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Towards Efficient and Sustainable Cost-Recovery for the European Gas Transmission Network

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Highlights

- The cost of gas transmission networks in Europe is currently covered via the so-called entry-exit tariffs. This tariff methodology is based on charging capacity reservations at both entry and exit points of balancing zones, or entry-exit systems. Current entry-exit systems largely coincide with Member States' territory.
- The entry-exit model has supported a smooth transition from the traditional organisation of the European gas industry to a single liberalised European market. However, as the EU gas market develops, the current tariff methodology is now being questioned, on the grounds that it may be unsuitable to achieve the objective of a single pan-European market, with unbiased gas flows and no obstacles to trading.
- This Policy Brief presents an alternative approach to gas transmission cost recovery that would address most of the drawbacks of the current methodology. The qualifying feature of our proposal is that the entire transmission revenue requirement is met by charging the transmission network's exit points to distribution networks and to directly connected end-customers.
- In contrast to the current system, our model requires an explicit mechanism to share the cost of transit networks among consumers connected in different countries. We consider two possible designs for such mechanisms. The first one assesses the share of transit networks' cost falling on destination countries according to a methodology that mimics current arrangements. This model could be implemented with no or limited impact on the institutional framework currently governing the European gas transmission sector.
- The second design option allocates ex-ante a share of the overall revenue requirement to each European country. In this approach, the share of transit networks cost falling on destination countries does not depend on the tariffs and realised demand for that networks' services. This approach would address potential weaknesses of the current regulatory framework in case the trend of declining gas demand does not reverse, and/or if covering most of the cost of (desirable) network upgrades cannot be met by selling long-term transmission rights.
- Although our proposal is conceived with reference to the entire Union, our approach might entail the first phase of implementation at regional scale.

POLICY BRIEF



1. The Current Gas Transmission Tariff Methodology in Europe

The main features of the current European gas transmission tariff methodology include:

- Network users pay for the right to move gas across the borders of neighbouring gas systems (or entry-exit zones). The tariff is assessed based on the transmission capacity reservations and, in some systems, on the gas volumes moved across the interconnection.
- The entry-exit zones largely reflect the political geography of Europe, thus applying at the borders of its Member States.
- The tariff level for each entry or exit point is set by the national regulator of the country in which the point is located, according to a methodology that splits the total cost of the zone's transmission network among all entry and exit points.

Resulting Distortions in Gas Market Results

Under the current tariff system, the cost of transporting gas to a particular country may vary depending on the path leading to its final destination, and thus the different entry-exit zones which need to be crossed.

As a consequence:

- the merit order of natural gas sources for the country may be distorted, resulting in imports from systems where gas is more expensive.
- as the existing entry-exit zones coincide with the political borders of Member States, *tariff pancaking* results when gas is carried through multiple entry-exit zones. The resulting path-dependency of transmission costs inefficiently discourages gas flows within Europe, since tariffs do not reflect the avoidable cost of using the infrastructure.

- for the same reason, the current transmission tariff methodology inefficiently reduces cross-border provision of flexibility services. In particular, transmission fees make *the cost of balancing* a position in a country *with* domestic storage or with storage located in a neighbouring country largely different. Such cost gap does not reflect, as it should, different variable cost of moving gas to and from the different storage sites. This holds all the more because of the inter-temporal structure of current transmission tariffs that in most countries penalise short-term purchases of transmission services.

Note that transmission tariffs¹ are sunk cost to long-term capacity holders since these tariffs are due whether or not capacity is used; as a consequence, for long-term capacity holders, the decision to use their capacity holdings is not affected by the level of transmission tariffs. However, in case the existing long-term capacity reservations are not renewed, the price elasticity of demand for transmission services at each entry/exit point will increase at their expiration, exacerbating the distortive effects of the current tariff methodology.

Sustainability of Low-Utilisation Infrastructures Contributing to Security of Supply

Cost recovery of infrastructures with low utilisation, but contributing to security of supply or contestability of the European market, might become difficult with the current tariff methodology. For example, if utilisation of a large pipeline – mostly used for transit – in a small entry-exit system fell, the tariff increases, which are necessary to offset the missing revenues on transits, may become unsustainable.

Unwanted Wealth Transfers

Differentiation of wholesale gas prices at different locations may generate unwanted wealth transfers.

1. More precisely, the tariff components that are not commodity-based.



Consider for example a country in which the marginal gas – i.e. the gas that sets the wholesale price in the country – is carried through the path with the highest total transmission cost. Since the price of the marginal gas reflects its transportation cost, all other gas imports will enjoy a rent unrelated to cost².

Uncertainty

To the extent that the current entry-exit model is a source of uncertainty on the value of transmission rights, it reinforces the tendency to short-termism in gas trading decisions. This is due to regulatory uncertainty on the conditions triggering tariff changes and on the content of such changes³.

Provisions introduced by the recent tariff Network code do mitigate some of the drawbacks of the current system. However, the structure of the cost recovery mechanism, and the corresponding limits, remain unchanged.

2. An Alternative Cost Recovery Mechanism for Gas Transmission in Europe

In the current system, mostly fixed costs are covered through charges on capacity reservations. Economic theory⁴ indicates that covering infrastructure's fixed cost with charges based on the demand for its services distorts its use and that the resulting inefficiency is larger the bigger the price-elasticity of the demand is for transmission services.

Since multiple paths across different entry-exit zones to move gas between two systems are available, the price elasticity of demand for transmission services along each path is well above the elasticity of demand

for gas expressed by final consumers at the destination. This generally does not hold for the transmission network's exit points to distribution networks or large end-consumer sites, where price elasticity of demand for transmission services reflects the price elasticity of the consumers' demand for gas directly.

For this reason, to minimise distortions, we propose to select the less elastic charging basis, namely the demand for capacity reservations at the transmission network's exit points to distribution networks or large end-consumer sites.

Differently from the current system, our proposal suggests that entry into a transmission system and exit to an interconnecting system are not charged. As a result, in our proposal, the entire transmission cost on the European network would then be passed on to consumers via the transmission tariff, whereas in the current system a material share of transportation cost is embedded in wholesale gas prices.

This implies that transmission tariffs cannot be used to share the cost of a transit network among those who benefit from it. For this reason, an explicit mechanism to split the cost of transmission infrastructures among the European gas consumers would be necessary. We sketch next two extreme designs of this cost-sharing mechanism, which we intend to analyse further in a forthcoming research project.

Option 1: A Cost-Sharing Mechanism Preserving the Core Features of the Current Arrangements

The core features of the institutional framework currently governing the European gas transmission sector can be summarized as:

2. Equal to the difference between total transmission charges on the marginal source and their own.
3. This issue has been recognized by the recent Network code on capacity allocation mechanisms (COMMISSION REGULATION (EU) 2017/459) but only for newly built infrastructures and Network code on tariffs (COMMISSION REGULATION (EU) 2017/460).
4. For example, D. Bös, Pricing and Price Regulation, Volume 34, 1st Edition, An Economic Theory for Public Enterprises and Public Utilities, 1994, Elsevier Publisher.



- National regulators (NRAs) independently approve transmission investments in their own country and set the corresponding revenue allowance. NRAs set the rate of return that gas transmission investments are allowed to achieve, as well as the risk allocation between investors and consumers, for example in the context of incentive-based regulatory mechanisms.
- The majority of network upgrade cost is covered by selling long-term commitments to network users; the remaining part, expected to be small, is shared by the involved regulators on a largely voluntary basis.
- The overall transmission revenue requirement of transit countries is shared with consumers connected in the destination countries based on transit gas volumes; each regulator's discretion in splitting the cost between domestic consumption and transit is limited by the provisions of the Tariff network code⁵.

Our first option for a cost-sharing mechanism aims to preserve those features of the current institutional framework. In particular, in the current model, the division of the costs generated by transits depends on the demand for that network's services; the split is therefore only known after demand is known. On the contrary, in our proposed approach, the revenue requirement for each system has to be set ex-ante, for the national regulator to set transmission tariffs consistent with it. Replicating this feature of the current mechanism in an exit-only tariff system, like the one we propose, entails:

- an initial forecast of the demand for transit services; on that basis the transit network's revenue requirement is provisionally split between the

- transit country's consumers and the consumers connected in destination countries, as it would happen in the current system;
- transmission tariffs then can be set, at the exit point of the transmission networks to the distribution networks, by each national regulator to meet each country's revenue requirement, which includes the allocated share of the transit network cost⁶;
- inter-TSO compensation is set based on actual ex-post demand or the transit network's services, to obtain the same outcome as with the current methodology;
- in the following year's tariff-setting round, any gaps between TSO's allowed and actual revenues⁷, due to errors in the initial forecast of demand for transit services, are offset.

Option 2: A Cost-Sharing Mechanism Addressing also Broader Weaknesses of the Current Framework

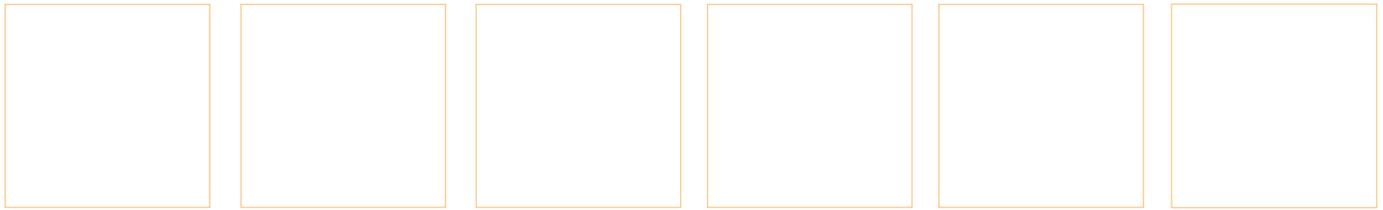
Under the current arrangements to share transmission cost among European gas consumers:

- if demand in destination countries – and therefore demand for transit capacity – fall, consumers in transit countries might end up paying a greater share of network cost. This might be challenged as unfair, on the basis that network infrastructures were built based on different assumptions on transit and domestic use;
- if the current reluctance of market participants to take long-term transmission related commitments endures, a large share of network upgrade cost will have to be allocated directly to the benefitting countries; this might generate pressure for a more structured and transparent process for the

5. COMMISSION REGULATION (EU) 2017/460.

6. In addition to the domestic revenue requirement.

7. Including inter-TSO compensation.



selection of network upgrades as well as for their cost allocation.⁸

Our second option for a cost-sharing mechanism is meant to address these weaknesses of the current framework. Although we cast the model's description with reference to the entire Union, our approach lends itself to implementation at a regional scale.

2.1 Identification of the European Transmission Network

The first element of the methodology is a network of European interest (the 'European transmission network'). Intuitively, we conceive the European transmission network as including all assets that could have resulted in the planning activity of a pan-European regulator. A reasonable starting point to define the boundaries of the European transmission network would be what national regulators currently regard as transmission assets. Our criterion for inclusion would not distinguish among assets currently used to transport gas and assets with poor load factor but contributing to security of supply and contestability of the European market, nor would we distinguish between infrastructure with cross-border relevance and state-specific assets. Finally, LNG terminals, as entry points to the European market, would be included in the European transmission network⁹.

2.2 Revenue Allowance for the European Transmission Network

In the second step of the methodology, a revenue allowance for each asset included in the European

transmission network is computed. Various issues would have to be addressed at this stage, in particular, related to the degree of harmonisation of national regulatory schemes.

Specific provisions, possibly transitory, might have to be implemented to address material deviations between revenues currently obtained for transmission owners and their revenue allowance according to the harmonised scheme, in particular keeping into account changes in the risk-allocation to transmission owners that may result from the move to the new scheme.

2.3 Sharing the Overall Revenue Requirement Among Member States

The third element of the methodology consists in allocating a share of the overall revenue requirement to each European country. In developing this crucial part of the mechanism, two opposing views would be confronted. The first view emphasises that the current stock of infrastructures is the result of independent decisions by Member States. In this perspective, each country should bear the risk that, in time, the value of its transmission assets could turn out different from what expected when it was decided. Consistently with this approach, a fixed part of the revenue requirement of the European transmission network should be assigned to each Member State, and that burden would be largely independent of the country's consumption and procurement sources¹⁰. The second view would emphasise that national regulators and governments have traditionally pursued the objective to deliver uniform service to all citizens, to the extent that this was feasible at rea-

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8. One may argue that the market's reluctance to buy long term may be address by a tariff structure that penalizes short term purchase. In fact, this would perpetuate the distortions in capacity utilisation (in the direction of underutilization) that our proposed tariff structure the seeks to eliminate.
 9. Alternative more selective inclusion criteria could be opaque, as for example some assets serve multiple purposes, and unstable – as for example the same asset may gain or lose cross-border relevance in time.
 10. A reasonable starting point to set those shares could be the transmission cost currently borne by each country's customers. However, assessing current transmission costs paid by a country's customers presents its own problems, since part of that cost is embedded in wholesale gas prices.



sonable cost. Furthermore, geographical tariff averaging, at the national or regional level, is a feature of most national tariff systems. This approach would provide grounds for higher degrees of cost averaging and risk socialisation among European consumers. The best balance between these views is a matter for political determination.

2.4 Tariff Setting

Finally, tariffs in each country would be set to cover the country's share of the total revenue requirement. As discussed in the previous section, in our proposal the entire revenue requirement would be met by charges the transmission network's exit points to distribution networks and customer's premises directly connected to the transmission network.

Compared to the current system, the cost-sharing option considered in this section implies a greater level of coordination of Member States' governments and regulators. In particular, this option entails an explicit agreement on cost-sharing among all concerned Member States. Furthermore, it is likely to entail more involvement of NRAs in the EU wide investment decision-making process, which determines the total cost to be shared among countries and each country's benefits quota, in terms of access to a diversified portfolio of potential suppliers and security of supply, in exchange for the cost that the country has paid.

3. Conclusions

The entry-exit model currently in place has been key to the overall positive development of the EU gas market in the last years. However, since the release of the Third Package (2007), when the entry-exit model looked like the most appropriate choice for that time's needs, most of the EU gas market's fundamentals have changed. It is, therefore, time to look for a new model which could effectively address today's challenges (renewable generation, end of long-term contracts, etc).

We propose an alternative model based on charging only the transmission network's exit points to distribution networks and to directly connected end-customers. We considered two versions of the model: the first option focuses on ease of implementation, by minimising the impact on the overall framework governing gas transmission in Europe.

The second option addresses broader potential weaknesses of the current arrangements, but would likely require a new governance structure. Notably, it would entail bringing the process of coordination of national energy policies to the next level, with greater participation of NRAs in the EU-wide investment decision-making process determining on one side the total cost to be shared among countries and, on the other, each country's quota of resulting costs and benefits.

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