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POLICY BRIEF

Making the TEN-E Regulation Compatible with the Green Deal: Eligibility, Selection, and Cost Allocation for PCIs

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Highlights

- The European Green Deal calls for a revision of the TEN-Regulation (Regulation (EU) No 347/2013). In this Policy Paper, we assess the experience with the implementation of the TEN-E Regulation and how it can be revised to align it with the new full decarbonisation objective.
- The TEN-E Regulation defined several categories of projects that can obtain the PCI status: electricity, gas, smart grids, oil, and CO2 networks. First, oil networks can be excluded, while the role of gas networks is more debatable. Gas pipelines need to support pursuit of the decarbonisation goal. Second, power-to-X technologies, electric vehicle charging stations and (smart) gas distribution grids can be added to the scope.
- The TEN-E Regulation attempted to make the selection of strategically important EU energy infrastructure more objective. We offer three recommendations in this regard. First, to make the TYDNP an integrated exercise over all energy vectors using an open source model. Second, to make the scenarios used in the TYNDPs subject to the approval of the European Commission. Third, to reallocate the approval decision for (harmonised) CBA methodologies from the European Commission to ACER.
- The TEN-E Regulation introduced a CBCA procedure. Also, CEF-E funding to support PCIs was made available. We offer two recommendations in this regard. First, CBCA decisions should become more ambitious than the minimum standard recommended by ACER in 2015. All jurisdictions involved should end up with similar benefit-to-cost ratios to increase commitment. Second, affordability should be the only award criterion that is linked to CEF-E funding. This award criterion shall complement two eligibility conditions: 1/ the project is strategic to reach the EU decarbonisation goal; and 2/ the project is regulated.

Introduction[1]

Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure (the Trans-European Networks-Energy / TEN-E Regulation) aims to foster the development of cross-border energy infrastructure in Europe.[2] The TEN-E Regulation was proposed by the European Commission in a context of lagging investment in energy infrastructure, in particular in large cross-border projects at transmission level, against the background of the demanding timeline of the EU 2020 energy and climate objectives.

The TEN-E Regulation was the first of its kind. Before its adoption, there were EU instruments for co-financing infrastructure projects (e.g., the temporary European Energy Programme for Recovery) yet many obstacles were faced. Examples are regulatory heterogeneity between Member States and slow permit granting. The main focus of the TEN-E Regulation was on accelerating the development of strategically important priority projects interconnecting energy networks across the EU, labelled Projects of Common Interest (PCIs). To achieve the PCI status, projects need to be included in the latest Ten-Year Network Development Plan (TYNDP) and, as such, they need to deliver positive net welfare benefits. Since the entry into force of the TEN-E Regulation, the European Commission has adopted four PCI lists, the last one being published on 31 October 2019.[3]

The European Green Deal calls for a revision of the TEN-Regulation.[4] The current context is different from that ten years ago. When the TEN-E Regulation was conceived, its main objective was to accelerate infrastructure deployment with a cross-border impact to complete the internal energy market. In this way, the EU 2020 energy and climate objectives could be reached in a more cost-efficient way. The future objective is to support the European Green Deal through decarbonisation of energy, transport, industry, and buildings by fostering the deployment of innovative technologies and infrastructure while keeping the energy transition socially sustainable.

In this Policy Paper, we discuss the experience gained with the implementation of the TEN-E Regulation and provide recommendations on how the TEN-E Regulation could be aligned with its new objective. We split the analysis into three parts. First, we focus on the range of projects which could be eligible for the PCI status. Second, we look at the criteria for the selection of PCIs and the role of the Cost-Benefit Analysis (CBA) methodology, long-term scenarios and the TYNDP. Third, we consider the sharing of costs of PCIs and the roles of the Cross-Border Cost Allocation (CBCA) procedure and of the Connecting Europe Facility for Energy (CEF-E) grants. We end the Policy Paper with an overview of our recommendations.

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1. This Policy Paper serves as the FSR-CSEI input for the DG ENER public consultation on the TEN-E revision. A draft of this Policy Paper was discussed during the online debate organised by FSR and CSEI on the 23th of June at 10am CEST: Revision of the TEN-E Regulation - an academic perspective (recording: https://www.youtube.com/watch?v=jY9--6AkD9s&feature=emb_logo). We are very grateful for the feedback from Aad Correljé (TU Delft), Elena Fumagalli (Utrecht University), Nils-Henrik von der Fehr (Oslo University), and the audience. The usual disclaimer applies.

2. https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32013R0347. For more background information on the TEN-E Regulation, consult: https://fsr.eui.eu/the-ten-e-regulation/

3. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0389&from=EN

4. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588580774040&uri=CELEX%3A52019DC0640

1. Eligibility for PCI status under the TEN-E Regulation

In this section, we first describe the experience gained with the different project categories. Then, we discuss whether the same project categories are still fit for future needs.

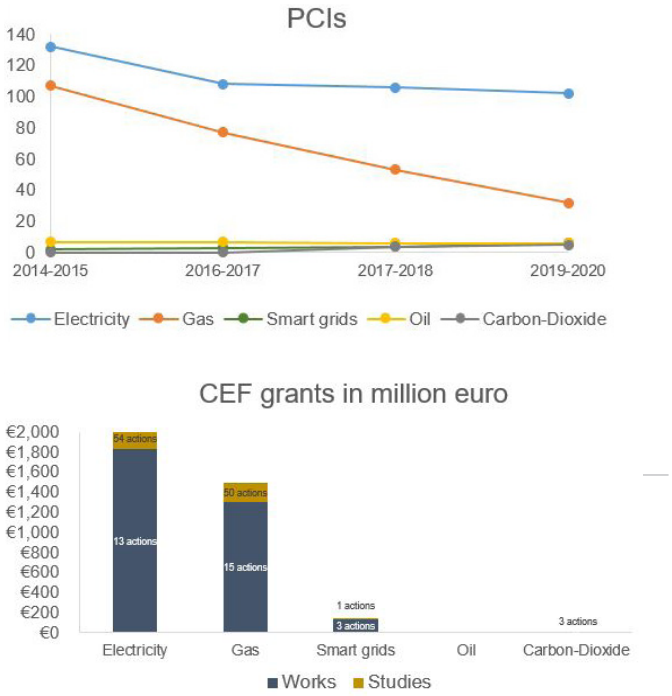
1.1 Experiences with different PCI project categories

The TEN-E Regulation defined several categories of projects that can obtain the PCI status: electricity, gas, smart grids, oil, and carbon dioxide networks. In order to be eligible for PCI status, projects do not need to have a cross-border geographical footprint. What matters is that they have a cross-border impact. Therefore, internal lines, storage projects and, in the case of gas, LNG terminals can be eligible for PCI status as long as their impact extends beyond national borders. Figure 1 summarises some key statistics related to the categories of projects that have been included in the four PCI lists since 2013.

The left-hand graph shows that electricity and gas projects have consistently represented over 85% of all PCIs. It can also be seen that the number of gas PCIs has decreased over the years. Gas projects represented 43% of all projects in the first PCI list but only 21% in the fourth. This can mainly be explained by the fact that the natural gas network has gained maturity over the years and few new projects were needed and thus added to the list.

The right-hand graph shows that over 95 % of the total CEF-E spending was allocated to electricity and gas projects. Oil projects were excluded by definition (article 14(1) of the TEN-E regulation). Three grants for works and one for a study were awarded to smart grid projects and three grants for studies to carbon-dioxide network projects. Electricity projects received most funding from CEF-E grants, a total of over 2.12 billion euros, about 624 million euros more than gas projects. More studies for electricity projects than gas were financed (54 versus 50). The grants for works on gas projects were divided among slightly more gas projects (15 versus 13).

Figure 1: Overview of the PCIs on the four lists and CEF grants per project category. Status: May 2020[5]



1.2 What types of projects should be eligible in the revised TEN-E Regulation?

Going forward, projects benefitting from the PCI status should contribute to meeting the EU's decarbonisation objectives. Therefore, it should be assessed whether the types of projects that fall under the scope of the TEN-E Regulation as defined in 2013

5. Own elaboration. Sources: the four official PCI lists and the CEF-Energy Supported Actions Report (May 2019) by the European Commission complemented with the projects awarded in the 2019 CEF call. https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-year/2019.

are still fit for purpose.[6] We split this section into two parts. First, we discuss whether we should still consider all the 'old project categories'. Second, we discuss whether there should be new types of projects added to the scope of the TEN-E Regulation.

1.2.1 The consideration of 'old project categories'

Given the increasingly ambitious EU decarbonisation objectives, there are reasons to question whether oil and gas networks should still be kept within the scope of the TEN-E Regulation. Oil networks were never prominent in any PCI list and were excluded from CEF-E funding. Considering all four PCI lists, seven oil projects have obtained the PCI status. All seven had the objective to enhance the security of oil supply in the Central Eastern European region by enabling adequate alternative supply routes and increasing interoperability.

In contrast, gas projects represented an important share of all the PCIs, but the number of such projects decreased significantly from 2013 to 2019. Nevertheless, between 2013 and 2020, about 1.3 billion euros of CEF-E funding were allocated for works related to gas projects, representing about 35% of the total. Already at the time of the adoption of the fourth PCI list there was some resistance against gas projects being granted PCI status.[7]

However, natural gas is just one of the energy vectors that can be transported through pipelines. The European Commission has made it clear that 'renewable' gases, such as (green) hydrogen, will be an important element in its strategy to reach the decarbonisation goals.[8] In particular, by scaling up their use of hydrogen, energy-intensive industries should play a key role in developing a sizeable well-functioning clean hydrogen market and cost-effective infrastructure. Moreover, hydrogen has many other potential applications. For example, it can become an important energy vector for marine or other heavy transport. As such, energy infrastructure planning might benefit from being coordinated with transport infrastructure planning. Especially after 2030, investments in hydrogen infrastructure (beyond industrial networks) can be expected. In this context, existing gas grids could be refitted to transport renewable gases or hydrogen.[9]

6. In theory, there is no need to explicitly define PCI eligibility criteria. A sound CBA methodology should lead to a rejection of non-beneficial projects. However, we still consider eligibility criteria important due to implementation issues with the CBA methodology, as discussed in the Section 2 of this Policy Paper. Also, eligibility criteria can help limiting the administrative burden.

7. A motion to reject the fourth PCI list was tabled by the Green/EFA group in the European Parliament due to the fact that 32 gas projects were included (https://www.europarl.europa.eu/doceo/document/B-9-2020-0091_EN.html). However, on 12 February 2019 the European Parliament rejected this motion by a large majority: 443 votes against 169 in favour and 36 abstentions.

8. See, for example, the EU Hydrogen Strategy Roadmap, which was published for consultation on 26 May 2020 (https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12407-A-EU-hydrogen-strategy).

9. For more information on the characteristics of different renewable gases and the necessary infrastructure, see Belmans, R. and Vingerhoets, P., 2020, Molecules: indispensable in the decarbonized energy chain. *FSR Policy Paper 2020/01*. https://cadmus.eui.eu/handle/1814/66205

Recommendation 1: **Oil networks should be excluded from being eligible for the PCI status.[10] Gas projects should still be able to become PCIs. However, priority for CEF-E funding should be given to projects that are directly in line with the full decarbonisation objective.**

Regarding eligibility for CEF-E grants for works, from a policy perspective it cannot be deemed a right signal still to allow CEF-E grants for gas infrastructure mainly intended to transport gas from fossil sources. In contrast, if studies or works are conducted to build new gas infrastructure, to retrofit/repurpose existing gas pipelines to allow the transport of 'renewable' gases (including hydrogen) or to reduce methane emissions, the projects could still be considered eligible for CEF-E grants. However, being strategic to reach the EU decarbonisation goal is not a sufficient criterion but only a necessary one for CEF funding. The criteria for awarding CEF-E funding are discussed in more detail in the Section 3 of this Policy Paper.

In addition, the application of such a requirement calls for a clear taxonomy of 'renewable' gases.[11] Other gas projects, which can allow gas to replace other vectors with a higher greenhouse gas content as part of an intermediate step towards decarbonisation, could be supported by other public funding schemes, such as possibly the Just Transition Fund.[12]

1.2.2 The consideration of new types of projects

New types of projects can be added to the scope of the TEN-E Regulation. We are coming from a context in which our main objective was to interconnect countries to integrate renewables in a cost-efficient manner, while the new context requires the integration of sectors leveraging digitalisation. In this regard, an example is power-to-X technologies, which could be added to the scope of TEN-E Regulation.[13] Another example of projects which could be added to the scope of the TEN-E Regulation are electric vehicle charging stations. Planning of these facilities lies at the intersection of the TEN-T (Transport) and TEN-E Regulations.

The PCI lists already included electricity and gas storage projects, hydro-storage projects, and LNG terminals. Networks displace energy in space; all these technologies store or convert energy into other energy vectors or forms that can then be released, transported or converted back into its original form. In that sense, these types of projects are, by their nature, not very different from power-to-X or electric vehicle charging stations. In addition, all these technologies do not exhibit such strong economies of scale as energy networks, and investment in them could potentially be left to the market.

A final example of new types of projects that could be included within the scope of the TEN-E Regulation are smart gas distribution networks. The TEN-E Regulation allowed for electricity smart grids to become PCIs as many renewables-based facilities connect to distribution grids. Similarly, the decarbonisation of gases also happens at lower pressure levels, e.g., biomethane.

In adding new types of projects to the scope of the TEN-E Regulation, consideration should be given to the extent to which the cross-border relevance criterion is still to be met in order to satisfy the principle of subsidiarity of EU legislation. Many of the projects of the types described above do not have a geographical cross-border footprint. However, infrastructures

10. With the possible exception of pipelines transporting 'renewable' liquids such as methanol.

11. See, for example, Conti, I., 2020, How many shades of green? An FSR proposal for a taxonomy of 'renewable' gases. *FSR Policy Brief 2020/06*. doi: 10.2870/614896. In addition, there should be consistency with the EU taxonomy for sustainable finance proposals (https://ec.europa.eu/info/publications/180524-proposal-sustainable-finance_en#investment).

12. An example is infrastructure to increase natural gas in the generation mix at the expense of coal. More information about the Just Transition Fund can be found here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0022

13. For a broader discussion about Power-to-X and in particular Power-to-Gas, see, for example, Olzcak, M. and Piebalgs, A., 2018, Sector Coupling: the New EU Climate and Energy Paradigm? *FSR Policy Brief*. http://hdl.handle.net/1814/59294

enabling sector integration are alternatives that compete with, or complement, cross-border transmission lines or pipes as solutions to make the energy system more flexible. The increased need for flexibility is driven by higher shares of intermittent renewables in the electricity generation mix. Therefore, to ensure cost-efficiency in achieving the EU-wide decarbonisation objectives, these projects cannot be disregarded in the revised TEN-E Regulation.

Recommendation 2: **Power-to-X technologies, electric vehicle charging facilities and smart gas distribution grids can be added to the scope of the TEN-E Regulation. Infrastructures enabling sector integration offer alternative or complementary solutions to cross-border lines or pipes to satisfy the increasing flexibility needs of the energy system. In this regard, the PCI eligibility requirement for projects to have cross-border relevance shall be interpreted in a more holistic way, by considering that some new infrastructure competes or complements more traditional cross-border networks and, as such, should be deemed to have cross border relevance, in compliance with the subsidiarity principle.**

Regarding eligibility for CEF-E grants for works, if smart gas distribution grids are strategic to reach the decarbonisation goal, they should be eligible. Power-to-X technologies and electric vehicle charging facilities are not necessarily regulated activities. Therefore, it does not seem appropriate to allow them to be eligible for CEF-E grants for works as this could distort competition in their markets. Project promoters can apply for national or other subsidy schemes that are designed to stimulate the deployment of innovative technologies.

Table 1 (next page) summarises the recommendations regarding the new scope of the TEN-E Regulation. Note that in this section we focus on eligibility criteria. We discuss the award criteria for CEF-E grants in more detail in the Section 3 of this Policy Paper.

2. Selection of PCIs: TYNDP and the use of CBA and scenarios

In this section, we first summarise the experience gained with the tools used for the TYNDP and PCI selection procedure. We then propose recommendations on how to improve this procedure.

2.1 Experiences with the tools used to select PCIs

Before the TEN-E Regulation entered into force, the selection of energy infrastructure projects that would receive European support was purely politically driven by individual Member States. The TEN-E Regulation aimed to make the identification of strategically important European energy projects more objective. Therefore, the European Networks of Transmission System Operators for Electricity and Gas (ENTSOs) developed separate CBA methodologies. When developing the TYNDPs, the ENTSOs had to apply their CBA methodologies using self-developed long-term scenarios. Based on the CBA results and in line with priority corridors, PCI lists were set up.

The first edition of the CBA methodology for electricity was used by ENTSO-E to assess projects in the 2014 and 2016 TYNDPs. Afterwards, ENTSO-E improved the CBA methodology. ENTSO-E used the so-called CBA 2.0 methodology to assess project benefits in the 2018 TYNDP. This was the basis for the latest PCI selection process. In December 2019, ENTSO-E published a third CBA methodology for public consultation. ACER published its opinion on 6 May 2020.[14]

For gas, the first CBA methodology, which was approved by the European Commission in February 2015, was applied for the TYNDPs in 2015 and 2017. For the 2018 TYNDP, ENTSOG updated the CBA

14. ACER, 2020, Opinion No 03/2020 of ACER of 6 May 2020 on the ENTSO-E draft 3rd guideline for cost benefit analysis of grid development projects.

Table 1: Summary of recommendations in terms of eligibility for the PCI status

	Oil networks	Gas transmission networks and (smart) gas distribution networks	P-to-X technologies	EV charging stations
PCI	No	Yes, and coordination with TEN-T Regulation (hydrogen for heavy transport)	Yes	Yes, and coordination with TEN-T Regulation
Eligibility grants for studies and financial instruments	No	Yes, but only for building or retrofitting/repurposing for gases that are strategic to reach decarbonisation	Yes	Yes
Eligibility grants for works	No	Yes, but only for building or retrofitting/repurposing for gases that are strategic to reach decarbonisation	No	No

methodology.[15] Finally, the European Commission's Joint Research Centre (JRC) also published guidelines for assessing smart grid projects with a CBA.[16]

The 2018 TYNDP was the first TYNDP for which the ENTSOs developed common scenarios, outlining three different possible paths towards a low-carbon energy system in line with EU targets up to 2040. These joint scenarios were also subject to improved practices in terms of stakeholder consultations. Joint electricity and gas scenarios are of particular importance as sector coupling technologies will increase the interlinkage between the two sectors.

We acknowledge that progress has been achieved with regard to the tools used to select PCIs. However, further improvements are still possible. Opinions from ACER (and earlier FSR recommendations) to improve the CBA methodology have only been partly implemented.[17] Examples where further progress is needed relate to the clustering of projects and the baseline definition, harmonised and disaggregated cost and benefit reporting and full monetisation.

2.2 How to improve the tools used for the PCI selection procedure?

In this section we formulate recommendations to improve the PCI selection procedure. We do not focus on the more detailed implementation of the CBA. Our recommendations in that regard have not

15. This gas CBA 2.0 was finally approved by the European Commission and published in February 2019. https://www.entsog.eu/sites/default/files/2019-03/1.%20ADAPTED_2nd%20CBA%20Methodology_Main%20document_EC%20APPROVED.pdf

16. Giordano, V., Onyeji, I., Fulli, G., Sánchez-Jiménez, M., Filiou, C., 2012, Guidelines for conducting a cost benefit analysis of smart grid projects. JRC reference reports. doi: 10.2790/45979.

17. See for example: Meeus, L., von der Fehr, N.-H., Azevedo, I., He, X., Olmos, L. and Glachant, J.-M., 2013, Cost benefit analysis in the context of the energy infrastructure package. *Think Report Topic 10*. doi: 10.2870/60378, Keyaerts, N., Schittekatte, T. and Meeus, L., 2016, Standing still is moving backward for the ABC of CBA. *FSR Policy Brief*. doi: 10.2870/57918 and Bhagwat, P., Schittekatte, T., Keyaerts, N. and Meeus, L., 2017, Assessment of Cost-Benefit Analysis for offshore electricity infrastructure development. *Robert Schuman Centre for Advanced Studies Research Paper No. RSCAS, 53*. http://hdl.handle.net/1814/48524

changed.[18] Here we focus mostly on principles, transparency, and governance. We have three recommendations, addressing the TYNDP, the development of scenarios and the CBA methodology.

2.2.1 TYNDP

The use of joint scenarios by the ENTSOs is a step forward. But these joint scenarios are used as an input to different CBA methodologies for different project categories (gas and electricity, but also smart grids) and result in different TYNDPs (one for gas and one for electricity). As highlighted before, the increased sector coupling potential requires more coordination and increases the risk of stranded or redundant assets. The ENTSOs are working on an interlinked model, which is definitely a step forward. However, this is a work in progress and improvements need to be implemented to make this model truly interlink the sectors.[19,20]

Recommendation 3: **The TYNDPs for gas and electricity should be integrated and become a joint exercise run by both ENTSOs and coordinated with DSO representatives and other relevant stakeholders.**

A prerequisite for this integration would be to have one single CBA methodology or a set of harmonised ones that are applicable to all types of project categories: electricity, gas and later also hydrogen and, importantly, all non-network alternatives. Similarly, the model underlying the CBA analysis should truly interlink the two sectors. Making this model open-source would allow for replicability of the results to gain trust and can aid speeding up the development of the model.[21] We acknowledge that there can be a trade-off between transparency and security and that some information can be commercially sensitive (e.g., cost data).

2.2.2 Scenarios

At the moment, the scenarios used to conduct the CBA are defined by the ENTSOs as part of the TYNDP process, and subject to an opinion by ACER. It is important for the CBA to be based on robust scenarios reflecting a shared vision of the future, consistent with policy goals, but also recognising the uncertainties surrounding the future, including about the achievement of these goals. The joint ENTSO scenario was a significant step forward. Decentralisation also increases the need for coordination between TSOs and DSOs.

Furthermore, as it has also been described by ACER and CEER, currently the boundaries between com-

18. See footnote 17.

19. See, for example, ACER, 2017, Opinion 07/2017 of 20 March 2017 on ENTSOS' draft consistent and interlinked electricity and gas market and network model; and Artelys, 2019, Investigation on the interlinkage between gas and electricity scenarios and infrastructure projects assessment. Link: https://www.entsoe.eu/news/2019/11/04/entso-e-and-entsog-publish-the-focus-study-on-interlinkage-between-gas-and-electricity-systems/

20. An additional point is that the consistency between the TYNDP and National Network Development Plans (NDP) can be improved. Currently, according to EU legislation, only independent transmission system operators (ITO) are formally obliged to present a NDP. This complicates the consistency check.

21. The energy sector is lagging in this regard. For discussions see, e.g., Pfenninger, S., DeCarolis, J., Hirth, L., Quoilin, S. and Staffell, I., 2017, The importance of open data and software: Is energy research lagging behind? *Energy Policy*, 101, pp.211-215; and Medjroubi, W., Müller, U.P., Scharf, M., Matke, C. and Kleinhans, D., 2017, Open data in power grid modelling: new approaches towards transparent grid models. *Energy Reports*, 3, pp.14-21.

petitive activities and monopoly activities are blurring.[22] Network solutions increasingly compete with non-network alternatives to integrate renewables. In addition, gas and electricity networks may compete with each other. Electrification of heating, the development of power-to-gas projects and/or networks of pipes conveying only hydrogen could change the value of gas (and electricity) transmission assets. Going forward, TSOs will likely be less neutral to market developments. The choice of scenarios can directly influence which projects will result as being beneficial and which will not. Therefore, the definition of scenarios should not be left with the ENTSOs, being associations of a subset of all possible project promoters.[23]

Recommendation 4: **It is worth considering transferring the responsibility to approve (and possibly amend) the scenarios to the European Commission, since scenarios are closely linked to the policies and measures which will be put in place to steer this future.**

In this regard, consistency between the National Energy and Climate Plans (NECPs) and the scenarios used for the TYNDP should be guaranteed.

2.2.3 CBA methodologies

Now, the CBA methodologies are proposed by the ENTSOs, subject to an opinion by ACER and approved by the European Commission. Two of the main pitfalls of the current methodologies are their lack of full monetisation and the discount factor. Regarding the former, a multi-criteria analysis (MCA) of PCIs does not allow for transparency and is not effective in increasing the objectivity of the process. The fact that some benefits do not directly result in monetary flows (e.g., environmental benefits, security of supply, etc.) should not be a problem as long as they can be somehow quantified in monetary terms. Regulation is fully capable of considering these benefits and has considered them – including those where quantification is more difficult – for a long time. National regulators have approved projects mainly aimed at enhancing security of supply with no immediate monetary returns.

Moreover, the CBA methodology takes into account social aspects and environment impact. Hence, it would be more appropriate to use the term Social Cost-Benefit Analysis (SCBA). This distinction may sound trivial, but it has important implications for project assessment. Energy infrastructure projects are capital intensive and, while private costs are borne early, benefits and social and environmental costs are accrued over longer periods of time. Due to the nature of these projects and their policy importance, the discount rate to compute the net present value needs to be a 'social discount rate' and its calculation should be subjected to sensitivity analysis. Social discount rates tend to be lower than private ones, meaning that future benefits and environmental and social costs have higher values than when private discount rates are used.[24]

22. ACER and CEER, 2019, The Bridge Beyond 2025. Conclusion Paper. 19 November 2019.

23. The use of these scenarios in the context of infrastructure development might well involve some asymmetry between the electricity and gas sectors. In particular, it could have been justified that TSOs and NRAs, to be on the safe side when planning electricity infrastructure development, refer to a future which is more electrically intensive than a central 'best guess' scenario. And conversely for gas. But any deviation from the best guess scenario should be proportionate.

24. In that regard, it is also important to consider a sufficiently long time horizon when performing the SCBA.

Recommendation 5: **It is worth considering transferring the responsibility to approve (and possibly amend) a single or a set of harmonised CBA methodologies to ACER. ACER is a more technical body than the European Commission.[25] Research centres such as JRC, CSEI and FSR could support ACER in enhancing the current methodologies.**

Priority should be given to full monetisation and the use of an appropriate social discount factor. If the ENTSOs find it difficult to set values for controversial parameters, such as the value of lost load (VOLL), the monetary impact of environmental harm or the social discount rate, ACER could do it or appoint independent experts to propose values. Regional Groups might still want to express their energy policy priorities, such as security of supply or integration of renewable energy. Today they can do this by attributing different weights to different indicators in the MCAs. With full monetisation, this will no longer be possible. Instead, regional groups could be asked to express their policy priorities via the PCI eligibility criteria. This would also be more transparent than working with weighting factors that are not made public.

3. Cost allocation of PCIs: CBCA and CEF-E grants

In this section, we first summarise the experience gained with CBCA decisions and CEF-E grants. Second, we formulate recommendations on how to improve the CBCA process and the allocation of CEF-E grants.

3.1 Experiences with the tools to allocate the costs of PCIs

Countries used to agree on cross-border investments on the assumption that they would each pay for assets in their territories. If they both benefitted enough to justify these costs, they would agree to go forward with the investment. If one of them had doubts, the project would be cancelled or delayed even though the project may have been beneficial from the EU perspective. Therefore, the TEN-E Regulation introduced a CBCA procedure with ACER deciding in cases in which NRAs cannot agree on the cost allocation within a six-month deadline. In addition, CEF-E grants to support the investment could be requested. A total budget of €5.35 billion was made available for energy infrastructure projects for the period 2014-2020. Figure 2 (next page) summarises some key statistics related to CBCA decisions adopted for PCIs and CEF-E grants awarded for works between 2014 and 2020.

The left-hand graph shows that in 2014 significantly more gas projects than electricity projects applied for a CBCA decision, but after that year the number of CBCA requests were almost equally divided between the two project categories. Requesting a CBCA decision is a necessary condition to apply for a CEF-E grant for works for electricity (except storage) and gas projects (Art 14(2.b) of the TEN-E Regulation). Of the 39 CBCA decisions, 37 were coordinated decisions by NRAs. Two decisions were taken by ACER.

The graph in the middle shows that in the majority of CBCA decisions (22 out of 39) the assets were built on the territory of one country and the costs were allocated to that country, possibly anticipating CEF-E grants. These PCIs mostly involved the construction of internal lines with cross-border impact. 11 CBCA decisions involved assets covering the territory of multiple countries and the costs were allocated to the involved countries without compensations.[26] In the cases in which all involved countries were estimated to be net beneficiaries, the territorial principle was applied: each country bears the costs of the assets and works on its territory. For the pro-

25. Giving more responsibility to ACER in the context of the Clean Energy Package, i.e., to approve the methodologies for assessing electricity resource adequacy, or in the context of approving electricity and gas network code methodologies, has been a positive experience.

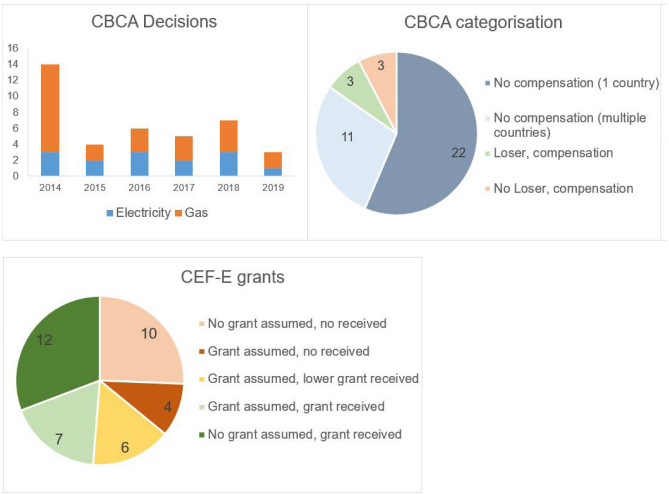
26. This is an upper-bound estimate as for some CBCA decisions the collected information does not allow to identify whether the CBCA deviated from the territorial principle.

jects for which a country was estimated to be a net loser (e.g., PCI 1.6, the Celtic interconnector, and 2.7, the Biscay Gulf project), a significant amount of anticipated CEF-E funding was allocated in a way to avoid a net loser.

In three projects, applying the territorial principle would have resulted in a net loser and the CBCA decision included a compensation payment from the net beneficiaries of the project to the net loser. Alternatively, to reach a similar outcome than with a compensation, the investment costs were allocated between the countries in a way that avoided any country being a net loser. Last, in three projects, countries agreed to a CBCA with compensation even though none of the countries involved was expected to be a net loser.

The right-hand graph shows whether CEF-E grants were assumed in the CBCA decision and whether the projects eventually received them. Of the 39 CBCA decisions, 25 received grants for works. However, it can be seen that often the grant assumed in the CBCA decision was not awarded (4 cases) or that a lower grant was awarded (6 cases).

Figure 2: Summary statistics of CBCA decisions 2014 - 2019.[27]



Looking at Figure 2, it is clear that improvements are possible. Past recommendations by ACER and FSR were, in most cases, disregarded.[28] In its 2015 Good Practice Recommendation, ACER recommended a minimum standard, i.e., costs should be reallocated only to the extent necessary to avoid an involved jurisdiction facing negative net (welfare) benefits. This happened for example in the case of the CBCA decision for the GILP gas interconnector (PCI 8.5)

27. Based on "Overview of Cross-Border Cost Allocation Decisions" by ACER, last updated on 1 July 2019, and the database of CEF action (https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/cef-energy-projects-and-actions). The middle graph shows that 25 gas and electricity CBCA decisions led to grants for works, while the left-hand graph of Figure 1 shows that there were 28 actions in terms of grants for works for gas and electricity. This difference is explained by: 1/ PCI 1.12 (Compressed air energy storage in United Kingdom Larne) did receive a grant for works (but was termined) and was not subject to a CBCA; 2/ two CBCA decisions (for PCIs 8.1.1-8.2.2 and 8.3) did receive grants for works. The CBCA decisions that were classified as 'Loser, compensation' are the decisions for PCIs 5.19, 8.3 and 8.5. For PCI 5.19, a similar outcome as a compensation was obtained by allocating 100% of the investment costs of the gas interconnector between Italy and Malta to Malta. The CBCA decisions that were classified as 'No loser, compensation' are the first decision for PCI 8.2.4 and the decisions for PCI 6.1.1 and 8.2.3. The CBCA decision for PCI 5.2. was classified as 'No loser, no compensation.' In this special case, the pipeline is physically located in southwest Scotland but the costs were fully allocated to Ireland as the pipeline belongs to the Irish gas transmission grid. For more information, also consult: Meeus, L. and Keyaerts, N., 2015, First series of cross-border cost allocation decisions for projects of common interest: Main lessons learned. *FSR Policy Brief*. doi: 10.2870/579216

28. See, for example, Meeus, L. and He, X., 2014, Guidance for Project Promoters and Regulators for the Cross-Border Cost Allocation of Projects of Common Interest. *FSR Policy Brief*, http://hdl.handle.net/1814/29679; and Meeus, L. and Keyaerts, N., 2015, First series of cross-border cost allocation decisions for projects of common interest: Main lessons learned. *FSR Policy Brief*. doi: 10.2870/579216; and ACER 2015, Recommendation 05-2015 of 18 December 2015 on Good Practices for investment requests, including CBCA requests, for electricity and gas PCIs.

taken by ACER. Few times did NRAs go beyond the minimum standard – and provided compensations to turn all the involved countries into net beneficiaries – in order to improve the commitment in the project.

In addition, very often the CBCA decision was incomplete (17 cases) as CEF-E grants for works were assumed, but not yet awarded. The consequence is that the final decision is delayed and approximate because not all EU funding requests were granted (4 cases) or a lower grant was awarded (6 cases).[29] This is unfortunate because the aim of the TEN-E Regulation is to expedite projects that are strategically important for the EU energy and climate policy objectives. At the origin of this issue are seemingly conflicting provisions in the TEN-E Regulation which state, on the one hand, that efficiency incurred costs of PCIs should be covered by tariffs (art. 12(1) and (5) of the TEN-E Regulation), while, on the other hand, that NRAs, when taking coordinated decisions on the allocation of investment costs to be borne by each system operator for the project, and on their inclusion in tariffs, may decide to allocate only part of the costs (art. 12(4) of the TEN-E Regulation).

Regarding the awarded CEF-E grants, the use of a plurality of criteria to guide the funding decisions makes these decisions less transparent. For example, in the case of the Biscay Gulf Project, 35% of the project investment costs were financed through CEF-E funding (578.5 million euros).[30] CEF-E funding was justified based on the use of innovative technology, security of supply and sustainability. Instead, in the case of the LitPol electricity interconnector, CEF-E funding was justified on an affordability basis, considering that without CEF-E funding the project would have caused an increase in the transmission tariff in Lithuania ranging from 18% (as estimated by ACER) to 38% (as estimated by the Lithuanian NRA) compared with 2015.[31] Eventually, 67% of the project was financed through CEF-E funding (27 million Euro). In contrast, in the case of the Biscay Gulf project, the TSOs estimated the impact of the full project cost inclusion in the network access tariffs of France and Spain to be 1.2% and 1.5% respectively.

3.2 How to improve the tools to allocate the costs of PCIs?

In this section we offer two recommendations. The first concerns the CBCA procedure and the second concerns the criteria for awarding CEF-E grants.

3.2.1 CBCA procedure

With a suitable allocation of costs to reflect benefits, any project which delivers overall positive net (welfare) benefits can be made to deliver these benefits in each affected jurisdiction. There was a good reason for ACER to recommend the minimum CBCA standard five years ago. The aim was to minimise the number of CBCA decisions at a time when the instrument was used for the first time. Now, more than 4 years and almost 40 CBCA decisions later (even though most of them were 'trivial' ones), it is worth considering whether a more ambitious CBCA approach could be adopted.

29. For example, difficulties in terms of the progress of PCI 10.5 were encountered as it was not rewarded financial support from CEF-E and therefore had to apply for other funding opportunities at the country level. Source: ACER, 2019, Consolidated report on the progress of electricity and gas projects of common interest. 01/07/2019.

30. CRE and CNMC, 2017, Common CBCA on the Biscay Gulf Project.

31. ACER, 2015, ACER Decision No 02/2015 of 16 April 2015 on the investment request including the CBCA for the Lithuanian part of the interconnector between Alythus (LT) and the Lithuanian/Polish border.

Recommendation 6: **CBCAs should not only avoid a jurisdiction facing negative net (welfare) benefits, but instead should allocate costs in such a way that all the jurisdictions involved end up with the same or similar benefit-to-cost ratios.**

In this way, every jurisdiction would be in a position to provide incentives to the project promoters – if the project is not merchant – to promote a timely development of the project. The greater the net benefits delivered by the project, the more this should be so. Better projects should be delivered more rapidly. Even though we recognise that this recommendation is not easy to implement, several CBCA decisions show that it is possible for NRAs to come to such agreements.

Lastly, CBCAs should not consider CEF-E funding, in particular when CEF-E funding is allocated to avoid a net loser. Instead, the CBCA should be complete and exclusively consider compensation payments between the relevant (hosting and non-hosting) countries.

3.2.2 Award criteria for CEF-E grants

If there were no financial constraints or affordability issues, any project delivering overall positive net (welfare) benefits would have to be developed – this is the standard regulatory test. This assessment is provided by the CBA, and so there is a need to have a proper methodology which can quantify benefits as accurately and comprehensively as possible (investment and operating costs are typically easier to quantify), as was discussed in the previous section. A multi-criteria outcome of a CBA results in a multi-criteria assessment when awarding CEF-E funding, with the risk of political interference.

Moreover, CEF-E funding, while very important for the promotion of some worthy projects, will only be able to play a minor role when compared to the overall investment needs and therefore it is essential to clarify its role. It is often proposed that CEF-E funding is used to overcome the problem of non-monetisable benefits. As indicated above, non-monetisable benefits can be, and have been dealt with by regulation for many years. The same goes for innovation, as research and development can be and have been funded through the tariff system. In any case, it is likely that the extent of benefits which cannot be monetised and the benefits from innovation would be quite large with respect to the CEF funds available.

Where CEF funding can definitely help is to fill the affordability gap, as was apparently the case for the LitPol project. This is where the standard regulatory test fails, as a jurisdiction would receive positive net welfare benefits from a project, but its energy consumers cannot afford to pay for the project (even though they would receive higher benefits from it). Such a role for CEF funding would be an application of the solidarity principle of the EU. Other European funds, such as the European Regional Development Fund and the Cohesion Fund, can complement CEF-E funding in this regard.

Recommendation 7: **Affordability should be the only award criterion that is linked explicitly to CEF-E funding. This award criterion can only be considered if two necessary conditions (eligibility criteria) are met: 1/ the project is strategic to reach the EU decarbonisation goal; and 2/ the project is regulated.**

Indicators can be developed which can assess where an affordability gap might emerge in a jurisdiction in relation to the development of a PCI. This implies NRAs, or ACER if the latter fail to agree, proceed with the allocation of the full costs of the PCI so that assessment of its impact on the tariff level in each jurisdiction can be performed and any affordability issue identified.

One remark could be added. For PCIs delivering benefits which are widely dispersed across the Union, it could be that applying the CBCA in the normal way would be impractical. Using CEF-E funding to compensate a net loser could be a pragmatic approach in such a specific case. However, this practice should not be abused.

Conclusion and recommendations

The initial objective of the TEN-E Regulation was to promote the internal energy market for security of supply and economic efficiency purposes. The current context is different from that of ten years ago. The TEN-E Regulation should be revised to support the European Green Deal through the decarbonisation of energy, transport, industry, and buildings, by fostering the deployment of innovative technologies and infrastructure while keeping the energy transition socially fair. In this Policy Paper we have discussed the experience gained with the implementation of the TEN-E Regulation and provided seven recommendations on how the TEN-E Regulation can be aligned with its new objective. The seven recommendations are:

1. Oil networks should be excluded from being eligible for the PCI status. Gas projects should still be able to become PCIs. However, priority for CEF-E funding should be given to projects that are directly in line with the full decarbonisation objective.
2. Power-to-X technologies, electric vehicle charging facilities and smart gas distribution grids can be added to the scope of the TEN-E Regulation. Infrastructures enabling sector integration offer alternative solutions to cross-border lines or pipes to satisfy increasing flexibility needs of the energy system. In this regard, the PCI eligibility requirement for projects to have cross-border relevance shall be interpreted in a more holistic way, by considering that some new infrastructure competes or complements more traditional cross-border networks and, as such, should be deemed to have cross border relevance, in compliance with the subsidiarity principle.
3. The TYNDPs for gas and electricity should be integrated and become a joint exercise run by both ENTSOs and coordinated with DSO representatives and other relevant stakeholders.
4. It is worth considering transferring the responsibility to approve (and possibly amend) the scenarios to the Commission, since scenarios are closely linked to the policies and measures which will be put in place to steer the future of the energy sector.
5. It is worth considering transferring the responsibility to approve (and possibly amend) a single or a set of harmonised CBA methodologies to ACER. ACER is a more technical body than the European Commission. Research centres such as JRC, CSEI and FSR could support ACER in enhancing the current methodologies.
6. CBCAs should not only avoid a jurisdiction facing negative net (welfare) benefits but instead should allocate costs in such a way that all the jurisdictions involved end up with the same or similar benefit-to-cost ratios.
7. Affordability should be the only award criterion that is linked explicitly to CEF-E funding. This award criterion can only be considered if two necessary conditions (eligibility criteria) are met: 1/ the project is strategic to reach the EU decarbonisation goal; and 2/ the project is regulated.

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