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CEER Report on Regulatory Frameworks for European Energy Networks 2023

Annex 6

General case study

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1. About this annex

Since the Regulatory Frameworks Report (RFR) was revised in 2018 (it was previously referred to as the Investment Conditions Report), its objective has always been to explain how the regulatory systems of participating countries work and to present key regulatory and financial figures. These descriptions form the content of the second section of the RFR.

So that the report does not become too long and cumbersome to read, each participating country's regulatory authority (NRA) has a maximum of five pages to describe its national regulatory system. This usually eliminates the option to supplement explanations with diagrams, charts and tables. The national case studies (NCS) in Annex 5 give the NRAs the possibility of showing, without limitation, how each country's regulation works. They include sample calculations and tables that enable the reader to better understand the regulatory system described.

One important quality of the RFR itself, and also of Annex 5, is the neutral depiction of the regulatory systems. Although it becomes clear that the individual NRAs use the same or similar regulatory instruments, no comparisons are made between the countries' regulatory systems, their instruments or key figures.

Following the creation of Annex 5, the idea of contrasting the implementation of regulatory instruments nevertheless remained, although not for assessment purposes. Even though a toolbox of regulatory instruments already exists, some instruments are used and weighted differently. It was important to the authors of the report to show the different ways the regulatory instruments are used, and for that reason, Annex 6 has been created to generate the description and assessment of a general case study (GCS).

In the next section, the structure and objective of the GCS is described, followed by a section that should enable a better understanding of the GCS's current weaknesses. The German values are then discussed as a basis for comparison, followed by assessments of the participating countries, including direct comparisons with the German values. The GCS concludes with a summary and outlook.

2. Structure and objective of the annex

A fictional German electricity distribution system operator (DSO) was used as the basis and given realistic but fictitious values for its fixed assets, regulated asset base (RAB) and return on equity and debt. The questions and content to be filled out are based on the German regulatory system but also leave room for further elaboration. Each participating NRA receives the allowed revenue calculated for the fictional DSO, which corresponds to the revenue the DSO would be allowed if it were regulated in the NRA's own country. The corresponding results of the DSO under German regulation are listed next to this figure, which makes it possible to compare the effects of different regulatory systems' basic structures. As for the RFR itself and for the NCS, no assessment of the individual regulatory systems is conducted.

The GCS uses an Excel file with a total of 12 sheets that are listed and described below.

1. Overview: entering metadata and overview of the file;
2. Introduction: description of the procedure and list of regulatory elements of milestones;
3. General aspects: list of questions about the main facts, depreciation, RAB and weighted average cost of capital (WACC);
4. Cost parameters: fictional cost over an observed time period;
5. Asset lifetimes: real lifetimes of fictional tangible fixed assets;
6. Tangible fixed assets: calculated depreciations;

7. RAB calculation: residual values of fixed assets linked to the balance values;
8. WACC calculation: WACC overview, cost of equity, cost of debt;
9. Revenue calculation: operating expenditure (OPEX), capital expenditure (CAPEX), allowed revenue, the German results in comparison;
10. Asset data differences: where are technical differences in the assets groups per country?;
11. Specific regulatory treatment: other regulatory instruments not included in the GCS; and
12. Index rows: which index rows were used to calculate depreciation?

Sheet "3_General_aspects" plays a major role in the GCS. By answering the questions asked in this sheet, most of the remaining Excel file is filled out synchronously. If it is not possible to answer the questions pertaining to the German regulatory system, other values can be entered to still generate a result.

The objective of the GCS is to gain further insight into various regulatory systems of European NRAs. In terms of content, only a narrow range of topics that exist at all participating NRAs can be compared. Each individual regulatory system also contains other instruments that likewise have an impact on the allowed revenues. These individual instruments thus have a supplementary character in the GCS. The GCS is one part of the RFR, NCS and GCS triangle.

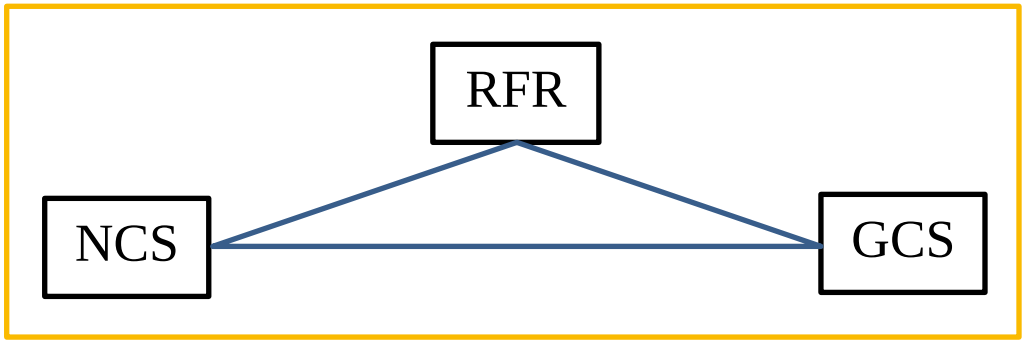

Figure 1- RFR, NCS and GCS triangle

Each of the three elements contributes in its own way to the presentation of the participating countries and their regulatory systems.

Even the combination of all three elements does not provide a complete picture of a regulatory system, but rather the reader is supposed to gain insight and a general overview. The respective NRA can explain details in response to direct inquiries.

3. Weaknesses of the GCS

Concrete examples of difficulties in comparing the individual GCS include:

- By orienting towards the German regulatory system, all participating NRAs must attempt to describe their regulatory system through their answers to the questions in the GCS. Depending on the country, this works well sometimes and sometimes it does not;
- Not all prescribed cost parameters are available in the participating countries and there are also other cost parameters that are not listed in the GCS. These cost parameters can be named, albeit without specifying their size and thus without any quantitative consideration;
- The asset lifetimes can differ from those in the country's own regulatory system, which in turn leads to different depreciation values;
- The RAB and the individual elements of the WACC can vary between the participating

countries; and
- Generally speaking, the GCS cannot provide a full picture of the German regulatory system or any others. Assumptions and simplifications must be made to obtain a compact case study.

As mentioned previously, additional fields were created to point out deviations that exist between the various regulatory systems. However, these supplementary fields cannot completely eliminate the difficulties described above.

4. German values as the data basis

In general, the description of the German regulatory system is classified as complex due to its more detailed legal basis. Special system features that are listed include the following:
- The system does not use WACC;
- There is a limit on funding through equity; and
- And a distinction is made between older and newer assets.

When calculating depreciation, the German system distinguishes between older and new assets. Assets that pre-date the year 2006 are recorded at 60% of their historical purchase and production costs. The remaining older assets are listed at the cost of replacement.

Newer assets are recorded at their full historical purchase and production costs. An asset's lifespan in the regulatory framework is typically longer than when it is considered from an economic perspective.

The German regulatory system uses the average values from the opening and closing balance sheets for determining the RAB. With the RAB, a distinction is also made between old and new assets.

No WACC is used with regard to the rate of return (RoR), whereas with the RoR on equity, a distinction is made between old and new assets. There is also an upper limit on funding through equity, beyond which a lower RoR on equity applies. The interest applied on borrowings is accepted as long as it is customary for the market.

The fictional German DSO's costs consist mainly of OPEX and CAPEX in the total expenditure (TOTEX). OPEX essentially comprises personnel and material costs and CAPEX consists mostly of depreciation and the allowed profit.

In addition to OPEX and CAPEX, there are other cost items (e.g. trading taxes) and cost-reducing revenues that are to be included in calculating the TOTEX. Other instruments in the German regulatory system include:
- A prescribed list of cost items that are charged to the network operators with no deductions from the revenues;
- Immediate addition of investments to the allowed revenue;
- The results of the efficiency benchmarking and the efficiency bonus influence the future approved costs;
- Parallel calculation of efficiency scores with age-adjusted and non-age-adjusted network elements;
- A simplified procedure for small network operators;
- A productivity factor to take the network sector's productivity development into account in comparison with the overall economy; and
- A quality element as a bonus/penalty system that rewards or penalises based on the

individual degree of coverage quality.

The interaction of all these instruments and the rules for determining values make the German regulatory system complex.

5. Other NRAs' values

5.1. Austria

The Austrian regulatory system for electricity DSOs in its current form was introduced in 2019. It features revenue cap regulation on OPEX. CAPEX is subject to a different incentive system similar to cost-plus regulation. They are adjusted annually with an efficiency-dependent return. Thus, they are tracked and compensated as they arise.

The system of individual efficiency-dependent WACC grants the average WACC to DSOs with average efficiency scores. More efficient operators receive higher WACCs and less efficient operators receive lower ones (for a more detailed explanation, please refer to Annex 5). This system applies for assets acquired up to 2016. A uniform WACC applies to all investments (net of customer prepayments) made in 2017 and 2018. For investments made from 2019 onwards, this rate will be increased by a mark-up to encourage investment. It should be explicitly noted here that the system of the individual efficiency-dependent return and the mark-up for investments during the regulatory period (RP), which increases the WACC to 5.20% p.a. for new assets, cannot be taken into account in the GCS.

The costs of equity are similarly high compared with German regulation. Depending on the result, the WACC efficiency bonus can cause an increase in the profit allowance. The allocation of CAPEX is comparable with the German system. The difference in the allowed revenues results from the fact that remuneration is not added for electricity feed-in by operators of distributed generation plants, according to renewable energy law, which is different from the German system.

Furthermore, there is no difference between depreciation periods in the regulatory system and in an undertaking's financial statements, and no distinction is made between old and new assets when assessing the value of fixed assets. All assets are valued at the historical acquisition and production costs.

Technical features, other cost items and additional regulatory instruments (apart from the efficiency-dependent return) were not mentioned.

It is worth mentioning that the regulatory system currently in force is valid until the end of 2023. Therefore, the NRA will soon revise and modify the regulatory system for electricity DSOs.

5.2. Greece

The Greek regulatory framework for the calculation of Allowed Revenue and Required Revenue for the Electricity DSO was amended in 2021, where the following modifications took place:

- Establishment of a 4-year regulatory period,
- Distinction of OPEX to controllable and non-controllable costs
- Introduction of an OPEX efficiency incentive mechanism for controllable OPEX,
- Introduction of WACC premium for Projects of Major Importance,
- Introduction of incentives to limit network losses
- Introduction of incentives for quality efficiency (to be applied)

- Modification of the calculation of working capital based on "lead-lag" approach.

Furthermore, a regulatory tool is developed to facilitate the calculation of allowed revenue and required revenue and enhance transparency.
For the calculation of the depreciation, the historical acquisition and production costs are used. Even though there is a provision in tariff methodology to differentiate regulatory and accounting asset lives, in practice there is no distinction between these lifetimes (as ranges per asset category). Due to a regularly five-year revaluation (being conducted by DSO according to IFRS), differences in the lifetimes could be found.
For the calculation of the RAB, the closing balance is used.
There is a provision for national gearing ratio and the accepted range is 45% - 60%. For the first Regulatory Period (2021 - 2024) in order to increase the gearing gradually, the gearing ratio has to reach the 40% level at the end of the RP. Also, according to the Methodology and in order to ensure capital adequacy in undertaking the regulated activities, the network operator's gearing ratio cannot be greater than 0.7.
The formula to determine the Cost of Equity was extended by a Country Risk Premium which is 1.5%.
For the first Regulatory Period no cost of debt and no debt premium was taken into account.

5.3. Spain

The Spanish regulatory system was last modified in 2020. Particular features of the Spanish system are that it is based on investment reference values and that the way for calculating the RAB depends on the asset's commissioning year. For assets built up to and including 2014, the RAB is set at replacement cost. For assets built between 2015 and 2018, the RAB is calculated as the average between audited costs and investment reference values. For assets built in or after 2019, the RAB is calculated considering the audited costs, with some limits. Replacement costs and audited costs have been assimilated to current values and to historical acquisition and production costs, as defined in the Excel form, in order to allow the CAPEX comparison with other countries.

There are considerable differences in the composition of OPEX and CAPEX in comparison with the German system. DSOs do not purchase electricity in Spain. Interest (cost of debt) is not considered as OPEX. Furthermore, OPEX is lower in Spain than in Germany because functions carried out by DSOs in Germany are performed by the transmission system operator (TSO) or other actors in Spain. Nevertheless, Spanish DSOs perform other regulated tasks, such as metering, contracting, invoicing and managing non-payments; attending telephone calls, grid planning, etc., which are included in the OPEX. OPEX also includes a remuneration for extending the regulatory lifetime of assets. The revenues for these components have been estimated and included into the term "other (individual) OPEX". The comparison between countries is challenging due to these differences in functions.

Technical features in Spain are: different voltage level ranges, and different classifications of the asset groups with regard to their lifetimes.

Various incentive schemes are listed as further regulatory instruments, designed to:

- Aim for efficiency in the cost of developing other regulatory tasks;
- Reduce electrical losses and reduce fraud;
- Improve the quality of the power supply;
- Control investments;
- Extend asset lifetimes; and
- Remain within defined economic and financial ratios (to promote an adequate economic and financial capacity).

Support is also provided in the implementation of innovations. Assets under construction, intangible fixed assets and current assets are not included in the RAB.

5.4. Sweden

The Swedish regulatory system for electricity in its current form was launched in 2012 and was last modified in 2018, for the RP 2020-23. There are many DSOs in Sweden, which is why an efficiency benchmarking was conducted for OPEX.

In the assessment of assets, no distinction is made between old and new assets, but rather the assessment is made on current values.

The lifetimes for calculating depreciation are assessments of the technical lifetime of the assets and are most likely longer than the book values. When determining the RAB there are also deviations from book values. Here, a compiled cost catalogue is used instead.

Lower allowed profits are calculated for CAPEX, which might be the result of the valuation method of the RAB. In previous RPs, the network operators have appealed the WACC, and the court has raised it compared to the original decisions.

Further regulatory instruments include:

- Additional CAPEX when assets are still in use after the end of their lifespan;
- Additional incentives based on network losses, average load in the grid and interruptions that can give ± 33% of the return based on performance;
- The possiblity to add some work and material expenses to OPEX; and
- Compensation for outages between 12-24 hours are included in the revenue cap.

6. Summary and outlook

This annex describes the GCS as a supplementary part of the RFR (in addition to Annex 5 of the report – NCS). The aim of the GCS is not to provide a complete description of individual regulatory systems or to assess different regulatory systems as regards content. There are historical and substantive reasons for how each regulatory system is designed, hence the GCS shows how similar instruments are used individually within the framework of regulation. Fictitious sample figures can be used to make numerical comparisons, though only to a limited extent with regard to content. It is important to reiterate that the euro values found in the study are fictional and must not be used for other analyses.

The table below provides the WACC (components) of the GCS.

Country	Cost of equity	Cost of debt	WACC	Real/ nominal	Pre-/post-tax
DEU	6.91%	-	-	-	Pre-tax
AUT	8.16%	2.7%	4.88%	Nominal	Pre-tax
GRC	8.36%	4,11%	6,70	Nominal	Pre-tax
ESP	6.40% (post-tax) 8.53% (pre-tax)	2.63% (pre-tax)	5.58%	Nominal	Pre-tax
SWE	4.37%	2.34%	2.35%	Real	Pre-tax

Table 1 – WACC (components) of the GCS (Sweden)

Looking at the results, it can be said that the fictional calculation of the OPEX, CAPEX and the allowed revenues using the German regulation leads to the highest fictional allowed revenues compared to other participating countries (focused on the common regulatory corridor).

The fictional allowed revenues of Austria are the lowest among participating countries, but similar to those in second and third place. Sweden and Spain's fictional allowed revenues are between Germany and Austria's.

Looking at the fictional OPEX, Germany has the highest amount, followed by Sweden. Spanish regulation calculates the highest fictional CAPEX, followed by Germany and Austria in second place, with similar results. Fictional Swedish CAPEX is the lowest among participating countries.

Nevertheless, it remains important to emphasise that the GCS does not show a regulatory system in its entirety, and can only provide insights. Only content about topics that are common to more or less all of the regulatory systems in the study can be compared. Furthermore, each regulatory system contains other individual elements, which means that detailed questions must be addressed to the respective NRA.

The GCS is a living document that can develop over time and hence there may be changes to its content and documents in the future.