An Energy (Dis)Union
Challenges and Opportunities in Europe's Emerging Energy Market

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Introduction

This paper examines the opportunities and challenges surrounding the creation of a common energy market within the European Union (EU). With particular attention to contemporary economics, current politics and European history, it will identify the frictions and missteps that have kept the internal market from being truly unified.

The formation of the EU brought with it four fundamental freedoms: The free movement of goods, services, persons, and capital. While not explicitly mentioned, energy and its accompanying infrastructure fit well within the parameters of these four freedoms. Failure to include energy in unambiguous terms in the founding documents of the EU, combined with the growing demand for energy in all its forms, created a necessity for the further development of an integrated internal market. This new project of the European Commission, known as the energy union, envisions new institutional, market and operational structures meant to unlock Europe's capacity to find, produce, import, refine, store and deliver energy seamlessly among its Member States.

The energy union has several goals, including lowered carbon emissions, greater reliability, more efficient connectivity, less expensive energy for consumers, and improved overall energy security. While the Commission lauds the plan, the multitude of political objectives within it constitutes a major roadblock to the realization of a single energy market. For example, a focus on de-carbonization decreases efficiency, which in turn reduces savings for consumers. Conflicting priorities like these pose a considerable challenge to an otherwise worthy and ambitious project and highlights the lack of unification and coordination within the current European energy markets.

The overarching mentality of solidarity characterizing the EU is the very catalyst for an energy union. All members would reap the benefits of shared resources, and several members would benefit dramatically, given the opportunity to overhaul domestic energy markets. Imagine a Europe where energy infrastructure enables the free and efficient transfer of renewables and fossil fuels from one part of the continent to the other. The benefits are obvious; a stable internal market system, which enhances each Member State's energy advantages (e.g., wind in Denmark, coal in Poland), while remedying supply and other gaps each member would struggle to bridge on its own. A truly European market would result in adequate supply across a widely synchronized grid and the ability to manage a continent-wide fuel and infrastructure mix efficiently. Cooperation and collaboration in every sphere, including energy, is essential to achieving the levels of integration European countries seek

to accomplish. This sense of unity, however, is sometimes undermined by minor disputes between Member States or differences in national interests.

Europe's internal energy union is a work in progress and will need continued support and guidance for successful future implementation. This paper also provides policy recommendations to assist in the successful creation of a unified energy market, taking into consideration the issues mentioned above.

These recommendations include, but are not limited to the following:

1) *Creation of a single institution dedicated to the promulgation, implementation and oversight of energy policy, and the integration of infrastructure;*
2) *Increased financing for energy infrastructure and connectivity;*
3) *Enforcement of integration deadlines;*
4) *Full exploitation of Europe's geographical layout to maximize production of renewable energy;*
5) *Creation of interconnected regional grids;*
6) *Acknowledgment and usage of natural gas as a significant bridge fuel.*

Historical Perspective

The EU is an economic, geo-political, and governmental coalition developed to unify the states of Europe. Consistency and cooperation are central to the function and purpose of the EU, and these elements contribute to its advancement. The recent objective of the EU to form an internal energy market will strengthen interconnected energy infrastructure and improve economic, environmental, and political conditions within the Union. The newly proposed energy union has lofty goals. Unfortunately, many question the EU's capacity to achieve the high-level cooperation required to make the energy union a reality and doubts have been deepened by the numerous missed deadlines regarding important milestones of the project. The energy union ushers in a new level of 'Europeanization', with policy implemented from the top, which benefits the entire continent (FleishmanHillard, 2015). While the energy union will obviously require action by the individual Member States, the EU governing bodies must act forthrightly to set the tone and criterion.

Europe faces two overarching issues within its energy sector, the lack of diversity in energy production, and its dependency on Russian supply (European Commission, 2015). Reliance on Russian natural gas has led to price increases for consumers throughout much of eastern and central Europe over the course of the last decade (EIA, 2014). Furthermore, a lack of adequate infrastructure has prevented sharing or trading of excess electricity and natural gas among states (European Commission, 2015). These factors originally caused former Polish Prime Minister Donald Tusk to propose the Energy Union (FleishmanHillard, 2015). As a result, European states, councils, and committees have called for a 10 percent interconnection of European energy infrastructure since 2002. In the last 13 years, demands for the 10 percent interconnection have been reiterated, but little progress has ensued. With the original 10 percent deadline passing, the latest plan released in February 2015 sets the new EU goal to be implemented by 2020 (FleishmanHillard, 2015). To achieve this, each country must prove its infrastructure is integrated up to 10 percent within the wider grid. These interconnections are only one part of the larger energy union package, which seeks to bring Europe into a more efficient, effective, and less carbon-intensive future.

Regulations such as the Trans-European energy network (TEN-E) in combination with the priority interconnection plan (PIP) and projects like the Baltic energy market interconnection plan (BEMIP) have demonstrated resolve to bring the European grid into a new paradigm. Physical progress, however, has not kept up with the rhetoric as 12 countries are still below the targeted interconnection level (European Commission, 2015). Before the inception of the TEN-E regulations, which set a three and one-half year cap on permit reviews, it took on average 10 to 13 years to obtain a permit for granting new infrastructure projects. The new framework has proven to be an effective policy for energy infrastructure development (European Commission, 2015). However, the regulations lacked checkpoints or enforcement mechanisms to ensure projects are completed

in a timely manner. Significant advancements have been made, with some countries exceeding the interconnection level, but it is projected 3 countries will miss the 2020 deadline and remain below 10 percent. This projection underscores the lack of unity in the proposed energy union. So ambitious a framework will remain a dream if the institutions involved do not demonstrate an intention to exert strong leadership and an ability to quickly address the needs of members who struggle to adhere to energy union goals, particularly when default on their commitments are highly foreseeable.

Current European politics and economics are a challenge to forming an integrated energy network

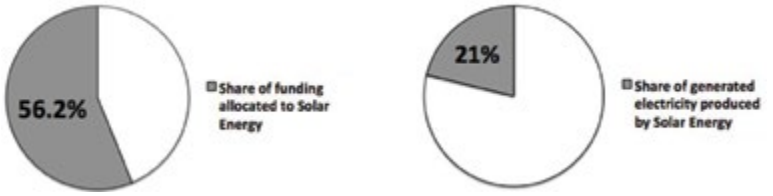
According to the European Commission, "A European approach is expected to result in lower costs and more secure energy supplies when compared to individual national schemes" (European Commission, 2015). Just as the EU has struggled with financial discipline for member countries, consistent and clear energy policy has been difficult to maintain. Energy policy determined at both a higher and broader European level, must reconcile 28 distinct regulatory frameworks underneath, where implementation of policy can be inconsistent and unpredictable. Acknowledging the lackluster condition of European energy, the European Commission stated in its report on the energy union, "We have to move away from a fragmented system characterized by uncoordinated national policies, market barriers, and energy-isolated areas" (European Commission, 2015). With energy islands, low cooperation, and different regulatory standards, the EU is not currently structured for its members to be in sync. Integrating the interests and policies of individual countries with the regional plan will be key for the energy union.

Misaligned Goals: Environment versus Efficiency

Renewable energy investment is a central theme of the energy union, heralded both as a means and as an end goal of the comprehensive project. As the European Commission states in its report on the energy union, "The goal of a resilient energy union with an ambitious climate policy at its core is to give EU consumers - households and businesses - secure, sustainable, competitive and affordable energy" (European Commission, 2015). However, the ambitious climate policy core creates a dichotomy between efficiency and environmental protection, which manifests itself when policies are implemented. Shifting from coal and oil to natural gas increases efficiency and reduces environmental impact (EIA, 2015, Downey, 2012). Natural gas produces about half the carbon pollution that coal produces (EIA, 2015). Improved production and distribution of natural gas could further promote efficiency while lowering Europe's current carbon footprint. In the energy union plan, however, interest in solar, wind, and other renewable energy sources takes precedence. In the long run, Europe could put just as many, if not more, carbon emissions into the environment in the course of its interconnection by making a shift to less efficient renewable sources and ignoring the benefits of natural gas for the midrange (Jorge & Hertwich, 2014).

While one may argue the finer points as to whether the United States has truly adopted an 'all of the above' energy strategy, it cannot be denied that country is focused on efficient production, transportation, and costs. The result of this policy is clear: lower consumer prices, higher output, and lower carbon emissions. The latter is especially instructive given the U.S. has focused on fossil fuels (EIA, 2014). Leaders in Europe refuse to acknowledge natural gas, or improved infrastructure, as a short-term or midterm solution while developing alternative energy sources. In choosing to use renewable energy sources in an effort to protect the environment over more cost-effective and efficient fuels, Europe is attempting to implement a long-term solution under a short-term timetable. This confusion of priorities has led to delays for more than a decade. Efficient energy production from renewable sources only

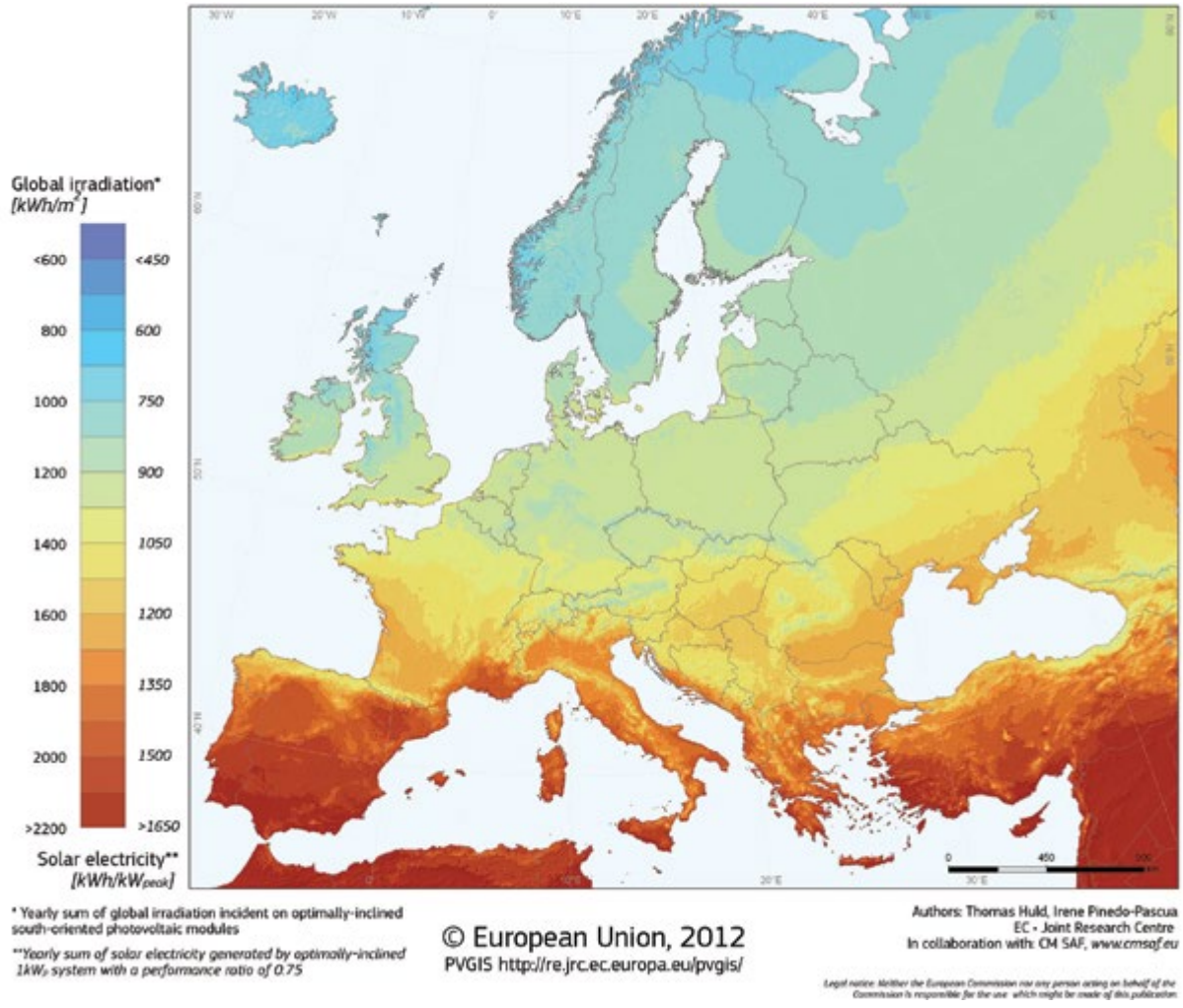
Figure 1
(source: Neubacher and Schroder, 2012)



becomes economically viable after decades of infrastructure investment, such as the extensive wind network in Denmark (Nelsen, 2015). These wind farms in particular have the lowest marginal cost in Europe, but only as a result of 40 years of investments (Lund et al, 2010). It is simply not practical for the rest of Europe to feasibly duplicate this result in the short-term. Furthermore, the lack of interconnection prevents the excess power from Danish wind farms from reaching Germany and other nations.

A major focus in parts of Europe is placed on solar energy. Solar panels are especially favored in Germany, where they are heavily subsidized. In 2012, the photovoltaic industry received more than 50 percent of German energy subsidies while only producing approximately 20 percent of the energy generated (*Figure 1* (Neubacher and Schroder, 2012). While solar energy is effective and results in low carbon emissions, state-of-the-art solar panels currently achieve less than 30 percent efficiency (Honsberg & Bowden, 2011). Intense focus on solar to the exclusion of other sources is costing Germany, and failure to integrate infrastructure systems across the

Figure 2 *- Photovoltaic Solar Electricity Potential in European Countries*
(source: Neubacher and Schroder, 2012)



continent is costing other countries within the EU. In the rush toward renewable energy, many countries have overlooked advances in efficiency of fossil fuels, which could ultimately reduce carbon emissions by comparable amounts.

In addition, much of Europe's climate is not sustainable or suitable to fully utilize solar energy. The region hosts prolonged low-altitude cloud and fog cover and large amounts of snow, which reflect sunlight (NASA, 2015). *Figure [II]* provides information on global irradiation levels and solar electricity in Europe.
Although Germany has led the implementation of solar energy technology in Europe, statistics show potential for high levels of photovoltaic solar electricity production in the area is not likely and is therefore not an effective source of solar power production compared to areas of southern Europe. This is reflected in *Figure 2,* which forecasts a much lower level of production when compared to southern Europe.

While the photovoltaic solar electricity potential in Germany is approx. 900 kWh/Kw, states such as France, Spain, Portugal, and Italy have rates ranging from 1650 – 1350 kWh/Kw creating a more well-suited environment to take on the solar energy industry *(European Union 2012).* This is not to say solar investments are ineffective. But solar might not be the most efficient energy source for significant parts of the EU which, ironically, are investing most heavily in this fuel type. Effectively using Europe's geography in order to maximize energy production is an essential part of creating an effective and efficient energy union

The focus placed on renewable energy production in the EU is a necessary component but could potentially prove disastrous if planning is not prudent. The root of this ideology can be found in the very documents constituting the EU. Article 194 of the Lisbon Treaty of 2009 states, "While the main principles and objectives of EU environmental policy remain largely unchanged, the Treaty reinforces the EU's commitment to sustainable development, the fight against climate change, and development of renewable energy sources." Confusing renewable energy with efficient or cost-effective energy contributes to the misalignment of the goals for the internal market. Claiming green energy as a goal is legitimate, but to use green energy for consumer savings and interconnection is inconsistent.

An economic perspective: Cost, time, and efficiency

More than 10 years ago, when 10 percent interconnection was being pushed, a report by The Commission of the European Communities estimated the interconnection plan would cost approximately 30 billion euros by 2013. The energy union package passed in 2015 and placed the 10 percent interconnection at 40 billion euros for scheduled completion in 2020. Logic should dictate that the interconnection plan is now less expensive. After all, innovation and technological advances over the last decade should decrease input and capital costs. Additionally, a significantly larger amount of new infrastructure should have been constructed in recent years, reducing the amount needed to reach the 10 percent level. Why then has this cost estimate increased? The probable answer is

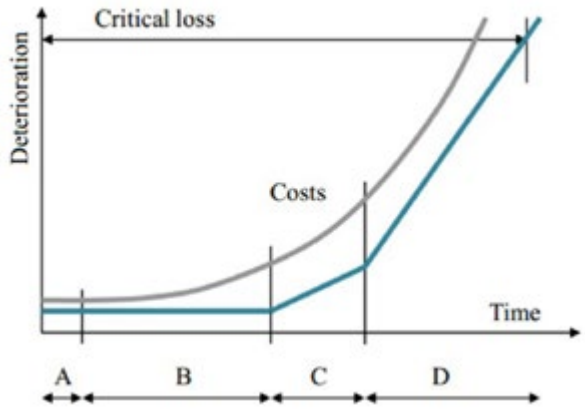


Figure 3 - Infrastructure Phases
(source: Mirza, 2007)

Phase A - Design and Construction
Phase B - Initiation of deterioration
Phase C - Increasing deterioration
Phase D - Accelerated deterioriation requiring replacement

that infrastructure becomes more expensive to replace or repair as time passes (Mirza, 2007). In fact, the relationship between time and cost is not linear, but exponential. Problems and weaknesses compound and the deterioration process accelerates (*Figure 3)*

Energy hardware exposed to the elements deteriorates and requires regular maintenance. If aging infrastructure is presenting a challenge to the Energy Union plan, then the EU is losing large sums of money by prolonging the project. A recent International Energy Agency report estimated investments in the power sector made after 2020 would cost 4.3 times more than those made before 2020. Ultimately, the sooner European states decide to complete this project, the better, considering investments made 25 years from now will have to compensate for aging infrastructure, not to mention the foregone consumer savings and reduced emissions. Investments are not unrecoverable sunk costs, which the government and its people will lose by allocating money to infrastructure. In fact, the returns on these fundamental infrastructure projects will externalize in legitimate consumer savings on energy and more sustainable energy transmission for the international grid.

Strength of a country's economy

Countries within the EU vary immensely in financial performance and economic capacity. Those with lower national incomes tend to have weaker infrastructure and need more investment and attention in the energy sector to participate in the integration plan. In some cases, these countries lack the resources to update their transmission lines and power plants. In order to identify important goals, the projects of common interest (PCI) program provides funding and regulatory relief to new construction and improvement undertakings. The PCI financial assistance will be critical to countries that lack the means to develop their infrastructure on their own. In addition to this, the European network of transmission system operators for electricity (ENTSO-E) acquired authority in 2009 from the EU's Third Legislative Package for the internal energy market. This association is composed of 41 electricity transmission system operators, which work together to facilitate the implementation of EU energy policies and market development (ENTSO-E, 2015). The internal market will not emerge simply by requiring it to do so. The lesser-endowed states will require regulatory, financial, and construction relief. Therefore cross-border financing and assistance, as well as corporate and intergovernmental funding will be necessary.

Consumer Impact

The call for electrical grid integration is projected to lower costs for all consumers. Across Europe, consumers have been at the mercy of both poor integration regulations and Russian aggression for years (Larsson, 2006). If more energy production facilities across the continent were interconnected, basic supply and demand equations dictate households would have considerably lower electricity costs. Moving electricity across borders reduces the higher costs of inefficient power plants and allows excess power to be used promptly. The market equilibrium encourages energy to be imported from across the continent at a cheaper rate. Consumers would benefit from the increase in supply and utility options, which would drive prices down. In terms of natural gas dependency, many consumers pay the price for poor government decisions. Russia's powerful influence in the natural gas market, and its ever-increasing policy of utilizing its leverage to disrupt supply to former Soviet states cannot be overlooked. (Shaffer, 2012). It must also be mentioned that such activities by Russian owned entities are unprecedented, even by cold war standards of conduct.

The inclusion of natural gas in the energy union plan helps lower dependencies and costs for countries by diversifying the market basket and increasing supply by opening up to new suppliers, such as the U.S, which is currently experiencing a boost in supply. The European Commission in its report on the energy union states, "a similar [interconnection] target for gas would not make sense." Practically, however, natural gas interconnectedness would be just as effective as electrical grid integration. When a country has an insufficient supply of natural gas, a bordering nation could reconcile it with its own supply. Improving pipeline infrastructure benefits European consumers and industry by lowering costs and dependency on imports from Russia.

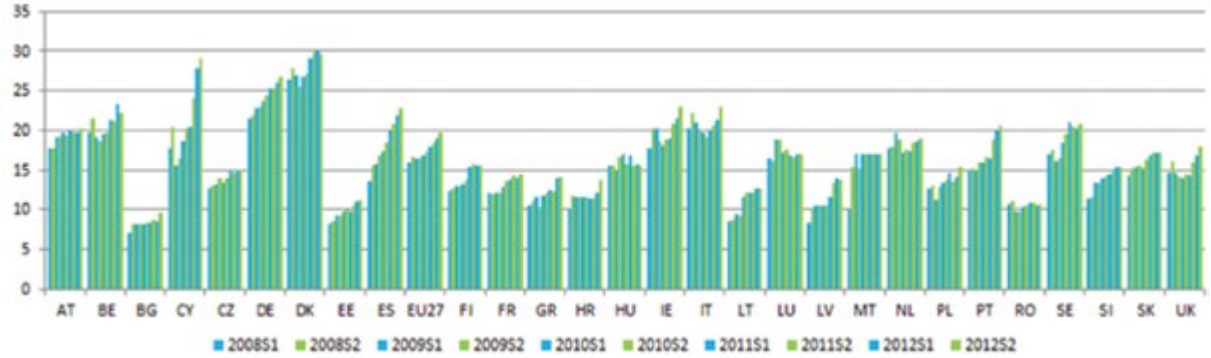


Figure 4 *- Household Electricity Prices (€c/kWh incl. taxes) (source: Eurostat Energy Statistics)*

Figure 4 from Eurostat displays the rise in cost of household electricity consumption over a five-year period. The average increase is four percent, which is beyond the influence of inflation. These cost increases should be seen as directly resulting from Europe's failure to implement the interconnection plans over a decade ago. An integrated grid in Europe would have been more resilient to harsh weather conditions, economic instability, and manipulation by foreign trade partners. Instead, every country in the EU saw price increases caused by a variety of factors.

As previously mentioned, the longer European states wait to make critical investments, the more costly the plan becomes, in both accounting and economic terms. The opportunity cost of waiting is, among other impacts, years of increasing energy prices and supply volatility. As the EU strangles itself with more stringent carbon standards, achieving those standards without investing in a sustainable grid will become far less practical. Eventually, if the EU decides to cut emissions by 95 percent, it will not have the proper infrastructure to allow the renewable energy it produces to reach the consumer.

European Power dynamics

Today's EU has emerged from an initial union of the Benelux (a politico-economic union of Belgium, the Netherlands, and Luxembourg) to include diverse states spanning parts of northern, southern, central, and eastern Europe. Although Europe share common values to a certain degree, today's union comprises a greater variety of economic circumstances, and cultural, political and other values. The increasing diversity of interests among among members of today's EU have begun to pose some of the union's its most serious challenges to cooperation, including the Energy Union project.

For example, many central European states such as Poland still depend on inefficient coal-fired power plants. Approximately 90 percent of Polish electricity (and 70 percent of the nation's carbon emissions) comes from coal-fired power plants (IEA, 2011, Ottery, 2013). These plants produce a relatively larger carbon footprint and a lesser marginal energy production when compared to natural gas-fired plants, nuclear, or hydroelectric generators in other countries. In contrast to this, its neighbor Germany has a far superior economy and power grid, with a strict focus on renewable energy as mentioned earlier. Although a plan to interconnect would reduce the need for the less efficient coal-fired plants and allow energy to be transmitted from more efficient foreign plants, many issues lie in the way of such integration.

In cases like this, countries lagging behind in technology such as Poland may find it in their economic interest to remain disconnected from a European energy union. The plan would see Poland reducing its coal output to rely on neighboring plants. For the Polish people this may have positive outcomes such as lower energy costs and increased efficiency, but this must be weighed against the loss of jobs at the power plants. Poland has 56 coal-fired plants, which collectively contributes 152 megatons of carbon emissions annually, making it difficult and for many, costly, for Poland to adapt to the energy union plan for emission abatement (Ottery, 2013). In 2012, the hard coal industry accounted for over 113,000 jobs, while lignite employed

more than 15,000 (EURACOAL, 2013). Strict carbon standards would threaten Poland's energy sector and economic vitality.

Situated next to Poland, Germany has a strong focus on renewable energy and the ideal opportunity to share its energy production with Poland. Given the countries' differing ideology on clean energy, Germany and Poland may not be able to easily reach a compromise on energy supply. It's possible that Germany would insist on strict environmental standards in Poland, which could potentially hurt its economy. At the same time, Poland may not want to sacrifice the coal industry, which supplies many jobs and provides an income.

In addition to such conflicting goals of domestic policy, issues of trust between states tend to plague the European region. Western Europeans still tend to carry a questioning perception of their eastern European states and citizens. Sharing a fundamentally important resource, such as energy, would therefore raise questions of how much states should trust others when doing business together. Whereas Germany could fear their energy will be misused by Poland, Polish citizens may blame Germany for the loss in jobs and income if Poland were to open up its energy market. It has already been discussed how certain countries in Europe seem to be failing at meeting the energy grid standard set forth for a successful energy union. This paper also highlighted the fact that the institutions of the EU do not appear to have any concrete answers to this issue. This factor may also be explained in terms of European political culture, wherein citizens of the the more prosperous western nations view their neighbors of the former Soviet bloc, at times, as a burden to the West. Poland and Germany serve as prime examples and are a small cross-section of the divergence of priorities and cultural and political dynamics between eastern and western Europe. Generally, western Europe is more concerned with climate policy, while southern and eastern Europe are more concerned with energy security and economic growth.

EU environmental policy seeks to decarbonize the European economy and energy practices. This would permanently strip Poland of its coal industry, something the Polish would want to delay. These differing priorities among the many EU countries stands in stark contrast to the goal of uniting an internal market. Each country wants to reap the long-term benefits of a fully developed internal market, but also wants to safeguard their national interests and avoid the short-term costs.

Pathway to the Future

Reaching a mere 10 percent interconnection by 2020 is only possible if Member States are willing to take the significant and concrete steps required to create a framework toward integration. While 10 percent is certainly not a significant number in terms of overall integration, the first steps will be the hardest as the path toward cooperation and alignment of resources required at this stage will serve as a framework for future progress. Previous schedules have failed simply because they were too aspirational and did not practically navigate the issue. In the 2015 energy union package, the EU made an ambitious goal to achieve 15 percent interconnection by 2030, even before reaching the 10 percent benchmark in 2020. If these goals are met, it will set Europe on the path toward its 2050 climate objective. The EU may be seen as having a tendency to be farsighted with policy by setting ambitious long-range goals, but failing to take the necessary immediate action to achieve them. Therefore, the future of the European energy markets, while deliberately planned, are dependent on present action.

In the foreseeable future, Europe will most likely shift away from carbon-intensive transportation and energy generation. The automotive industry will turn increasingly electric as tighter CO_2 emission standards take effect. Expanded use of solar and wind power is well underway in several countries and is being integrated into each state's grid. It is envisioned that the interconnection plan will function like energy osmosis, allowing areas with a high concentration of power to disseminate electricity to low-concentration areas. This type of unconstrained energy trade will allow for a more efficient market and help lower costs for consumers. As the European Commission puts it, "With a common energy market, energy can be produced where it is cheapest and delivered to where it is needed" (European Commission, 2015).

Technological innovations are allowing new opportunities for energy production, transmission, and consumption. Research and development are promoted as critical in the package, indicating Europe's intention on being the leading technological power in the field of renewable energy. Computerizing the electrical utility grid will enhance the efficiency of electrical transmission (ETP, 2013). Smart grids are the future of the electrical grid and will help Europe by increasing the efficiency and effectiveness of its newly interconnected grid. Utilizing two-way communication through computer processors in the smart grid, utilities send information directly to the consumer and receive information back. This allows the utility to adjust and control for discrepancies and demand. The grid can self-identify malfunctions, which reduces the need for manpower and the potential for human error incidents.

Consistency and cooperation are central to the EU mindset and will be pertinent when forming an integrated energy union

An Alternative Framework

The rest of the developed world does not necessarily reflect the choices and values of the EU. Trade agreements and grids give insight to the priorities of those states. In North America, energy trade is given precedence over issues like climate policy. The United States, Canada, and Mexico determined that allowing the flow of energy through the continent would benefit each country. In the North American Free Trade Agreement, this attitude is laid out prominently. Chapter 6 of the agreement, in article 601 states, "The Parties recognize that it is desirable to strengthen the important role that trade in energy and basic petrochemical goods plays in the free trade area and to enhance this role through sustained and gradual liberalization." This contrasts with the EU treaties, which do not directly mention energy trade at all.

The electrical power grid showcases the cooperative nature of the American continent. The comprehensive grid includes two major and three minor alternating current (AC) power grids. The eastern and western interconnections are the main systems, which each extend from the southern border of the U.S. into Canada. The Texas, Alaska, and Quebec interconnections are the minor grids, but operate on the same synchronized frequency as the primary systems. In rare cases of grid failure, power can be diverted from one interconnection to another by direct current (DC) ties. The energy trade, including electricity and petroleum products, is permitted by the free trade parameters. The written framework allows the energy policies of the U.S. and Canada to work in unison. The founding legislative documents of the EU are actually counterproductive in this regard and act to restrain this type of unity. The governing body of the EU is not empowered to compel the integration of grid interconnections, which would require an amendment to the treaties. In fact, the EU simply pushes an agenda that must be accepted and ultimately implemented by individual states.

The EU tends to be very goal oriented and focused on strategy instead of practical action. David Buchan, a Senior Research Fellow at Oxford Institute for Energy Studies explained that, "embarrassingly for Europe, the U.S. has no climate policy and their carbon intensity is decreasing and Europe *has* a climate policy and its carbon intensity is increasing" (Buchan, 2014). The theoretical mindset in Europe is contrasted by political action across the Atlantic. Not only is action and initiative a weakness for the EU, but it must also coordinate with 28 states. Action sometimes occurs in individual states but that action is not always in the direction that EU policy prescribes.

In many instances, the European states refuse to work together, and instead pursue independent paths to the same eventual goal. As exemplified in previous sections, the EU as a whole is fractured geographically, politically, and economically, which resonates in the development of a truly unified energy market. This is the true state of an emerging *energy disunion*.

Policy Recommendations

1. *Creation of a single institution dedicated to the promulgation, implementation and oversight of energy policy, and the integration of infrastructure;*

A multitude of institutions within the EU structure currently handle the energy union project. Therefore, the project lacks clear communication, efficiency, and leadership causing the interference of many state and non-state actors, deadlocks, and delays. The creation of one dedicated institution to over-see the project will provide for accountability and a structured process to implement integration in a timely and effective manner, taking into account the opinions of key players. This institution would also be able to carry out enforcement, financing, and production planning actions that will be further expanded upon below.

2. *Increased financing for energy infrastructure and connectivity;*

To truly become the energy union, Europe must work together and assign resources to areas with the greatest need. This paper has attempted to establish how differences in national income levels and difficulties in financing infrastructure projects has served to impede the formation of an Energy Union. In order to circumvent this problem, more cross-border financing options should be made available to states. Programs such as the projects of common interest (PCI) and the European network of transmission system operators for electricity (ENTSO-E) should be sponsored and encouraged by the EU in order to ensure states reach the necessary level of grid infrastructure needed to join the energy union. The institution mentioned in the first recommendation could oversee these programs.

3. *Enforcement of integration deadlines;*

When analyzing the timeline of the energy union project, it is apparent delays are commonplace. Deadlines are constantly pushed back or adjusted, for a variety of reasons, but mainly the self-interest of individual states. Therefore, strict enforcement mechanisms are necessary to carry out mandatory deadlines for states to reach the necessary levels of grid infrastructure integration. This recommendation would be most effective with the creation of a specialized institution to oversee the energy union.

4. *Full exploitation of Europe's geographical layout to maximize production of renewable energy;*

Europe covers a wide geographic area with varying landscapes. Each region in Europe has different resources and levels of capacity for the production of renewable energy. For example, states in southern Europe would be more suited to produce solar energy than those in the north, in contrast with northern European coastal zones more suited for wind. Identifying these areas, reorganizing energy production, diverting the necessary resources to produce this energy, and effectively transporting it out into the rest of Europe, would greatly aid the European energy grid. It would maximize the utility of renewable energy sources and reduce costs for consumers. Within this system, supply and demand would be balanced by regulating a certain percentage of energy from a specific source.

5. *Creation of interconnected regional grids;*

In addition to the previous recommendation, regional grids could create an efficient system of energy connectivity throughout portions of the continent. Each regional grid would then be connected to adjoining regional grids as a first step toward a unified grid. These regional grids would be the first step in creating one unified energy union. It would also assist countries with varying levels of energy infrastructure still needed to participate in the energy union project. Once established, the regional grids can then be developed within a given timeline to reach the ultimate goal of a technologically advanced, integrated European smart grid for the reliable and affordable transmission of electricity, natural gas, etc.

6. *Acknowledgment and usage of natural gas as a significant bridge fuel.*

Despite its promise, natural gas has been largely ignored as an energy source within the framework of the energy union. It is, however, an ideal bridge source of energy to supplement renewables until the necessary infrastructure for the sharing of renewable energy is completed. Natural gas is widely available from suppliers

other than Russia, including the U.S, providing renewed options to reduce the cost of energy to consumers. With the energy export ban in the U.S set to come to an end within the next few months, Europe could greatly benefit from including LNG as a source of energy worth including in the energy union.

Conclusion

The EU's energy union faces many challenges. These include a tradition of collective inaction or hesitation due to economic and other domestic interests, varying goals related to renewable energy, and historic, social and cultural barriers to cooperation. Perhaps more damaging, at the federal level, there is a tradition of failure, with the EU calling for sweeping continent-wide policies, without first putting in place the necessary mechanisms for the implementation by Member States. EU members need to clearly define their goals, synchronize priorities, and take initiative to develop an internal market. There are currently too many conflicting goals, which are not consistent across the Member States. Bilateral relationships are strained in places and healthy in others, but are overly inconsistent.

Each EU member must recognize that it is responsible for part of the goal and must make it a matter of national significance to achieve it. The issues currently faced by the energy union echo the issues that arose during the formation of the EU itself, therefore it can be expected that with time, the Energy Union will succeed, but only if Member States are willing to take up the cause and work toward it together.

About the author

Brigham A. McCown is the Chairman and CEO of Nouveau, Inc., a Washington, DC-based advisory firm. He is also the Chairman and CEO of the U.S.-based non-profit, Alliance for Innovation and Infrastructure (Aii). Brigham previously held various senior executive posts in the U.S. Government, including a leading role regulating the nation's energy and dangerous goods transportation. He is also an accomplished attorney, having practiced international trade, environmental, energy, and transport law. Brigham previously served as the federal government's top commercial truck and bus attorney, and was responsible for implementation of the surface provisions of The North American Free Trade Agreement (NAFTA) with Mexico. In addition to his federal civilian service, he completed twenty-nine years of active and reserve service as a commissioned naval officer and naval aviator. Brigham earned his Bachelor of Arts degree from Miami University (Diplomacy & Foreign Affairs/EU Security), earned a Juris Doctor from the Salmon P. Chase College of Law, and has twice appeared before the United States Supreme Court.

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