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Report on investment evaluation, risk assessment and regulatory incentives

Akos Hofstadter

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Energy transition put a challenge on grids

European Green Deal and REPowerEU set ambitious climate and energy targets, which require more grid capacity (via efficient use of existing and additional investments)

- Development of energy infrastructure strongly depends on the national regulatory frameworks, which need to ensure efficient network development by the monopolistic system operator and scrutiny of the projects' value
- **An investment in high value project may not happen due to various reasons:**
  - Insufficient mitigation or reward of TSOs' risk: project promoters may refrain from investing or to delay their investment decisions in a hight risk project
  - Inadequate infrastructure planning: a high value project may not be identified or not given the right priority
  - Ineffective or perverse regulatory incentives: financial interests by TSOs in an alternative (socially less beneficial or less cost efficient) solution than the higher value one

Note: Energy commissioner's recent Keynote speech art 7 Sept. HL Grid Forum confirmed the infrastructure challenges and need for additional actions.

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Legal provisions

NRAs have the power and duties to facilitate efficient network development and grant appropriate incentives to transmission system operators

Article 58 of Directive (EU) 2019/944	NRAs shall take all reasonable measures within the framework of its duties and powers in pursuit of ensuring that system operators are granted appropriate incentives, in both the short and the long term, to increase efficiencies, especially energy efficiency, in system performance and to foster market integration; NRAs shall monitor investment plans of the TSOs and providing in its annual report an assessment of the investment plans of the TSOs (consistency with the Union-wide network development plan); NRAs shall monitor and assess the performance of system operators NRAs shall set or approve standards and requirements for quality of service and quality of supply NRAs shall ensure that TSOs make available interconnector capacities
Article 18 of Reg. (EU) 2019/943	Tariff methodologies shall reflect the fixed costs of system operators and provide appropriate incentives to them over both the short and long run, in order to increase efficiencies, including energy efficiency, to foster market integration and security of supply, to support efficient investments, to support related research activities, and to facilitate innovation in interest of consumers in areas such as digitalisation, flexibility services and interconnection
Article 17 of Reg. (EU) 2022/869	Possibility of granting project-specific incentives for high-risk projects to facilitate the implementation of high benefit projects for Europe. (For this NRAs shall set and publish their methodologies/criteria for investment evaluation and risk assessment (including specific risks of offshore grids for RES and high OPEX projects)

ACER facilitates the sharing of good practices and make recommendations

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ACER's work on regulatory incentives

Past ACER work:

- Recommendation on risk evaluation and incentives for PCIs (July 2014)
- Summary report on project specific risk-based Incentives (Oct. 2018)
- Position paper on incentivising smart Investments (Nov. 2021)
- Report on Investment evaluation, risks and incentives for energy network projects (June 2023)

Next steps:

- Practical support to NRAs in form of workshops, technical discussions
- ACER consultancy work on benefit-based incentives (2023/2024)
- Contributions to the next Copenhagen Infrastructure Forum (2024)

* https://acer.europa.eu/Publications/ACER_Report_Risks_Incentives.pdf

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Risk mitigation

Question 1: Do national regulatory frameworks provide sufficient mitigation of or reward for TSOs' risk in Europe?

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Return is not linked to individual project risks

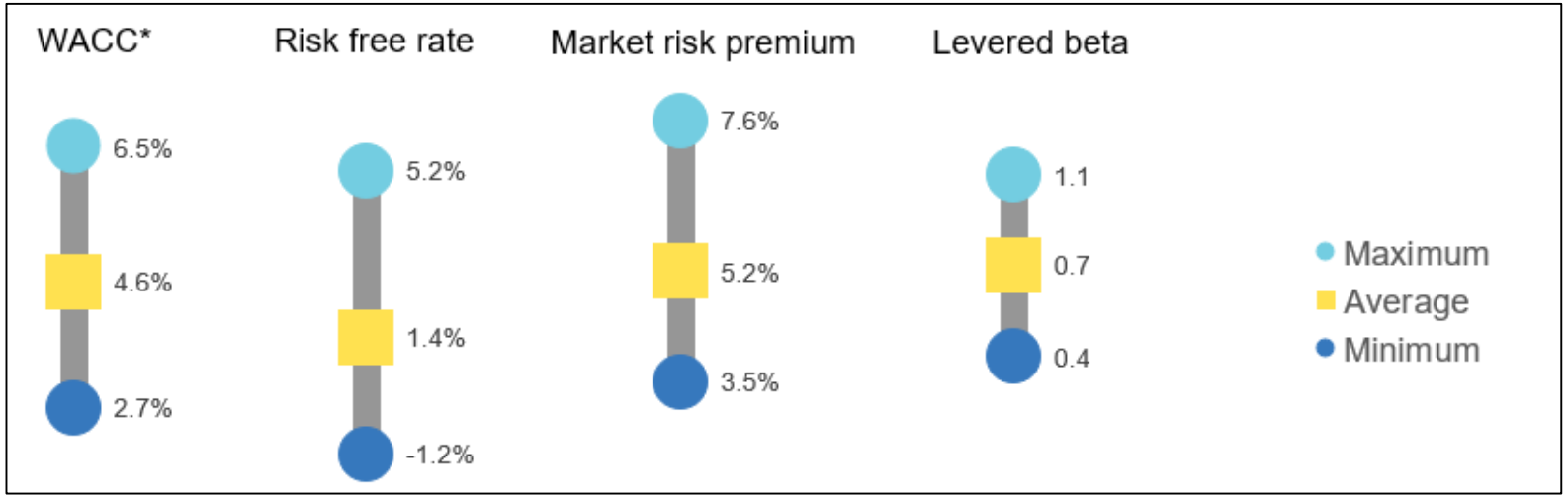
Typically, the same return is applied to all electricity transmission infrastructure projects in the country, irrespective of their individual risk profile or impact

- The national regulatory frameworks rarely differentiate in the treatment of projects based on specific project features; Few exceptions for high CAPEX (2), interconnection (2) or offshore investments (4):

	Measure
FR	Above € 30 million: bonus/penalty for difference btw. target vs. actual budget Interconnection: fixed bonus for timely implementation, bonus/penalty based on the difference btw. target vs. actual expenses and utilization of the infrastructure
GR	Above € 500 million: premium rate of return (in addition to WACC) for projects with significant economic impact (“MIP”)
RO	Interconnection: surplus to WACC due to high risks
BE	Offshore: specific depreciation periods, potential additional remuneration if higher risks
DE	Offshore: Grid operators can apply compensation payments for grid connection costs for offshore wind farms. OPEX and CAPEX are determined annually and reflected in the levy.
IE	Offshore: Treated case-by-case
NL	Offshore: Different WACC, costs before commissioning considered in the determination of the annual TSO revenues

CAPM model to find risk/reward balance

- **Most Member States (23/25) apply the Capital Asset Pricing Model** ('CAPM') to assess and set an appropriate remuneration of equity:
  - calculates the expected rate of return based on the risk-free return plus a risk premium (beta x market premium; the cost of capital is a weighted average of the interest rate on debt and the expected rate of return on equity
- This model focuses on identifying the level of systematic risk for the overall transmission activity.
- The parameters for the **Weighted Average Cost of Capital ('WACC') vary in Europe**



Note: The comparison of the WACC values is not always straightforward due to their different format (i.e. nominal or real, pre-tax or not)

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Five risk categories differentiated

- **Investment in energy infrastructure projects entails different risks, which the regulatory frameworks can fully or partially mitigate for the TSOs**

- **ACER considers that all project risks can be grouped under 5 categories from the perspective of the TSOs**

a) Risks of cost overruns: The risk that during development, construction, operation or maintenance of a project, the actual costs turn out to be higher than the expected project costs (applicable when costs are approved ex-ante by NRAs).

b) Risks of time overruns: The risk that development and construction of a project takes longer than anticipated by the project promoters. This risk can translate into non-timely compensated costs for project promoters, depending on how investments during construction are treated.

c) Risk of underutilised or stranded assets: Stranded asset risk is the risk that an asset will underperform both in terms of availability or in terms of actual lifetime vs. regulatory lifetime, causing a potential reduction of revenues for the project promoter. Volume risk: The risk that the demand for the services of the project will unexpectedly decline (or will not rise to projected levels), due to reasons which are not under the control of the project promoters, potentially causing reduction of revenues for the project promoter.

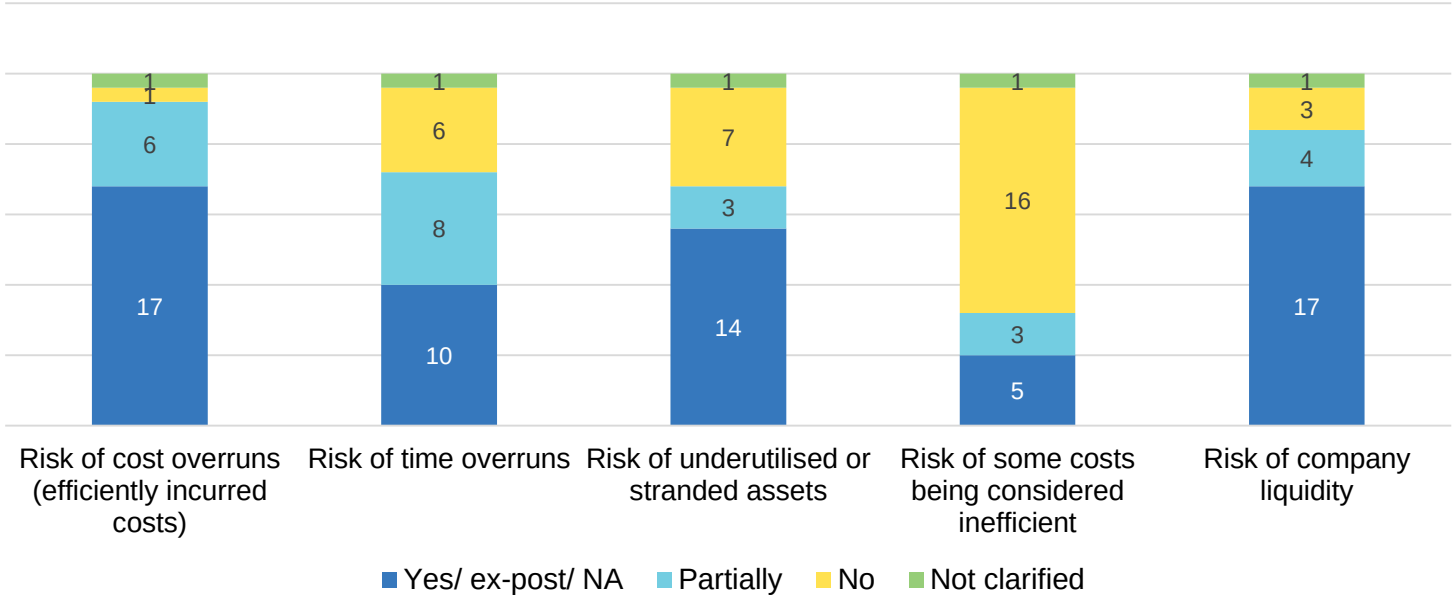
d) Risk of some costs being considered inefficient: The risk that costs are not considered as being efficiently incurred based on benchmarking or other measures (applicable when such measures are used by NRAs).

e) Risks of company liquidity: The risk that the project promoter will be temporarily faced with insufficient cash and/or cash equivalents to meet its financial commitments, for example because allowed revenues and expenditures are significantly not aligned in time. Liquidity risks may especially be a problem where projects have high expenditures compared to the allowed overall revenues of a project promoter.

TSOs' risk not appear as major barrier

The TSOs' risks are largely mitigated by the default national regulatory framework:

- the means of risk mitigation vary across the countries
- some risks are deemed marginal or intentionally left with the project promoters (to incentivise timely and efficient investments)



Risk coverage by the default national regulatory frameworks

Individual project risk mitigation or reward

ACER monitoring confirms that transmission projects are rarely delayed due to high risks or lack of rewards:

- The most frequent reasons for project delays are related to permit granting and public opposition;
- Very few requests were made by project promoters to the NRAs over the past decade for project specific incentives

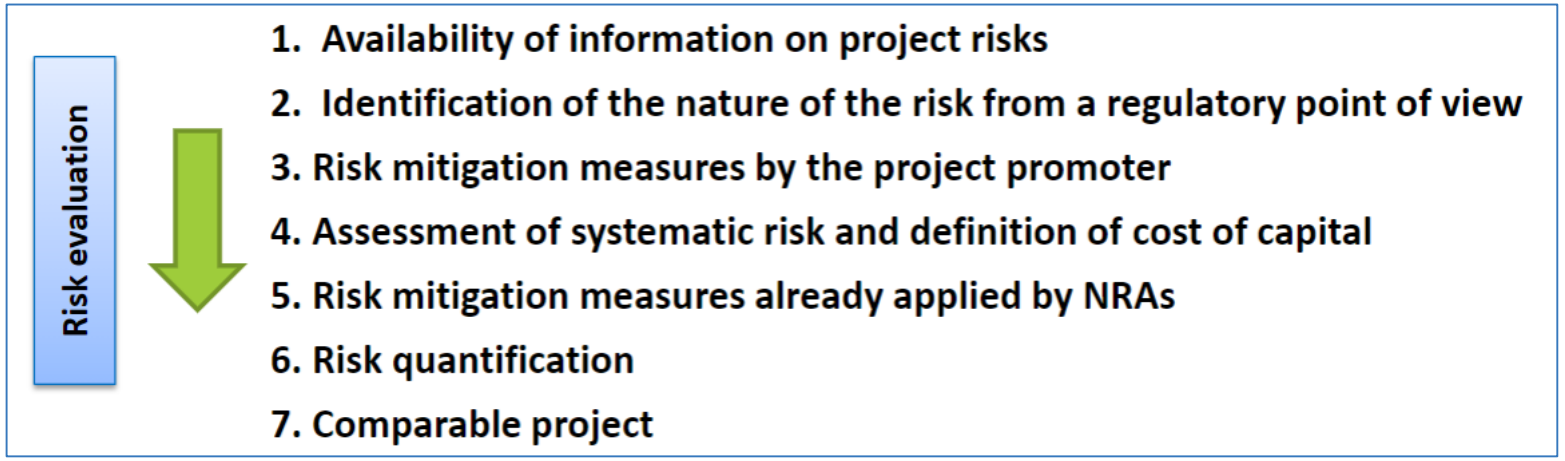
The Netherlands
PCI 1.5 Denmark — Netherlands interconnection between Endrup (DK) and Eemshaven (NL) [currently known as "COBRA cable"] – RISK RELATED
Year of claim/incentive: 2015 Claimed risks: HVDC subsea cable with specific risks caused by challenges of subsea environment. Accepted risks: The decision is based on the analysis of the claimed risk by the project promoter and other comparable subsea projects.
PCI 2.12 Germany — Netherlands interconnection between Niederrhein (DE) and Doetinchem (NL) – RISK RELATED (APPLICATION REJECTED)
Year of claim/incentive: 2015 Claimed risks: This project, as a PCI, was eligible to apply for incentives within the scope of Article 13 of Regulation (EU) No 347/2013. However, the project promoter did not demonstrate that the project faces higher risks than a comparable infrastructure project. The NRA therefore did not grant project-specific risk-based incent

Belgium
Modular Offshore Grid (non-PCI) – RISK RELATED (APPLICATION PARTLY ACCEPTED)
Year of claim/incentive: 2018 Claimed risks: Risk of time overruns; Risks of cost overruns, Liquidity risk; Risks due to contractors: Available offers for cables; Risk of stranded assets: Dismantling of the offshore turbines; Continuous modifications of the project; delays or bad quality of the Seabed Survey; Contractors quality of work. Accepted risks: Risk of time overruns; Risks of cost overruns: Offshore maintenance costs; Risk of stranded assets: Dismantling of the offshore turbines; Continuous modifications of the project; Contractors' quality of work.

Recommendations regarding the treatment of risks 1/2

ACER recommends NRAs

- To apply project-specific risk-based incentives only for projects where the default regulatory framework fails to already provide a fair and sufficient risk/revenue balance.
- To apply a common risk evaluation methodology:
  - considers the distinctive features of and the measures taken in the different national regulatory systems and encourages reasonable and transparent evaluation of risks



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Recommendations regarding the treatment of risks 2/2

ACER recommends NRAs:

- to compare the relevant parameters used for WACC (e.g. market-related risk) in the EU and to justify the use of outlier values
- to consider the following risk-mitigation measures:

Measure	Addressed risk
Adjustment for caps (ex-ante or ex-post) for innovative technology with higher costs incurred due to unforeseen events.	Cost overrun
Recognition of efficient costs from time overruns beyond promoter's control	Time overrun
Regulatory account (e.g. reconciliation of the deficit or surplus).	Volume risk
Benchmarking and similar measures (unit investment costs) for the identification of efficiently incurred cost. Anticipatory investments included into the RAB and connected assets unexpectedly are not built should still be considered efficient.	Risk of some costs being considered inefficient
Allowing revenues based on planned (stages of) expenditure or approving and including in the Regulatory Asset Base (RAB) efficiently incurred expenditures before commissioning of the project for a large project compared to the size of the TSO (combined with an ex-post adjustment based on economically efficient real values)	Liquidity risk

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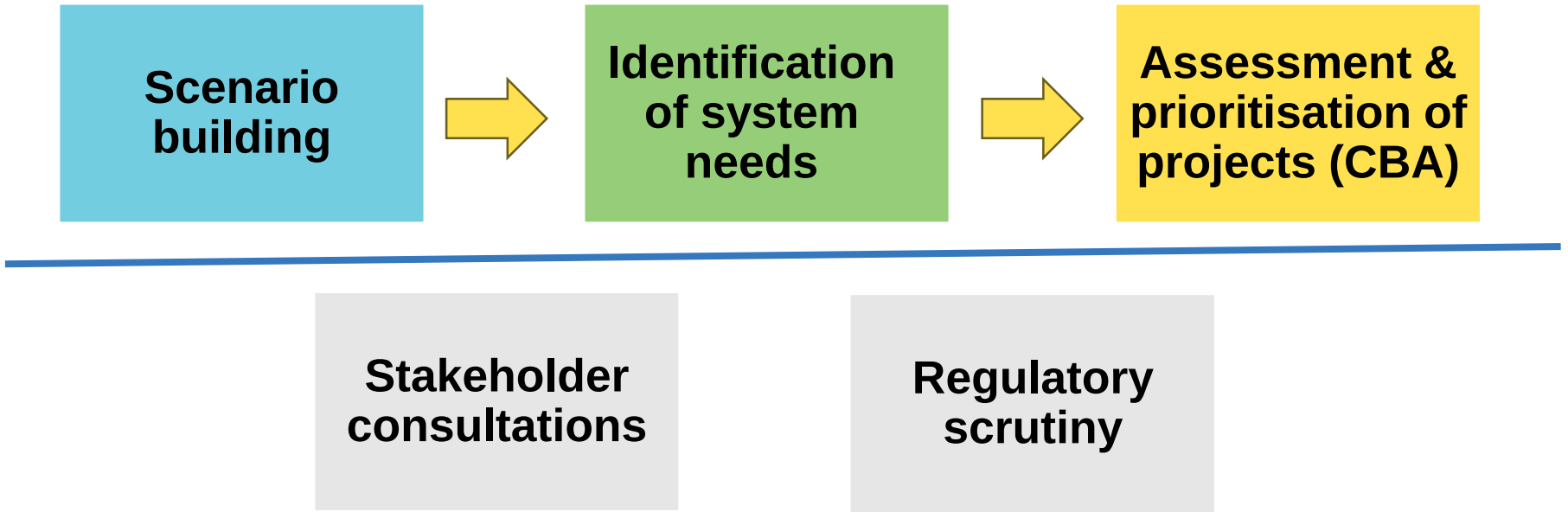
Infrastructure planning

Question 2: Do we have adequate infrastructure planning in Europe?

Infrastructure planning requires several steps

- **Infrastructure planning and its scrutiny may have important links to the design of regulatory incentives (and the need for them)**
- **Infrastructure planning is a multi-step and multi-actor process** (involving system operators, regulators and other stakeholders)



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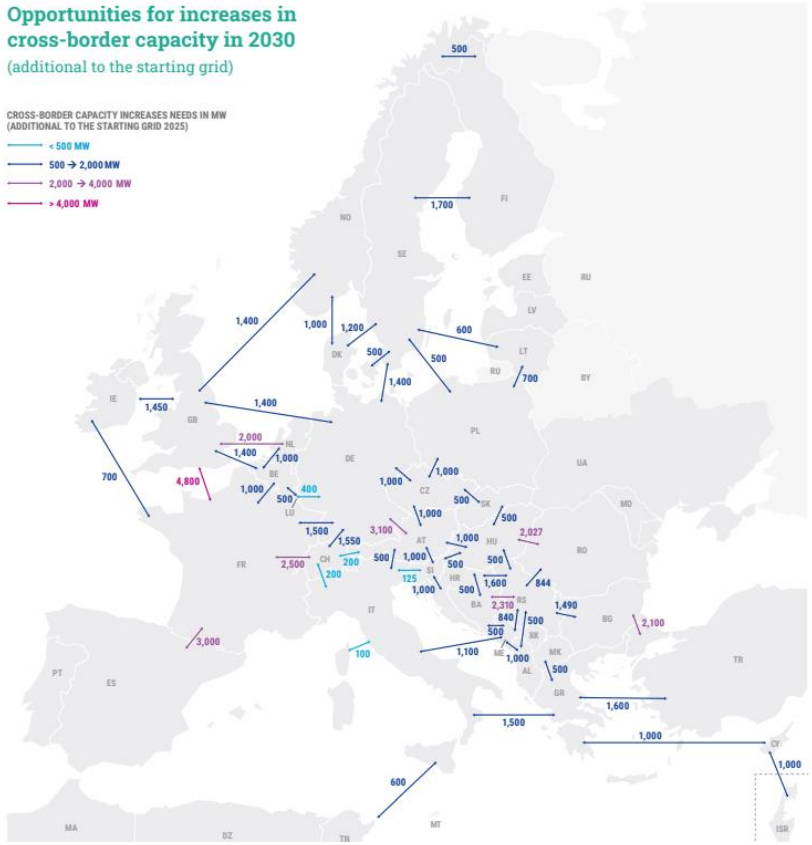
Needs of the system, including over the longer term, must be understood by the parties

- Infrastructure gaps identification **required by the TEN-E** (Articles 13 and 14) is an important step to for setting the right goals for network development in Europe.

- It foresees that **all relevant alternative <u>network development</u> options are considered** and favours the most efficient solutions to be prioritised

- Assessment of the investment needs is **often NOT in place or adequately developed in the national frameworks**



Source: ENTSO-E, 2022

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CBA is an important tool to make right decisions on network development projects

- **Cost-benefit assessment (CBA) evaluate, by using monetised indicator, whether a project is net beneficial to society** and **allows prioritisation** between project alternatives addressing the same need.
- **ENTSO-E's CBA Guideline (4th update) has made progress** over the past decade. However, out of the 11 benefit components proposed by ACER, still only 5 are monetised.*
- **In about half of the Member States a CBA is NOT performed for any project.**
  - *Note: individual project assessment may still be carried out, but it is only quantitative and/or qualitative.*

Table 2 – A proposal for future CBA updates (Source: Agency's evaluations based on inputs from Frontier's study)

Benefit	TYNDP 2012	TYNDP 2014	Post TYNDP 2014
Socio-economic welfare[10]	Monetary value	Monetise	Monetise
Variation in losses	Non-monetary value	Monetise	Monetise
Security of supply (load)	Non-monetary value	Quantify EENS in MWh and provide national VOLLs	Monetise
Variation in generation curtailments[11]	Initial analysis	Analyse options to monetise and monetise (if possible)	Monetise
Releasing national constraints[12]	Not included	Monetise (if possible)	Monetise
Future costs for new (avoided/delayed) generation investments	Not included	Monetise (if possible)	Monetise
Future costs for new (avoided/delayed) transmission investments	Not included	Analyse options to monetise (evaluate project by project)	Monetise
Optimisation of regulating power and ancillary services	Not included	Analyse options to monetise (evaluate project by project)	Monetise
Technical resilience (system safety margin)	Non-monetary value	Include as monetary value "insurance value" (if possible)	Monetise (if possible)
Social and environmental sensibility	KPI value	Analyse further options to quantify	Quantify and analyse options to monetise
Effects on competition and market power	Not included	Analyse importance of the effect	Evaluate project by project and monetise if important

Source: ACER position on ENTSO-E CBA, 2013

*ACER Opinion No 07/2023 on the draft 4th ENTSO-E Guideline for Cost Benefit Analysis of Grid Development Project, p.3-4
https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER_Opinion_07-2023_on_the_draft_4th_ENTSO-E_Guideline_for_Cost_Benefit_Analysis.pdf

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ACER recommendations to improve key planning instruments

ACER recommends TSOs

- to carry out detailed technical studies for the identification of the investment needs
- to discuss the results with stakeholders via (substantial) public consultations, making all relevant information (including the network and market datasets used for the studies)

ACER recommends NRAs

- to evaluate the investment gaps identified by TSOs or other stakeholders and make sure all identified.
- To establish and request TSOs to use a CBA methodology and pursue the monetisation of the most relevant project benefits at least for the assessment of high CAPEX projects

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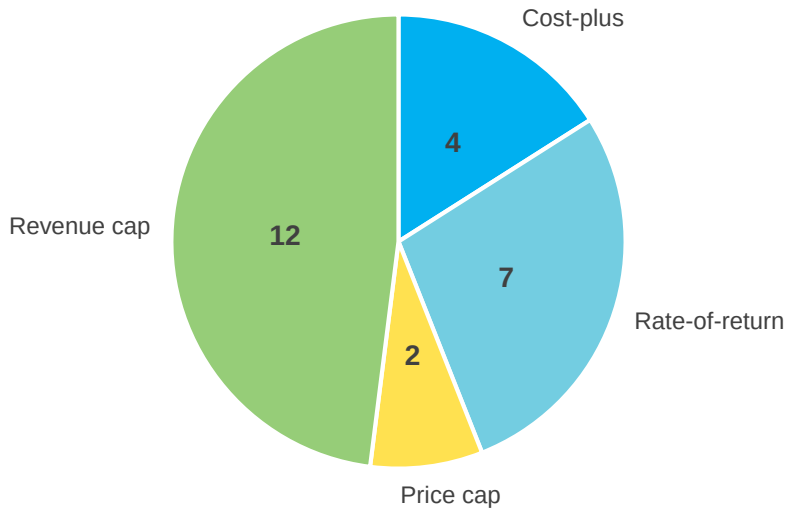
Regulatory incentives

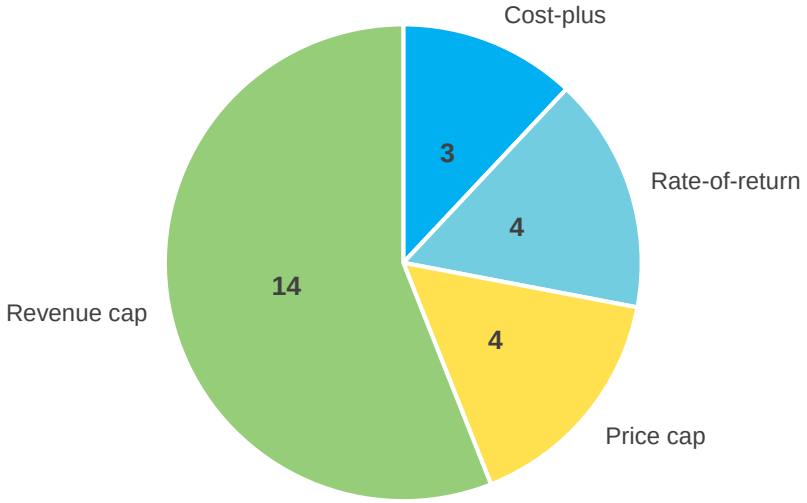
Question 3: Are the regulatory incentives fit for purpose in Europe?

Different practices in cost recovery by the national regulatory frameworks

- Regarding cost recovery (remuneration method), the regulatory frameworks split into two main categories: Cost-of-service regulation (cost-plus or rate-of-return) and incentive regulation (revenue cap or price cap).
- Incentive regulation is more frequent in the Member States: for CAPEX (about 55%), while for OPEX (about 70%).
- In most, both CAPEX and OPEX are subject to similar regime, but 25% of Member States (BE, CZ, FR, GR, IE, IT) apply different frameworks for CAPEX and OPEX, typically, cost-of-service regulation for CAPEX and incentive regulation for OPEX.



CAPEX



OPEX

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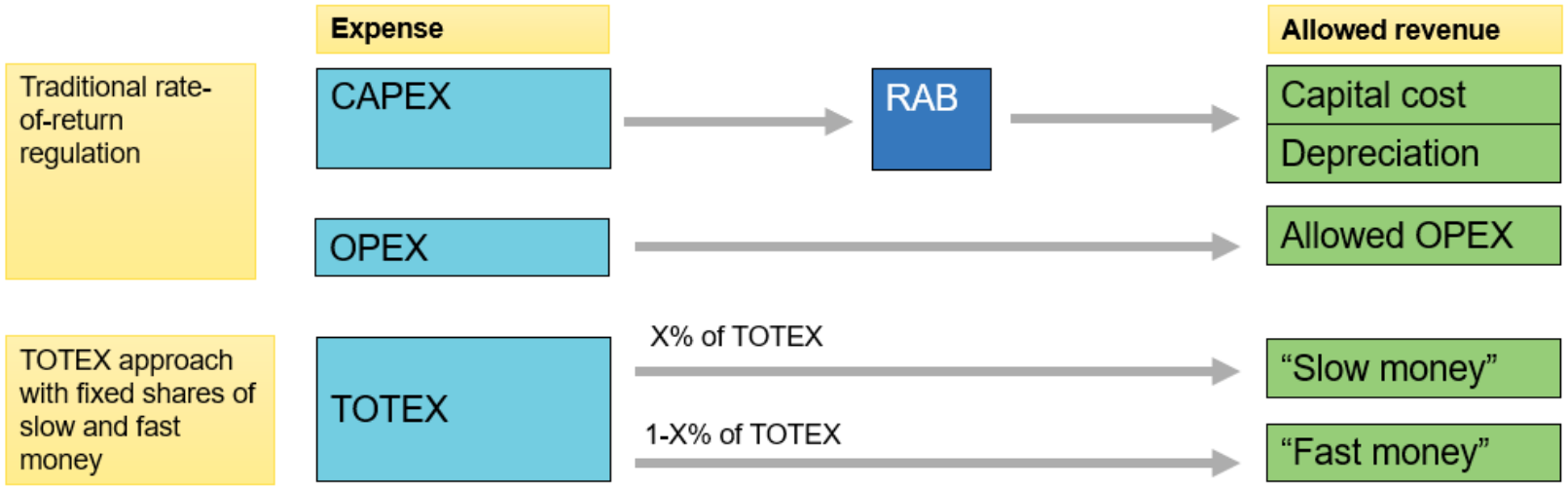
System operators may be biased due to the applied regulatory design

- Regulatory frameworks should ensure that the network is developed in an efficient way and TSOs do not face bias towards certain costs categories or technologies
- **CAPEX-bias** (i.e. preference for CAPEX-intensive solutions due to more favourable remuneration scheme and business interest) **is currently a prominent issue in Europe.**
- **TOTEX regulation has the potential to mitigate it**



TOTEX approach

TOTEX approach is applied/currently planned in a few Member States

- In Portugal, since 2022 a revenue cap regulation is applied to TOTEX, and an efficiency target is set to both CAPEX and OPEX components.
- In Italy from 2024 new expenditures will be shared according to CAPEX and OPEX rates to be set by the NRA (considering both CAPEX/OPEX historical shares and forward-looking estimates), instead of using actual CAPEX and actual OPEX. A more advanced implementation of the TOTEX regulation is expected from 2026.
- For Sweden, some considerations of a potential transition towards a TOTEX regulation in the future was reported by the NRA

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Regulatory incentives for network development

- Regulatory frameworks, often treat all projects alike, while continuous technological advancements are likely to offer **more cost-efficient solutions to reach the envisaged benefits/targets**
- **Systematically applied benefit-based or performance-based incentives can better align the interest of TSOs and society**
- ACER finds that in **several** Member States the **TSOs receive (benefit-based or performance-based) incentives** (including penalties and rewards) **targeting one or more specific objectives:**
    - to foster/increase cost efficiency, energy efficiency (reducing network losses); market integration; quality/reliability of supply; availability of network equipment; security of supply, deploy network-scale investments in non-traditional electricity transmission projects (e.g. dynamic line rating, devices to control power flows, high-temperature conductors); RES integration
    - NOTE: Some national practices are highlighted on the next slide
- In other Member States, the regulatory frameworks some of these objectives may be still implicitly pursued due to the general CAPEX and OPEX treatment (e.g. via revenue or price caps).

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Systematic benefit-based or performance-based incentives: various practices/solutions are applied/tested

ITALY

- reward if the actual CAPEX for an increase of transfer capacities (MW) is lower than the reference CAPEX for that boundary
- benefit-based reward for increases of cross-zonal transfer capacity
- incentive tools for quality of supply

FRANCE

- for interconnections a bonus or penalty, based on the difference between the project's target budget and actual investment expenses.
- for large projects, (i.e. over 30 million euro CAPEX) a bonus or penalty, based on the difference between the project's target budget and actual investment expenses.
- for the whole envelope of investments, a penalty scheme if the total actual cost is above 120% of the overall target budget.
- for non-grid investments: Cost efficiency on these investments (vs. target expenditures) is fully kept by the TSO

GREECE

- for interconnections and other major importance projects (MIPs), a WACC adder is set
- for major importance projects penalty (reduction of premium WACC) for delays
- plans to discontinue MIP incentives and develop incentive methodology related to KPIs

IRELAND

- General cost incentive
- Variety of performance incentives, such as:
  - Investment Planning and Delivery incentive
  - TAO Project Delivery incentive
  - Incentives for RES integration

SLOVENIA

- incentives for some transmission investments linked to KPIs
- incentive related to voltage quality
- efficiency factor for OPEX

PORTUGAL

TOTEX approach

Benefit sharing

- Incentive to improve technical performance

SLOVAKIA

- WACC+ for innovative investments

For more details, please refer to ACER report on investment evaluation, risks and incentives (2023), p.42-47

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Monitoring the efficient use of the existing grid and defining KPI-based incentives

ACER recognised the potential contribution of network key-performance indicators ('KPIs') in monitoring the existing grid and measuring the impacts and the benefits of TSO investments and consequently of KPI-based incentives (if any)

- Third of the Member States applies some KPIs to monitor the efficient use of existing infrastructure, and some of them are used for the purpose of providing economic incentives.
- Implementation of major KPIs in all Member States could facilitate harmonised setting of metrics and allow, to a certain degree, comparable results, taking into account the specificities among the individual Member States.

Table 11. Key performance indicators used for the monitoring the efficient use of existing electricity transmission infrastructure

KPI	Countries
Related to market integration, (e.g. transfer capacity between zones, or its unavailability)	IT, AT
Related to unavailability of network elements, system performance, continuity of supply (e.g. SAIDI, SAIFI)	EE, IT, IE, SE
Related to investment costs	IT
Related to costs/volumes of losses or system services	IT, IE, SE, AT
Related to generation curtailments (e.g. RES)	IT, FR
Related to security/continuity of supply (e.g. energy not supplied/withdrawn after interruptions, major outages, number of interruptions/ outages, etc.	IT, AT, SE
Related to the utilization of the grid, transformers (e.g. average load factor)	PT, SE
Voltage quality parameters	IT, FR
Compliance with deadlines and commitments to users (e.g. in connection agreement, meter repair, response to claims, publications, etc.)	FR, AT

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Recommendations on regulatory incentives

ACER recommends NRAs:

- To ensure that TSOs receive a **fair and sufficient remuneration** for their investments and face **no counterincentives** to most efficiently develop the network.
- Where CAPEX-bias is present, to mitigate it (primarily) with total-expenditure **(TOTEX) regulation**
- To ensure that the **investment gaps are addressed the most efficiently**; If current tools are insufficient, to **apply benefit-based incentives in a systematic way** linked directly to the measurable project benefits or major performance targets
  - to set them in a way to ensure the investment's value to the network user (not increasing the overall electricity cost);
  - to define ex-ante the rules and parameters of such incentives*
  - to consider to share (ex-post) part of the monetised benefits the investments brings to society with the TSO, which should be reassessed over time**
- To define and if appropriate, implement major performance indicators for monitoring the efficient use of existing infrastructure (may be also linked to regulatory incentives)

*to avoid any potential dispute and allow predicting economic impacts, aim to avoid exogenous parameters impacting the results
**the new performance level, once structurally achieved, should become a standard expectation, at which time the benefit sharing would stop.

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Summary

- Ambitious climate and energy targets **require more grid capacity**
- Development of energy infrastructure strongly **depends on the national regulatory frameworks**.
- The **TSOs' risks are largely covered** by the regulated regime and not deemed as a major barrier to network development
- Focus should be on how to identify cost-efficient/high value, but currently "**missing" solutions/project**
- **Investment needs identification** is important and national efforts should be increased
- Regulatory frameworks should provide the **right incentives for efficient network development** and ensure that TSOs do not face bias towards certain costs categories or technologies.
- **TOTEX regulation and benefit-based incentives (incl. benefit sharing)** appear as tools with great potential to align the interest of TSOs and the society.

Thank you.
Any questions?

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European Union Agency for the Cooperation of Energy Regulators

info@acer.europa.eu
acer.europa.eu
@eu_acer
linkedin.com/company/EU-ACER/

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Useful links

Report on Investment Evaluation, Risk Assessment and Regulatory Incentives for Energy Network Projects (June 2023):
https://acer.europa.eu/Publications/ACER_Report_Risks_Incentives.pdf

ACER Position on incentivising smart investments to improve the efficient use of electricity transmission assets (Nov. 2021):
https://acer.europa.eu/Official_documents/Position_Papers/Position%20papers/Position%20Paper%20on%20infrastructure%20efficiency.pdf

ACER-CEER Position on Improving the Regulation on Guidelines for Trans-European Energy Networks (March 2021):
https://www.acer.europa.eu/Official_documents/Position_Papers/Position%20papers/ACER_CEER_TEN_E_2021.pdf

CEER Status Review Report on Regulatory Frameworks for Innovation in Electricity Transmission Infrastructure (Oct. 2020):
https://www.ceer.eu/documents/104400/-/-/8c2aace7-5601-8723-4d45-337073af38d5

ACER Summary Report on Project Specific Risk Based Incentives (Sept. 2018):
https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER-summary-report-on-project-specific-risk-based-incentives_2018.pdf

ACER Recommendation No 03/2014 on incentives for PCIs and on a common methodology for risk evaluation (June 2014):
https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2003-2014.pdf