

Transnational power transmission and international law

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r.plaza@student.unimelb.edu.au**ABSTRACT**

Power transmission networks are crucial. Every country requires the means to transport and deliver energy, whether produced locally or in foreign countries. The paper deals with transnational power-transmission networks, those aimed at delivering energy across borders. It considers the challenges posed by transposing to the legal and regulatory fields the unique features of power grids in order to foster transnational network interconnections and unrestrained power transit under international law. The European Union 2020 Energy Policy and the European Transmission System, though still unsuccessful in achieving the creation of a single electricity market, serve as a case study for an enhanced model of regulation, with emphasis on the enforceability of power trading and transit across national borders. The research advances that a well-framed, technically-based, dedicated scope for transnational power grid interconnections and energy transit, at regional level, into ongoing international trading schemes such as the WTO or an improved Energy Charter Treaty, would further international power trading and synchronisation of energy matrices as drivers for international law to achieve greater legitimacy and enforceability.

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I. INTRODUCTION

States are compelled to make decisions on what power generating sources will drive their economies and how to structure them to meet increasing power demand and other political goals, such as energy security. It is apparent that, at least at domestic level, every country requires means to transport and deliver energy produced by its own sources. While the kind of energy sources available may vary widely depending on each country's particular conditions, the need for a power transmission network is unavoidable.

This enquiry deals with transnational power-transmission networks. Using a multidisciplinary approach, it aims to explain the main features of power grids and the legal aspects embedded in international power transmission operations. It considers the international law challenges posed by transmitting electricity cross-border, as well as how some of the grids' unique features might be effectively transposed to the legal and regulatory fields to foster networks interconnections and secure cross-border unrestrained transit of electricity. The European Union 2020 Energy Policy and the European Transmission System serve as a case study as well as a potential approach for a single power market's enhanced model regulation, with an emphasis on the enforceability of power trading and transit across national borders, policy concerns coming from cross border disputes, and examples of how the system works in practice.

Through the comparative analysis of a particular regulatory system: Brazil, the paper aims at assessing transnational (European Union) and international (European Energy Community and Energy Charter Treaty) schemes as to their potential to foster cross-border power grids interconnections and unrestrained power transit in regional non-integrated contexts. This paper advances the view that part of the answer as to why countries are reluctant to interconnect their power grids are legal factors inducing certain types of energy matrices mostly based on the use of carbon-based sources, as well as the use of traditional understandings of sovereignty.

The paper ultimately proposes that a well-framed, technically-based, and dedicated international legal scope for transnational power grid interconnections and power transit into ongoing international trading schemes would further both international trade as a driver for international law to achieve greater acceptance and, thus, enhanced enforceability.

II. POWER TRANSMISSION NETWORKS

The theme of this section is the transnational power transmission. It explains the main features of power grids and how they might be effectively transposed to the legal and regulatory field in order to foster interconnections. It examines the legal nature of international power transmission operations, and the challenges posed by transmitting electricity across borders. In the light of this thematic perspective, the European Union serves as the paradigm for a regulatory approach to the matter. The analysis explores the EU 2020 policy, the European Transmission System, and the efforts towards creating a single power market. The focus of the analysis is on the EU legal framework for power-trading with, and transit across non EU-countries, whether through bilateral legal mechanisms (like Cooperation and Energy Integration Agreements) or multilateral tools (like the Energy Community Treaty and the Energy Charter Treaty (ECT)).

The following sections provide an overview of power transmission, its elements, and features as well as some regulatory conditions making international power transmission possible. It will attempt, finally, a legal conceptualization and classification of power transmission networks.

II.1. Transmission and power grid elements

Transmission (from Latin *transmission, -onis*) denotes the act of passing something on from one person or place to another.¹ When this comes to power transmission, it refers specifically to the process of delivering electricity from one point to another (called nodes). Over time, the concept has been refined and restricted only to the transfer of high-voltage electricity from generating step-up units to substation step-down transformers.

The concept of power transmission conveys at least three elements: first, an entity (either an individual or a juridical person e.g., a generating power unit) acting as a remitter in a designated point

¹Cambridge Advanced Learner's Dictionary.

of origin; second, a recipient entity (likewise) in a different place as the final destination and, lastly, something which is carried and delivered between such two points.

From a legal point of view, these elements are relevant since they refer to legal problems common to decision-making and regulatory processes, such as acquisition of property and proprietorship issues, risk management, and dispute resolution mechanisms.

II.2. Characteristics of power grids

Two basic features associated with all grids are *functionality* and *robustness*. The former refers to the primary function of a power grid operating under normal conditions which is to transport blocks of energy; the latter refers to the fact that transmission networks must be designed to fulfil such function and to transfer bulk power and withstand network failure events, either involving single or multiple network's components as well as such events occurring either separately or in any credible combination.²

The economic operation is an outcome of grid expansion processes and the rise of investment and construction costs. Although grid operation is constrained by power transfer capacities and engineering needs, under normal conditions, it is cost-efficient where marginal power generating units are dispatched,³ full transfer capacity is in use, and transmission losses are kept the least possible.

The grid is also said to be double-focused, because it both conveys electricity and also serves a load balancing function, physically matching supply and demand of power.⁴ Conventional power grids are designed for given parameters of real and reactive power as well as load requirements, thus, substantial deviations from them require compensation devices to regulate load voltage. The so-called 'smart' power grids are said to be responsive to real load-demands and rapid time-variability of inputs. Contemporary electric utilities not only produce power for consumers but also pool and coordinate volatile excess power among them,⁵ thus, making excess power trading possible.

In sum, power transmission networks are, therefore, networks of interconnected high to very high-voltage transmission lines,⁶ substations and transformers that enable bulk-carrying of electrons flow (electrical energy) from one place to another and, ultimately, the delivery of power from generation sources to areas of demand.⁷ Electricity transmission grids can be classified into two major subgroups: bulk transmission grids⁸ and

²The failure of a single element of a grid e.g., a transformer or a transmission line, is referred to as an 'N-1' event. Simultaneous failures of multiple elements such as that of a transmission line when a parallel line has been disconnected for maintenance, are termed 'N-2' events. In any case, the transmission network should be capable of holding up such events to be considered 'robust', as opposed to a 'weak' grid.

³In other words, the cheapest generating unit.

⁴Electric load is the amount of electric power delivered or required at any specific node (or point) or nodes on a system. Power load balancing refers to the function of reducing energy costs by storing electric power during low demand periods to use it as demand rises. This functionality can be carried out by power facilities (power stations, transmission facilities, etc.) using several techniques (3-phase distribution system according to NEC Art calculation, the so-called NEMA method or IEEE, the mathematics-based symmetrical components method, just to name a few). On power grids' load balancing function see generally Santacana, E, Rackliffe, G, Tang, L, Feng, X, *Getting Smart* Power and Energy Magazine, 8(2) IEEE (March-April 2010) 41-48 (available at http://ieeexplore.ieee.org/xpl/login.jsp?tp=&number=5430489&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D5430489). For a current view on the exercise of this functionality through an innovative adaptive pole-placement control strategy as proposed control system, see particularly Araujo Ribeiro, R. L., de Acevedo, C.C., de Sousa, R.M., *A robust adaptive control strategy of active power filters for Power-factor correction, harmonic compensation, and balancing of non-linear loads* in IEEE Transactions on power Electronics 27(2), 718-730 (February 2012) (available at http://ieeexplore.ieee.org/xpl/login.jsp?tp=&number=5942190&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D5942190). In addition to power load balancing, energy savings can also be created through load scheduling, a technique consisting on agreed-upon power transactions specifying all particulars (megawatts, start and end time, rate, type of power delivery and receipt) between the contracting parties and the grid operator involved in the transaction.

⁵Günther Oettinger, *An integrated and competitive electricity market: a stepping stone to a sustainable future* (Speech delivered at the Eurelectric Conference: 'Building a secure and sustainable future: how can market integration contribute', Brussels, (March 17, 2010) (available at <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/10/102&format=HTML&aged=0&language=EN&guiLanguage=en>).

⁶Overhead, underground, or undersea power-transmission lines of insulated conductors.

⁷Either large customers directly connected to the transmission network or, most commonly, power distribution companies.

⁸Transmission network voltages are typically above 100 kV and, in general, the higher the voltage the larger the network's transfer capacity. High voltage transmission can be split into two subsections: extra (very high voltage transmission, over 230 kV up to about 800 kV) and ultra high-voltage power transmission lines (higher than 800 kV). Claverton Energy-Research Group, *HVDC* (February 22, 2011) Claverton Energy (<http://www.claverton-energy.com/tag/hvdc>).

distribution grids.⁹ Due to one of the tensions described next,¹⁰ this inquiry is restricted in scope to the former.

III. TRANSNATIONAL POWER TRANSMISSION: FERTILE GROUND FOR INTERNATIONAL LAW

As a general proposition, international law is commonly regarded as a fragmentary body of rules. Its provisions are not necessarily designed to cover a given field of law exhaustively; instead, the provisions provide minimalistic procedural legal principles to deal with situations having an international element, leaving the bulk of detailed regulation to domestic *fora*. Power-transmission is normally a heavily regulated activity at domestic level. Additionally, amongst national legal systems, there might be tensions as to the legal characterization of electric power¹¹ and how to balance individual jurisdiction's regulatory goals with transnational transmission. In contrast, there is little regulation of transboundary power transmission in the international realm which this paper considers advantageous, as it shall be seen shortly. In order to foster cross-border interconnections, this section analyses how relevant features of power grids might be efficiently transposed to the international legal field.

It is proposed that transboundary power transmission presents a number of advantages for making international law to achieve greater levels of substantiveness and, thus, enforceability. The argument rests upon the following. First, cross-border transmission is largely a technical matter in which the how-to-do-it question is basically resolved. Second, the idea of interconnecting grids of different countries is strongly supported by economics: the achievement of economies of scale, cost reductions, integration of new generating units, and a resulting enhanced market undoubtedly favour its consideration. Third, not even the common characterization of transmission grids as monopolistic (or oligopolistic) markets prevents states from getting their facilities interconnected because, as long as a proper regulation on these imperfect markets is set up, the shortcomings of a monopolistic operation can effectively be

⁹The technology for high power transmission referred to is ± 800 kV high voltage direct current (HVDC) transmission, designed to long-distance power transmission (over 7,000 kms for direct current and 4,000 for alternating current). This type of power transmission system can convey approximately 6.5 GW through a single bipole (i.e., two conductor bundles – one for each pole – on each electrical tower) overhead line system. Thereafter, when further transmission systems are built, on a double bipole system, it can transport twice the power. Distribution grids operate regularly beneath 100 kV and their purpose is to distribute power from the transmission network to end-users. Currently, setting aside wind and other renewable power sources (mostly experimental), not as much of generation is connected to distribution networks (and when it does, it is called 'embedded generation'). Like its transfer capacity, its reliability is also less than those of a transmission network. Distribution networks are operated by distribution systems operators (DSOs), *ibid*.

¹⁰The tension concerning the legal characterization of electric power. See section III as well as n. 12 below.

¹¹From a comparative law point of view, domestic legal systems can deem electric power either as a good or a service. A good overview of the divergent legal positions on the matter in the U.S. courts, for instance, can be found in Energy Law Bulletin, *Electricity: A "Good" under the UCC. Should be a Simple Question – Right?* (April 2005) Morrison & Foerster (http://faculty.law.miami.edu/rrosen/courses/documents/05electricityagood_000.pdf). Considering it a 'highly differentiated technology service' is Lynne Kiesling, *Electricity: Commodity or Service?* (August, 2005) The Reconstruction, Economics, Energy and the Environment (<http://www.thereconstruction.org/2005/08/11/electricity-commodity-or-service/>). As a general statement, market-based economies (and appurtenant legal systems) tend to consider electric power as a tradeable good or merchandise, ultimately a commodity. This is an approach largely based upon apprehensible physical features of electricity. It was largely the internal European approach before the launch of its new external policy on energy. See generally, *Treaty on European Union or Maastricht Treaty (EU Treaty)*, opened for signature February 7 1992, consolidated version [2008] O.J. C115/1 (entered into force on November 1 1993). The EU Treaty was amended by the *Treaty of Amsterdam*, opened for signature October 2 1997 OJ C 340/1 (entered into force May 1 1999); the *Treaty of Nice amending the TEU, the Treaties establishing the European Communities and certain related acts*, opened for signature February 26 2001, [2001] O.J. C80/1 (entered into force February 1 2003), and by the *Lisbon Treaty or Treaty of the Functioning of the European Union (TFEU)*, opened for signature June 20 2007 OJ C 306/1 (entered into force December 1 2009) art 4(1)-(2). The consolidated version can be found in: *Maastricht Treaty (EU Treaty)*, [2008] O.J. C115/1. See also generally, as to electricity in the EU *Directive 2003/54/EC of the European Parliament and of the Council of June 26 2003 concerning common rules for the internal market in electricity* [2003] OJ L 176/37; *Directive 2005/89/EC of the European Parliament and of the Council of January 18 2006 concerning measures to safeguard security of electricity supply and infrastructure investment* [2006] OJ L 33/22;. Finally, see particularly as to the EU approach discussed in the main text *Directive 2003/54/EC of June 26 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC* [2003] OJ L 176/37; *Directive 2003/96/EC, of October 27 2003, of the European Parliament and of the Council, restructuring the Community framework for the taxation of energy products and electricity (the 'Energy Taxation Directive')* [2003] OJ L 283. In contrast, centralized and social-market economies' approach tend to lie more upon a social welfare function attributed to electricity supply and, therefore, as something more than the simply sum of individual utilities, in other words, a service. Further, within national systems, the electric power legal characterization issue cannot be totally ruled out. It is still possible to legally conceive electricity as a good or commodity in regard to bulk transmission networks dealing with wholesale power purchases whilst having a legal service-based approach to power distribution, i.e., the market reaching end-consumers.

overcome. Due to the capital-intensive nature of supplying electricity and diminishing costs of generating units and transmission line construction, it is far more cost-effective to spread these costs over the large customer-base provided by a monopolistic market set-up, rather than create the opposite effect if widespread competition were allowed between smaller economic agents (e.g. transmission facilities owners) among which economies of scale can hardly be achieved. Finally, the fact that several countries may depend on energy provided by a non-neighbouring country, requiring power to cross the territory of states having vested interests in any of the formers, might incentivize the interconnection of the grids, assure permanent supply, and further mechanisms of enforcement.¹²

Along with advantages, transnational power transmission might also represent substantive policy concerns connected with potential cross-border disputes. Setting aside engineering technical challenges of laying a transmission line and commercial aspects of substantive deals, relevant policy issues are the physical operating control over transmission facilities, the territorial regime over lands or waters bearing power lines, and most importantly investment and transit issues, particularly, involving third countries. A classic approach would answer these policy questions straightforwardly: territorial sovereignty cannot be discussed nor negotiated. Contemporary approaches, however, see things differently. International law has envisaged mechanisms to allocate actual possession and control over tracks of land/waters to third parties for limited and specific purposes.¹³ While still acknowledging eminent domain over these areas to the traditional national legal owner; in some particular cases (and mostly when dominion itself is under discussion) a given territory can be neutralized. These problems are most commonly addressed in a practical manner through non-binding protocols for interconnection or more generally through bilateral energy integration agreements. These kinds of arrangements normally assume that land control belongs to the country owning the territory, whilst all matters pertaining to the interconnection itself, operation, testing, as well as the maintenance of the facilities must be coordinated by technical bodies designated by both parties involved. Let us analyse this in more detail using the example of Brazil and Paraguay with regard to the Itaipú dam. This is a case in which transnational measures have effectively contributed to solve problems faced by two nations in exploiting bordering natural resources. It illustrates how transnational power-generation and transmission undertakings can become cooperative drivers of shared-management, natural resource preservation, and peaceful resolution of conflicts.

Historical territorial conflicts between Brazil and Paraguay over the Salto Grande de Sete Quedas, home to the Itaipú dam, date back to 1750. While the 1872 Peace Treaty failed to resolve the boundary claims to each country,¹⁴ in 1966 Brazil and Paraguay agreed to jointly explore the feasibility to exploit the hydroelectric potential of De la Plata basin as part of the Iguazú Declaration.¹⁵ A year later, the Brazil-Paraguay Mixed Technical Commission was created to conduct feasibility studies for the proposed facility; and an international tender process was initiated to choose the contractors for building the 14 gigawatt Itaipú hydro-electrical dam on the Paraná River.

¹²In regard to primeval mechanisms of enforcement in the realm of International Private Law see, *Convention on Jurisdiction and Enforcement of judgments in civil and commercial matters*, opened for signature 27 September, 1968, 8 ILM 229 (entered into force February 1, 1973).

¹³Cedric Ryngaert, *Jurisdiction in International Law* (Oxford University Press, 2009) 241. The book explains how the principles of sovereignty and territoriality have been undermined by piecemeal developments. Particularly interesting is Howard J. Taubenfeld, *The Antarctic and Outer Space: An Analogy in retrospect* in Joyner, Christopher and Chopra, Sudhir K. *The Antarctic Legal Regime* (Martinus Hijhoff Publishers/Kluwer Academic Publishers, 1988) 269. The article is worth looking at since deals with a comparison of two not so different regimes to address jurisdictional matters in areas where a strict application and/or enforcement of the principle of territorial sovereignty is not exempted of serious difficulties: Antarctica and Outer Space. See also Darrel C. Menthe, *Jurisdiction in Cyberspace: a theory on International Spaces*, 4 *Mich. Telecomm. Tech. L. Rev.* 69 (1998), section V 'theory for international spaces' and section I for an overview on *Principles of jurisdiction*. See also p 88 et seq. sub-section C.2. *Jurisdiction in Antarctica among the 'case for international spaces'* (available at <http://mttlr.org/volfour/menthe.pdf>). As to Antarctica, particularly, see Donald R. Rothwell, *The Polar Regions and the development of International Law* (Cambridge University Press, 1996); Todd P. Chatham, *Criminal jurisdiction in Antarctica: a proposal for dealing with jurisdictional uncertainty and lack of effect of enforcement* 24(1) *Emory International Law Review*, 331-356 (2010); Harold G. Maier, *Jurisdictional rules in Customary International Law*, in *Extraterritorial Jurisdiction in Theory and Practice* 64, 67 (Karl M. Meessen ed., 1996); Keith D. Suter, *Antarctica: private property or public heritage?* (Zed Books, 1991).

¹⁴The 1872 Peace Treaty put an end to the so-called 'War of Paraguay'.

¹⁵*Declaração de Assunção sobre o aproveitamento de rios internacionais*, signed on June 3 1971, art 5, 6 [Assunção Declaration on exploitation of international watercourses].

Late in 1973, the Parties entered into the Itaipú Treaty.¹⁶ Despite much criticism of this instrument, the treaty is interesting for several reasons. One of them is the treatment in the treaty of sovereignty-sensitive resources (water) and territorial issues. Firstly, the treaty fully acknowledged the bi-national nature and co-ownership regime over hydro resources in the relevant track of the Paraná River.¹⁷ Secondly, it contains a sovereignty-safeguard clause whereby the construction of the electricity facilities shall neither alter the *status quo ante* in regard to national border delimitation nor confer on any party jurisdiction or property rights over any part of the other nation's territory.¹⁸ However, the Itaipú Treaty finally overcame a long-standing territorial dispute, by, literally, flooding the area in dispute. It is interesting too, that it created a bi-national entity: Itaipú, to which both nation-state parties granted a concession to exploit the hydro potential of the Paraná River¹⁹ in return for royalties flowing to each nation.²⁰ However, the central point for consideration in respect of the present thesis is the power distribution agreement enshrined in Art. XIII. According thereto, the entire Itaipú power output shall be divided equally between Brazil and Paraguay, the treaty recognizes that each party has the right to acquire the excess power not domestically consumed by the other. The parties also agreed to acquire the entire production of the installed capacity.²¹ Finally, Art. XV paragraph 3 establishes as an element of the cost of the service provided by Itaipú, a certain amount which is set aside to remunerate the party assigning power surpluses.²²

In 1984, the Itaipú hydro plant commenced operation but new problems began to emerge. Argentina feared Brazil's control over the floodgates for the dam was regarded as a security threat posed to Buenos Aires in the event that the floodgates were opened. These external security issues were resolved through a tripartite agreement.²³ Paraguay claimed that a strict interpretation of the treaty as to the exclusive nature of the power-surpluses acquisition right²⁴ adversely affects its commercial options. Paraguay as well cast doubts upon the 'fairness' of the amount payable to the power-assigning party.²⁵ This is of the utmost commercial importance because, although Paraguay enjoys enormous power-surpluses, it is not allowed, under the terms of the treaty, to sell it to third parties even if they are willing to pay higher prices than those provided in the Agreement. Under the Itaipú Treaty, Paraguay can only assign surpluses to Eletrobrás (Centrais Elétricas Brasileiras S.A.) the publicly-owned Brazilian energy company. As a result of diplomatic negotiations held over the past few years, as of 2023, Paraguay's State-owned national electricity utility, Administración Nacional de Electricidad (ANDE), will be authorized to sell power-surpluses to Brazilian companies other than Eletrobrás and to third party countries as well.²⁶ This will result in a more widely distributed transnational power sharing process.

Relationships between Brazil and Paraguay may continue to improve with the realisation of the 500 kilovolt Villa Hayes transmission line, a project valued at USD\$ 400 million which is intended

¹⁶*Tratado entre a República Federativa do Brasil e a República do Paraguai para o aproveitamento hidroelétrico dos Recursos Hídricos do Rio Paraná, pertencentes em condomínio aos dois países, desde e inclusive o Salto Grande de Sete Quedas ou Salto de Guairá até a Foz do Rio Iguaçu* [Treaty between the Federative Republic of Brazil and the Republic of Paraguay for the hydroelectric exploitation of water resources of the Paraná River, belonging in a condominium to both countries, from and including the Salto Grande Seven Falls or Guairá Falls to Foz do Iguaçu River], opened for signature April 26 1973, UNTS 13164 (entered into force April 26 1973), art XXIII.

¹⁷In other words, from and including Salto Grande de Sete Quedas [Salto Grande Seven Falls] (also known as Guairá Falls) to Foz do Rio Iguaçu [Foz do Iguaçu River].

¹⁸Above n 17, art VII.

¹⁹Ibid arts III, V.

²⁰Ibid art XV (1).

²¹Ibid art XIV. In the manner set forth therein.

²²Ibid art XIV (3), Annex C.

²³*Acordo Tripartite entre Brasil, Paraguai e Argentina para aproveitamento dos recursos hidráulicos no trecho do Rio Parana desde as Sete Quedas até a foz do Rio da Prata* [Tripartite Agreement between Brazil, Paraguay and Argentina to the use of water resources in the stretch of the Parana River from the Seven Falls to the mouth of the River Plate] opened for signature October 19 1979, 2216 UNTS I-39389 (entered into force December 5 1979).

²⁴Differences in the interpretation of this point go back to a Treaty's antecedent: the *Foz do Iguaçu Statement*, according to which both countries shall have a 'preferential right' to buy each other's power surpluses, which shall also be acquired for a 'fair price'. However, this wording was not transferred into the current *Itaipú Treaty*, leading to the construction of an exclusive power-surplus acquisition right.

²⁵See ABC Digital, *Lugo deja renegociación de Itaipú en manos de voluntad del Brasil* (2010) ABC Digital (<http://www.abc.com.py>).

²⁶*Declaração de Assunção sobre o aproveitamento de rios internacionais*, signed on June 3 1971, art 5, 6 [Assunção Declaration on exploitation of international watercourses]. In fact, it has been informed that the then current payment of USD\$ 120 million for that concept would increase up to USD\$ 360 million.

to be carried out by Brazil, Paraguay, Argentina, and Uruguay once funding has been agreed upon.²⁷ It is remarkable that, despite its formal multinational character, the project will provide an improvement to Paraguay's poor power-transmission infrastructure. Paraguay's transmission network is made up of only seven 220 kilovolt lines totalling approximately 3566 kilometers. Its scarce and unsophisticated transmission infrastructure sharply contrasts with its huge generation capacity. The reason why the network in Paraguay remains to date so simple is, basically, because the most important lines belong to the bi-national stations. These lines mostly convey power towards Brazil and Argentina, while the remainder goes to feed the distribution system focused mainly on the east part of the country. In fact, the Paraguayan transmission capacity²⁸ lies far behind that of Uruguay which, though having much less power capacity, enjoys a widespread power transport network.²⁹ Apart from the transport coverage issue, the Paraguay network is well-known for having serious efficiency and reliability weaknesses.

Therefore, in the context of the bilateral relationships between Brazil and Paraguay in which the Itaipú transnational power distribution issues are central, it is quite understandable why Brazil is willing to promote the Villa Hayes' transmission line project which will assist in improving Paraguay's inadequate electricity transmission infrastructure, even funding it either in whole or part. The Itaipú hydro-electrical dam thus represents not only an example of cross-border interconnection, but also a cooperative approach towards energy integration in the transmission area and a working example of transnational grid interconnection in South America.

Potential differences as to legal systems do not represent unsurmountable problems, particularly when mutually beneficial economic interests are at stake. However, each system might give particular policy responses as how to consider the transaction and what would the appropriate legal treatment be accorded thereto. Further, energy integration agreements usually set forth that the legal framework applicable to energy purchases, power exports/imports, and transmission shall be that of each party, what is – true be told – next to nothing. Indeed, this situation leads first to the problem of determining which are the domestic rules applicable—a matter of comparative law; and, secondly, in the absence of conflict of law rules or any specific and expressed clause in the relevant agreement, chances for a dispute to arise on the transnational effects of the transaction are high.³⁰ In turn, a multilateral trading

²⁷Through contributions to MERCOSUR's Convergence Structural Fund. MERCOSUR Fondo de Convergencia Estructural (FOCEM) (www.mercosur.int/focem).

²⁸Paraguay has only 9 km of high-voltage lines per 1000 km², totalling 3566 kms. Centro de Estudios Económicos, *La energía eléctrica Paraguaya en un marco regional* (Unión Industrial Paraguaya, 2009) [Centre for Economic Studies, Paraguayan electricity within a regional framework].

²⁹Even though totalling just 4330 kms, Uruguay has 25 kms of high-voltage lines per 1000 km², thus, leading with this ratio the regional transmission coverage ranking. Comisión de Integración Energética Regional (CIER), *Regional Statistics* (2007) CIER (www.cier.org) [Regional Commission for Energy Integration].

³⁰In such an uncertain zone, where no particular governing-law clause can be called to settle a dispute, international trade law principles might provide some relief. The United Nations Commission on International Trade Law (UNCITRAL, a subsidiary body of the General Assembly of the United Nations) has crafted some solutions which are 'acceptable to States having different legal systems and levels of economic and social development' through processes of harmonization and unification of the law of international trade. Whilst harmonization refers to the amendment of domestic laws 'to enhance predictability in cross-border commercial transactions'; unification seeks a 'common legal standard governing particular aspects of international business transactions'. UNCITRAL has produced several conventions (i.a. 1980 United Nations Convention on Contracts for the International Sales of Goods – CISG), model laws (i.a. 2011 UNCITRAL Model Law on Public Procurement), legislative guides (i.a. 2007 UNCITRAL Legislative Guide on Secured Transactions), and rules (i.a. 2010 UNCITRAL Arbitration Rules) embodying international trade principles and rules acceptable worldwide towards which conflicting parties might resort in settling a trade dispute. See UNCITRAL (<http://www.uncitral.org/uncitral/index.html>). An intergovernmental organisation created by a multilateral agreement thus enjoying independent international status, the International Institute for the Unification of Private Law (UNIDROIT) has as its basic statutory objective 'to prepare modern and where appropriate harmonised uniform rules of private law understood in a broad sense'. Interestingly, however, UNIDROIT declares that 'experience has demonstrated a need for occasional incursion into public law, especially in areas where hard and fast lines of demarcation are difficult to draw or where transactional law and regulatory law are intertwined'. The instruments drawn up by UNIDROIT deals largely with the unification of substantive law rules; they only address uniform conflict of laws rules incidentally. See UNIDROIT (<http://www.unidroit.org/dynasite.cfm?dsid=103284>). Although beyond the scope of this paper, it is the author's opinion that in the absence of a specific body of rules dealing with transnational power transactions as it would be under an improved ECT/WTO framework and lacking a clear substantive governing law suited to such commercial practice (as it would be a determined national law set forth in the contract); or, at the very least, a predictable set of conflict of laws rules, UNCITRAL's common legal standards (unification process-originated) ought to be pre-eminently considered. This proposition is based on several reasons: firstly and pragmatically, these standards enjoy widespread acceptance within the UN constituency; secondly, because UNCITRAL's most suitable instruments to deal with cross-border power transmission disputes (i.a. 2010 UNCITRAL Arbitration Rules) are non-substantive laws, precisely the legal character of the type of problems common to power transmission disputes as well as the most difficult to resolve (for instance, cross-border power supply interruption operated by a transit-country).

setting having more than one suitable provider or a regional trade agreement might also give birth to disputes, since the particulars of power business transactions may constitute barriers to trade in the terms of the World Trade Organization (WTO)/Energy Charter Treaty (ECT) frameworks; or, worse, constitute a transit dispute outside those general trading frameworks involving third states.³¹

In sum, despite above referred to concerns and arguably because of them, cross-border transmission provides an interesting opportunity for international law to improve its acceptance, legitimacy and enforceability. To achieve this, the legal character of international power transmission operations shall first be analysed.

III.1. Nature of transnational power transmission operations

Some legal concepts and interests relate directly to power transmission – electric power nature, energy matrix, ownership of the facilities and the electricity, amongst the most relevant. However, there are also different legal regimes that may – or may not – have a common understanding on what electricity is and/or enforce such legal interests in a way consistent with promoting interconnections. Regarding with the first two elements of power transmission: a remitter in a designated point of origin and a recipient in a different final destination, it is crucial to bear in mind that power – although it may be consumed domestically or destined to be sold beyond the frontiers of the state in which it is being produced – is always generated and distributed locally and, therefore, it is primarily the focus of domestic regulation which inextricably concerns the configuration of energy matrices or the problem of energy selection. In contrast, power transmission is *per se* not locally-constrained, thus, rendering international law particularly suitable for handling cross-border power exchanges.³² Let us analyse both aspects through examples.

An energy matrix is a mix of energy sources that a given country/area/community employs to carry out its economic production and social objectives. It is a strategic instrument of economic policy designed to meet a country's energy demand in a given period of time, based both on current available resources and energy demand projections. Energy planning instruments are designed as a response to different situations of energy supply disruptions or vulnerability. However, the way in which such scenarios can be addressed to determine the best solution might differ radically when looking at them in broader contexts, beyond a traditional notion of sovereignty.

Where power excess generation is sent transboundary (interconnected grids implied and generally in mere bilateral contexts), the underlying legal transaction is characterized as an international purchase of electricity, an export, which constitutes international power trading to which WTO rules, therefore, apply.³³ As to the third element: what it is conveyed through the grid and delivered between such two points, electricity is a electrons-flow, a fungible element³⁴ which once injected into the grid through a

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Indeed, these problems are akin more to the exercise of sovereign powers, the control over territory, facilities, and natural resources or jurisdictional issues, thus to public international law; rather than to mere aspects of private international law. This proposition is reinforced even by the UNIDROIT's realm, UNIDROIT has acknowledged the shortcomings of private international law in certain areas (in the author's opinion, being transnational power transmission one of them). Finally, although UNCITRAL deals with the laws applicable to private parties in international transactions and its scope and approach is clearly different to that of contemporary WTO, as long as both the WTO and by reference the ECT framework seem inadequate to address transit and third parties issues, resorting to UNCITRAL arbitration rules appears suitable.

³¹As to specific concerns derived from transit disputes, see Russia-Ukraine case at III.3.4; see also n. 78 below.

³²Indeed, the very idea of transmission conveys the existence of at least two different places. If they happen to be sited on different state jurisdictions the suitability of international rules get even highlighted.

³³By international power trading we mean cross-border exchanges of electric power subject to international trade rules, largely *World Trade Organization's* including the *WTO Customs Valuation Agreement (CVA)*. For an illustrative article on the potential of transboundary power trading see Aharon Amit, *Smart Electrification: the win-win solution for sustainable world trade* in *World Trade Organization (WTO), World Trade Report 2010 (June 2010)*, (available at www.wto.org/english/res_e/publications_e/wtr10_forum_e/wtr10_18june10_e.thm). The author is the General Secretary and CEO of the International Electrotechnical Commission (IEC), a global developer of International Standards in the field of electricity, electronics and associated technologies. See also, *Marrakesh Agreement establishing the World Trade Organization (with Final Act embodying the results of the Uruguay Round of Multilateral Trade Negotiations, Annexes and Protocol) (Marrakesh)*, opened for signature April 15 1994, 1867 UNTS I-31874 (entered into force January 1 1995).

³⁴The question of whether or not electric power is a fungible or an intangible commodity has been long scholarly debated. In some jurisdictions, power is stated to be a service rather than a tradeable good. For an introductory approach see Jeff Vail Law Office LLC (Litigation Strategy and Innovation), *Why does fungibility matter (and where did it go)?* (available at <http://www.jeffvail.net/2008/10/why-does-fungibility-matter-and-where.html>). A good approach to fungibility from a technical point of view in regard to energy sources can be found in NTNU Trondheim, November 6, 2002, Lecture in Electric Conversion, Systems and methods for electric generation – PowerPoint PPT presentation at (http://www.powershow.com/view/102b35-0ThiY/From_Renewables_to_Electrical_Power_and_Fungible_Energy_powerpoint_ppt_presentati)

nodal point, becomes physically and legally undistinguishable from other loads presently transported through the grid. From the international trade law perspective, electricity is deemed as a good, a commodity,³⁵ an approach that avoids one of the tensions common in domestic realms, as much as it supports this paper's finding that the well-framing of international instruments as to their subject-matter (bulk power/commodity transfers), might facilitate international consensus on interconnections.³⁶

Therefore, power transmission operations occur where electricity is transported across borders of different countries which power grids are somehow interconnected. From the standpoint of the most relevant specific operations involved in power-transmission i.e., power injections/withdrawals, transit, and load-balancing,³⁷ the distinctive international element arise from these activities taking place and having effects in different countries.

III.2. Conditions for transnational transmission to assist international law

To assist enhancing the legitimacy of international law, a framework of cross-border interconnected power networks and harmonised domestic energy matrices (preferably based on renewable sources) is required. Such a framework calls for both technical and economic compatibility as well as for a specific common driving force.

Of all conditions upon which renewable energy mixes configuration and transboundary interconnection lies, technical compatibility is the less troublesome.³⁸ Indeed, current technology

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on). From a legal point of view, see *Bunge Corp. v. Recker*, U.S. Ct of App, 8th Cir, 1975; Restatement (Second) of Contracts Ch 16 (1981). The paper's argument is based upon the assumption that the distinction is essential in the domestic realm more than in the international community's, this latter in which international law attempts imposing constraints over sovereign powers. Furthermore, domestically and by large, in market-based economies only the distribution of electricity is deemed a service; not the generation and transmission sectors. The argument of this paper is, precisely, that well-framed, technically-based interconnection and transit agreements might strengthen international law's enforceability and, therefore, pave the way to substitute the current predominant view at international level of electric power as a mere good or commodity and – over time – to replace it with one in which cross-border supply of electricity through interconnected power grids be considered more as a service between nations and, therefore, triggering State liability whether in securing delivery and/or unobstructed power transit.

³⁵*International Convention on the Harmonized Commodity Description and Coding System* (HS Nomenclature) from the Customs Co-Operation Council, also informally known as the 'World Customs Organization' (WCO), which code (heading) 2716 refers to 'Electricity energy' under chapter 27 which, interestingly, comprises 'Mineral fuels, mineral oils and product of their distillation; bituminous substances; mineral waxes'. The nomenclature governed by the above referred to Convention is an international multipurpose nomenclature which was elaborated under the auspices of the World Customs Organisation (WCO). Currently, consistent treatment is given by the WTO *Customs Valuation Agreement* (CVA). The objective of the HS Nomenclature agreement is '[t]o facilitate international trade by establishing a uniform system for the collection, comparison and analysis of international trade statistics, and for the transmission of data and trade documentation, and through the establishment in the states party of tariff and statistical nomenclatures in conformity with an international harmonised system'. The Annex on the HS Nomenclature is an integral part of the Convention and comprises about 5,000 commodity groups identified by a 6-digit code. The HS Committee is entrusted with providing the official interpretation of the HS Nomenclature and ensuring its uniform interpretation worldwide. More than 98 per cent of all goods traded in the world are classified according to the HS. In turn, The European Union integrates the HS Nomenclature in a Combined Nomenclature of hers comprising additional subdivisions. See the Protocol of Amendment to the International Convention on the Harmonised Commodity Description and Coding System, opened for signature June 24 1986 [1986] OJ L 198/11-409 (entering into force July 20, 1987). See European External Action Services, (<http://ec.europa.eu/world/agreements/prepareCreateTreatiesWorkspace/treatiesGeneralData.do?step=0&redirect=true&treatyId=512>).

³⁶It is worth noting that over time and under a progressive construction, the paper's argument (which emphasizes interconnections and unrestrained transit) might well contribute to develop the next stage on international law characterization of electric power: no longer seen as mere bulk commodity-trading (largely between private entities and subject to be interrupted by non legal-based considerations of domestic jurisdictions) See, for instance, in re *Pacific Gas And Electric Co*, 2004 U.S. Dist. LEXIS 22023 (September 30, 2004); but, ultimately, as a continuing service between contracting States pledging their State liability (as subject of international law) as to secure unobstructed transit/delivery of electricity.

³⁷Frequency regulation. Frequency is the number of complete alternations or cycles per second of an alternating current measured in Hertz. See US-Canada Power System Outage Task Force, Final Report on the August 14th, 2003 Blackout in the United States and Canada: Causes and Recommendations (April 2004), p 214 available at (<https://reports.energy.gov/BlackoutFinal-Web.pdf>).

³⁸From an historical point of view, four decades ago, electricity could only be efficiently transferred 600 kms. Further scientific breakthroughs allowed distant transfer capacity to increase up to 2,500 kms. Current technology transmission schemes of high voltage alternate current (HVAC) and high voltage direct current (HVDC) have extended the transmission distance to 4,000 and 7,000 km respectively. Current high-voltage wires, known as superconductors, are designed to allow power transmission at lower current, thus, generating less heat and consequently less energy loss in the process. See Centre for Energy website (available at <http://www.centreforenergy.com>). In regard to renewable connection to the grid

transmission schemes of superconductors have expanded transmission capacity and carrying-distances, reducing energy-losses, and making possible crossing time-zones, seasonal demand compensation, pooling, and more effective electrical-flow coordination.

As to economic compatibility, studies³⁹ on limits and costs of long-distance transmission systems have consistently reached the conclusion that – even exploitation of remote energy sources at low cost ‘[is] feasible and economical for distances never before entertained’,⁴⁰ offering acceptable reliability levels and costs small enough⁴¹ as to make convenient its economic exploitation. Currently, rising costs of conventional fuels and superconductors’ technology reaffirm the economic conclusion.

In turn, the economic convenience of long-distance transmission is answered in two ways. On the one hand, high voltage direct current (HVDC) transmission schemes⁴² experience negligible electric power unit cost increases when transmission-distances go up.⁴³ On the other hand, upward variations in the cost of power produced close to demand centres (as determined by market prices) bring about notable variations of kilometres in competitive distances of remote sources.

Transboundary transmission poses several questions: whether it would be more efficient to have a single or multiple markets; what the features of such market(s) would look like; and how the share of participants’ market-power would be calculated. Transnational grids are a means to deliver reliable, secure, and efficient power supply. Reliability is, for the greater part, a technical issue; whilst security of supply relies mostly on international regulatory aspects. Efficiency, however, pertains to the field of economics. To understand the economic efficiency problem of a transnational network, two ideas must be emphasized: that it is a global macroeconomic endeavour which effects are meant to reach local economies; and that pursuing economic efficiency leads to market-structure.

The third condition is a common supra-national interest driving policy-making process. Human economic behaviour is normally driven by the pursuit of an interest. Though usually true at individual level, it can be quite different when looking at social conduct, i.e., at what motivates joint-actions by a group of people living in a social framework, either domestic or international. In this sense, a supranational interest is one that transcends boundaries or spheres of interest held by separate nations. It is about governments understanding and acknowledging that achieving some targets goes well beyond a single country’s capability and that they could be sooner and better achieved through joint efforts. Under what conditions, then, may one expect the development of supranational/international authority and a common policy on worldwide grid interconnection?

Recalling pioneers’ path, like the ECC and EURATOM,⁴⁴ one might be tempted to first confine the transmission sector of the energy industry, then to regulate it, and finally – if applicable or needed – to deregulate it.⁴⁵ But, is it necessary to do things the same way? Currently, policy-making processes are more sophisticated and the trend points towards redefining the energy sector in relation to the market, environment, and foreign issues.⁴⁶ From an international point of view, instead, the meagre

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see especially, Karen Palmer, A. Paula, and M. Woerman, *Federal Policies for Renewable Electricity* (February 12, 2011) Economics Climate Change (<http://www.economicsclimatechange.com/2011/02/federal-policies-for-renewable.html>).

³⁹Historically, see L. Paris, G. Zini, M. Valtorta, G. Manzoni, A. Invernizzi, N. De Franco, A. Vian, *Present Limits of very Long Distance Transmission Systems* (Paper presented at International Conference on Large High Voltage Electric Systems, Paris, France, 29 August – 6 September, 1984) 8. For a current perspective see, specially, Michael Rodi (ed.), *Energy Infrastructure and Policy Options for a Sustainable Future* (Lexxion, 2012).

⁴⁰*Ibid.*

⁴¹5 to 20 mills/kWh.

⁴²High voltage direct current (HVDC). As opposed to high voltage alternate current (HVAC). See Claverton Energy-Research Group, *HVDC* (February 22, 2011) Claverton Energy (<http://www.claverton-energy.com/tag/hvdc>).

⁴³It has been calculated that for transmitting 10GW the increase is c.1.5 mills/kWh for each additional 1000 kms.

⁴⁴*Treaty establishing the European Atomic Energy Community (EAEC or EURATOM Treaty)*, opened for signature March 25 1957, 298 UNTS 167 (entered into force January 1, 1958).

⁴⁵For a good assessment on the theoretical costs and benefits of unbundling power grids and the models of transmission ownership see Pollit, Michael, *The arguments for and against ownership unbundling of energy transmission networks* (Ofgem, August 2007). The author concludes suggesting that evidence seems to be that ownership unbundling of transmission is an essential part of successful energy market reforms. The author is part of the ESRC Electricity Policy Research Group of the University of Cambridge.

⁴⁶As still insufficient outcomes of such trend at transnational and international level see *Regulation 714/2009/EC of the European Parliament and of the Council of July 13 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 [2009] OJ L 211/15*. See also *Energy Charter Treaty (ECT)* and *Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)* (Lisbon), opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998).

interaction between states is channelled through the traditional rules of international cooperation, mostly, bilateral.

Supranational decisions, in turn, requires more than that. The development of supranational authorities and common policies points to the progressive appearance of common and overlapping intergovernmental interests. Normally, at the international level, this process manifests itself through the formation of coalitions focused on achieving a particular goal by means of concerted actions in the sphere of common interest. Conversely and most of the time, the main cause of not having a common policy in energy does not reside upon states and/or industry sectors lacking of overlapping interests, but on legal obstacles such as discriminatory rules, outdated legal regimes, and lack of transparency.

The three conditions analysed above: technical and economic compatibility as well as a common supranational interest-oriented policy, have enormous potential for driving up the legitimacy and enforceability of international law, for they foster international power trade and renewables-based sustainable economic development. The enhancement process works through exploiting the common know-how on power transmission, thus levelling the technical ground for players; getting the most out of the comparative advantage economic theory in practice, and building upon the interdependence created by supranational interests articulated by policy harmonization processes.

Indeed, international law provides a framework of necessary minimal rules designed to lower levels of uncertainty and mutual suspicion between states but, it also can encourage cooperation in achieving common beneficial goals.⁴⁷ However, this seems not enough to make transnational power interconnections a reality. International law is an evolving normative system which provides a source of mutual recognition and legitimacy of states' decisions interacting with each other. The possibility of a nation *motu proprio* limiting the exercise of its sovereign capacities in a confined area – for instance, to allow foreign electricity en route to a third state flow through the local grid and across its territory without legal appropriation nor interruption – being this status guaranteed to, and enforceable by third parties, does not exist currently at the international realm.⁴⁸

Cross-border transmission provides an opportunity for international law to achieve greater acceptance and enforceability due to pursuing the attainment of a common beneficial goal, which naturally favours consensus and mutual responsibility in cooperation frameworks. This is so because cross-border grid interconnection is a well-defined technical matter which does not leave room for political misinterpretations; the usual characterisation of the industry as monopolistic is no obstacle for interconnection making sense economically. Considering the power status of the parties involved, their energy policies configuration, current technical features and capabilities of power networks – even if not straightforwardly expressed, its functionality can at any rate be construed as a long-term one destined to deliver a continuing service, thus, making possible – if so required – to infer legal obligations and responsibilities between stakeholders going beyond those of mere export/import transactions.

A number of arguments can be advanced for international law enforceability to benefit from cross-border interconnections. In the first place, cross-border grid interconnections is a well-defined technical matter which per se, facilitates negotiation and reaching consensus. Second, interconnecting grids cross-border makes economic sense even based solely upon the advantages of international power-trading, all the more if potential energy policies synchronisation (or better still, harmonisation) is considered. Thirdly, transmission systems' usual characterization as monopolistic does not represent a serious obstacle for states to get their facilities interconnected, provided adequate antitrust regulation is put in place guaranteeing domestic access to power trunk-grids suitable both for international interconnection and all kind of sources, particularly, renewables. Fourthly, energy dependency and corresponding energy security policies constitute real incentive for grid interconnections and legal mechanisms of enforcement.⁴⁹ Finally, the possibility to link a single, technically-based, well-defined scope (cross-border grid interconnection) to an already set-up and ongoing international law

⁴⁷See generally, Ian Brownlie, *Principles of Public International Law* (Oxford Clarendon Press, 7th ed., 2008).

⁴⁸In this sense, just consider the number of possibilities opened for international trade, development of financial markets, globalized GHG abatement process, furtherance of renewable sources worldwide, and international law efficacy.

⁴⁹An important development in sovereign states transferring some enforcement power to international organisations and their secretariats is found in arts 162(2) (a), (u), (v), (w) and (z) and 176 of the 1982 UNCLOS. Through these provisions the authority is endowed with legal personality and capacity as may be necessary for the exercise of its functions and the fulfilment of its purposes. *United Nations Convention on the Law of the Sea (UNCLOS, Montego Bay)*, opened for signature December 10 1982, 21 ILM 1261 (entered into force November 16, 1994).

framework (such as the WTO or an improved ECT-scheme) with due guarantees of non-discrimination, full grid access, independent operation, and non-interrupted power flow, would contribute to international law achieving greater enforceability, being the motivation for such a scheme fair unrestricted power trade, energy security, and sustainable economic development, objectives shared by all stakeholders of the international community.

III.3. Case study: European Union

For many observers, the European Union stands out as a model of integration and international cooperation. In the following sections, a comprehensive overview of the EU's electricity regulation is provided. It starts by describing the overarching legal framework sustaining the EU's relevant institutions before focusing on energy and, finally, addressing the specific legal regulation of power transmission. The focus is aimed at identifying legal tools useful for energy regulation which are potentially applicable to foster grid interconnection and international power transit between countries not engaged in integration processes.⁵⁰

In analysing the European Union case study and the need for developing comprehensive legal structures to facilitate power transit and guide prospective and independent operation of cross-border power grids, the paper will address the interaction between international⁵¹ and supranational law,⁵² in terms of the effect upon the traditional understanding of sovereignty.⁵³ In a traditional view the interplay between sovereignty and national territory on the one hand; and natural resources sited within on the other, requires the national territory not to be transferred, leased, or alienated in any way to a foreign entity. Over time, however, this somewhat harsh and mostly unrealistic view of national sovereignty has been weakened by several factors including the pragmatism derived from trading needs. Under pressure from transnational corporate action and international tender processes for infrastructure projects, many states grant concessions for the exploration and exploitation of natural resources, as well as allowing foreign private or public investment upon lands, which in effect means that controls over property are being granted, particularly, by developing countries. This trend, however, is also bringing about some consequences for the not-so-need: the EU supranational legal framework is being challenged by a reality for which it was not originally designed: the pressing need to multilaterally integrate energy sources coming from outside its borders.

III.3.1. General legal framework

The EU is an international organization⁵⁴ established by international treaties⁵⁵ that impose mutual rights and obligations upon its contracting states and limits their sovereign rights in specific matters.⁵⁶ In effect, this transfers competences/powers to EU institutions over which the member states have no direct control. This particular legal system is, therefore, 'supranational' in nature,⁵⁷ for it constitutes

⁵⁰See section V below, on comparative analysis of the Brazilian case study.

⁵¹For these purposes, the body of law composed of principles and rules of conduct which states feel themselves bound to observe.

⁵²Often defined as the law of supranational organisations or regional agreements, where a distinguishing feature is that the domestic law of its member states are deemed inapplicable when conflicting with the supranational legal order in which those states partake.

⁵³In a traditional understanding of sovereignty, the power and control that a state exert over its territory is absolute and does not allow exceptions. Under this view, sovereignty do not convey a flexible approach as to the inherent prerogatives of the state, particularly, over territory control and jurisdiction. As a consequence, in this conventional light, for instance, the idea of non-exclusive use of natural resources is unacceptable.

⁵⁴Above n. 50.

⁵⁵*Treaty on European Union or Maastricht Treaty (EU Treaty)*, opened for signature February 7 1992, consolidated version [2008] O.J. C115/1 (entered into force on November 1, 1993). The EU Treaty was amended by the *Treaty of Amsterdam*, opened for signature October 2 1997 OJ C 340/1 (entered into force May 1, 1999); the *Treaty of Nice amending the TEU, the Treaties establishing the European Communities and certain related acts*, opened for signature February 26 2001, [2001] O.J. C80/1 (entered into force February 1, 2003), and by the *Lisbon Treaty or Treaty of the Functioning of the European Union (TFEU)*, opened for signature June 20, 2007 OJ C 306/1 (entered into force December 1 2009) art 4(1)-(2). The consolidated version can be found retrieved in: *Maastricht Treaty (EU Treaty)*, [2008] O.J. C115/1. See also, *Treaty Establishing the European Atomic Energy Community (EAEC or EURATOM Treaty)*, opened for signature March 25 1957, 298 UNTS 167 (entered into force January 1, 1958).

⁵⁶*Van Gend&Loos v. Nederlandse Administratie der Belastingen* (26/62) [1963] E.C.R. 1 at 12; [1963] C.M.L.R. 105.

⁵⁷Although the term 'supranational' – in use in art.9(5, 6) of the ECSC- was totally left out of the two Treaties of Rome by the repealing of the said art.9 ECSC by the Merger Treaty and replaced with an identical text in the three European Treaties.

the contracting states own common legal system though not being national law *per se*, namely, different from any individual domestic jurisdiction ultimately derived from sovereign powers.

The ‘shared competences’ between the EU and the member states include energy issues, trans-European networks, security, the internal market, and economic and territorial cohesion;⁵⁸ policies relating to these areas are entrusted jointly to the EU and the member states. The Council has been empowered, however, to ‘adopt broad guidelines of the economic policies of the member states and the Union.’⁵⁹ Nonetheless, since the EU – acting alone – has no competence to implement what has been recommended, cooperation and flexible coordination between member states are necessary.

III.3.2. European energy policy: internal market and infrastructure investment

This section analyses the current European energy policy and how appurtenant EU law deals with energy markets in general and networks and security of supply, in particular.

The internal market of the EU is defined by the Treaty of the Functioning of the European Union (TFEU) as ‘an area without internal frontiers in which the free movements of goods, persons, services and capital is ensured in accordance with the provisions of the Treaties.’⁶⁰ We are concerned here, only, with the goods-movement aspect of the internal market, since we acknowledge power as a fungible commodity: a movable good⁶¹ which, in accordance to the EU law, can circulate freely, without obstacles, across the territory enclosed by the external frontiers of the Union. This creates, in theory, a single market for electricity.

The EU energy policy is embedded in the overarching European internal market policy. Creating a competitive internal market for energy is one of the EU’s priority objectives. For this to occur, a reliable and integrated energy network is required and, therefore, infrastructure investment. In line with this, the Council Regulation (EU, EURATOM) 617/2010 of June 24th 2010 provides for a harmonised reporting framework to the Commission of investment projects in energy infrastructure (of any kind) within the European Union.⁶² This information enables the Commission to conduct analyses on the market and prepare annual network development plans for electricity.⁶³

When it comes to security of supply, each member state must designate a transmission system operator for a certain period which is responsible for ensuring that the system’s transmission capacity and reliability meet reasonable demands for power transmission. In this field, the EU has the Agency for Cooperation of Energy Regulators (ACER) a body established in 2010 by Regulation (EC) 713/2009 of the European Parliament and of the Council of 13 July 2009 with an overarching mission ‘to assist national energy regulatory authorities (NRAs) to perform their duties at EU level and to coordinate their actions.’⁶⁴ These actions are focused on the development of common network and market rules

⁵⁸*Lisbon Treaty or Treaty of the Functioning of the European Union (TFEU)*, opened for signature June 20 2007 OJ C 306/1 (entered into force December 1 2009) art 4(1)-(2).

⁵⁹*Ibid* [99] art 121(2)3.

⁶⁰*Ibid* [14(2)] art 26(2).

⁶¹See above n. 35, 37 on the character of electricity. Power’s mobility is a physic-based feature. Its legal characterization as fungible or not is far more troublesome and poses several interesting questions. For instance, it can properly be said that power is fungible in the context of each industry sector, for the power produced by any generator; conveyed by any transmitter; and delivered by any distributor is or might be interchangeable. However, if one considers power outcome at certain tension (say low voltage) undertaking step-up voltage transformation (to be transported long distances, for example) could it be legally said that it is still the same interchangeable product? Similar legal question may arise after step-down voltage transformation process undertaken. Furthermore, if economic characterization of ‘goods’ factors are got into consideration, the outlook might get even more daunting, for as to economics is concerned, power (regardless of voltage transformation) simply cannot be replaced by anything alike, economically, there is no substitute ‘good’ for electricity. In the current state of exceptional interconnected power grids, states’ sovereign power-prone policies tend to look at electric power as a tradeable good, a mere seasonal export commodity rather than as a long-term service of cross-border electricity supply. See *Puget Sound Energy, Inc. v. Pacific Gas & Electric Co.*, 271 B.R. 626, 638-40 (N.D. Cal. 2002). The argument of this paper aimed at putting on the spotlight the relevance of dedicated long-term power grid interconnection and transit international agreements to change mainstream views whilst strengthening international law’s legitimacy and enforceability in the specific area of regional cross-border electricity transmission.

⁶²*Council Regulation 617/2010/EU-EURATOM of June 24 2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union and repealing Regulation No 736/96/EC* [2010] OJ L 180/7.

⁶³The Commission must forward this analysis to the European Parliament, the Council and the European Economic and Social Committee.

⁶⁴*Regulation 713/2009/EC of the European Parliament and of the Council of July 13 2009 establishing the Agency for Cooperation of Energy Regulators (ACER)* [2009] OJ L 211/1. See also Agency for Cooperation of Energy Regulators (ACER),

and the coordination of regional initiatives to support the European power market integration.⁶⁵ In doing so, ACER boasts a quite distinctive feature: it may allow third countries outside the EU to participate therein.⁶⁶

III.3.3. The energy policy: targeting 2020

The EU energy policy has evolved around the common objective of securing uninterrupted physical availability of electricity in the market, at an affordable price, while contributing to the EU's social and climate goals.⁶⁷ In November 2010, the Commission communicated its vision of a European energy strategy for competitive, sustainable and secure energy: Energy 2020.⁶⁸

The new energy strategy focuses on five priorities.⁶⁹ First, energy efficiency as a key-factor for long-term energy, climate goals, and member states' decoupling energy use from economic growth. Second, a truly pan-European integrated, interconnected, and competitive energy market. Third, empowering consumers to exercise EU's rights in regard to accessing the power services they need, as well as to achieving the highest level of safety and energy security on the basis of sufficient transmission and storage infrastructure. Fourth, energy technology development and innovation leadership through cooperation at EU level. Fifth, strengthening the external dimension of the EU energy market acting with third-country energy partners with a common voice, beyond mere national initiatives, and formalising the principle whereby member states act in the benefit of the EU as a whole in bilateral energy-related negotiations. A couple of years after its release, a critical assessment of what have and have not worked in implementing this strategy varied. Positives counts in measures taken for developing new energy technologies (e.g., plasma, nuclear fission projects having EU funding)⁷⁰ and those adopted for increasing energy efficiency.⁷¹ However, being intrinsically measures of a long-term nature, they can hardly be attributed to any impact of the new strategy. In turn, the advance of the 'power-to-consumers' priority is arguably, particularly, as not being considered specific or fully detached from the general process of consumers empowerment in other markets; and, if existent, could well be considered modest. Rest examining the downsides of the model in practice and, to this end, we shall look at priorities two and five in more detail next.

Footnote continued

'Possibility of Neighbouring Countries and their Transmission System Operators to Participate in ACER and in the ENTSOs' (Staff Working Paper No 546, SEC, April 28 2011).

⁶⁵Council Directive 2003/54 concerning common rules for the internal market in electricity [2003] O.J. L176/37. See also A. Mathijssen, *A Guide to European Union Law as amended by the Treaty of Lisbon* 191, 208-209 (Sweet & Maxwell – Thomson Reuters, 10th ed., 2010). See especially, Council Directive 2003/54/EC of June 26 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC [2003] O.J. L 176/37, 37-56; Regulation 714/2009/EC of the European Parliament and of the Council of July 13 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 [2009] O.J. L 211/15.

⁶⁶Agency for Cooperation of Energy Regulators – ACER (<http://www.acer.europa.eu>).

⁶⁷Article 194 of the Treaty on the functioning of the European Union (TFEU). See also, Council Directive 2003/54/EC of June 26 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC [2003] O.J. L 176/37, 56.

⁶⁸A worth noting legal mechanism being 'joint support schemes', whereby a certain amount of energy from renewable sources produced in the territory of a member state may count towards the national overall target of another. See Directive 2009/28/EC including mandatory national targets for the overall share of energy from renewable sources in gross final consumption by 2020. Being the first that (a) statistical transfer of specified amounts of energy from renewable sources from one member state to another member state has been made in accordance with art 6; or (b) set up a distribution rule agreed by participating member states that allocates amounts of energy from renewable sources between the participating member states. This mechanisms is in force since 2011, thus, the impact of the Renewable Energy Directive is still a matter to be assessed against conventional policy support schemes.

⁶⁹European Commission, *Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Energy 2020 a strategy for competitive, sustainable and secure energy COM 639 final* (2010) Eur-Lex (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0639:EN:HTML:NOT>). See also Energy Community, *The Energy Community. Legal framework* (Energy Community Secretariat (ECS), 2nd ed., 2010), (available at www.energy-community.org).

⁷⁰The Max Planck Institut für Plasmaphysik (Institute for Plasma Physics, IPP), for instance, is an institute of the Max Planck Gesellschaft, part of the European Fusion Programme (EURATOM) and an associate member of the Helmholtz-Gemeinschaft Deutscher Forschungszentren. The Institute has undertaken projects on Plasma Physics and Controlled Fusion for several years in conjunction with the European Union. To that effect, a plasma vessel of Wendelstein 7-X is currently under construction at the Institute's facilities in Greifswald, Germany. The completion of the assembly of Wendelstein 7-X is foreseen for 2014. IPP *Annual Report 2011* (Druckerei Behr, Scheyern-Fernhag, 2011).

⁷¹The origin of such measures can be fairly dated back as far as the early 70s, just after the so-called 'oil crisis' that causes a shocking acknowledgement of the European and USA oil-based energy dependency.

III.3.4. *The pan-European energy market and its external dimension*

Here, the legal framework for international cooperation relevant to the transmission sector within the EU will be considered. In most cases, the policy-making action of the European Council in the area is determined by the submission of a proposal by the Commission, which conferred powers, therefore, will be commented in connection with the strategy priorities mentioned above.

One of the Commission's priority is to establish a pan-European integrated energy market and has already taken concrete actions to that end. Its *first action* is, not surprisingly, regulatory in nature: to efficiently and accurately implement the existing internal market legislation and to strengthen the competition policy. The third Internal Energy Market Package created new tools of public policy, including an Agency for the Cooperation of Energy Regulators (ACER)⁷² and the new European Networks of Transmission System Operators for Electricity and Gas (ENTSO-E and ENTSO-G) which should play a major role in finally integrating energy markets. Regional initiatives such as the Baltic Energy Market and the Mediterranean Ring should also serve as building blocks of a European energy market.⁷³

The second action is establishing the strategic infrastructure priorities needed for 2020–2030. Accordingly, the Commission is preparing a communication aimed at identifying what is required for a functioning internal market, integration of renewable sources, and security of supply as well as a set of policy instruments to implement them in the next two decades. By the same token, ENTSO-E and ENTSO-G have been entrusted by the Commission to develop the blueprint of European Electricity and Gas grids. The target is getting all member states interconnected through cross-border corridors by 2015 whilst taking into account network connections with third countries on the basis of the energy 2050 roadmap, released in 2011.

The third action of the Commission is reforming and improving permit procedures and rules for grid infrastructure projects of 'European interest'. The method for defining 'strategic infrastructure' or 'European interest' will prove to be essential in terms of energy selection, sustainability, access, and secure competitive supply.

On September 7th 2011, the Commission released the communication entitled 'The EU Energy Policy: Engaging with Partners beyond Our Borders' which addresses security of the energy supply and international cooperation.⁷⁴ This document furthers and strengthens an idea embodied in the Energy Strategy 2020: that of the EU having, effectively, a common voice as to external energy policy. To this effect, the Union sets up four specific priorities.

The first priority is to create an external dimension of the energy market, in other words, one reflecting the interconnectedness and transparency of the internal market beyond its boundaries. This works as an express recognition of the interdependence between member states which is seen as the best option of the Union to face the challenges of ever-increasing energy costs and energy supply disruptions. The EU attempts to build up the external dimension by also revitalizing the principle of solidarity among member states and, in accordance to it, configuring a regular information-exchange on intergovernmental energy-related agreements planned and entered into member states and third countries. As seen, bilateral agreements with third countries impact the carrying-out of infrastructure projects and energy supply to the Union. Apart from abiding in full by EU legislation, particularly notification procedures, the negotiation and conclusion of these agreements are subjected to structured forms to exchange information at EU level, which might represent a new erosion of traditional views of state sovereignty.

A further priority is to strengthen partnerships with key energy suppliers for secure, safe, sustainable, and competitive energy. In this context, the Union must deal comprehensively with Russia⁷⁵ and other

⁷²Agency for Cooperation of Energy Regulators (ACER), 'Possibility of Neighbouring Countries and their Transmission System Operators to Participate in ACER and in the ENTSOs' (Staff Working Paper No 546, SEC, 28 April 2011), See Regulation 713/2009/EC of the European Parliament and of the Council of July 13 2009 establishing an Agency for the Cooperation of Energy Regulators [2009] OJ L 211/1. See also Agency for Cooperation of Energy Regulators – ACER (<http://www.acer.europa.eu>).

⁷³European Commission at (http://ec.europa.eu/energy/infrastructure/bemip_en.htm).

⁷⁴European Commission, *Communication on security of energy supply and international cooperation – The EU Energy Policy: Engaging with Partners beyond Our Borders COM 539 final* (September 7, 2011) Europe (http://ec.europa.eu/energy/international/security_of_supply/doc/com_2011_0539.pdf).

⁷⁵EU-Directorate for Energy, *Common Understanding on the preparation of the Roadmap of the EU-Russia Energy Cooperation until 2050 between the coordinators of the EU-Russia Energy Dialogue, the European Commissioner for Energy and the Minister of Energy of the Russian Federation* (February 24 2011) EC-Europe (<http://ec.europa.eu/energy/>)

hydrocarbon-exporting countries such as Algeria, Qatar, Australia, and OPEC countries which provide natural gas and crude-oil. It is important, also, the long-standing interaction with Norway through the European Economic Area and the EU-Norway Energy Dialogue. The EU's carbon-abatement targets require, however, new sorts of partnerships involving reliable supply of renewable energy from countries like Brazil and the USA in regard to biofuels. This goal is of utmost importance for the EU, particularly, after the winter of 2009 who witnessed serious gas transit disputes between Russia and Ukraine, ultimately resulting in cut-offs of Russian gas supply destined to Europe traversing Ukraine's territory. As it shall be seen,⁷⁶ in this area, the EU encourages the participation of major suppliers in the Energy Charter Treaty (ECT) framework, something in which has clearly failed.⁷⁷

A third priority is to improve access to sustainable energy for developing countries. Here, the Union relies on achieving the Millennium Development Goals and the EU-Africa 2020 energy targets to promote inclusive growth, eradicate poverty, achieve reliable supply of energy and increased access to energy services. In the view of the Union, energy is a key driver of sustainable development. Accordingly, energy access is one of the main challenges for it. In close connection, efforts revolve around making the energy markets more stable, since oil-price fluctuations have substantial impacts on developing economies.

The final priority is to better promote EU policies beyond its borders by using a strategic approach involving flexibility in scope, different sorts of legal relationships entertained with EU partners, and legal instruments tailored for each country or organisation. In this sense, the Union has clearly set forth that amongst member states (market integration relationship) and in the relationships between the Union, its key energy suppliers and transit countries (consumer/supplier relationship), common instruments to be used to deal with EU energy policy and issues of common interest (such as security of supply/demand) will be those under the European Neighbourhood Policy, crisis-response instruments, and/or specific partnership, cooperation, and trade agreements on energy, particularly, the ECT. In line with these decisions, the EU is committed to improve the coordination among member states in relevant *fora* such as the International Energy Agency (IEA),⁷⁸ the International Energy Forum (IEF), the International Partnership for Energy Efficiency Cooperation (IPEEC), and the International Renewable Energy Agency (IRENA), in which unity of interests and cooperation among member states should prevail in the conduct of negotiations.

As a way of optimising the EU's external assistance in the sector, the Union seeks to promote the alignment of international financial institutions' instruments with EU external energy policy priorities in order to improve visibility and impact of EU's policies in non-EU countries. The proposed creation of a database on EU and member states' energy projects in third countries is another important follow-up action. Of course these actions can be read under a more critical light and reinterpreted as efforts to

Footnote continued

publications/doc/2011_eu-russia_energy_relations.pdf). See also EU-Directorate for Energy, *Progress Report on the Roadmap of the EU-Russia Energy Cooperation until 2050* (29 July 2011) EC-Europe (http://ec.europa.eu/energy/international/russia/doc/20110729_eu_russia_roadmap_2050_report.pdf).

⁷⁶See section IV.2 below.

⁷⁷For a detailed analysis of the 2009 Russia-Ukraine gas dispute and implications as to the Energy Charter Treaty, see Anna Marhold, *Is there Light at the End of the Gas Pipe? – Provisional Application of the Energy Charter Treaty to the 2009 Russia-Ukraine Gas Dispute* in Rodi, Michael, *Energy Infrastructure and Policy Options for a Sustainable Future* (Lexxion, Berlin, 2012) 127. See also EU-Directorate for Energy, *Common Understanding on the preparation of the Roadmap of the EU-Russia Energy Cooperation until 2050 between the coordinators of the EU-Russia Energy Dialogue, the European Commissioner for Energy and the Minister of Energy of the Russian Federation* (February 24 2011) EC-Europe (http://ec.europa.eu/energy/publications/doc/2011_eu-russia_energy_relations.pdf). See also, EU-Directorate for Energy, *Progress Report on the Roadmap of the EU-Russia Energy Cooperation until 2050* (July 29 2011) EC-Europe (http://ec.europa.eu/energy/international/russia/doc/20110729_eu_russia_roadmap_2050_report.pdf). See also The Independent, *Dependence on Russian energy places Europe at risk* (2009), The Independent (<http://www.independent.co.uk/voices/editorials/leading-article-dependence-on-russian-energy-places-europe-at-risk-1229945.html>); Cameron, Fraser *The Politics of EU-Russia Energy Relations* (EU-Russia Centre, 2010) at (http://scholar.google.cl/scholar?q=EU+energy+dependence+from+Russia+fraser+cameron+&btnG=&hl=es&as_sdt=o&as_vis=1); Aalto, Pami and Korkmaz Temel, Dicle, *European/Eurasia Energy Security: From Vulnerability to Viability and Sustainability* in Global and Regional Problems. Towards an Interdisciplinary Studio (Aalto, Pami, Harle, Vilho and Moisio Sami (eds.), Ashgate Publishing Limited, 2012) The International Political Economy of New Regionalism Series, ch 4 p 79. On the question about the provisional application of the ECT in the Russia-Ukraine gas dispute of 2009, see *Hulley Enterprises Limited v. the Russian Federation* (PCA Case No AA226), *Yukos Universal Limited v. the Russian Federation* (PCA Case No AA227) and *Veteran Petroleum Limited v. the Russian Federation* (PCA Case No AA228), *Interim Awards on Jurisdiction and Admissibility*, November 30 2009 available in the Energy Charter Treaty's website at (www.encharter.org). See also n. 32 above.

⁷⁸International Energy Agency (www.iea.org).

control the financing of energy projects in third countries, from institutions such as the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), other European development banks, and even the World Bank (WB), providing financing a way to make them align with EU energy policy interests.

IV. THE INTERNATIONAL COOPERATION LEGAL FRAMEWORK

The EU's desire to expand its energy policy external dimension would not have much support if a net of intertwined international cooperation schemes and instruments relevant to the energy sector had not already existed, such as the WTO and ECT amongst those multilateral. An environment in which the EU can not only deploy its co-ordinated and external common energy strategy⁷⁹ trying to influence other bodies' goals and actions, but also to interact with other countries or groups, most of the time pursuing opposite interests. A pan-European energy market is seen for many outside-onlookers as a mere revival of a long-despised anti-competitive strategy.

The EU's current international instruments can be classified in two categories: political and legal instruments. The distinction is relevant because the EU's international cooperation legal framework comprises the Energy Community, the Energy Charter Treaty,⁸⁰ and the WTO;⁸¹ and the scope of this paper deals only with the two former, subject-specific, international regulatory frameworks in what concerns Europe.⁸²

IV.1. The European Energy Community

The international treaty establishing the European Energy Community (EEC) was signed in Athens on October 25th 2005 and entered into force on July 1st 2006. The contracting parties are the EU on the one hand and a number of third countries on the other.⁸³ All of them determined to establish among themselves an energy community⁸⁴ with a stable market and regulatory framework capable of attracting investment in gas, power generation, and transmission networks,⁸⁵ and enabling all parties to have access to continuous energy supply.

Acknowledging the importance of security of energy supply to economic development and social stability, the Energy Community is mostly about extending the internal gas and electricity market towards South-East Europe through energy investments. In fact, the scope of the EEC deals much with the EU directives on security of electricity and gas supply towards which the *acquis communautaire*

⁷⁹As proposed in European Commission, above n. 47.

⁸⁰The current EU framework also comprises the Non-Proliferation Treaty and the ITER Agreement which deal with nuclear weapons and a multilateral scientific project involving the EU, U.S., India, China, South Korea, Russia, and Japan to demonstrate the feasibility of fusion as energy source, respectively. The EU, acting on the basis of the Treaty establishing the European Atomic Energy Community, confirmed ITER Agreement's adoption to the International Atomic Energy Authority (IAEA) on February 5, 2007. Since both agreements cover atomic issues they are out of the scope of this research. *Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project (International Thermonuclear Experimental Reactor – ITER)*, signed on November 21 2006 (entered into force October 24, 2007).

⁸¹As such, the WTO framework largely exceeds the material scope of this paper, thus, it shall not be analysed except for what concerns to international trade law mechanisms used to secure energy supply by reference of the Energy Charter Treaty.

⁸²In this sense, current political tools as Energy Dialogues, Memoranda of Understanding, Partnership Action Plans or Roadmaps, Association Agendas, or other similar political instruments are not considered.

⁸³Original signatories were Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, the Republic of Montenegro, Serbia, Romania, Turkey and Kosovo represented by United Nations Mission Interim in Kosovo (UNMIK) under UNSC Res 1244. Later, in 2010, it was signed by Moldova and Ukraine this latter with effect as of February 2011. Neighbouring third countries interested into and having observer status according to the treaty are Norway, Georgia, and Turkey. Lately, Armenia has applied for observer status, which is worthy to note since it is a country falling outside of the European neighbourhood policy area.

⁸⁴*Treaty establishing the Energy Community (also known as EEC and ECSEE)*, opened for signature October 25 2005, OJ L 198, 18–37 (entered into force July 1 2006), art 1(1).

⁸⁵The European Energy Community defines 'network energy' in art 2(2) as including the gas and electricity sectors falling within the scope of the European Community Directives 2003/54/EC and 2003/55/EC. See *Council Directive 2003/54/EC of June 26 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC* [2003] OJ L 176/37, 37-56; *Council Directive 2003/55/EC of June 26 2003 concerning common rules for the internal market in natural gas repealing Directive 98/30/EC* [2003] OJ L 176/57, 57; *Regulation 1775/2005/EC of the European Parliament and of the Council of September 28 2005 on conditions for access to the natural gas transmission networks* [2005] OJ L 289/1, 1-13; *Council Directive 2004/67/EC concerning measures to safeguard security of natural gas supply* [2003] OJ L 176/57, 57-78.

was extended in 2007, the EU legislation on energy efficiency,⁸⁶ selected Directives on environmental protection, competition, and state-aid rules.

For these objectives to be achieved, one of the instruments of the treaty is the implementation of key parts of the EU law into the territories of non-EU participating countries. Indeed, by joining the EEC, the contracting parties commit themselves to implement relevant EU rules on energy, environment, and competition within specific timeframes. In this fashion, the EEC purports to create a common regulatory framework for gas and electricity markets via extending the EU law. Title II of the treaty addresses the legally-binding commitment to extend energy-related core parts of the *acquis communautaire* to non-EU contracting parties. In regard to electricity,⁸⁷ the parties have agreed on transposing the common rules for the internal market,⁸⁸ the rules on conditions for access to the network for cross-border exchanges in electricity,⁸⁹ those dealing with the management and allocation of available transfer capacity of interconnections between nationals,⁹⁰ and the rules promoting power generation from renewable energy sources in the internal electricity market, among others.⁹¹ The timeline set up to achieve the entire liberalisation of the electricity market in the common area is to expire by January, 2015.

Title III is of particular relevance for it contains 'provisions on creating mechanisms for long-distance transportation of Network Energy'⁹² as well as for providing safeguard-measures in crisis events. Article 28 sets forth that the EEC 'shall take additional Measures establishing a single mechanism for the cross-border transmission and/or transportation of Network Energy'.⁹³ However, for the greater part, the provisions in Title II and III call for implementation through actions to be taken either by the parties or by energy community bodies. The main bodies established are the Ministerial Council, the Permanent High Level Group, the Energy Community Regulatory Board (ECRB), the Fora, and the Secretariat.

According to Title VII provisions, the implementation of decisions addressed to the parties in their domestic legal systems shall be performed within the period specified in the decision.⁹⁴ Failure by a party to comply with it may be brought to the attention of the Ministerial Council by a reasoned request of any party, the Secretariat or the Regulatory Board. It is also possible for private bodies to approach

⁸⁶This includes, particularly, directives on buildings' energy performance, energy labelling, and energy services, which according to the ECC-Treaty must be implemented in general by late 2011. However, the contracting parties have also agreed to implement parts of *Council Directive 2009/28/EC of April 23 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (the 'Third Package' on the internal market in electricity and gas)* [2009] OJ L 140/16 on a voluntary basis.

⁸⁷The ECC-Treaty makes explicit, as well, the core parts of the *acquis* on gas, environment, competition, and energy efficiency that must be implemented by the contracting parties. On gas, for instance, the following Directives must be transposed to national realms: *Council Directive 2003/55/EC of June 26 2003 concerning common rules for the internal market in natural gas repealing Directive 98/30/EC* [2003] OJ L 176/57, 57. As to environment, *Council Directive 85/337/EEC of June 27 1985 on the assessment of the effects of certain public and private projects on the environment* [1985] OJ L 175/40, 40-48; *Council Directive 97/11/EC of March 3 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment* [1997] OJ L 073/5; *Council Directive 2003/35/EC providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC* [2003] OJ L 156/17, 17-24; *Council Directive 2001/80/EC of October 23 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants* [2001] OJ L 309/1; *Council Directive 1999/32/EC of April 26 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC* [1999] OJ L 121/13, 13-18; *Council Directive 79/409/EEC of April 25 1979 on the conservation of wild birds* [1979] OJ L 103/1, 1-18 must be implemented. In regard to competition, essential rules are arts 81, 82, 86(1)-(2), and 87 of the EC Treaty prohibiting cartels and abuse of dominant positions the two former, respectively; making applicable EC's rules on public undertakings and undertakings to which special or exclusive rights have been granted; and prohibiting state-aids, the latter.

⁸⁸*Council Directive 2003/54/EC of June 26 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC* [2003] OJ L 176/37, 37-56.

⁸⁹*Ibid.*

⁹⁰*European Commission Decision 2006/770/EC of November 9 2006 amending the Annex to Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity (guidelines on the management and allocation of available transfer capacity of interconnections)* [2006] OJ L 312/59. See also *Regulation 1228/2003/EC of the European Parliament and of the Council of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity* [2003] OJ L 176/1.

⁹¹*Council Directive 2001/77/EC of September 27 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market* [2001] OJ L 283/33.

⁹²Energy-Community, *About the Treaty* (2011) Energy-Community (<http://www.energy-community.org>).

⁹³*Ibid.*

⁹⁴*Treaty establishing the Energy Community (also known as EEC and ECSEE) (Athens)*, opened for signature October 25 2005, OJ L 198, 18–37 (entered into force July 1 2006), art 89.

the Secretariat with complaints.⁹⁵ The party concerned has a right to response to any complaint or request that arises.⁹⁶ According to different *quora*, it is a matter of the Ministerial Council's competence to determine the existence of a breach of a treaty obligation: by simple majority if it relates to Title II or by two-thirds if concerns Title III.⁹⁷ Serious and persistent breaches by a party to its obligations might cause certain treaty rights to be suspended, if so determined by the Ministerial Council by unanimity.⁹⁸

The final objective of the EEC is to attract investment in power generation and networks in order to ensure stable and continuous energy supply, create an integrated energy market allowing for cross-border energy trade and, linked to the EU power market, enhance the security of energy whilst improving the regional environmental situation.

IV.2 The Energy Charter Treaty

The Energy Charter Treaty (ECT) and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) were signed in Lisbon, in December of 1994 and entered into force in April of 1998. The ECT is a multilateral international treaty concerning energy investments and trade. Up to date, the treaty has been signed or acceded to by fifty-one states, the EU and EURATOM.⁹⁹

From the organisational point of view, the Energy Charter Treaty sets up the conference as an inter-governmental decision-making body. The conference has created several subsidiary bodies under the form of working groups and committees which report to it and deal with particular issues such as the strategy, investment, trade and transit, and protocol on energy efficiency and related environmental aspects (PEEREA) groups as well as the budget and legal advisory committees. We are concerned here with the tasks of one of these bodies: the Trade and Transit Group, because it assists and monitors treaty rules' implementation process on the said area and considers ways to facilitate energy flows across the ECT constituency.

Apart from those on investments in infrastructure and power production,¹⁰⁰ the ECT sets forth a much more innovative body of rules covering trade and cross-border energy flows, namely, the way in which energy-products can be transported across multiple domestic jurisdictions to reach international markets. Its scope, however, is limited to the transit of energy products through fixed infrastructure.

The ECT relies on the WTO general rules in regard to power trading, applying them by reference for trade between ECT members as well as between those contracting parties who have not yet acceded to the WTO. However, in certain areas such as tariffs, services, and trade-related intellectual property rights, the ECT's scope is more restricted and appurtenant WTO's rules do not apply. In regard to the strategic issue of energy transit, ECT provisions oblige contracting parties to adopt measures to facilitate power-flow in line with the principles of freedom of transit and no-discrimination. Moreover, it compels transit-countries not to interrupt or obstacle current power flow, even in the presence of disputes concerning the transit.

The basic rule on transit is set forth by Article 7(1) according to which:

Each Contracting Party shall take the necessary measures to facilitate the Transit of Energy Materials and Products consistent with the principle of freedom of transit and without distinction as to the origin, destination or ownership of such Energy Materials and Products or discrimination as to pricing on the basis of such distinctions, and without imposing any unreasonable delays, restrictions or charges.

For the purposes of that article, 'transit' is defined in a twofold manner: in Article 7(10)(a)(i) as 'the carriage through the Area of a Contracting Party, or to or from port facilities in its Area . . . of Energy Materials and Products originating in the Area of another state and destined for the Area of a third

⁹⁵*Ibid.*, art. 90(1)-(2).

⁹⁶*Ibid.*, art. 90(2).

⁹⁷*Ibid.*, art. 91.

⁹⁸*Ibid.* art 92(1). The vote of the representative of the party concerned is, naturally, not taken into account for this purpose, art 93.

⁹⁹The current number of contracting parties is, to date, fifty-three. It is pertinent to note here, however, that Russia signed the ECT Treaty and though *was applying it provisionally until October 18 2009 inclusive*; it has not ratified it yet. *Energy Charter Treaty (ECT) and Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998).

¹⁰⁰As for energy-related investments it is noteworthy, however, that the treaty contains a set of rules capable to be enforced through a dispute settlement system.

state, so long as either the other state or the third state is a Contracting Party; or¹⁰¹ under Article 7(10)(a)(ii) 'the carriage through the Area of a Contracting Party of [said items] originating in the Area of another Contracting Party and destined for the Area of that other Contracting Party . . .', being this latter the default situation.

However, contrary to rules concerning investments – when failure to comply might trigger international arbitration – material rules concerning energy transit are supposed to be enforced through a distinctive bilateral dispute settlement mechanism.¹⁰² This special mechanism to address potential power-transit disputes, though understandable in the light of multiple cross-border transit requiring the consent of several sovereign states, may also be deemed as the fundamental flaw of a system purportedly designed to secure unrestricted flow of energy-outputs. Indeed, there is a strong conviction among contracting parties – particularly, the EU – that the ECT's provisions on transit ought to be enhanced in order to develop a more robust operative framework capable of securing transit flow of energy resources in situations where transboundary crossing takes place at least between three countries.

Indeed, market coupling¹⁰³ attempts in regional power markets are being conducted between the Central Western European and Nordic regions and Great Britain. Here, the starting point is an interconnection: the BritNed cable,¹⁰⁴ a submarine transmission line which connects Great Britain (Isle of Grain) with the Netherlands (Maasvlakte). The market coupling mechanism was jointly developed by power exchanges (PEXs) and transmission systems operators (STOs), and operates on the basis of running day-ahead auctions daily in the linked set of markets where members submit anonymous firm orders which are matched to power offers on the basis of available transmission capacity and economic welfare criterion. This determines the optimal power flow from low-price areas into areas of higher prices. In this fashion, the isolated British power market is connected with the Dutch power market and, through this, on the one hand with the wider Central Western European market in which the Dutch market partakes; and, on the other, with the Nordic European regions, since the Dutch market is also interconnected to Norway through the NorNed interconnector.

¹⁰¹The exception would be set forth in 4. Annex N which list Canada and the United States of America as contracting parties requiring at least three separate areas to be involved in 'transit' in accordance with art 7(10)(a) of the Energy Charter Treaty. However, both countries have not yet signed the ECT. *Energy Charter Treaty (ECT) and Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998).

¹⁰²Ibid. ECT Article 7(6) states:

A Contracting Party through whose Area Energy Materials and Products transit shall not, in the event of a dispute over any matter arising from that Transit, interrupt or reduce, permit any entity subject to its control to interrupt or reduce, or require any entity subject to its jurisdiction to interrupt or reduce the existing flow of Energy materials and Products prior to the conclusion of the dispute resolution procedures set out in paragraph (7), except where this is specifically provided for in a contract or other agreement governing such Transit or permitted in accordance with the conciliators' decision.

ECT Article 7(7), in turn, sets forth provisions applicable to disputes described in paragraph (6) only after exhaustion of 'all relevant contractual or other dispute resolution remedies'. Only then, resort is given to the conciliation paragraphs (a) to (f) of the Article. According to them, the claimant contracting party may refer the dispute to the Secretary-General of the ECT. This, in consultation with the parties to the dispute and other contracting parties concerned, shall appoint a conciliator. The conciliator shall seek the agreement of the parties to the dispute to a resolution thereof or upon a procedure to achieve such resolution within 90 days of his/her appointment. If the conciliator does not succeed within that time in securing such agreement, he/she shall recommend a resolution to the dispute or a procedure to achieve such resolution and 'shall decide the interim tariffs and other terms and conditions to be observed for Transit from a date which he shall specify until the dispute is resolved'. The parties to the dispute must observe the interim decisions set forth by the conciliator for twelve months, unless a solution is found earlier.

¹⁰³In 2005, the European Commission first mentioned power regional markets as a step towards a single European power market. On January 2007, the Commission launched a package pointing at a common energy policy emphasizing the need for a more transparent and competitive European power market. Since then, regional projects started amongst them: the Central Western European (CWE) and the European Market Coupling Company (EMCC). The EMCC's so-called 'tight volume coupling' project initiated the Nordic-German market coupling on November, 2009 by steps: the first one, involving interconnectors Denmark-Germany (in 2008-2009) and Germany-Sweden (in May 2010, using the Baltic cable); the second step, initiated in January 2010 aimed at creating a system integrating CWE price coupling and Nordic market splitting (this time, the mechanism deployed was the so-called 'Interim Tight Volume Coupling'); finally, since November 2010, the EMCC is undertaking the interconnection between Norway and the Netherlands through the NorNed cable. It represents the world's largest single power market of 1,816 TWh, about 60 per cent of European power consumption.

¹⁰⁴BritNed is a 260 km long 1,000 MW high voltage direct current (HVDC) line owned by a joint venture formed by two transmission companies: British (British National Grid) and Dutch (Dutch TenneT).

Such inter-state trading platform design presents an opportunity for actually making a contrast between experiences on the ground running ahead of fully developed regulatory solutions and, therefore, potentially leading to transit-related controversies. As early as 2000, the ECT's contracting parties initiated formal negotiations aimed at elaborating a transit protocol. Twelve years later, this protocol remains under discussion and, instead, the parties resort to either embedded legal principles or other non-legal mechanisms in order to deal with transit disputes.

The role of international law principles

Three principles of international law contribute to shape up a legal framework on energy: international cooperation, non-discrimination, and liberalization of trade.

The principle of international cooperation is paramount and underlies most of the ECT Treaty provisions, particularly, those relating to energy transit and competition. The treaty obliges the contracting parties to encourage cooperation in developing, modernizing, and operating energy transport facilities serving areas of more than one contracting party, thus, mitigating the effects of supply interruptions whilst facilitating interconnections of energy transport facilities.¹⁰⁵ As to competition, the ECT encourages consultation and information-exchange processes among contracting parties as means for mutual assistance when enforcing competition rules.¹⁰⁶

The principle of non-discrimination imposes a domestic regulatory duty on contracting parties not to discriminate or treat less favorably energy materials and/or products in transit in connection with the domestic provisions relating to energy transport and use of transport facilities, unless an existing international agreement provides otherwise.¹⁰⁷ This, in essence, is a conventional positive application to energy matters of the well-known WTO 'most favoured nation' clause. The same provision also contains a negative formulation of the principle where energy infrastructure proves itself insufficient. In this scenario, contracting parties are compelled not to establish obstacles to new transport capacity being established.¹⁰⁸

A third principle informing the ECT framework is that of liberalization of international trade. This brings the ECT's provisions in line with WTO rules which hold that a process of progressive trade liberalization is essential to achieve competitive markets. The contracting parties are expected to mitigate any possible market distortion and eliminate barriers to competition in the energy sector.¹⁰⁹ On the one hand, each contracting party is obliged to have and enforce an appropriate regulatory framework capable of dealing with both unilateral and joint anti-competitive conducts in the relevant market.¹¹⁰ Any contracting party may request appropriate enforcement action of the competition rules of other contracting parties, if it believes that an anti-competitive conduct has been carried out in the territory of the requested state which 'adversely affect[s] an important interest relevant to the purposes identified in . . . ' Article 6 of the treaty, which is the one dealing with competition.¹¹¹ The provision sets forth a procedure for notification and exchange of information on the alleged anti-competitive conduct, assessment on the part of the notified contracting party (or its competent authorities), and a decision on the issue of initiating enforcement actions (or any relevant interim development).¹¹² The procedure alluded to, along with that for the settlement of disputes between contracting parties provided for in Article 27(1) ECT, namely, diplomatic channels, are the sole means

¹⁰⁵*Energy Charter Treaty (ECT) and Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998), art 7(2).

¹⁰⁶*Ibid* art 6(4). See for instance European Commission, COM/39.316, *Gas de France* (December 3 2009) 37 et seq, COMP/M.2684, *EnBW/EDP?Cajastur/Hidrocantábrico* (March 19, 2002) 33 et seq, COMP/M.2432, *Grupo Villar Mir/EnBW/Hidroeléctrica del Cantábrico* (September 26, 2001) 67, *VABA/VIAG*, OJ 2001 L 188/1 (June 13, 2000) 224. See also Regulation (EC) No 714 of the European Parliament and of the Council (July 13, 2009) on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003, OJ 2009 L 211/15. A good contrasting analysis on competition rules applied to the area can be found in Quick, David M and Carey, James M, *Transmission capacity and market power: the Effect on a Dominant Generation Firm*, 30 *Energy Policy* 699 et seq (2002) and Borenstein, Severin, Bushnell, James and Stoft, Steven, *The Competitive Effects of transmission capacity in a Deregulated Electricity Industry*, 31 *RAND Journal of Economics*, 294 et seq, 305 (2000).

¹⁰⁷*Energy Charter Treaty (ECT) and Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998), art 7(3).

¹⁰⁸*Ibid* art 7(4).

¹⁰⁹*Ibid* art 6(1).

¹¹⁰*Ibid* art 6(2).

¹¹¹*Ibid* art 6(5).

¹¹²*Ibid*.

established in the ECT for resolving disputes with regard to the implementation or interpretation of Article 6.¹¹³

This enquiry is concerned with the operational phase of a transmission line carrying power across borders of several contracting parties, therefore, it is necessary to consider what happens when things go wrong, which is typically the case of unilateral power supply interruptions, reversions of flow and others alike involving at least three parties and generally known as transit disputes. Under Article 7(1), contracting parties are compelled to act ‘to facilitate the Transit of Energy Materials and Products’.¹¹⁴ Not to do so, not to take ‘necessary measures’ in pursuing that could amount to a breach of the treaty. As we shall see, the international legal solution proposed by the ECT to this core problem is, however, substantively disappointing, for it ultimately relies upon the conciliation paragraphs (a) to (f) of Article 7 ECT viable only after total exhaustion of ‘all relevant contractual or other dispute resolution remedies’.¹¹⁵

Article 27 ECT provides for a dispute settlement mechanism applicable to this hypothesis in the alternative. According to it, contracting parties in dispute should first resort to diplomatic negotiation in settling the matter within a reasonable period of time. Otherwise, resort to submitting the matter to an ad hoc tribunal is possible. The Charter provides for the establishment of the tribunal, which consists of a panel of three judges. Default governing rules are UNCITRAL’s.¹¹⁶ The arbitral award must solve the dispute according to the ‘Treaty and applicable rules and principles of international law’¹¹⁷ and is to be ‘final and binding upon the Contracting Parties to the dispute’.¹¹⁸ However, unless otherwise agreed upon by the contracting parties in dispute, the mechanism at stake does not apply to trade-related investment measures¹¹⁹ or to energy materials and product-related trade between contracting parties while any of them is not a party to the GATT or other relevant GATT-related instrument governing the matter.¹²⁰

Finally, as other platform-treaties do in pursuing their objectives and furthering their principles, the ECT permits the negotiation of association agreements with states, regional economic integration organizations or other international organizations.¹²¹

¹¹³Ibid art 6(7). ECT Article 27 provides for the settlement of disputes between contracting parties. Article 27(1) sets forth that ‘Contracting parties shall endeavour to settle disputes concerning the application or interpretation of this Treaty through diplomatic channels’. Paragraph (2) of the said Article, in turn, states that:

[i]f a dispute has not been settled in accordance with paragraph (1) within a reasonable period of time, either party thereto may, except as otherwise provided in this Treaty or agreed in writing by Contracting parties, and *except as concerns the application or interpretation of Article 6* [emphasis added] or Article 19 or, for Contracting parties listed in Annex IA, the last sentence of Article 10(1), upon written notice to the other party to the dispute submit the matter to an ad hoc [arbitral] tribunal under this Article.

In another way, under the ECT, a competition dispute based on the application or interpretation of Article 6 ECT might only be resolved using either the ad hoc mechanism set forth in Article 6 or through that of Article 27(1). Unless reaching agreement in writing on the contrary, Article 27(2) bans Arbitral Tribunals for solving the matter. Transit disputes under Article 7 which may not be limited as to applicable treaty mechanisms of Article 27, face, however, different challenges in connection with treaty’s general applicability, as is the case of state energy suppliers not ratifying it (such as the Russian Federation) or making express reservations that hinder dispute settlement provisions.

¹¹⁴Ibid Annex 1, EM Energy Materials and Products (in accordance with Article 1(4)), 27.16 lists in ‘Electrical Energy’.

¹¹⁵Ibid art 7(7). See also n. 103 above.

¹¹⁶See above n. 35, 37, 62.

¹¹⁷Above n. 102, art 27(3)(g). Ibid on the question of whether or not electric power is a fungible or an intangible commodity.

¹¹⁸Ibid art 27(3)(h).

¹¹⁹Ibid, concerning art 5.

¹²⁰Art 29 of the Energy Charter Treaty (ECT) contains interim provisions on trade-related matters applicable to trade in energy materials and products, precisely, while any contracting party is not a party to the GATT and related instruments. It is worth noting that art 29(4) ECT contains GATT mimic rules limiting the taxation capacity of a contracting party when importing/exporting energy materials and products when a contracting party is not a party to the GATT. In accordance thereto, contracting parties shall endeavour not to increase tariff rates or other charge levied above the levels set forth in appurtenant GATT Schedules. Notwithstanding this rule seems to be useful in terms of trade-related conditions, a critical analysis reveals its true character as a mere consequential provision on potential tax-related issues, thus not addressing a previous sine qua non subject matter which is the focus of this thesis, namely, getting power grids interconnected and securing unrestricted power transit.

¹²¹*Energy Charter Treaty (ECT) and Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16, 1998), art 43.

IV.3. International standards and grid codes: A case study of universal cooperation

In order to set up the market coupling by 2014, a clear policy and common standards are needed in advance to ensure interoperability across the network.¹²² For the EU, smart-meters and power grids are vital to the ‘full exploitation of the potential for renewable energy and energy savings as well as improvements in energy services’.¹²³ A detailed action-programme is to be prepared to assist member states in rolling-out smart-metering, information to consumers, and new available services. In this predicament, ACER must ensure the standardisation of all necessary technical issues linked to access to renewable sources and cross-border grid interconnection. In the latter context, ‘international standards’ – sometimes referred to as the ‘universal system’ – are the technical foundations for trans-boundary systems.

International standards for electronic and related technologies are developed in accordance with Annex 3: Code of Good Practice for the Preparation, Adoption and Application of Standards of the WTO Agreement on Technical Barriers to Trade (TBT), which accepting standardization bodies – either national or international – must abide thereby. One of the global organizations that prepares and publishes international standards for all electric-related technologies, including transmission, and carries out assessment of conformity to those standards is the International Electrotechnical Commission (IEC). Indeed, one of the IEC’s Technical Committees – TC90 – is currently working to define terms and a measuring method for superconducting wires; while TC20 has been in charge of similar tasks in regard to insulated electrical power and control cables, accessories, and cable systems for use in transmission.

Following, an example: transformers, an essential component of any interconnected transmission system, allow voltage homogenization of alternating electric currents produced by different generating units – either conventional or based on renewable sources of energies – which might be located in different states. In regard thereto, international efforts for standardization and appurtenant assessment systems play a critical role, firstly, because international standards not only improve industrial efficiency (economies of design, better production, product quality and delivery), but also even most importantly they facilitate interconnection and inter-operability of grids. Further, they allow electricity, electrical devices or any component produced by a given country under international standards, to be introduced, marketed, and sold in countries with different electrical systems, thus, preventing any technical barrier or unnecessary obstacle for trading them across borders.

In the context of the European Energy Community, for instance, Title II of the EEC Treaty requires the parties to bring their energy sectors in line with generally applicable standards of the EU.

V. COMPARATIVE ANALYSIS: BRAZIL

Brazil has been chosen as case-study of for a number of reasons. Firstly, Brazil has not only one of the largest single state-owned transmission networks, but also one of the largest grid expansion-rates in the world.¹²⁴ However, its international nodes are relatively few, and all of them relate to joint undertakings with neighbouring countries.¹²⁵ Secondly, Brazil currently faces a

¹²²The European Commission has set up a smart grid task force to discuss the implementation of smart grids at the European level. European Union, *Task Force on SmartGrids* (2011) Europe (http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm). See also, in the context of international standards on safety, *International Convention on Load Lines*, as amended, opened for signature April 5 1966, 604 UKTS 133 (entered into force July 21, 1968); *Protocol to the International Convention on Load Lines (London)*, opened for signature November 11 1988, 604 UKTS 133 (entered into force February 3, 2000).

¹²³Notification to the Commission, above n. 47.

¹²⁴Brazil requires investing c. USD\$ 23,5 billion from now to 2019 in new transmission lines to keep power supply stable due to the country’s economic growth. Brazil will have to add 36,000 kms of new transmission lines in order to integrate new energy projects to the national power grid and several zones to the main power distribution networks. From a study conducted by the think-tank Instituto de Pesquisa Econômica Aplicada (IPEA) [Applied Economics Research Institute] linked to the Brazilian government. IPEA (<http://www.ipea.gov.br/portal/>).

¹²⁵The most relevant bilateral treaties entered into by Brazil concerning shared natural resources and transnational cooperation in the electricity area are: *Tratado entre a República Federativa do Brasil e a República do Paraguai para o aproveitamento hidroelétrico dos Recursos Hídricos do Rio Paraná, pertencentes em condomínio aos dois países, desde e inclusive o Salto Grande de Sete Quedas ou Salto de Guairá até a Foz do Rio Iguaçu* [Treaty between the Federative Republic of Brazil and the Republic of Paraguay for the hydroelectric exploitation of water resources of the Paraná River, belonging in a condominium to both countries, from and including the Salto Grande Seven Falls or Guairá Falls to Foz do Iguaçu River], opened for signature April 26 1973, UNTS 13164 (entered into force April 26 1973), art XXIII; *Acordo Tripartite entre Brasil, Paraguai e Argentina para aproveitamento dos recursos hidráulicos no trecho do Rio Parana desde as Sete Quedas até a foz do Rio da Prata* [Tripartite Agreement between Brazil, Paraguay and Argentina for the use of water

huge and pressing power-deficit which it is trying to overcome through strengthening the diversification of its energy matrix and entering into international energy cooperation agreements focused on transnational interconnections. Thirdly, Brazil has followed its own independent way on energy issues making renewable sources its long-run energy choice since the 1970s. Over time, this led to a situation where circa 70 per cent of the energy produced in Brazil comes from renewable sources. The Brazilian commitment to having an even larger share of renewable energy holds up.¹²⁶ Moreover, it keeps a firm policy of domestic oil-substitution and oil-exports.¹²⁷ Finally, this particular economic model comprising emphasis on renewable energy, consistent policy, and adequate energy planning and regulation is working fairly well.¹²⁸ However, being a single country, Brazil's regulatory experience might not be suitable for direct replication. To address this limitation, this paper performs a comparative analysis of energy regulation of the European Union in a similar quest for reorganizing their energy mixes in connection with the power transmission network issue.

The vast Amazon Basin provides an ideal setting for hydro-generation, which over time has proven itself crucial for Brazil's economic development.¹²⁹ Brazil boasts the world's largest capacity for water storage and 82.8 per cent of its current energy consumption is based on hydroelectric power of which 74.3 per cent¹³⁰ comes from domestic production, and 8.5 per cent corresponds to imported hydro-power. Conventional thermo-generation –oil, coal, and natural gas– follows in the energy mix with 14.7 per cent. The final component of power demand is met with nuclear power, which contributes 2.5 per cent to it. Thus, more than 80 per cent of Brazil's power needs are met by hydro-generation, which makes the Brazilian power market distinctive in two main aspects: firstly, its profound reliance on a single source of energy¹³¹ and, secondly, the fact that this source happens to be a renewable one. These features of the Brazilian power market have relevant implications. However, as it shall be seen, such implications upon cross-border energy

Footnote continued

resources in the stretch of the Parana River from the Seven Falls to the mouth of the River Plate] opened for signature October 19 1979, 2216 UNTS I-39389 (entered into force December 5 1979); *Protocolo de Entendimiento entre los Gobiernos de la República Argentina y de la República Federativa del Brasil sobre Cooperación e Interconexión Energética* [Protocol of understanding between the Governments of the Republic of Argentina and of the Federative Republic of Brazil on Energy Co-operation and Interconnection], opened for signature April 9 1996 2015 UNTS I-34706 (entered into force March 18 1998); *Tratado entre el Gobierno de la República Federativa del Brasil y el Gobierno de la República Argentina para el aprovechamiento de los Recursos Hídricos compartidos en los tramos limítrofes del Río Uruguay y de su afluente el Río Pepirí-Guazú* [Treaty between the Government of the Federative Republic of Brazil and the Government of the Republic of Argentina for the exploitation of shared water resources in border sections of the river Uruguay and its affluent river Pepirí-Guazú], opened for signature May 17 1980 1339 UNTS I-22475 (entered into force June 1 1983); *Memorandum de Entendimiento entre la Republica Argentina y la Republica Federativa del Brasil sobre el desarrollo de Intercambios Eléctricos y futura Integración Eléctrica* [Memorandum of understanding between the Republic of Argentina and the Federative Republic of Brazil on the carrying on of power exchanges and future electric integration], opened for signature August 13 1997, 1995 UNTS I-34147 (entered into force August 13 1997). For a technical example on implementation see ABB Power, *Power Systems/HVDC. HVDC International Interconnection between Argentina 50 Hz and Brazil 60 Hz* (ABB Power Technologies AB, 2010) POW-0037.

¹²⁶The Brazilian energy planning is made up, basically, of the following policy instruments: Empresa de Pesquisa Energética (EPE), *Plano Decenal de Expansão de Energia 2019 (PDE-2019)* (Ministério de Minas e Energia, Secretaria de Planejamento e Desenvolvimento Energético, 2010) [Ten-year Energy Expansion Plan 2019 (PDE-2019)]; Empresa de Pesquisa Energética (EPE), *Programa de Expansão da Transmissão – PET 2010-2014. Estudos para licitação da expansão da transmissão. Consolidação das análises e pareceres técnicos* (Ministério de Minas e Energia, Secretaria de Planejamento e Desenvolvimento Energético, 2009) [Transmission Expansion Plan – PET 2010-2014. Studies for the procurement of the Transmission Expansion Procurement Studies. Consolidated analysis and technical opinions].

¹²⁷Since Brazil has large proved oil reserves.

¹²⁸It has placed Brazil on the verge of becoming a developed country in terms of macro-economic parameters such as growth-rate and industrial production. All these impressive achievements – in what concerns this paper – would not have been possible had Brazil not effectively addressed energy selection and planned and regulated the expansion and improvement of its transmission network accordingly.

¹²⁹For a generally accepted definition on sustainable development see World Commission on Environment and Development, *Brundtland Commission's Report 1987. Our Common Future* (Oxford University Press, 1987); World Economic Forum, *Global Competitiveness Report 2009-2010* (WEF, 2011); World Bank, *World Development Report 2010* (World Bank, 2011).

¹³⁰The quota is made of 72.60 per cent share of 'big-hydro' (>=30 MW) plus 1.70 per cent share of 'small-hydro' (<=30 MW).

¹³¹There are 24 hydroelectric plants of greater than 1000 MW of installed capacity, including the massive 14 GW Itaipú facility which by itself produces a fifth of Brazil's electricity. 75 hydroelectric facilities have installed capacity of more than 100 MW. Brazil's installed generation capacity is currently slightly more than 69 GW. PSI, *Brazil Energy Handbook* (PSI Media, 2009) 14.

transmission are quite different depending on the energy security concept used in policy and legal terms.¹³²

The first implication is that while having a low-cost matrix and one that is largely based on renewable sources could surely be pointed out as a virtue, the overwhelming dependence on a particular source makes the Brazilian mix highly vulnerable to climatic conditions, particularly, rainfall patterns and droughts.¹³³ Under a traditional view of national security the policy response would be – as it is in the Brazilian case – to look for diversifying the sources of energy generation. A second implication of the current Brazilian energy configuration is even more remarkable for, according to the same traditional understanding of energy security, the perspective gets darker if external power-supply is brought into the calculations. Indeed, as if a single domestic power source were not bad enough, having to depend upon another country for the delivery of such energy is even worse *per se*, no matter what source the electricity delivered is ultimately generated from. In this scenario, the problem of security is not only one about policy (when, for how long, how, and what type of energy is used), but one that brings in strictly legal issues regarding enforceability mechanisms under international law. It is argued that by adopting a strategic approach to energy security embodying large-scale renewable sources integration, international energy policies coordination,¹³⁴ and power grid interconnections would make the fact that Brazil's energy mix is focused mostly on one generating-source in something much less dramatic.

Brazil is aware of the danger of overdependence on hydroelectric power, thus, it has been struggling to diversify its energy matrix by means of reinforcing biomass, biofuels,¹³⁵ bagasse,¹³⁶ and nuclear energy industries in both the medium and long-term. Simultaneously, it seeks to integrate non-conventional renewable energy sources such as wind, tidal, and solar power through clean development mechanisms (CDM) and the *Programa de Incentivo às Fontes Alternativas de Energia Elétrica* (PROINFA program), which has led to awarding several long-term power purchase agreements for wind-projects.¹³⁷ Brazil, therefore, is committed to keeping its reputation as the country having the world's cleanest energy matrix.¹³⁸

However, a fundamental energy mix-related vulnerability of the Brazilian system is that of power transmission.¹³⁹ Brazil's transmission high-voltage lines have north-south and west-south patterns which have developed over time to supply energy from generation plants based in northern and western areas, and to deliver electricity to huge urban markets, mostly located in the south. On the one hand, the vast size of the country has led for several years to the creation of many unsophisticated

¹³²*Lei 10.847, de 15 de Março de 2004, autoriza a criação da Empresa de Pesquisa Energética – EPE e dá outras providências* [Act 10,847 of 15 March 2004 authorizing the establishment of the Energy Research Company – EPE and sets forth other provisions], art 4(0); *Lei 12.111, de 9 Dezembro de 2009* [Act 12,111 of December 9 2009]; *Lei 8.666, de 21 Junho de 1993* [Act 8,666 of 21 June 1993]; *Decreto 5.184, de 16 de Agosto de 2004, cria a Empresa de Pesquisa Energética – EPE, aprova seu Estatuto Social e dá outras providências* [Decree 5,184 of August 16 2004 establishes the Energy Research Company – EPE, authorizes its Social Charter and sets forth other provisions]; *Decreto 6,685, de 10 de Dezembro de 2008, dá nova redação aos arts. 2º e 4º do Decreto 3.520, de 21 de junho de 2000, que dispõe sobre a estrutura e o funcionamento do Conselho Nacional de Política Energética – CNPE, e dá outras providências* [Decree 6,685 of December 10 2008 restating arts 2 and 4 of Decree 3,250 of June 21 2000 on structure and functioning of the National Energy Policy Council – CNPE, and sets forth other provisions].

¹³³For example, Brazil suffered a drought in the late 90s which heavily impacted the generation capacity in 2001. It was a time when quotas and rolling blackouts were imposed as drastic measures for cutting energy usage.

¹³⁴S. Bourdon, S. Choteau, C. Pflanz, E. Spire, S. Bruijns, J. Vanzetta, R. Neumaier, and C. Bartocci, *Harmonization of cross-border transmission capacity allocation within the Central West Europe region* (Paper presented at the 43rd Conseil International des Grands Reseaux Electriques (CIGRE) [43rd International Council of Large Electric Resources], Paris, France, 2010) C5-102-2010.

¹³⁵See also, *National Program of Biodiesel Production and Use*, PNPB, 2003. IPEA – Instituto de Pesquisa Econômica Aplicada (<http://www.ipea.gov.br/portal/>) [IPEA – Applied Economics Research Institute]. See also *Programa de Incentivo às Fontes Alternativas de Energia Elétrica (PROINFA) – Ministério de Minas e Energia* [Program of Incentives to Alternative Electricity Sources (PROINFA) – Ministry of Mining and Energy] Document available at (<http://www.mme.gov.br/programas/proinfa/>).

¹³⁶Mostly used to fire thermal plants and refine low-cost ethanol.

¹³⁷In this sense, although the hydro-generation share should decline from c.76 per cent to 67 per cent in 2020, the power produced by alternatives sources (including wind-power, thermo, biomass, and PCHs) should double from current 8 per cent to 16 per cent in the same 10-year period.

¹³⁸To do so, Brazil has approved investments in the area of renewable energy technologies for R\$ 190 billions.

¹³⁹*Empresa de Pesquisa Energética (EPE), Programa de Expansão da Transmissão – PET 2010-2014. Estudos para licitação da expansão da transmissão. Consolidação das análises e pareceres técnicos* (Ministério de Minas e Energia, Secretaria de Planejamento e Desenvolvimento Energético, 2009) [Transmission Expansion Plan – PET 2010-2014. Studies for the procurement of the Transmission Expansion Procurement Studies. Consolidated analysis and technical opinions].

transmission networks designed exclusively for delivering power to remote areas, mostly linked to mining/forestry undertakings and rural consumer centres. In other words, a situation characterised by the proliferation of relatively small isolated/independent power networks and the building up of several solitary regional markets.¹⁴⁰ Further, distances between major generating plants and urban load-centres have progressively become larger, thus posing additional pressure upon any possible faster implementation of generation projects; and increasing the already substantial distance-associated power-transmission losses occurred when electricity is conveyed over thousands of kilometres.¹⁴¹

The two major grids in Brazil are those placed in the south and northeast part of the country, which were gradually implemented in a three-phase project in 1999, 2006, and 2008 through extending more than 21,500 kms of new lines, when a basic trunk-interconnected network between the two regions was finally achieved. However, interconnecting all these isolated systems, upgrading them, and expanding the existing network according to the requirements of demand growth poses a major challenge for the country.¹⁴² Internationally, Brazil has sought to arrange power-supply from its neighbours, thus, fostering international interconnections.¹⁴³ Venezuela, Argentina,¹⁴⁴ and Uruguay are within the framework of long-term power purchase agreements with Brazil, as well as in the multilateral realm of regional integration frameworks.¹⁴⁵ Brazil has the world's largest integrated power grid, but when something goes wrong, the domino effect is also a major inconvenience. Such a situation occurred in November 2009 when 18 out of 26 states of the country experienced a power-outage due to lightning strikes on transmission lines.¹⁴⁶ The aforementioned weaknesses in transmission have played a significant role in exposing the grid to possible failing. In response, Brazil has launched a policy aimed

¹⁴⁰Eletrobras, *Administration Report 2009* (Eletrobras, 2010) 6.

¹⁴¹Ibid, transmission losses are historically estimated around 16 per cent.

¹⁴²In response, the government has launched a R\$ 2.2 billion plan for new lines and substations to be constructed by late 2017.

¹⁴³See *Acordo Tripartite entre Brasil, Paraguai e Argentina para aproveitamento dos recursos hidráulicos no trecho do Rio Parana desde as Sete Quedas até a foz do Rio da Prata* [Tripartite agreement between Brazil, Paraguay and Argentina to use water resources in the stretch of the Paraná River from the Seven Falls to the mouth of the River Plate] opened for signature October 19 1979, 2216 UNTS I-39389 (entered into force December 5 1979); *Protocolo de Entendimiento entre los Gobiernos de la República Argentina y de la República Federativa del Brasil sobre Cooperación e Interconexión Energética* [Protocol of understanding between the Governments of the Republic of Argentina and of the Federative Republic of Brazil on Energy Co-operation and Interconnection], opened for signature April 9 1996 2015 UNTS I-34706 (entered into force March 18 1998); *Tratado entre el Gobierno de la República Federativa del Brasil y el Gobierno de la República Argentina para el aprovechamiento de los Recursos Hídricos compartidos en los tramos limítrofes del Río Uruguay y de su afluente el Río Pepirí-Guazú* [Treaty between the government of the Federative Republic of Brazil and the government of the Republic of Argentina for the exploitation of shared water resources in border sections of the river Uruguay and its affluent river Pepirí-Guazú], opened for signature May 17 1980 1339 UNTS I-22475 (entered into force June 1 1983); *Memorandum de Entendimiento entre la Republica Argentina y la Republica Federativa del Brasil sobre el desarrollo de Intercambios Eléctricos y futura Integración Eléctrica* [Memorandum of understanding between the Republic of Argentina and the Federative Republic of Brazil on the carrying on of power exchanges and future Electric Integration], opened for signature August 13 1997, 1995 UNTS I-34147 (entered into force August 13 1997). See also *Decreto Legislativo N° 23, de 30.5.1973 – Aprova o texto do Tratado de 26.4.1973 celebrado entre a República Federativa do Brasil e a República do Paraguai, bem como as Notas então trocadas entre os Ministros das Relações Exteriores dos dois países (Publicado no 'Diário do Congresso Nacional' de 1°.6.1973, pág. 1.659)* [Law Decree Nr 23 of May 30 1973 – Approves the text of the treaty of April 26 1973 entered into the Federative Republic of Brazil and the Republic of Paraguay as well as the exchanging of notes between foreign offices of both countries (Published in 'National Congress Newspaper' of June 1 1973, p 1,659); *Decreto N° 72.707, de 28.8.1973 – Promulga o Tratado de 26.4.1973, celebrado entre a República Federativa do Brasil e a República do Paraguai, bem como as seis Notas trocadas entre os Ministros das Relações Exteriores dos dois países (Publicado no 'Diário Oficial' de 30.8.1973, págs. 8.642-45)* [Decree Nr 72,707 of August 28 1973 – Enacts the treaty of April 26 1973 entered into the Federative Republic of Brazil and the Republic of Paraguay as well as the exchanging of notes between foreign offices' secretaries of both countries (Published in 'Official Gazette' of August 30 1973, p 8, 642-45)].

¹⁴⁴ABB Power, *Power Systems/HVDC. HVDC International Interconnection between Argentina 50 Hz and Brazil 60 Hz* (ABB Power Technologies AB, 2010) POW-0037.

¹⁴⁵See *Montevideo Treaty constitutive of the Latin American Integration Association (ALADI, Montevideo)*, opened for signature August 12 1980, UNTS I-22309 (entered into force March 18 1981); *Treaty establishing a common market between the Argentine Republic, the Federal Republic of Brazil, the Republic of Paraguay and the Eastern Republic of Uruguay (MERCOSUR) (Asunción Treaty)*, opened for signature March 26 2011, 2145 UNTS 252 (entered into force November 29 1991); *Treaty for Amazonian Co-operation (Brasilia)*, opened for signature July 3 1978, 17 ILM 1045 (entered into force February 2 1980); *Memorandum de entendimiento relativo a los intercambios eléctricos e integración eléctrica en el MERCOSUR*, MERCOSUR/MC/DEC N° 10/98 (July 23 1998) XIV CMC [Memorandum of understanding on power exchanges and electric integration within MERCOSUR]; *Constitutive Treaty of South American Union of Nations (UNASUR)(Brasilia)*, opened for signature May 23 2008 (entered into force March 11 2011).

¹⁴⁶Distance can also be held responsible for creating susceptibility of grids disruption.

at diversifying its overwhelming reliance on hydro-generation in its energy mix and to address the lack of upgrading of its transmission infrastructure through increasing both qualitative and quantitative investment in the coming years, with an instance of this being the 2020-Decennial Energy Plan (DEP-2020).¹⁴⁷ The DEP-2020 is Brazil's official policy instrument on energy planning and energy-related investment drivers. It is issued by the *Empresa de Pesquisa Energética* [Energy Research Company], the Brazilian Energy Agency. It contains a ten-year energy expansion plan, forecasts of the outcomes of energy demand, supply studies, information on energy-related projects and infrastructure needs; as well as the outcomes of energy auctions.

To sum up, throughout its contemporary history – although not exempted from economic setbacks, social inequalities, and political struggles – Brazil has had the merit of conducting its energy policy in a remarkably consistent manner. It is true that this is more likely to happen when a country has vast and natural resources relatively at hand as Brazil does, but its recent political history shows several opportunities in which the policy might well have turned in a different direction. That, however, did not happen. In itself, the energy policy can be viewed as having three main lines. The oldest but still crucial is that which strives to harness the complete hydropower potential.¹⁴⁸ The second line of policy is that focusing on consolidating Brazil as a net oil-exporter country, as well as on expanding and deepening its pioneering world leadership in producing low-cost biofuels. Finally, the current policy trend is to achieve a more diversified energy portfolio, without sacrificing the distinctive 'green-character' of Brazil's historic energy mix. It aspires to achieve this latter policy objective by means of integrating different renewable energy sources through ambitious investment plans which certainly include expanding, upgrading, and interconnecting power networks both domestically and internationally.

VI. CONCLUSIONS

This paper addressed transnational power-transmission through a thematic approach based on grid interconnections and power transit. The enquiry looked at the main features of power networks, the legal nature of international power transmission operations, and the most relevant challenges posed by conveying electricity transnationally. It aimed at drawing lessons from the comparative analysis of transnational (EU) and international (EEC, ECT, Brazil) case studies capable to be transposed to the legal and regulatory fields in order to foster cross-border power grids interconnections and unrestrained power transit in regional non-integrated realms.

An apparent conclusion is that there is no current technical limitation for power network interconnections to be done, mostly, due to the use of international standards for electricity transformation and the development of high-voltage superconducting technologies.¹⁴⁹ Further, compliance with up-to-date international standards for interconnection, minimum transfer capacities, reliability and security must form part of any proposed regulatory framework.

Another finding is that the most important challenges that cross-border networks face are of an economic nature regarding how to secure investments for interconnecting different transmission systems in the context of vertically-integrated companies, the kind of disputes falling in the scope of Article 6 ECT. On the one hand, these kind of companies – for the sake of their own corporate interest – are fairly willing to extend their generation arms toward the transmission field, but not equally eager to do so when it comes to investing in interconnecting systems across borders because the process contributes to an enlarged integrated electricity market within which such companies would see their market share diminished or have to strive to compete. For such reasons, though the economics of potential cross-border interconnected transmission systems might appear complex, the outlook changes considerably for the better when considering renewable instead of conventional power sources feeding the grid on a large-scale. However, this requires a considerable regulatory effort at international and domestic levels on expanding antitrust legal mechanisms. This is explained because transparent market information and equalitarian access to markets – whether domestic or international – are essential to boost 'green' power generation and thus greater competitiveness (lower power prices) and efficiency (ultimately, lower marginal generation costs).

¹⁴⁷Ministério de Minas e Energia (MME), Secretaria de Planejamento e Desenvolvimento Energético (SPE), Empresa de Pesquisa Energética (EPE), above n. 145.

¹⁴⁸Estimated as 260 GW, hence more than 70 per cent of it not yet developed. In this context, massive, as well as small, hydro projects are on their way to completion to meet the country's rapidly expanding power needs.

¹⁴⁹For example, Sumitomo's or Hitachi's.

In addition, due to diversification,¹⁵⁰ expansion,¹⁵¹ competitiveness,¹⁵² and oneness¹⁵³ of the resulting power generating market as well as the consequent overall cost-reductions and environmental advantages that it represents, the enquiry suggests that the economic outlook is better-off if the share of renewable sources in energy mixes is predominant as in the Brazilian case study. From the economics point of view, an international power transmission network theory is based upon the idea of internationalizing, operating, and maintaining a common asset deemed to be, precisely, off-the-market, but functioning simultaneously as a means to articulate the enhancement and efficiency of two other different markets: the generation market at one end of the spectrum, and the distribution market at the other. This proposition allows overcoming usual economic characterizations of power grids as imperfect markets, either mono- or, at least, oligopolistic markets. Among non-technical problems posed by interconnections is optimization: how to minimize energy losses, particularly, in long-distance exchanges involving synchronisation of cross-border systems. In sum, interconnections help to expand and make more efficient the power generation markets to which these latter are attached.

More troublesome, however, are the findings in relation to policy issues that could hinder international power transmission projects as well as those strictly legal and/or regulatory in nature, such as those involving equality of treatment in accessing transmission services, setting reliability standards, and the use of potential CO₂ abatement mechanisms.¹⁵⁴ Here, the correlation between international cooperation on the one hand, and security and sovereignty on the other, is crucial to understand the stagnation in which an economically sensible and viable transmission project may have been for quite a long time. This is so, because the former concept appears to have an inversely proportional relationship with the two latter. However, in advancing the proposition that they are not really irreconcilable, the goal of a regulatory framework to strike an appropriate balance becomes paramount.

As seen, international law is usually considered as a minimal, fragmentary body of rules and principles to resort to for solving a conflict presenting an international element, covering a given law-field neither extensive nor exhaustively, more or less procedural in character, leaving the bulk of detailed material regulation to domestic *fora*, and commonly unenforceable.

The enquiry proved that cross-border interconnected power networks and proper regulation on power transit, under certain conditions (technical, economic, and political), have potential to improve the legitimacy of international law. Indeed, the analysis presented five concrete arguments through which international law might achieve greater levels of legitimacy and enforceability by promoting cross-border grid interconnections.

In that sense, the analysis of the case study of the European Union is paramount. Energy-related issues such as trans-European networks, the internal market and territorial cohesion are 'shared competences' between the EU and the member states.¹⁵⁵ Policies are, therefore, jointly agreed upon all member states and the Union along guidelines and recommendations adopted by the Council. Since the EU – acting alone – has no competence to implement what has been recommended, cooperation and flexible coordination between the member states are necessary. Nonetheless, higher-rank

¹⁵⁰In the sense that the mix is opened up to foster several types of conventional and alternative energy sources.

¹⁵¹Making possible, not only to extend the geographical area of the market by adding more power stations to the grid (production side) whether in different time zones (East-West) or hemispheres (North-South), but also – and equally important – the customer base (demand side) having access to the market.

¹⁵²By progressively reducing the capital and/or operational costs, achieving economies at scale, and removing from the market inefficient power units.

¹⁵³This is the idea of a single power market taking the place of several domestic isolated power markets.

¹⁵⁴The potential of transmission projects to reduce CO₂ poses an interesting question regarding who is entitled to the CO₂ credit, the exporter power generator or the buyer/consumer on the other end of the transaction? In the author's opinion, the attribution of the credit for CO₂ reduction can legally be neutral, namely, that the law can either decide that one party (and not the other) is to be entitled to claim the GHG credit, split it or apportion it between the parties in any suitable fashion. However, where the decision should not be neutral as in the legal realm is when considering the issue from the policy point of view. Who can use the CO₂ credit is a matter relevant to policy, rather than to law, which usually plays in this a mere instrumental role. From the policy perspective and in the context of liberalised economies interacting in a common (interconnected) power market, the credit for any CO₂ reduction associated to transnational power transmission should correspond to the users whose power demand is ultimately satisfied through 'green' power. However, for this to finally occur, these users must be duly informed about the supply options as well as empowered enough to select the renewable power provider. Therefore, the role of regulation as to the conditions of the market is once again emphasized.

¹⁵⁵*Lisbon Treaty or Treaty of the Functioning of the European Union (TFEU)*, opened for signature June 20 2007 OJ C 306/1 (entered into force December 1 2009) art 4(1)-(2).

measures, such as regulations, directives, or decisions adopted by the Council are compulsory at European level and their implementation – to a certain extent – has the effect of eroding traditional views of national sovereignty. The EU law is currently regarded as a set of rules constituting ‘a separate [autonomous] legal order, whose provisions belong neither to international law nor to the municipal law of the member states’.¹⁵⁶ Some of them feature direct applicability, direct effect, prevailing over domestic law and imposing on member states liability for EU-law breaches. This supranational aspect of the EU-law is, by far, the most important feature and its consequences over the understanding of sovereignty are, thus, directly related with the proposition that trans-boundary interconnections are better advanced through certain types of domestic energy portfolios: those ‘green’ and harmonized through a large-scale (regional) single system of interconnected bulk-power grids.

Turning to current European energy policy, two relevant dimensions are found. The first one is internal, consisting of setting up a pan-European integrated, interconnected and competitive energy market through the development of several infrastructure projects whilst moving towards sustainable decentralised energy production to which renewable energy sources integration is essential. Just as set forth by Directive 2009/28/EC including mandatory national targets for the overall share of energy from renewable sources in gross final consumption by 2020.¹⁵⁷

However, as to European energy policy concerns, the outbound dimension has been gaining momentum over recent years. In this new dimension, successive enlargements of the Union as well as outside-EU projects have started influencing policy decisions. Making transmission projects possible, such as Nabucco, ITGI, and the Southern Corridor, all essential for EU’s networks stability and security of supply, has sparked European eagerness for placing interconnectors at the outbound limits of the Union with third countries or maritime areas. Often presented as a manifestation of the obligation of solidarity among member states, under a critical analysis, the placing of interconnectors across external borders is a natural expression of the need for strengthening the external character of the EU energy market. In this sense, it is understandable the EU’s interest in attracting Russia, North Africa, and the Far East to the Energy Charter Treaty framework, even as defective as it is, whilst putting pressure on work to be done for improving – particularly – the transit provision of the ECT and/or eventually finalise its protocol on transit. Along a similar line of interests, the EU conducts permanent efforts in trade at the WTO arena.

Applicable to both dimensions of the EU market: internal and external, further conclusions are to be drawn from future European Court of Justice’s decisions as to mechanisms to settle disputes between member states encompassed by an international agreement on international transmission interconnections.

For countries not embarked in integration processes and willing to engage in an international legal framework capable to sustain cross-border power trading and transit, both the analysis and case study offer a number of valuable lessons, the first being the importance of setting up an area of influence, whether territory-based as the EU model or functional (connectivity and transit), as this paper advances. Secondly, there must be a clear identification of the transmission projects or current facilities deemed as of mutual interest. Thirdly, an overarching operative structure, preferably enjoying independent international status, is required. In fourth place, shared competences between states as to the normal operation of an interconnected power grid should not be permitted and, if allowed, they should be limited in scope, accurately framed, and restrictively construed. Fifth, participation of third parties in transmission projects or accession to already established legal frameworks should be allowed and encouraged. Sixth, the principle of solidarity whereby bilateral negotiations on energy issues benefit all common stakeholders is essential and must be strengthened. Finally, competition issues and, particularly, grid access should – in principle – be addressed domestically, but, in any case, contracting parties should enjoy good standing at national courts and be reciprocally entitled to request appropriate antitrust enforcement actions.

Amongst a group of states, whether neighbouring countries or not, the analysis and case study on power transmission led ultimately to conclude that, for furthering energy mix regulatory convergence to occur, the legal approach to it must be selective and coherent as to the relationships between transit-, power-deficit, and power-surplus countries and include both internal legal measures, such as the harmonization (or better still, synchronization) of energy mixes integrating renewable sources; as well

¹⁵⁶*Common Market Law Revue* (1967) 483.

¹⁵⁷As well as for the share of energy from renewable sources in transport.

as outbound common legal decisions on cross-border grid interconnections, power trade, and unrestricted energy transit.

In principle, there is nothing wrong in wanting to diversify energy mixes. The alternatives to do so are multiple and fossil-based fuels, renewable sources, or most likely a combination of the two might be used to reduce energy security tensions, whether in Brazil or the EU. However, a solution might be to push for diversification of the energy matrix, whilst also furthering the integration and use of environmentally-friendly energy sources, this latter option is relatively easier for Brazil rather than Europe. Under the argument of this paper, however, this could be facilitated for both – individual countries or regions, either integrated or not – by fostering transnational power grid interconnections. They not only assist local integration processes where suitable, but also diversify energy matrices by means of adopting a share on how diversified imported production might be.

Transit disputes – driven by the potential risk to a country of being deprived of energy supply as a result of another state's suspension of non legally-binding agreements or flawed international legal schemes (ECT/WTO), constitute common security concerns to which the EU and Brazil have attempted different solutions: whilst the EU is dealing with a multilateral approach, Brazil has mainly opted for a bilateral one. Interestingly, however, in both cases international legal enforceability remains the fundamental obstacle. Indeed, on the one hand, such agreements mostly arise from governmental acts receiving various non-committal denominations i.e., political agreements, memoranda of understanding, statements of intentions, non-normative agreements, or gentlemen's agreements. These agreements bind only the immediate authorities and they avoid mentioning the states which, consequently, assume no legal obligation whatsoever. The most relevant are the so-called 'energy integration agreements' or 'energy integration declarations'. On the other hand, despite the Energy Charter Treaty (ECT) and World Trade Organization (WTO) general rules for trading in goods, there is still no specific regulatory framework dealing with international power-trading and cross-border power transit. There are no WTO specific rules on power-trading; whilst negotiations for giving Article 7 of the ECT on transit issues further development have not yet crystallised in a complete binding protocol.¹⁵⁸ Moreover, there are doubts about the ECT being the only regulatory domain applicable to the energy sector.¹⁵⁹ The ECT was originally designed as a multilateral investment treaty. In regard to power trading, third-party access, and energy policies, the ECT is still ineffectual. Not even after the hard negotiation and entering into effect of the so-called 'Trade Amendment'¹⁶⁰ (which made possible the application by reference of the WTO rules to energy trading) such issues have been adequately resolved.

A combined transnational market – whether achieved bilateral or multilaterally – not only represents the apparent flow of power and trade between two or more countries.¹⁶¹ Although not yet detailing what specific sources of energy are to be used for keeping power flowing across the borders, in effect, correlative energy policies represent a somehow implied understanding between parties on the basic acknowledgement of keeping energy policies synchronised. At this level, a practical legal approach to an energy agreement would lead to the conclusion that building an international interconnection node is purportedly destined to be operative anyhow, but in a sporadic way, given the fact that arranging an interconnection is a long-term, costly, capital-intensive project, with long-term investment rate returns, normally fixed, and so destined to be permanent. However, even setting aside

¹⁵⁸A transit protocol draft, in negotiation since 2002, further elaborates art 7 of the ECT, but it is still subject of bilateral consultations between the EU and the Russian Federation as to several issues such as the way in which potential mismatches between the duration of supply and transit contracts can be avoided or the applicability of the transit protocol inside the EU. Some progress, however, has been achieved as to the definition for available capacity, principles of transit tariffication, transparent and non-discriminatory congestion management rules, and provisions for the creation of new capacity. See especially EU-Directorate General for Energy, *EU-Russia. Energy Dialogue. The First Ten Years: 2000-2010* (European Commission, 2011). See also, *Energy Charter Treaty (ECT)* and *Energy Charter Protocol on Energy Efficiency and related Environmental Aspects (PEPEREA)*, opened for signature December 17 1994, 33 ILM 360 (entered into force April 16 1998).

¹⁵⁹The Energy Community Treaty, for instance, is a multilateral agreement and one of the EU complementary frameworks derived from the EU's external energy policy to address the issue of energy security. The treaty promotes market integration, but also *acquis* transposition and implementation on potential areas for EU's enlargement processes. *Treaty establishing the Energy Community (also known as EEC and ECSEE)*, opened for signature October 25 2005, OJ L 198/18 (entered into force July 1 2006).

¹⁶⁰In 2004.

¹⁶¹Ross Buckley, Vailo Lo, and Laurence Boule (eds) *Challenges to Multilateral Trade. The impacts of bilateral, preferential, and regional agreements* Global Trade Law Series, vol 14, 87 (Wolters Kluwer Law & Business 2008).

this purposive approach, what is to be emphasized here is the capacity of energy network interconnection agreements to cast a different light upon traditional conceptions of energy security and, ultimately, sovereignty. These kind of 'arrangements' should be highly specific and subject-matter-focused to serve the function of softening – at international level – the rigours of legal concepts that are far less flexible in domestic realms.

In sum, a well-framed, technically-based, dedicated scope for transnational power grid interconnections and energy transit at regional level, into ongoing international trading schemes such as the WTO or an improved Energy Charter Treaty, would further international power trading and synchronisation of energy matrices as drivers for international law to achieve greater enforceability.