



The **E15** Initiative

# STRENGTHENING THE GLOBAL TRADE SYSTEM



## Clean Energy and Access to Infrastructure: Implications for the Global Trade System

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Clean Energy Technologies and the Trade System

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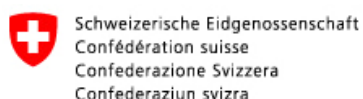
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# ABSTRACT

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To meet climate change and renewable energy targets and ensure security of supply, large amounts of renewable and other low-carbon generation have to be able to connect to electricity networks in the next decade. Timely grid access arrangements are vital to delivering new generation projects. Regulation of access on reasonable terms to transport and distribution networks is thus crucial for integration of clean energy trade into economies. Moreover, for such successful integration of clean energy in present and future energy systems, long-term investments in energy infrastructure are necessary. Most renewable energy resources are location specific, which means that the electricity generated using such resources may need to be transported over long distances. Therefore, it is expected that regional trade in clean energy will develop on a larger scale. This emphasizes the importance of rules for cross-border transportation of clean energy, especially through fixed infrastructure. Moreover, the efficiency of clean-energy systems would increase if the new infrastructure interconnections allow selling electricity at peak hours in different time zones. Interconnections between continents could take advantage of the total available power and transfer it where it is needed, increasing the potential of exploiting renewable energy. Promoting renewable energy in the power sector will require policies to address its integration into transmission and distribution systems.

Regulatory changes that accompanied energy sector reform in many countries have allowed independent power producers to operate in the market. In some countries, however, regulations protect the dominant, centralized production, transmission, and distribution system, making the introduction of alternative technologies, including renewable energy, difficult. While an examination of existing domestic laws and regulations is a first step in the introduction of renewable energy technologies, especially for integrating them into the electric power system, the focus of this paper is on how international trade rules could better accommodate renewable energy trade through fixed infrastructure. Outlining the characteristics of energy transportation, this paper proceeds to explain the World Trade Organization (WTO) disciplines relevant to trade in clean energy via fixed infrastructure, in particular General Agreement on Trade in Services (GATS) disciplines on energy services and General Agreement on Tariffs and Trade (GATT) transit rules. Finally, it suggests policy options to adopt existing rules to the challenges of integrating clean energy transported via fixed infrastructure.

There are two interrelated features of energy trade via fixed infrastructure that need to be taken into account. First, energy transport infrastructure possesses the characteristics of a natural monopoly. Second, infrastructure construction projects are highly capital-intensive investments. These characteristics render the regulation of trade in their respective products by existing multilateral trade rules challenging. The technical structure of the energy sector leads to the prevalence of natural monopolies in some of its segments, which are associated with high fixed costs and technical constraints. Regulation is necessary to minimize unproductive monopoly rent of the natural monopolies. In addition, to foster competition and promote clean energy supplies, regulation's aim should be to ensure access to the fixed infrastructure by other energy suppliers, especially smaller independent producers of renewable energy. Given the lack of large extra capacity in energy infrastructure, third-party access rules will not necessarily be sufficient to address the problem. Rules for the expansion of network capacity and construction of new infrastructure are therefore necessary for the continued development of clean energy trade and investment.

Even if a foreign supplier of clean energy were granted market access and established a power trading and marketing company in a foreign country, he may still encounter obstacles related to access to the transmission network. An independent regulator controlling the behaviour of these incumbents as well as competitive safeguards are necessary to enable access to the transportation infrastructure. In the context of the multilateral rules embodied in the WTO, the problem with regulation of third-party access to transportation networks is related to that such infrastructure is mostly controlled by private companies, rather than by governments that are subjects of obligations under WTO Agreements. For this, additional pro-competitive disciplines would be necessary. General rules regarding energy transportation services under the GATS, with specific provisions for preferential access of clean energy to networks, would be a better option.

With respect to transit through fixed infrastructure, general transit rules are not as complete as they should be to address all the pertinent problems that cross-border clean energy trade faces. Also for the sake of clarity and predictability, adopting an interpretative note to Article V to the effect that transit disciplines cover electricity transit via fixed infrastructure could be envisaged.

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# LIST OF ABBREVIATIONS

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ECT	Energy Charter Treaty
EU	European Union
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
IEA	International Energy Agency
MFN	most-favoured nation
OECD	Organisation for Economic Co-operation and Development
TISA	Trade in Services Agreement
TPA	third-party access
US	United States
WTO	World Trade Organization

# INTRODUCTION

The greenhouse gases emissions associated with the use of conventional energy are a major cause of climate change.

Over the past decades, there has been a major focus on developing cleaner energy sources because of the pressing need to mitigate irreversible changes to the planet.<sup>1</sup> Enabling government policy and renewable energy targets, the declining cost of many renewable technologies, the high prices of fossil fuels for a long period of time, and other factors have supported a continuing increase in the use of clean energy (IPCC 2011: 196). While the share of renewable energy is still relatively small, its growth has accelerated in recent years.<sup>2</sup> These developments suggest that renewable energy could play a much more prominent role in both developed and developing countries over the coming decades.

To meet climate change and renewable energy targets and ensure security of supply, large amounts of renewable and other low-carbon generation have to be able to connect to electricity networks in the next decade. Timely grid access arrangements are vital to delivering new generation projects (Department of Energy and Climate Change 2013). Regulation of access on reasonable terms to transport and distribution networks is thus crucial for integration of clean energy trade into economies. Moreover, for such successful integration of clean energy in present and future energy systems, long-term investments in energy infrastructure are necessary.

Most renewable energy resources are location specific, which means that the electricity generated using such resources may need to be transported over long distances. Therefore, it is expected that regional trade in clean energy will develop on a larger scale. This emphasizes the importance of rules for cross-border transportation of clean energy, especially through fixed infrastructure. Significant investments in the transport infrastructure will be necessary. Often such investments in additional transmission infrastructure would allow access to higher-quality and lower-cost renewable resources, instead of using lower-quality renewable resources closer to load centres.<sup>3</sup>

Moreover, the efficiency of clean-energy systems would increase if the new infrastructure interconnections allow selling electricity at peak hours in different time zones.<sup>4</sup> Interconnections between the continents could take advantage of the total available power and transfer it where it is needed, increasing the potential of exploiting renewable energy. Moreover, the existence of the interconnections around the world would help to decrease the amount of necessary power reserves within a region (Czisch Unpublished). In sum, there is no doubt that in the long term,

the use of renewable energy would require a more or less global network for electricity to function efficiently (WBGU 2004: 189). Importantly, the global grid could result not only in economic and environmental efficiency gains, but also export opportunities for developing countries (WBGU 2004: 190).

The recent development of regional grids and studies showing the feasibility of developing a global grid put an additional emphasis on the infrastructure issue.<sup>5</sup> Long transmission networks, in addition to existing ones, will be necessary to deliver renewable energy-based electricity from production sites to load centres. The studies suggest that efficiently integrating more renewable sources into the current system will require reinforcing the transmission infrastructure (Chatzivasileiadis et al. 2013: 372–83).

Promoting renewable energy in the power sector will require policies to address its integration into transmission and distribution systems (IPCC 2011: 45). Regulatory changes that accompanied energy sector reform in many countries have allowed independent power producers to operate in the market. In some countries, however, regulations protect the dominant, centralized production, transmission, and distribution system, making the introduction of alternative technologies, including renewable energy, difficult. While an examination of existing domestic laws and regulations is a first step in the introduction of renewable energy technologies, especially for integrating them into the electric power system, the focus of this paper is on how international trade rules could better accommodate renewable energy trade through fixed infrastructure.

1 The international community's discussions of renewable energy began with the fuel crises of the 1970s, when many countries began exploring alternative energy sources to tackle energy security issues.

2 For instance, despite global financial challenges, in 2009, renewable energy capacity growth in wind power constituted 32 percent, hydropower 3 percent, grid-connected photovoltaics 53 percent, geothermal power 4 percent, and solar hot water/heating 21 percent.

3 For instance, windy regions are often far from consumption and load centres in China. In the United States (US), wind resources are in the Midwest, at a significant distance from the highly populated coastal areas. Tidal energy resources in Scotland are also far from the populated areas. See IPCC (2011: 196).

4 For instance, due to time differences, when electricity consumption falls in Europe during the night, power consumption is still at its peak in the US.

5 For instance, a 100 percent renewable energy supply system in Europe with interconnections in North Africa and West Asia is being discussed. The profitability of producing electricity from geothermal and hydro power plants in Iceland to transmit and sell in the UK has been demonstrated. Projects such as Desertec, Medgrid, and Off-Shore Grid have been launched to connect the Mediterranean region with Europe and transmit renewable electricity from the African desert or North Sea to consumption centres. Projects such as Gobitec in Asia and Atlantic Wind Connection in the US aim to connect Asian power grids or transmit offshore wind energy to the US East coast. See Czisch (Unpublished). The global grid advocates the connection of all regional power systems into a unified system. With the introduction of more efficient transportation technologies such as high-voltage direct current power transmission or even hydrogen pipelines, the development of a worldwide grid would be simplified.

The dependence of energy trade on fixed infrastructure implies that traditional trade disciplines might not be enough to ensure free trade in energy. While multilateral trade rules are oriented towards ensuring market access, additional measures have to be taken to guarantee the availability of fixed infrastructure and timely access to transportation pipelines/transportation networks, distribution systems, and the like (Selivanova 2007).

The paper starts with outlining the characteristics of energy transportation. It proceeds with explaining the World Trade Organization (WTO) disciplines relevant to trade in clean energy via fixed infrastructure, in particular General Agreement on Trade in Services (GATS) disciplines on energy services and General Agreement on Tariffs and Trade (GATT) transit rules. Finally, it suggests policy options to adopt existing rules to the challenges of integrating clean energy transported via fixed infrastructure.

## CHARACTERISTICS OF ENERGY TRANSPORTATION AND IMPLICATIONS FOR TRADE RULES

There are two interrelated features of energy trade via fixed infrastructure that need to be taken into account. First, energy transport infrastructure possesses the characteristics of a natural monopoly. Second, infrastructure construction projects are highly capital-intensive investments. These characteristics render the regulation of trade in their respective products by existing multilateral trade rules challenging.

The technical structure of the energy sector leads to the prevalence of natural monopolies in some of its segments, which are associated with high fixed costs and technical constraints (Melly 2003).<sup>6</sup> The implication of a natural monopoly is that an activity cannot be carried out in an efficient way in a competitive context and needs to be carried out by one company (Selivanova 2007).<sup>7</sup>

Consequently, the energy industry in many countries has been historically based on a small number of companies—sometimes even a monopolist in electricity or gas supply—operating a centralized infrastructure system (World Bank 2006). Such systems developed as vertically integrated monopolies that have been often committed to large

conventional central power facilities. Government policies have often supported such systems to ensure they deliver affordable and reliable electricity or gas. Such systems have sometimes been unreceptive to distributed, smaller supply technologies, which renewable projects often are.<sup>8</sup>

Regulation is necessary to minimize unproductive monopoly rent of the natural monopolies. In addition, to foster competition and promote clean energy supplies, regulation's aim should be to ensure access to the fixed infrastructure by other energy suppliers, especially smaller independent producers of renewable energy (Waelde and Gunst 2003: 127).

Grid-bound energy is difficult to store; in fact electricity needs to be transmitted at the moment it is being consumed. Capacity therefore needs to be available at the right time.<sup>9</sup> Due to lack of free capacity, it may turn out to be impossible to provide new access to transportation infrastructure without affecting the transport capacity of other user(s). Indeed, it is unusual to invest in infrastructure with substantial extra capacity.<sup>10</sup>

6 A natural monopoly is a situation where production of a good or service by one producer ensures the least costly supply. See also Bhattacharyya (2011).

7 There are elements of natural monopoly in transportation through fixed infrastructure of natural gas and electricity as substantial costs are involved in building alternative energy networks.

8 For instance, because of monopoly or near monopoly situation, energy regulations, including technical regulations and standards, have evolved on the assumption that energy systems are large and centralized and of high power density and/or high voltage. Such regulations may be unnecessarily restrictive for renewable energy systems. For instance, most of the rules governing sea lanes and coastal areas were written long before offshore wind power and ocean energy systems were developed and do not consider the possibility of multiple uses that include such systems (IPCC 2011).

9 Construction of transportation pipelines and transmission grids requires substantial investments. Such transportation facilities involve significant economies of scale in the construction phase, and once constructed, have limited capacity for transporting specific energy products. Energy transport infrastructure projects necessitate large capital investments, and the sunk costs in this segment are very high. Therefore, companies that carry out investments in infrastructure projects have typically sought exclusive rights for a certain period to recoup their investments, often using long-term contracts with take-or-pay clauses. Cameron (2007: 21) comments that the exclusive rights granted often included the ownership or operation of a transmission grid over a specified period of time as well as an exclusive right to import gas or electricity.

10 Other transportation modes such as motorways, railways and the like also have their capacity constraints. A difference, however is that there is usually some spare capacity in such infrastructure. For most manufactured goods (transported by rail, trucks, or other such means) capacity constraints can be easily solved because of a favourable relationship between fixed and variable costs. If the use of airplanes, ships, and trucks has a higher portion of variable costs than a pipeline, transportation service providers can more easily afford having spare capacities— at times idle—available than the operator of a pipeline. Such spare capacities also make commercial sense because they allow responding with supply expansion to temporarily increased demand. Another difference of such modes compared to energy networks is that trucks, ships, planes, and trains can move to the location of increased demand at a specific moment and on a temporary basis (Ehring and Selivanova 2011).

Considering the lack of large extra capacity in energy infrastructure, third-party access (TPA) rules will not necessarily be sufficient to address the problem. Rules for the expansion of networks capacity and construction of new infrastructure are therefore necessary for the continued development of clean energy trade and investment. The WTO framework does not contain investment disciplines (except to a limited extent in the GATS with respect to market access for service suppliers). Yet, such disciplines appear necessary to effectively address the trade of clean energy via fixed infrastructure.

## DISCIPLINES ON ENERGY SERVICES AND ACCESS TO TRANSPORTATION NETWORKS

Under the GATS, WTO Members are obliged to accord services and service suppliers of any Member treatment no less favourable than that they accord to like services and service suppliers of any other country.<sup>11</sup> Moreover, in the sectors inscribed in its Schedule, Members must accord services and service suppliers of any Member treatment no less favourable than it accords its own services and service suppliers.<sup>12</sup> If distribution of infrastructure capacity could be considered “measures affecting the supplier of services,” discrimination between different service suppliers is prohibited. In practice, however, countries favour various methodologies of capacity distribution that might be considered discriminatory per se, that is, they would result in excluding some supplier over others (the only non-discriminatory method seems to be pro-rata distribution, while auctions and historical allocations result in discriminatory outcomes).

Even if a foreign supplier of clean energy were granted market access and established a power trading and marketing company in a foreign country, he may still encounter obstacles related to access to the transmission network (Melly 2003: 176). Often barriers include excessive access fees and discriminatory allocation of network capacity. In addition, non-transparent terms and conditions for calculating access fees may aggravate the situation (Melly 2003: 169). Grid operators can claim lack of capacity and charge transportation fees exceeding the cost of services rendered (Waelde and Gunst 2003: 123). An independent regulator controlling the behaviour of these incumbents as well as competitive safeguards is necessary to enable access to the transportation infrastructure (Selivanova 2007).

In the context of the multilateral rules embodied in the WTO, the problem with regulation of third-party access to transportation networks is related to that such infrastructure is mostly controlled by private companies, rather than by governments that are subjects of obligations under WTO Agreements. WTO rules and commitments ensure market access and non-discrimination, and tackle quantitative measures. However, existing rules do not address anti-competitive practices commonly carried out by incumbents controlling different segments upstream and downstream of the energy value chain. For this, additional pro-competitive disciplines would be necessary.

Arguably, it would be inefficient and not make much sense to negotiate pro-competitive disciplines for only clean energy networks. General rules regarding energy transportation services under the GATS, with specific provisions for preferential access of clean energy to networks, would be a better option. The following section takes stock of the existing rules, draws on the experience of creating pro-competitive disciplines in telecommunications, and makes some proposals for addressing the issue of fixed energy infrastructure.

### PRO-COMPETITIVE PRINCIPLES IN GATS

WTO Agreements do not contain competition rules although the GATS has limited provisions that deal with the conduct of private companies such as monopolies and exclusive service suppliers.<sup>13</sup>

However, the GATS disciplines do not address the main anti-competitive practices adversely affecting access to and use of energy transport facilities by third parties.<sup>14</sup> Some WTO Members proposed introducing pro-competitive safeguards in relation to energy services in WTO, like it was done for

11 Article II GATS.

12 Article XVII GATS.

13 Restrictive business practices by incumbent operators are subject to Article VIII and Article IX GATS. Article VIII is especially pertinent to gas transportation and distribution services. It requires Members to ensure that the incumbent natural monopolist in the transportation and distribution market does not act in a manner inconsistent with the most-favoured nation (MFN) principle and with the Member's specific commitments. However, there have been not many commitments undertaken by WTO Members in this respect. In addition, if such a monopoly/exclusive supplier competes in the supply of a service outside the scope of its monopoly rights, the Member has to ensure that it does not abuse its position subject to the Member's specific commitments. Finally, monopoly suppliers acting outside the scope of their monopoly in a sector where a Member has undertaken GATS commitments must respect those commitments (Cossy 2011). See also Selivanova (2007).

14 According to Article IX, Members recognize that “certain business practices” other than those addressed under Article VIII “may restrain competition” and agree to enter into consultation with a view to eliminating these. This provision is limited to an obligation to consult and provide information and has never been used so far (Cossy 2011: 159).



telecommunications services in the Reference Paper on Basic Telecommunications Services.<sup>15</sup>The negotiations based on these proposals did not, however, receive any impetus.<sup>16</sup>

Additional commitments either in an Annex to the GATS on energy services or a Reference Paper could be used to address competition issues and third-party access to fixed infrastructure, as with the additional disciplines for the telecommunications sector (see Bernabe 2013). However, while telecom companies supplying services are unquestionably "service suppliers" within the meaning of the GATS, the situation is different in the energy sector. Additional commitments on energy services in the traditional GATS sense may not benefit all firms seeking to access transportation facilities (Cossy 2011: 159) because companies that need access to energy transportation networks are mainly producers or traders of energy products; they are not providers of energy services in a classical sense. It has been argued that as the scope of the GATS is limited to services and services suppliers, companies transporting their own energy goods should in principle fall outside the Agreement and, hence, not benefit from the above competition disciplines (Cossy 2011: 159).

The opposite interpretation is also, however, possible—supported by WTO jurisprudence. The WTO Appellate Body has made it clear that application of the GATT and GATS is not mutually exclusive. While generation of electricity is a production process related to a commodity, transportation and transmission are service activities. Companies that are producers of energy commodities can also act as service suppliers when transporting such energy products through fixed infrastructure. In this case, vertical integration of the sector does not preclude the application of services disciplines.<sup>17</sup> Considering, however, the uncertainty associated with different possible arguments and interpretations of the GATS coverage with respect to energy services, the issue should be clarified in the proposed annex or reference paper.

In summary, for network-related disciplines on energy, it is essential to tackle the following issues to secure an effective pro-competitive framework for clean energy trade, including TPA to fixed infrastructure.

- Ensuring TPA to and interconnection with energy networks and grids, and other essential infrastructure whether dominated by government entities or privately owned companies.
- Creating an independent regulator separate from and not accountable to any supplier of energy services.
- Ensuring non-discriminatory, objective, and timely procedures for the transportation and transmission of energy.
- Maintaining appropriate measures for preventing certain anti-competitive practices in the sector.

- Ensuring transparency in the formulation and implementation of rules, regulations, and technical standards.
- Providing non-discriminatory and timely information on data relevant for transportation and transmission of energy, such as prices and transmission capacity.
- Ensuring security of supply and non-interruption of energy transportation.
- Having expeditious, fast-track dispute settlement (as the interruption of energy transportation services can have drastic consequences for consumers).

Moreover, it should be envisaged allowing governments to provide preferential grid access to clean energy on a non-discriminatory basis among domestic and foreign suppliers. This should be possible to do through inscription of the respective services in the Members' schedule with a listing

<sup>15</sup> The US and Norway proposed in 2001 to devise a Reference Paper for energy services, modelled on the Reference Paper on telecoms and to devise rules for cross-border energy trade. The purpose of these additional disciplines would be to ensure transparency in the formulation and implementation of rules, and non-discriminatory third-party access to and interconnection with energy infrastructure, non-discriminatory objectives and timely procedures for the transportation and transmission of energy, an independent regulator, and requirements preventing anti-competitive practices. Market access and national treatment commitments have been supplemented in the telecommunications sector by additional commitments on regulatory principles to ensure pro-competitive conditions in supply of services. These competition disciplines have been set forth in the Reference Paper to the GATS Agreement on Basic Telecommunications Services (WTO, Council for Trade in Services, Special Session, Energy Services, Information Note by the Secretariat, JOB(05)/204).

<sup>16</sup> Cossy (2011: 168) provides the following account of the latest discussion of the Reference Paper on energy services, which took place in the Council for Trade in Services in Feb 2010. "The issue of a Reference Paper for energy services briefly resurfaced in the Council for Trade in Services, in February 2010. Referring to possible additional disciplines, several delegations cautioned against using the telecom Reference Paper as a model because, in their view, there were important differences between telecom and energy networks, as well as among different energy industries, which meant that disciplines in the telecom Reference Paper were not necessarily transposable to the energy sector. Nevertheless, one delegation supported the idea of developing specific disciplines for energy services and was ready to consider the extent to which the telecom Reference Paper could be relevant in that context."

<sup>17</sup> For example, in *EC – Bananas*, the Appellate Body dealt with vertical integration. Although that dispute concerned an entirely different product (bananas), this judgement has a direct repercussion for trade in energy commodities. In that case, one of the issues was whether the GATS and the GATT 1994 are mutually exclusive agreements. The Appellate Body concluded that measures that involved a service relating to a particular good or a service supplied in conjunction with a particular good could be scrutinized under both the GATT 1994 and the GATS (WTO 1997: paras. 220–21). With respect to that the operators were vertically integrated with producers, ripeners and retailers, "even if a company is vertically integrated, and even if it performs other functions related to the production, importation, distribution and processing of a product, to the extent that it is also engaged in providing 'wholesale trade services' and is therefore affected in that capacity by a particular measure of a Member in its supply of those 'wholesale trade services', that company is a service supplier within the scope of the GATS" (WTO 2000: para. 163).

of the respective conditions and qualifications, in addition to the general principle set forth in the Reference Paper.

Finally, as with the Annex on telecommunications services, developing countries should be able to place reasonable conditions on the access to and use of fixed energy transportation networks and services necessary to strengthen their domestic energy infrastructure and service capacity. Such conditions should be also specified in Members' schedules.

The most important aspects of the disciplines mentioned above are elaborated below.

## THIRD-PARTY ACCESS TO TRANSPORTATION NETWORKS AND OTHER ESSENTIAL FACILITIES

TPA is an essential condition for creating competitive cross-border energy markets and trade (Waelde and Gunst 2003). TPA entitles third parties, including competitors of the network owner in production and supply of energy, to use fixed infrastructure—on the basis of a reasonable fee and on practical technical terms—either with respect to only free capacity, or on the basis of sharing existing capacity. The right of access to grids is one of the most important competition safeguards in network-bound industries. Moreover, access to storage will become more important with the development of clean energy trade and electricity storage technology.<sup>18</sup>

TPA is related to the concept of essential facilities in competition law,<sup>19</sup> which has been developed in the US<sup>20</sup> and the European Union (EU). The essential facility doctrine had led to the inclusion of the definition of the “essential facility” in the Reference Paper on Basic Telecommunications.<sup>21</sup> The definition of essential facilities in the telecoms Reference Paper could be used for discussion of similar additional disciplines on energy services. The TPA regulation needs to deal with the following issues—(1) lack of capacity; (2) tariffs; and (3) terms and procedures.

The pricing of interconnections can adversely affect competition in the market. The access to essential facilities should be ensured on the basis of tariffs that are cost reflective, do not involve cross subsidies, or discriminate between competing suppliers. The terms of access should be reasonable, not favour incumbents, and not be discriminatory. Moreover, they should be standardized and publicly available. Procedures should not be cumbersome. Both tariffs and terms should be approved and publicly available.

Taking into consideration the physical limitations of energy, the access to essential facilities should be provided in a timely fashion. Finally, the access must be sufficiently

unbundled so that the supplier will not be obliged to pay for network components or facilities that it does not require for the service to be provided.

Importantly, in telecoms, the interconnection must also be provided on request at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of additional facilities. Taking into consideration the limited capacity of energy networks, the question arises whether additional disciplines should be devised to provide a similar obligation to expand the capacity, which may include the construction of new grids. This issue is linked to regulation of the rights of way and investment.

In particular, in the context of discussing a global grid, the billions of dollars of investment needed to construct the necessary infrastructure and interconnections make it pertinent to consider the investment disciplines to encourage it.<sup>22</sup> The capital-intensive nature of these projects induces a

<sup>18</sup> Large storage capacities will be necessary for absorbing non-transmissible power and relieving congestion. The technologies most likely to play this role are pump-hydro power plants and compressed air energy storage systems (Chatzivasileiadis et al.2013: 372–83).

<sup>19</sup> The essential facilities doctrine refers to a type of anti-competitive behavior in which a firm with market power uses a “bottleneck” in a market to deny competitors entry to the market. It is closely related to a claim for refusal to deal. As put by US courts, “The essential facilities doctrine imposes liability when one firm, which controls an essential facility, denies a second firm reasonable access to a product or service that the second firm must obtain in order to compete with the first,” or “Where facilities cannot practicably be duplicated by would-be competitors, those in possession of them must allow them to be shared on fair terms. It is illegal restraint of trade to foreclose the scarce facility” (*Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992, D.C.Cir.1997).

<sup>20</sup> The essential facilities doctrine refers to a type of anti-competitive behavior in which a firm with market power uses a “bottleneck” in a market to deny competitors entry to the market. It is closely related to a claim for refusal to deal. As put by US courts, “The essential facilities doctrine imposes liability when one firm, which controls an essential facility, denies a second firm reasonable access to a product or service that the second firm must obtain in order to compete with the first,” or “Where facilities cannot practicably be duplicated by would-be competitors, those in possession of them must allow them to be shared on fair terms. It is illegal restraint of trade to foreclose the scarce facility” (*Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992, D.C.Cir.1997). *United States v. Terminal Railroad Association*, 224 U.S. 383 (1912). See also *B&I Line PLC v. Sealink Harbours Ltd. and Sealink Stena Ltd.*, Case IV/34.174 (1992); *Hugin v. Commission*, Case 22/78 (1979) ECR 1989; *Volvo v. Venk*, Case 238/87 (1988) ECR 6211; *Radio Telefis Eiraenn and Independent Television Publications Limited v. Commission* (Magill), joined Cases 241/91 P and 242/91 P (1995) ECR I-743; *Bronner v. Mediaprint Zeitungs- und Zeitschriftenverlag, GmbH & Co.*, Case 7/97 ECR I-7791.

<sup>21</sup> According to the Reference Paper, essential facilities mean facilities of a public telecommunications transport network or service that: (a) are exclusively or predominantly provided by a single or limited number of suppliers; and (b) cannot feasibly be economically or technically substituted in order to provide a service.

<sup>22</sup> Projections estimate the creation of a European offshore grid, connecting a large number of wind farms in the North Sea, at about EUR 70–90 billion. The EU estimates that new electricity infrastructure will require investment costs of EUR 140 billion until 2020. In total, the EU projects investments in the range of EUR 1 trillion for the European energy sector to “meet expected energy demand and replace aging infrastructure.” See EC (2006).

significant amount of risk that a private consortium might not undertake in the absence of additional guarantees.

Negotiations of general investment disciplines have faced difficulties every time they have been considered in the WTO context. Should the discussion of the energy services Annex or Reference Paper be envisaged, negotiators should therefore consider investment rules to the extent they are necessary for the creation of energy fixed infrastructure. The existing rules in plurilateral and regional agreements could be used as an example—such as those existing in the Energy Charter Treaty (ECT).

## TRANSPARENCY AND AVAILABILITY OF INFORMATION

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The general rules of the GATS on transparency and domestic regulation arguably do not provide sufficient coverage of issues crucial to the energy industry (for example, concrete measures implemented by energy regulatory authorities on access to transportation networks).

The Reference Paper on Basic Telecommunications addresses the transparency issue, and could serve as an example for a similar approach in the area of energy. It specifies that interconnection procedures applicable to a major supplier must be made publicly available (Para. 2.3). There is also a requirement of transparency of interconnection arrangements (Para 2.4). “Not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services” (Para 1.2) is considered an anti-competitive practice.<sup>23</sup> Further, public availability of licensing criteria is required (Para. 4).<sup>24</sup>

Rules to ensure transparency in formulating regulation and licensing procedures, as exist in telecoms, should be devised for the energy sector. Fair and non-discriminatory standards should apply to ensure an efficient and fair system for siting, permitting, and constructing new transportation networks and other essential infrastructure (Evans 2003: 183).

## PRO-COMPETITIVE SAFEGUARDS

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The energy sector has traditionally been associated with market concentration, as explained above, which, in turn, has led to the accumulation of market power and anti-competitive behavior, making it difficult for smaller clean energy producers to enter the market.

Cross-subsidization is a serious problem in energy industries, especially when it concerns activities where the incumbent competes with other market participants by using the activity where he has a monopoly position. This problem is especially

acute in countries that have not undertaken broad reforms in the energy sector. Without vertical unbundling, which is the most efficient competitive safeguard, the major supplier may cross-subsidize loss-making activities using the benefit made in the segment where he has an exclusive right or dominant position (Poretti and Rios-Herran 2006).

Therefore, including similar pro-competitive safeguards as exist in telecommunications services in the energy services reference paper is proposed. WTO Members could undertake an obligation to maintain appropriate measures for the purpose of preventing suppliers who, alone or together, are major suppliers from engaging in or continuing anti-competitive practices. In particular, the anti-competitive practices that should be targeted include

- (a) Engaging in anti-competitive cross-subsidization;
- (b) Using information obtained from competitors with anti-competitive results; and
- (c) Not making available technical information about essential facilities to other service suppliers on a timely basis and commercially relevant information that is necessary for them to provide services (Article 1.1 and 1.2, Reference Paper on the Basic Telecommunications).

## INDEPENDENT MARKET REGULATOR

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In practice, TPA would be ineffective without regulation of access and monitoring by an independent body (Waelde and Gunst 2003: 131). An independent regulator should be established to set tariffs for the use of fixed infrastructure transmission and distribution networks, protect market participants against discrimination, identify obstacles to competition, and so on (OGEL 2003: 6).<sup>25</sup> Market monitoring can be useful to reduce anti-competitive behavior and

23 According to the telecoms Reference Paper, any procedures for the allocation and use of scarce resources, including frequencies, numbers, and rights of way, must be carried out in an objective, timely, transparent, and non-discriminatory manner. The current state of allocated frequency bands must be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required.

24 Where a license is necessary, the following information has to be made publicly available—(a) the licensing criteria and the period of time normally required to reach a decision concerning an application for a licence; and (b) the terms and conditions of individual licenses. An applicant has a right to know the reasons for the denial of a licence.

25 The monitoring functions over the following issues could typically be assigned to regulators—management and allocation of interconnection capacity; mechanisms to deal with congested capacity within the national system; publication of appropriate information; the effective unbundling of accounts to avoid cross-subsidies, and the unbundling compliance programmes; connecting new producers; access conditions to storage and to other ancillary services; and monitoring the security of supply. In addition, regulators may have responsibility for issuing authorizations and licenses; organization, monitoring, and control of the tendering procedure for generation; dispute settlement; and deciding on exemptions to normal access rules for new investments (OGEL 2004: 3).

determine changes that should be made in market rules (Parker and Van Siclen 2003: 11).

The Energy Reference Paper should contain a principle saying that the regulatory body should be separate from and not accountable to any supplier of basic telecommunications services. The decisions of regulators and the procedure used by them must be impartial with respect to all market participants.<sup>26</sup>

## PREFERENTIAL GRID ACCESS FOR CLEAN ENERGY

The question of preferential access for “clean” electricity to transport networks should be addressed.

Preferential grid access for clean energy, on a non-discriminatory basis between domestic and foreign suppliers, should, in principle, be allowed. The legislation of some countries already gives priority grid access for renewable energy, although till now such clean energy has been typically produced domestically.

For the sake of promoting clean energy, the rules should explicitly allow giving it priority access to networks, be it exported/imported or domestically produced and consumed energy. This should be possible through inscription of the respective services in Members' schedules with a listing of the respective conditions and qualifications, in addition to the general principle set forth in the Reference Paper.

There is, however, a question if a positive discrimination favoring priority grid access to renewable energy will be legitimate in the light of current trade rules. Where the capacity of networks is limited and transportation of additional electricity volumes becomes de facto impossible because of the preferential access granted to domestically produced renewable energy, cross-border electricity trade (not only in clean electricity but also electricity in general) might face obstacles.

Considering that electricity itself should be regarded as a good, priority access for renewable energy should be addressed not only under the GATS, which deals with the transportation/transmission aspects of energy trade, but also under the GATT, which prohibits discrimination between like products.<sup>27</sup> The issue of likeness of “clean” electricity and fossil fuels-based electricity needs to be clarified. This is one of the most controversial issues in renewable energy trade that has implications for many aspects of it apart from fixed infrastructure.

The term “likeness” is not clearly defined in WTO Agreements. The GATT and WTO jurisprudence has dealt with the issue on a case-by-case basis and developed the following criteria for the “likeness” of products—(i)

properties, nature, and quality of products; (ii) the end uses of the products; (iii) consumers' tastes and habits; and (iv) the tariff classification of the products (according to Border Tax Adjustment working party). According to these criteria and current jurisprudence, it has been argued that identical goods produced with different methods are like products. A cleaner method of producing electricity would thus not lead to a permissible differentiation between treatment of products under the WTO.

The opposite view has been expressed as well. It has been pointed out that, according to *Japan – Alcoholic Beverages* and *EC – Asbestos*, other relevant factors than those listed above may need to be taken into consideration on whether two products are like and that all the evidence needs to be examined. Further, it has been argued that since electricity is an intangible good with simultaneous production and consumption, in considering its “physical characteristics,” one would almost necessarily be required to consider the physical nature of the process (UNCTAD 2009). Also interesting is that the European law allows differences in taxation based on production method.

Finally, in the *Canada – Renewables* case, the Appellate Body stated that “what constitutes a competitive relationship between products may require consideration of inputs and processes of production used to produce the product.”<sup>28</sup> In addition, it noted that the government's preferences may reflect that “consumers are ready to purchase electricity that results from the combination of different generation technologies, even if this is more expensive than electricity that is produced exclusively from conventional generation sources” (Para. 5.177). It can be concluded that both interpretations regarding likeness of clean and non-clean electricity have some grounds. In the context of promoting clean energy, it would be desirable for governments to reach a multilateral understanding on the permissibility of factoring in production methods to distinguish clean energy—the relevance of this will only increase with the cross-border trade in electricity.

26 Para. 5 of the Reference Paper on Basic Telecommunications. The regulator has to be independent not only from regulated companies, but also from the government authorities, including ministries. Only such full independence will assure potential and actual market participants that the rules are being applied in a non-discriminatory, stable, and transparent manner. Both the International Energy Agency (IEA) and the Organisation for Economic Co-operation and Development (OECD) call for a separation of political and regulatory functions. See, for instance, IEA (2001) and World Bank (2001).

27 According to Article III.4 GATT, imported products shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, *transportation*, distribution or use (emphasis added).

28 See para. 5.63 of the Report of the Appellate Body, *Canada — Certain Measures Affecting the Renewable Energy Generation Sector*, DS412, 6 May 2013.

# IMPLICATIONS OF GATT TRANSIT RULES FOR INTERCONNECTION OF CLEAN ENERGY TO FIXED INFRASTRUCTURE

It is not only the transportation of energy inside countries that causes difficulties for clean energy trade but also transit, and this problem will be exacerbated with the development of clean energy trade through regional and global grids. While multilateral trade rules are aimed at governments, electricity transmission grids are often owned by private parties or national monopolies, which charge monopoly prices for transportation. Moreover, these companies often give priority to their own or national interests (WBGU 2004: 188).

Disciplines on transit were not as relevant in the past to electricity trade as regional trade in electricity is a relatively recent phenomenon. With increased development in regional trade in renewable electricity, the question arises if current transit rules are adequate to ensure the delivery of clean energy to its destination through transit territories.<sup>29</sup>

The applicable multilateral trade rules in Article V GATT provide a general framework that governs energy transit.<sup>30</sup> Arguably, with respect to energy transit through fixed infrastructure (such as grids), these rules are not as complete as they should be to address all pertinent problems that cross-border clean energy trade faces.

The GATT transit provisions set forth the non-discrimination requirement on the transit of energy products and materials. This obligation equally concerns those products transported via fixed infrastructure. However, it has been sometimes doubted whether Article V of the GATT 1994 applies to energy products and materials at all, especially electricity, and transportation methods, notably grids.<sup>31</sup> These doubts are, however, not justified, as will be explained below.

## COVERAGE OF ELECTRICITY BY TRANSIT RULES

Electricity is an intangible "good" with electrons moving in a circuit, for example, inside a conductor such as a metal wire. Electricity is special because it cannot be stored

(except to a limited extent in batteries) and traded as a chemical compound. Many national and other legal systems understand electric power as a "good." Moreover, a number of WTO Members have taken tariff commitments on energy products, including on "tariff item number 2716.00.00,<sup>32</sup> electrical energy."<sup>33</sup> WTO literature supports the idea that the GATT 1994 applies to electricity trade.<sup>34</sup> It is therefore difficult to justify an argument that GATT cannot be applied to the transit of electricity, as it is not considered "a good" (Clark 1998).

With respect to transportation modes, it has been argued that grids do not fall under Article V as they are not expressly mentioned there. However, the only explicit exception concerns aircraft in transit. Considering the broad definition of "traffic in transit" in Article V:1, an express reference is arguably not necessary to cover particular transport modes, such as electricity grids. Whether the GATT negotiators specifically thought of including one or the other specific mode of transportation does not detract from fixed infrastructure such as grids being covered by the abstract terms of Article V:1 (Ehring and Selivanova 2011).

There have been attempts to clarify both these issues in the context of trade facilitation negotiations, where the EU made a proposal that Article V specify that it covered

29 | GATT transit rules are relevant for access to energy transportation networks used when the energy flow crosses the country borders more than once, that is, when energy traffic is in transit.

30 | Article V para. 2 establishes "freedom of transit through the territory of each contracting party, via the routes most convenient for international transit, for traffic in transit to or from the territory of other contracting parties." No distinctions are allowed based on the flag of vessels, the place of origin, departure, entry, exit or destination, or on any circumstances relating to the ownership of goods, of vessels or of other means of transport. Although contracting parties may require that traffic in transit through its territory be entered at the proper customs house, such traffic cannot be subject to any unnecessary delays or restrictions. Furthermore, such traffic shall be exempt from customs duties and from all transit duties or other charges imposed in respect of transit, "except charges for transportation or those commensurate with administrative expenses entailed by transit or with the cost of services rendered." Transit charges as well as regulations must be reasonable. Para. 5 requires members to accord MFN treatment with respect to all charges, regulations and formalities in connection with transit.

31 | These doubts were especially expressed by energy endowed and transit countries.

32 | The Harmonized Commodity Description and Coding System in Chapter 27 contains headings for all these energy products, including coal, petroleum, gas, and electrical power.

33 | For example, the European Communities and the US. These tariff commitments receive legal significance through Article II of GATT 1994, but it would be weird to apply Article II:1(a) to trade ("commerce") in electrical energy, but not those provisions that refer to "goods" or "products," such as Articles I:1, II:1(b), III, and V of GATT 1994.

34 | Although the GATS may apply simultaneously to the transmission and distribution of electrical power, according to WTO jurisprudence, GATT 1994 and the GATS are not mutually exclusive. See Appellate Body Reports, *EC – Bananas III*, para. 221; *Canada – Autos*, para. 160; *Canada – Periodicals*, p. 19; Panel Report, *Canada – Periodicals*, paras. 5.14–5.19.

transit through fixed installations such as pipelines. There were also discussions to clarify the application of transit disciplines when private parties control the infrastructure. The final agreement did not, however, include the respective provisions. For the sake of clarity and predictability on the above issues, adopting an interpretative note to Article V to the effect that transit disciplines cover electricity transit via fixed infrastructure could be envisaged.

With respect to the substance of disciplines on transit, controversial questions arise on access to the fixed infrastructure when it is privately owned and when there are substantial capacity constraints. This is a crucial issue for regional trade in clean electricity.

## OWNERSHIP OF INFRASTRUCTURE

The fixed infrastructure used for transportation of energy products is often privately owned although such networks were owned by the state when the GATT was negotiated. Therefore the problems related to private ownership of transit networks are quite recent, originating after most countries carried out reforms in the energy sector.

The GATT obligation on “freedom of transit” is, however, imposed on Member states. Could measures taken by private companies be attributed to the respective WTO Member according to principles of general international law? That the WTO Agreement binds Members and not private parties does not rule out a respective WTO obligation under Article V being binding on Members, even where a private company owns the transport infrastructure. It has been argued that the obligation for a Member to guarantee the freedom of transit applies in any case, regardless who owns the transportation infrastructure.<sup>35</sup> It might, however, be preferable to eliminate this uncertainty by an interpretative note to Article V.

## CAPACITY CONSTRAINTS

Given the rapid development of renewable energy sources, the existing transport infrastructure will turn out to be insufficient to meet all demands.

The decision over the construction of transport infrastructure on a country’s territory typically belongs to that country’s sovereignty, which could, however, be restricted by international obligations. Does the GATT contain such an obligation? There is nothing explicit in the transit provisions of the GATT obliging WTO Members to allow infrastructure construction or expand existing transit capacity.<sup>36</sup> The first sentence of Article V:2, (“via the routes most convenient”) seems to mean that freedom of transit exists only within existing capacities (Ehring and Selivanova 2011).

What would happen if the lack of capacity is such that it effectively denies any “freedom of transit”? In this case, one may argue that “freedom of transit” should imply the possibility of creating new infrastructure. Especially if an investor offers to undertake the construction of the additional infrastructure that is needed, the government’s opposition to that project could be argued to constitute a denial of “freedom of transit.” This question needs to be addressed specifically—through either an interpretative statement (unlikely as an option considering the far-reaching implications of such an extensive interpretation) or an addendum to Article V GATT.

Another question is the access to existing limited transport infrastructure where there is congestion. Arguably, it not possible to apply MFN treatment and refuse to grant access for all goods in transit, while reserving the route in question to domestic transportation or import/export traffic. Probably a WTO Member must allocate scarce transport capacities in such a way that transit is nevertheless possible. Again a clarification of this issue is needed.

Another question in the context of limited capacity is whether distinctions between transit and domestic (or import/export) transportation are permitted.<sup>37</sup> It is clear, however, that a distinction between transiting goods based on foreign/domestic ownership or the means of transport would be in violation of Article V GATT.

The question of preferential access of “clean” electricity arises in this context. The legislation of some countries already gives priority grid access to renewable energy, although such clean energy has been typically domestically produced till now. Where the capacity of networks is limited and transit becomes de facto impossible because of the preferential access to networks granted by legislation to renewable energy of domestic origin, the implications of current rules are not clear. For the sake of promoting clean energy, the rules should explicitly allow giving it priority access to networks, be it exported/imported or domestically produced and consumed energy.

<sup>35</sup> It simply may mean that the government must take measures vis-à-vis the private owner of the infrastructure to meet its WTO obligations (Ehring and Selivanova 2011).

<sup>36</sup> The latter is argued by Prof. Roggenkamp, see Martha M. Roggenkamp, ‘Implications of GATT and EEC on Networkbound Energy Trade in Europe’, (1994) 12 *Journal of Energy and Natural Resources Law* 59, at 73, 82; and M.M. Roggenkamp, ‘Transit of Networkbound Energy: The European Experience’, in Thomas W. Waelde (ed.) *The Energy Charter Treaty, An East-West Gateway For Investment and Trade* (London, The Hague, Boston: Kluwer Law International, 1996), at 510, with the argument that “means of transport shall be deemed to be in transit.” One has to recall, however, that means of transport are deemed in transit only when they pass across territory, which is not the case of fixed infrastructure.

<sup>37</sup> This was also a thorny issue in the context of the Energy Charter’s transit discussion and Article 7.3 of the ECT is one of its most controversial provisions.

# CONCLUSIONS AND RECOMMENDATIONS

To meet climate change targets, large amounts of renewable energy have to be able to connect to networks and long-term investments in energy infrastructure will be necessary. Moreover, regulation of access on reasonable terms to transport and distribution networks will be crucial for integration of clean energy trade into economies. While multilateral trade rules are oriented towards ensuring market access, additional measures have to be taken to guarantee availability of fixed infrastructure and timely access to transportation pipelines/transportation networks, distribution systems, and the like.

Some of the issues discussed in this paper would benefit from a clarification of existing rules through interpretative notes, while others might require negotiations of specific disciplines, modifications, and addendums to existing rules.

Issues linked to fixed infrastructure could possibly be addressed in the context of GATS negotiations, and as additional disciplines on transit, similar to the Trade Facilitation Agreement. Moreover, in the context of the Trade in Services Agreement (TISA) negotiations, proposals have been made to address energy services specifically. Unfortunately, these proposals do not address the issue of energy transportation and access to fixed infrastructure.

One of the problems with regulation of TPA to transportation networks in the WTO is related to that such infrastructure is mostly controlled by private companies, rather than by governments that are subjects of obligations under WTO Agreements. The existing rules do not address the anti-competitive practices commonly carried out by incumbents controlling different segments upstream and downstream of the energy value chain. For this, additional pro-competitive disciplines will be necessary. This paper argued that it would be inefficient and not make much sense to negotiate pro-competitive disciplines for clean energy networks only. General rules linked to the GATS, with possible specific provisions for preferential access of clean energy to networks, would be a better choice.

Additional commitments, either in an Annex to the GATS on Energy Services or a Reference Paper, could be used to address competition issues and TPA to fixed infrastructure, as with the additional disciplines for the telecommunications sector. It is essential to tackle the following issues to secure an effective pro-competitive framework for clean energy trade, including TPA to fixed infrastructure.

- Ensuring TPA to and interconnection with energy networks and grids, and other essential infrastructure, whether dominated by government entities or privately owned companies.
- Creating an independent regulator separate from and not accountable to any supplier of energy services.
- Ensuring non-discriminatory, objective, and timely procedures for the transportation and transmission of energy.
- Maintaining appropriate measures for preventing certain anti-competitive practices in the sector.
- Ensuring transparency in the formulation and implementation of rules, regulations, and technical standards.
- Being required to provide non-discriminatory and timely information on data relevant for transportation and transmission of energy, such as prices and transmission capacity.
- Ensuring the security of supply, and uninterrupted energy transportation.
- Having expeditious fast-track dispute settlement (as the interruption of energy transportation services can have drastic consequences to consumers).

Moreover, allowing governments to provide preferential grid access to clean energy, on a non-discriminatory basis between domestic and foreign suppliers, should be envisaged. This should be possible to do through inscription of the respective services in Members' schedules with a listing of the respective conditions and qualifications, in addition to the general provisions to this effect in the Annex or Reference Paper.

In addition, with respect to transit through fixed infrastructure (such as grids), general transit rules are not as complete as they should be to address all the pertinent problems that cross-border clean energy trade faces.

For the sake of clarity and predictability on the above issues, adopting an interpretative note to Article V to the effect that transit disciplines cover electricity transit via fixed infrastructure could be envisaged. Through an interpretative note, it should also be possible to clarify that the obligation for a Member to guarantee the freedom of transit applies in any case, regardless who owns the transportation infrastructure.

Should the application of WTO transit rules on energy be revisited (which is desirable), the ECT transit provisions and Transit Protocol discussions could be useful to draw lessons from (despite the failure to reach a final agreement on the Transit Protocol). Issues such as setting transit tariffs,

congestion management, and distribution of available capacity are especially pertinent.

Finally, the question of granting “clean” electricity preferential access to transport networks should be addressed. The legislation in some countries already gives priority grid access to renewable energy, although such clean energy has been typically domestically produced. Where the capacity of networks is limited and transit becomes de facto impossible because of the preferential access to networks granted by law to domestically produced renewable energy, the implications of current rules are not clear. For the sake of promoting clean energy, the rules should explicitly allow giving it priority access to networks, be it exported/imported or domestically produced and consumed energy.

Another option is to address the issues related to energy trade through fixed infrastructure in a separate agreement under the auspices of the WTO devoted to energy trade (see, for instance, discussions on a Sustainable Energy Trade Agreement [SETA] in different ICTSD publications). Such an agreement may be plurilateral. Apart from the question of its feasibility, it could be argued that with respect to energy trade via fixed infrastructure, disciplines should be created for trade in energy in general, not only for clean energy. The clean energy trade would be the main beneficiary of such rules, especially if the possibility of preferential access for it to networks is introduced.

Given the lack of extra capacity in energy infrastructure, TPA rules will not necessarily be sufficient to address the problem. Therefore, a more difficult issue to address is linked to creating new infrastructure should the existing capacity be insufficient. For the development of regional and global energy trade, it would be important to devise rules that mandate new infrastructure construction should the existing infrastructure turn out to be insufficient, especially if an investor offers to undertake such construction. Rules for expanding the capacity of networks and constructing new infrastructure are necessary for the development of clean energy trade and investment. The WTO framework does not contain investment disciplines, yet these appear necessary to effectively address the construction of the fixed infrastructure necessary for clean energy trade.



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