FLORENCE SCHOOL OF REGULATION

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POLICY BRIEF

An Inter-TSO Compensation Mechanism for renewable and low-carbon gases

1. Introduction

Beyond the current energy crisis and the need to adopt emergency measures to mitigate its impact on consumers, the decarbonisation of the gas sector - a clear EU energy policy goal already for many years - still remains a high priority in the EU regulatory agenda today. Renewable hydrogen has been increasingly identified as one of the 'clean gases' which could contribute to the decarbonisation objective, in particular by replacing fossil fuels in the so-called 'hard to decarbonise sectors'[1], such as aviation or heat-intensive manufacturing industry. The EU Hydrogen Strategy[2], released in July 2020, outlined the vision for the development of a fully-fledged hydrogen sector in Europe by 2050, based on the gradual, but consistent scaling up of renewable hydrogen capacity, with the intermediate goal of increasing electrolysers' capacity to 40 GW by 2030.

1 Defined in the Strategy as those sectors where "other alternatives might not be feasible or have higher costs".

2 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A hydrogen strategy for a climate-neutral Europe, Brussels, 8.7.2020, COM(2020) 301 final

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More recently, the Fit for 55[3] and REPowerEU[4] Communications increased the ambitions of the 2020 Hydrogen Strategy with a target of 20 Mton of renewable hydrogen replacing about 25-50 bcm per year of imported gas from Russia by 2030[5].

The Hydrogen and Decarbonised Gas Markets Package[6] in December 2021 already aimed at facilitating the integration of renewable and low-carbon gases, including hydrogen, into the existing gas network, by revising the 2009 Gas Directive and Regulation, which only addressed natural gas.

In particular, the proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen[7] envisages, in Article 16, tariff discounts for renewable and low carbon gases, including a 100% discount at all interconnection points, entry points from and exit points to third countries and entry points from LNG terminals[8]. Moreover, if the revenue of a TSO from these specific tariffs is reduced by 10% as a result of applying these discounts, the same Article requires the affected and all neighbouring TSOs to negotiate an Inter-TSO Compensation (ITC) mechanism. In case the involved TSOs are unable to reach an agreement within three years, the respective NRAs become responsible for agreeing on the ITC mechanisms and, failing their agreement within two years, the issue is transferred to the EU Agency for the cooperation of energy regulators (ACER) for a decision[9].

In this context, concerns have been raised by commentators and stakeholders about the potential complexity of an ITC mechanism for renewable and low-carbon gases. These concerns are based on the experience with the establishment of the ITC mechanism for the internal electricity market in 2002, at the time when the transit charges[10] were abolished and TSOs needed to be compensated for the costs related to the hosting of transits on their networks.

This Policy Brief assesses the extent to which the complexities encountered in designing the electricity ITC mechanism are likely to be encountered in the design of an ITC mechanism for renewable and low-carbon gases. It also considers some of the implications for the tariff framework for these gases that arise from the premises underlying the need to establish an ITC mechanism. However, a discussion about the best tariff framework for renewable and low-carbon gases is beyond the scope of this Policy Brief.

2. The ITC mechanism in electricity

In the electricity sector, the removal of the transit charges in 2002 aimed at avoiding the so-called ‘tariff pancaking’, i.e. the accumulation of transmission charges on transactions between distant points on the EU electricity network that cross several national borders[11]. Tariff pancaking was considered a barrier to electricity market integration, since the resulting transmission tariffs were not reflecting the costs imposed on the system by the underlying transactions or what could be considered a fair contribution to the overall transmission system costs. Said in a different way, it was considered contrary to the spirit of the internal electricity market that transactions between more distant points on the EU electricity network were charged a higher overall

3 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, ‘Fit for 55’: delivering the EU’s 2030 Climate Target on the way to climate neutrality, Brussels, 14.07.2021, COM/2021/550 final

4 Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, REPowerEU Plan, Brussels, 18.5.2022, COM(2022) 230 final

5 Ibid. p.7

6 https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6682

7 COM(2021) 804 final.

8 Ibid., Article 16(5).

9 Pursuant to Article 6 of Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators (recast).

10 These were the transmission charges levied by TSOs on electricity flows transiting through their systems.

11 Transmission charges were, and still are, generally implemented at national level and so were the transit charges.

transmission tariff, based on the number of national borders crossed.

Therefore, a different concept was introduced: the 'single system paradigm'. According to this concept, when it comes to setting transmission tariffs, the whole EU electricity network should be considered as if it were a single system – entry-exit zone. Moreover, it was also considered that network users should be charged to inject and withdraw power from this single system irrespective of the transactions associated with these injections and withdrawals, and the distance between the injection and withdrawal points.

The single system paradigm clearly left TSOs hosting 'transits' with lower revenues than in the case in which transit fees were charged. An ITC mechanism was therefore needed to compensate these TSOs.

The ITC mechanism for electricity, introduced in 2002, was initially based on an agreement among the involved TSOs, prompted and endorsed by the respective national regulators. In June 2007 an enhanced approach was adopted. Regulation (EC) No 714/2009[12], as part of the Third Energy Legislative Package, in Article 13(1) and (2) established the right for "*transmission system operators* [to*] receive compensation for costs incurred as a result of hosting cross-border flows of electricity on their networks*", to "*be paid by the operators of national transmission systems from which cross-border flows originate and the systems where those flows end*". The same Regulation, in Article 18(1) and (5), provided the legal basis for the Commission to issue guidelines on several design aspects of the ITC mechanism. These guidelines were issued In 2010 with Commission Regulation (EU) No 838/2010[13].

Indeed, designing the ITC mechanism for electricity was not an easy task. In particular, two aspects were particularly complex:

- Identifying transits on a specific portion of the network – a network element or a control area;
- Identifying the responsibilities for these transits – which injections and withdrawals were responsible for the transits identified in a specific portion of the network.

As we all know, electricity flows according to the laws of physics and therefore it does not necessarily follow a contractual path, or any other predefined path for what matters[14]. Therefore, it is very difficult to establish, *a priori*, which network elements would be affected, in terms of an increase in their loading, by a specific transaction, i.e. an injection and a withdrawal of electricity at two locations on the European network[15]. Different approaches were proposed to estimate the extent to which each network element is affected by transits and the extent to which these transits are caused by injections and withdrawals of power at different locations in the other control areas[16].

The current ITC mechanism operates through two funds[17]:

- the Framework Fund (FF), related to the costs of making infrastructure available to host transits; and
- the 'With and Without Transit' Fund (WWT Fund) related to the costs of losses incurred by national TSOs as a result of hosting transits.

12 Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003.

13 Commission Regulation (EU) No 838/2010 of 23 September 2010 on laying down guidelines relating to the inter-transmission system operator compensation mechanism and a common regulatory approach to transmission charging.

14 With the exception of flows on high-voltage direct current lines and the use of power control devices.

15 In fact, the transaction might even lower the loading on the network element, if it would generate flows in the opposite direction to the prevailing ones on that element.

16 For a description and an assessment of the different approaches, see, for example, Ignacio Pérez-Arriaga, Luis Olmos Camacho, Francisco Javier Rubio Odériz, *Report on Cost components of cross border exchanges of electricity* prepared for the Directorate-General for Energy and Transport of European Commission, Instituto de Investigación Tecnológica. Universidad Pontificia Comillas, Madrid, Spain, November 2002, available at: https://www.iit.comillas.edu/docs/IIT-02-100I.pdf.

17 For a description of the ITC mechanism see, *inter alia*, Sophia Ruester, Christian Von Hirschhausen, Xian He, Jonas Egerer, Jean-Michel Glachant and Claudio Marcantonini, *EU involvement in Electricity and Natural Gas Transmission Grid Tarification,* FSR Technical Report, January 2012, available at: https://cadmus.eui.eu/handle/1814/20759.

The size of the FF is capped to 100 million euros[18,19].

Identifying transits and those responsible for them were not the only features which needed to be defined in designing the electricity ITC mechanism. Once transits were identified, the costs associated with their hosting needed to be determined. This, in turn, required the identification of the portion of the network affected by transits (the so-called 'horizontal network') and its costs. No significant effort was devoted to harmonise the way in which the different countries approached these aspects.

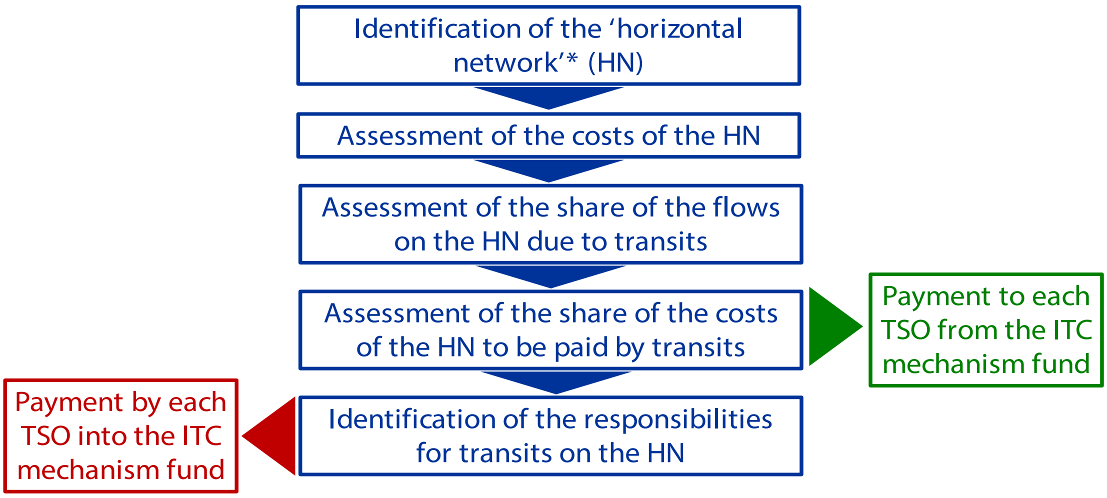
The same has been the case for valuing losses to be compensated through the WWT Fund. In fact, the value of losses incurred by a national transmission system as a result of hosting transits shall be calculated on the same basis as the one approved by the regulatory authority in respect of all losses on the national transmission system[20]. This has led to very different values of losses used by the different countries participating in the ITC mechanism[21].

The following chart summarises the main building blocks which characterise the ITC mechanism in the electricity sector[22].

3. An ITC mechanism for renewable and low-carbon gases

The experience gained in developing the electricity ITC mechanism can definitely assist in designing a similar mechanism for renewable and low-carbon gases, if this were needed.

First of all, it is to be noted that most of the conceptual complexities encountered in the design of the electricity ITC mechanism were associated with the characteristics of electricity. In the case of renewable and low-carbon gases, identifying transits and what causes them is much easier. Renewable and low-carbon gases can be traced over the EU network, as they are pumped through it.



* The Horizontal Network is the portion of the electricity network in each Member State which is assumed to be used by transits

18 Point 5.4 of Part A of the Annex to Regulation (EU) No 838/2010.

19 With the establishment of the Cross-border Cost Allocation (CBCA) for new infrastructure developed as 'Projects of Common Interest', introduced by Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009, the electricity ITC mechanism was left to cover only the costs of existing infrastructure used to host transits. These costs were mostly already paid through domestic tariffs and with a decreasing relevance over time. The limitation of the FF to 100 million euro therefore did not affect the incentives for network development.

20 Point 4 of Part A of the Annex to Regulation (EU) No 838/2010.

21 In 2020, the value of losses applied by the countries participating in the ITC mechanism varied between 28.45€/MWh for Sweden and 72.72€/MWh for Switzerland.

22 Please note that the chart does not reflect the detailed design of the electricity ITC mechanism; it rather aims to outline its logic.

To stress the point, consider that, in the electricity ITC mechanism, transits through a control area are defined as the minimum between imports into and exports from the control areas. Therefore, measuring only imports or only exports, or flows on some interconnectors between different control zones is not sufficient to identify transits. In the case of renewable and low-carbon gases, it is possible to identify, already at the entry into an entry-exit zone and with a certain degree of accuracy, how much of the volumes flowing through the interconnection point is destined for withdrawal in the same entry-exit zone and how much is just transiting through that zone as it is destined for withdrawal in other entry-exit zones. It is also possible to identify, again with a certain degree of accuracy, where that gas comes from and where it is destined to. Therefore, what represented the greatest complexity in the design of the electricity ITC mechanism – identifying transits and those who cause them – should not pose any particular difficulty in the case of a possible ITC mechanism for renewable and low-carbon gases.

Clearly, as indicated above, there are other features which need to be defined. But also here, the design of a possible ITC mechanism for renewable and low-carbon gases would likely not be more complex than its electricity counterpart, and possibly less complex. For example, it should be quite straightforward to identify through which network elements the transiting gas flows. Defining the costs of these elements should also be relatively easy, as it was in the case of electricity, since these are regulated assets for which an asset valuation is already needed for tariffication purposes.

Therefore, designing an ITC mechanism for renewable and low-carbon gases should be much less problematic than it was the case with the design of the electricity ITC mechanism. In particular, it does not require the use of a conventional approach to identify transits and the injections and withdrawals causing them.

Finally, note that an ITC mechanism for gas is already envisaged in the Network Code on harmonised transmission tariff structures for gas (the 'Gas Tariff Network Code')[23], in order to enable the proper application of the same reference price methodology jointly by all transmission system operators active in the same Member State.

4. Some fundamental reflections

Not charging entry and exit fees at interconnection points within the EU, and thus requiring the establishment of an ITC mechanism for compensating TSOs hosting transits, raises a number of considerations. Their relevance depends on the share of the allowed revenues for the involved TSOs that the ITC mechanism is expected to handle. Some of these considerations did not emerge in the case of the electricity ITC mechanism because it was expected that it would have remained marginal in the overall tariff framework – and when the fund to cover infrastructure costs started to increase, the €100 million limit was introduced[24]. In the case of renewable and low-carbon gases, while volumes will clearly be very limited to start with – as this is basically a nascent sector – the policy goals that the EU has committed to might imply an increase in the allowed revenues managed through the ITC mechanism and therefore the following considerations could assume greater relevance.

First, and fundamentally, the question needs to be asked as to what tariff methodology would be the most appropriate if the EU gas network were to be considered a 'single system'. While this is a theoretical question, the answer to it provides the framework for assessing the basis on which the ITC mechanism is predicated. In the case of electricity, it is clear that, as already noted, the tariff framework implemented across Europe is based on charges which do not depend on the contractual path of the underlying transaction and therefore on the distance between the injection and withdrawal points.

In the case of gas, while it is beyond the scope of this Policy Brief to assess what the optimal tariff structure for renewable and low-carbon gases

23 Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas.

24 See also footnote 19.

could be[25,26], we note that, already at the single entry-exit zone level, several jurisdictions are implementing a tariff framework (so called, 'reference price methodology') where entry and exit fees are somehow dependent on the capacity-weighted distance that the gas is assumed to travel. If distance plays a role in setting transmission tariffs already at the single entry-exit zone level, it could be claimed that, *a fortiori*, it should play a role when the market zone expands to a EU-wide dimension.

Therefore, it is evident that, in this respect, the situation with renewable and low carbon gases might be different from the one characterising electricity and which led to the abolition of the transit tariffs and the establishment, in each control area, of what is essentially a 'postage stamp' tariffication system.

Clearly, it could be claimed that 'tariff pancaking' based on the accumulation of entry and exit fees at internal interconnection points does not equate to a well-designed distance related tariff framework. However, the difference becomes more one of degree, rather than kind, which nonetheless may still merit a redesign.

A second reflection is whether the reallocation of tariff revenues between the different entry-exit zones – and therefore the different jurisdictions – through the ITC mechanism requires any degree of harmonisation of the transmission tariff structures in the different involved jurisdictions. History in this respect is not particularly encouraging. The Gas Tariff Network Code has been so far the only one for which ACER has been unable to provide a proposal to the European Commission, as no agreement was reached in ACER's internal decision-making process. In the end, this Network Code did not deliver what it was supposed to achieve – that is, harmonised gas transmission tariff structures – and mostly contains provisions on transparency of the tariff-setting process.

5. Conclusions

This Policy Brief suggests that designing an ITC mechanism for renewable and low-carbon gases is unlikely to encounter the same difficulties as the ones which had to be addressed for designing the electricity ITC mechanism. In fact, in that case, the complexities were mainly related to the fact that electricity cannot generally be 'traced', as it flows on the EU transmission network according to the laws of physics. Renewable and low-carbon gases are pumped through the EU gas network and therefore it is quite straightforward to determine the network elements which are used by the gas injected and withdrawn through any pair of points in the gas transmission network.

However, the abolition of the 'transit' component of the transmission charging system, to avoid tariff pancaking, was based, on the electricity side, on the assumption, or premise, that the distance between the injection and withdrawal points was not an important determinant of the degree of utilisation of the network. The 'single system paradigm' was then used as a reference for tarification purposes.

It is far from obvious that the same assumptions and premises hold in the case of renewable and low-carbon gases. However, if policy priorities lead to the removal of entry and exit charges at interconnection points, the task of designing and implementing an ITC mechanism should be much easier than in the case of electricity.

25 There are typically several objectives to be considered in designing a network tariff framework, including efficiency, cost-reflectiveness, non-discrimination, fairness, revenue adequacy. In general, these objectives pull in different directions and therefore regulators have to find the right balance between them.

26 On the option to remove entry-exit charges on internal interconnection points within the EU gas network, see also Guido Cervigni, Ilaria Conti and Jean-Michel Glachant, *Towards Efficient and Sustainable Cost-Recovery for the European Gas Transmission Network*, FSR Policy Brief, Issue 2017/32, December 2017. At around the same time, the European Commission published the results of a study - "*Quo Vadis EU gas regulatory framework*" – carried out by consultants to analyse whether the existing regulatory framework in the EU gas sector is efficient and maximises overall EU welfare or whether changes may be necessary, and if so provide recommendations. Among these, the study proposed the abolition of entry-exit charges on internal interconnection points. The final report of the study is available at: Quo Vadis EU gas market regulatory framework - Publications Office of the EU (europa.eu).

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