national sovereignty

The history of ASEAN contains some significant successes in terms of multilateralism and the search to eliminate common threats to the region's energy security has previously had some success. Regional cooperation on anti-piracy operations have reduced threats to the region's maritime traffic, and such collaboration indicates that the ASEAN member states have the potential to successfully cooperate on other non-traditional security issues, including energy security through greater electricity market integration.

However, the reluctance to yield national sovereignty remains a powerful obstacle to multilateral cooperation in Southeast Asia and is an important factor that reduces the political will to cooperate on electricity market integration in ASEAN.[42] As a result, ASEAN lacks institutions with authority like the European Commission to set regional targets on environmental and energy issues, and all ASEAN members effectively maintain their veto power on regional governance issues. Among other things, this hampers ASEAN's ability to effectively promote the construction of a regional energy grid. However, many analysts of multilateralism in Southeast Asia also maintain that progress on cooperation in ASEAN is made when the region has to respond to a crisis, as was for instance seen in the wake of the Asian financial crisis in the 1990s. Should a similar crisis in energy occur, or should the energy security of the region be perceived by the regional actors to be in danger, this could serve to trigger a greater drive towards more cooperation on energy issues, such as establishing a common electricity market, in the future.

In comparison to the ASEAN member states, the EU members have pooled a significant portion of their sovereignty in a central regional authority. Therefore, the ability of European decision makers to pool sovereignty and pass binding legislation for the entire union on energy matters is a centrepiece in the EU's ability to promote electricity market integration in Europe. For instance, pre-existing trade related legislation has played a crucial role in the EU's promotion of regional electricity market integration. The cross-border transport of physical goods requires a solid legal framework for effective regulations and the existence of dispute-settlement mechanisms.[43] Due to the single market structures established within the EU, these mechanisms are already in place.

6. Conclusion: Comparing EU and ASEAN energy grid governance

Regardless of the much publicised scepticism regarding the feasibility of renewable energy, the global development of renewable energy and regional electricity markets holds a lot of potential. A global energy economy which fully relies on renewable energy sources is feasible. Notwithstanding the initial costs of establishing an effective regional electricity market, the long term benefits, both by increasing energy security and the mitigating the dangers of climate change, are significant. This is increasingly being realised and governments are, in some form or other, planning to make the transition to a more sustainable energy future.

The European case has showed how a variety of policy tools has been utilised in order to further the EU's electricity market integration. It highlights the role that a central regional authority can play in such projects. European laws on energy and environmental issues are forcing the EU member states to interconnect their electricity markets and to increase their use of renewable energy technologies. An active engagement with private sector players and private investors also serves to drive the European electricity project forward.

Perhaps the most important factor behind European cooperation on the integration of the region's electricity markets is the common ground that the EU member states share on energy consumption. The homogeneity of the European energy scene in terms of its dependence on foreign oil and gas makes the decision making process on energy matters relatively easy. Being a union of energy consumers, it is in the shared interests of members of the EU to facilitate the growth of their renewable energy sector by providing improved market conditions for these technologies, thus improving their energy security by reducing their dependence on imported energy. Moreover, other economic incentives and fears about global warming are further motivating the EU member states to integrate their electricity markets.

[42] The impeding effects of sovereignty issues on Southeast Asian multilateralism has been explored by a number of authors. See for instance Jones, L. 2011. "ASEAN, Sovereignty and Intervention in Southeast Asia." Palgrave Macmillan.

[43] See, for instance, Redgwell, Catherine. "International Energy Security" in Barton, B. Redgwell, C. Rønne, and A. Zillman, D. N. (eds) "Energy Security: Managing Risk in a Dynamic Legal and Regulatory Environment." Oxford University Press. pp. 18-21.

To a significant degree, the ASEAN case supports the findings of the case of the EU. Despite a professed will to tackle the challenges of energy security and climate change, significant progress on establishing a regional electricity market in ASEAN has not been forthcoming. The lack of a central authority makes the Southeast Asian nations dependent on complex inter-state arrangements to interconnect their energy grids. No regional legislation exists to compel these nations to adopt a larger share of renewable energy production and economic disparity and intra-state conflicts pose further obstacles to a functioning electricity market in the region. But above all, divergent energy interests within the region are perhaps the most significant impediment to the realisation of a regional electricity market in Southeast Asia, where some nations benefit from their neighbours' demand for fossil fuels. The lack of common economic interests on energy in the ASEAN region, therefore, is one of the main reasons for the relative lack of effective electricity market integration and energy grid governance in Southeast Asia.

A further question concerns the importance of central regional authorities in the establishment of regional electricity markets. Due to the physics of electricity networks, various hubs must be created to control the functioning of a regional energy grid. If the grid extends beyond the borders of two or more nations then sovereignty of control over the grid must be yielded to the grid operator so that it can function properly. However, during the construction phase of the energy grid the role of regional organisations is theoretically less important. Although a significant level of coordination on the technical aspects of the grid project is required, this can be achieved by interstate cooperation. Nevertheless, regional organisations have the potential to boost the development of regional energy grids. As the European case illustrates, EU laws and directives on energy and environmental matters have been essential in driving the development of common electricity markets. These legal constraints have given the member states no choice but to cooperate on energy matters, including energy grid interconnection, at the regional level.

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