Regulation and monitoring of investment activities of regulated companies
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Regulation and monitoring of investment activities in regulated companies

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<tr>
<td>ANRE</td>
<td>National Energy Regulatory Agency, Moldova</td>
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<td>CAPEX</td>
<td>Capital expenditures</td>
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<td>CER</td>
<td>Commission for Energy Regulation, Ireland</td>
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<td>DSO</td>
<td>Distribution System Operator</td>
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<td>EARS</td>
<td>Energy Agency of the Republic of Slovenia</td>
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<td>EC</td>
<td>European Commission</td>
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<td>ECT</td>
<td>Energy Community Treaty</td>
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<td>ENTSO-E</td>
<td>European Network of Electricity Transmission System Operators</td>
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<td>ERO</td>
<td>Energy Regulatory Office, Kosovo</td>
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<td>EU</td>
<td>European Union</td>
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<td>FIRR</td>
<td>Financial internal rate of return</td>
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<td>FNPV</td>
<td>Financial net present value</td>
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<td>HERA</td>
<td>Croatian Energy Regulatory Agency</td>
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<td>IRR</td>
<td>Internal Rate of Return</td>
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<td>NCC</td>
<td>National Control Commission, Lithuania</td>
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<td>NPV</td>
<td>Net Present Value</td>
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<td>Ofgem</td>
<td>Office for Gas and Electricity Markets, UK</td>
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<td>OPEX</td>
<td>Operational expenditures</td>
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<td>RAB</td>
<td>Regulatory Asset Base</td>
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<td>RIIO</td>
<td>A regulation model linking Revenues to Incentives, Innovation and Outputs</td>
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<td>TAO</td>
<td>Transmission Asset Owner</td>
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<td>TSO</td>
<td>Transmission System Operator</td>
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<td>UK</td>
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Executive summary

This report is prepared by INOGATE in providing assistance to the National Energy Regulatory Agency (ANRE) of Moldova. The main objective of this report is to assist the ANRE in understanding the rules and practices applied in EU member states for assessing investments to enable the Regulator to develop the necessary guidelines and reporting requirements that the regulated entity must provide to enable the assessment of the submitted investment proposal by the Regulator.

The report reviews the main driving factors behind infrastructure investments in European Energy Markets, analyses the approach of different pricing methodologies and their effects in approving and monitoring capital investment projects, provides examples of some of the means used by Regulators to appraise investments and summarises approaches used in various EU and ECT countries to regulate investments. Finally, the report reviews ANRE’s current draft policy governing the regulation of investments and provides proposals and recommendations for updating the current procedures used by ANRE.

The report consists of an introduction, 4 chapters (the last chapter includes recommendations), list of references and 2 annexes, providing real examples from the EU and ECT countries on the relevant issues.

The 2nd chapter shows the driving forces behind investments into the network assets. The main differences between transmission and distribution companies are described and different objectives of investments in these activities are explained. As the main aim of liberalisation and integration of the EU electricity markets is a creation EU-wide electricity market, it requires significant increase of investments into the grids, both national and international (cross-borders). All EU transmission system operators are oblige to prepare 10-year development plans, the plans must be approved by the national regulatory authorities.

The main difference between investments into transmission and distribution networks is that usually there is only limited number of investments in the transmission networks with big budgets and long planning periods, and there is a large number of investments into the distribution networks with lower investment volumes, shorter planning periods and strong relationship with the local demand.

The 3rd chapter of the report shows that different regulatory regimes have different impact on investments. Two the most popular pricing approaches: rate of return (or cost-plus) and incentive pricing are discussed. Under the rate of return regulation prices are set on the basis of operating costs plus a return on capital and thus facilitating cost recovery and avoiding pricing above costs. Yet, as all costs are covered, incentives for grid operators to increase their efficiency in service provision are limited. The emphasis on cost recovery in rate of return regulation is the source of the concern that companies may not operate efficiently. For example, if the regulator allows a rate of return that is higher than what the company actually needs to ensure that shareholders continue to provide capital for investment, the
company could increase its returns to shareholders by making unnecessary investments (if the regulator does not catch the company doing so). This is called the Averch-Johnson effect.

Thus in the EU member states incentive pricing methods are used. The most prominent forms of incentive regulation are price cap and revenue cap regulation where an upper limit on the price or the revenue of the grid operator is placed for a certain longer period of time (usually, five years) and the regulated company has incentives to gain better returns by improving its efficiency. The price (revenue) cap regulation has its drawbacks when we speak about investments. There are potential under-investments as company wants to save costs and receive higher returns, investment incentives strongly depend on the design of the regulatory model and it requires supplementary quality regulation. Indeed, under a price cap, the firm may be able to increase profit by reducing costs without regard to service quality, particularly if it is difficult for consumers to directly discern delivered service quality levels.

Investments could be differentiated according to the following categories: extension investments, asset replacement expenditures, exceptional investments, e.g. resulting from new legal obligations. This classification should facilitate the regulator’s assessment of the investment’s projections, e.g.:

- for the capacity extension, the regulator can check whether the data are consistent with the formal investments approvals that have been given to the business and/or study the major extension investment drivers;
- for the replacement category, the regulator can determine perhaps on the basis of comparison with similar investments in previous years, cumulated available depreciation volumes, asset age structure and other supporting information supplied by the business, whether the levels of proposed investments are reasonable; and
- for the exceptional investments, the regulator can check whether any such investments, are actually required.

Ex-post assessment may be undertaken to supplement the ex-ante investment reviews. In this way regulators aim to identify differences between the capital expenditures allowed in the ex-ante review and the actual investments undertaken by the regulated company.

There are several main types of criteria that can be used by the regulator to assess whether the capital expenditure should be included in a network operator’s RAB and hence allowed for in the revenue stream allowed under the price regulation. The main types of criteria include engineering models, total cost benchmarking and standard cost approach.

This chapter provides also an overview of the approaches applied by various EU and ECT countries in calculating the Allowed Return on Assets. The Allowed Revenues of a regulated business include, among others, a return that the company is allowed to recover in order to compensate their debt and equity holders for the return and risk they assume in financing the assets with which the regulated company provides regulated services.
The 4th chapter of the report reviews the practices of UK, Ireland, Croatia, Slovenia, Kosovo and Lithuania in regulating investments in the energy sector. The main differences between the practices of the countries investigated and the current practice by ANRE can be summarized as follows:

- The countries investigated apply multi-year incentive based regulation. The capital investment plans are approved for the length of the Regulatory Period which may be 3 years (in Croatia\(^1\)), 5 years (in Ireland and Kosovo) or 8 years (in the UK). ANRE applies Rate-of-return regulation for a period of one year.
- The investment plans of the countries investigated above generally stem from the approved Development Plans which cover a prolonged period of time. The Development Plans for Transmission System Operators (TSOs) cover a 10 year period (in line with EU Third Energy Legislative Package) whereas those of Distribution System Operators typically cover a period of 3 or 5 to 10 years. In contrast, the investment plans submitted to ANRE cover a one year period.
- The National Regulatory Agencies (NRAs) of the investigated countries tend to focus on the overall objectives of the investment plans and to ensure that the proposals submitted by the regulated companies meet the overarching objectives of the development plan and energy strategies. The focus of the NRAs is on large-scale infrastructure projects and on benchmarking the unit costs to ensure they fall within an acceptable range in comparison to relevant projects elsewhere. The legislation in Moldova obliges ANRE to review all capital investment projects in excess of 7,000 Leu which burdens the Regulator to a detailed analysis of relatively small investment projects.

The 5th chapter of the report analyses the draft document titled “Regulations on the principals of planning, execution and approval of investments in the energy sector when calculating tariffs” prepared by ANRE and comes with some recommendations. The aim of the Regulations is to establish categories of investments, procedures and criteria for the evaluation of investments, which are taken into consideration in setting of the regulated tariffs in the energy sector.

The Regulations define the evaluation criteria applied for the appraisal of the investment plans, they differ for different categories of investments. ANRE examines each of the investment projects included in the investment plan and determines whether the investment project is reasoned in accordance with this Regulation. After the approval of investment plans licensees start their implementation. ANRE checks implementation of the planned investments also.

The Ingate experts made a number of comments on the draft Regulations, among them: too many categories of investments, no description how the efficiency of investments is defined, no clarity when the approved investments are included into the Regulatory Asset Base, too excessive data requirements (for each single investment), etc.

\(^1\) The Croatian legislation states that the first Regulatory Period is 3 years whereas the next two will be 5 years each. Slovenia sets the length of the Regulatory Period on a case-by-case basis.
Finally, some further recommendations were made, including:

- ANRE must ask the licensees to submit long term plans, especially, transmission system operators (TSO) should be preparing for that as the 3rd Energy Package requires for them to prepare and submit ten year development plans. Distribution system operators (DSO) must also present at least five year development plans. The existence of such long term planning will help better allocate scarce resources and prioritise investments.

- ANRE could propose an amendment in the legislation allowing the regulator to treat small and big investments differently. Investments could be separated into those which require complex procedures under the public procurement legislation and the rest which do not require such procedures.

- Moldova following examples from other European countries should plan switching from the rate of return regulation to an incentive regulation. Such an approach would enable the Regulator to smooth-out the effects of large one-off capital investment projects as the depreciation and return allowances may be spread throughout the length of the regulatory period.

There are 2 Annexes at the end of the Report providing examples of the regulations of investments’ appraisal in Lithuania and Kosovo.
1 Introduction

This AHEF assignment is based upon a request submitted by the National Energy Regulatory Agency of Moldova. ToR for the assignment was approved by EC in July 2014 and work started in December 2014. The ITS team consisted of experts John Swinscoe, Ardian Berisha and Dr. Vidmantas Jankauskas, the last two of them carried out two missions to Moldova for information gathering and consultations with the beneficiary and stakeholders. The key contacts person by the Beneficiary was Mr. Lilian Barcaru. The draft report was presented to the Beneficiary at the end of March and the draft recommendations discussed with the relevant stakeholders on March 4, 2015.

The guiding principle during preparation of this Report and the two missions in Moldova was to give advice to ANRE on those issues described in the TOR of the Project and in addition those new issues encountered during the first and second mission.

The specific objectives of the technical assistance to the National Energy Regulatory Agency (ANRE) of Moldova according to the ToR were:

• Review the practises and procedures adopted in the EU but also in the countries members of Energy Community for assessing the relevance of investment proposals in terms of resulting benefits to both network users and final energy customers;

• brief the National Agency for Energy Regulation (ANRE) of Moldova on EU mechanisms for appraising investment plans with emphasis on the requirements for supporting investment costs and resulting benefits to consumers;

• develop recommendations for the revisions in secondary legislation to require the relevant information in the tariff submission to be presented by the applicant.

The methodology used in the assignment was an analytical study and a comparison of the existing approach to appraisal of investments of the regulated energy companies used in Moldova and the proposed draft regulations for the approval of such investments with those existing in the EU MS as also in the Energy Community Treaty countries.

During the first mission INOGATE experts at the seminar with the ANRE staff presented the best European practices in appraisal of investments into regulated activities and showed several examples from different EU and European Energy Community countries. Consultations with ANRE have revealed the main issues in approving investments by ANRE for the licensees.

During the second mission the main findings and recommendations were presented both to the applicant and to other stakeholders at a special seminar arranged at ANRE's premises. Positive responses were received from all participants and the beneficiary confirmed usefulness of the recommendations for improving the draft Regulations on appraisal of investments.
2 Driving factors for an increase of investments in distribution and transmission networks

2.1 Investments in energy networks

An investment is incurred when a business spends money either to buy fixed assets or to add to the value of an existing fixed asset. Three types of investments may be considered:

- Extension investments: all investments needed for meeting the change of load and generation patterns in the future;
- Replacements investments: all investments related to replacement of aged (technically or economically) equipment;
- Exceptional investments: investment resulting from e.g. new legal obligations. For example, if new labour safety rules require safety measures in substations or high voltage pylons, this probably leads to investments. These investments neither lead to more capacity nor replace aged components.

Some investments cannot be characterised as only one type of investment as given above, but could be allocated to two categories. For example, when an old transformer has to be replaced because of ageing, it could be decided to increase its capacity at the same time. In this case, the investment will be both for network extension and for replacement reasons.

To reduce over-estimation by the regulated companies, this approach should be followed together with an independent assessment of capital expenditure at each major review.

2.2 Transmission

Liberalisation of the electricity and gas sectors in the European Union (EU) with an aim of creation EU-wide electricity and gas markets requires significant increase of investments into the grids, both national and international (cross-borders). According to the estimates of the European ElectricityTransmission Systems Operators association (ENTSO-E) more than €100 million is needed to invest in new and upgraded electricity lines in order to meet EU’s energy market integration goals and connect new renewable energy generators. One goal (set in 2002) is to have a level of interconnection for each country at least equivalent to 10% of its generating capacity, to achieve trans-EU electricity infrastructure. This is far from being achieved now, but the above investment will bring it about for all EU countries except Spain.

According to the European Commission (EC) about €600 billion of investments are needed for electricity grids from 2010 until 2020. About one third of all investments, i.e. about €200 billion should go into the transmission grids. It is estimated that €100 billion of this total investment need will be delivered on time by the market alone, whereas the other €100 billion will require public action on permitting and levering the necessary private capital\(^2\).

The Ten Year Network Development Plan released by ENTSO-E in 2014 pinpoints about 100 spots on the European grid where bottlenecks exist or may develop in the future if

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\(^2\) European Commission. Memo 10/582. Brussels, 17 November 2010
reinforcement solutions are not implemented. Interconnection capacity must double on average throughout Europe by 2030. Total investment costs for the portfolio of projects of pan-European significance amount to €150 billion.\(^3\)

Two major European think-tanks – Frontier Economics and Consentec in their study prepared for the EC have identified three key drivers to this large investment programme in the electrical grids:

- First, if the 2020 carbon emissions and renewable targets are to be met, a very large amount of new generation will need to be connected to the EU transmission network. Given that a significant proportion of the most favourable sites for renewables generation are relatively distant from centres of load, this implies that there will be a need for significant volumes of new transmission infrastructure. In addition it is likely that a new wave of conventional generation will be constructed to replace an ageing European generation fleet that might not be located where existing plant are currently sited.

- Second, additional infrastructure naturally opens up markets to competition, as additional imports can compete with incumbent domestic generation. Increased interconnection presents a way, therefore, of reducing market concentration in any individual market, thereby facilitating competition.

- Third, increased interconnection improves security of supply. This is all the more important given that a large proportion of renewables generation that is likely to connect to the network is intermittent in nature. Improved interconnection is likely to reduce the costs of holding back up reserve to cover this intermittency\(^4\).

### 2.3 Distribution

The main difference between investments into transmission and distribution networks is that usually there is only limited number of investments in the transmission networks with big budgets and long planning periods, and there is a large number of investments into the distribution networks with lower investment volumes, shorter planning periods and strong relationship with the local demand.

According to the estimates of the EC out of planned €600 billion investments into the European electricity networks from 2010 to 2020 about two thirds will take place in distribution grids. By 2035, the distribution share of the overall network investment is estimated to grow to almost 75%, and to 80% by 2050\(^5\). European distribution system operators (DSOs) have to cope with demanding investment requirements, driven by distributed energy resources, quality of supply and smart grids:

- **Integration of distributed generation:** photovoltaics and wind installed capacity have increased significantly all over Europe. The greatest amount of

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\(^5\) European Commission 2011, IEA World Energy Outlook 2012 and European Energy Roadmap 2050
this renewable capacity is connected to the distribution grid. Network operators are obliged to perform extension investments, including the connection of renewables without delay, in order to ensure non-discriminatory connection and access to the network.

- **Maintaining quality of supply**: Assets that were built several decades ago are reaching the end of their investment cycle and need to be replaced. Quality regulation is common in many European countries.

- **Smart grids and smart metering**: A smart grid is an electricity network that can intelligently integrate actions of all its users to ensure a sustainable, economic and secure electricity supply. Rising shares of distributed generation and other distributed energy resources such as electric vehicles also create new needs to monitor and optimise networks. In addition, DSOs have been mandated to roll out smart metering in most European countries, creating additional investment and expenses for network operators. Finally, growing customer expectations, such as more frequent meter readings, might also require further distribution investments\(^6\).
3 Regulation of investments

3.1 Different pricing methodologies

The networks as natural monopolies are regulated in terms of price, entry and access regulation. Investments and innovation in the networks are not governed by market mechanisms as investment decisions do not rely on expected returns exceeding the cost of capital incurred. The under-investment in network infrastructures can aggravate the existing and new network challenges and risks facing the electricity systems.

The main role of an independent sector regulator is to act as the guardian of public interest. Hence, the regulator aims to ensure that network utilities provide network security while pricing the associated services efficiently and equitably. These goals should be consistent with satisfying a break-even (or budget-balance) constraint for the regulated networks by allowing them to cover the costs of providing adequate security while restraining their ability to create productive and allocative inefficiencies through market power. At the same time, the regulator is constrained to consider that the regulated charges are adequate to allow the networks to undertake new investments and innovation pertaining to network security while offering them incentives for maintaining and improving the production efficiency.

The calculation of an adequate rate of return, the determination of the regulatory asset base (RAB) and the depreciation of assets are major elements in any regulatory regime. The National Regulatory Authorities (NRAs) are aware that energy network infrastructure investors base their decisions on a wide range of relevant factors; including, for example, the time required for permitting processes or the stability of the regime over time.

Regulatory frameworks include of a variety of components that form a coherent package:
- the determination of the RAB (including, for example, the evaluation of efficient costs of assets, working capital, assets under construction etc.);
- the cost of capital (e.g. WACC);
- the depreciation rates;
- the inclusion of contribution from third parties;
- the treatment of under-recovery; and
- the pass-through of capital expenditures (CAPEX) for new investments.
- technical requirements, standards, compensations and incentives for quality of service.

Different regulatory regimes have different impact on investments. With regards to price regulation, two main principles can be distinguished: rate of return regulation (a form of cost-based regulation) and incentive regulation. The former sets prices on the basis of

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8 CEER Memo on regulatory aspects of energy investment conditions in European countries. 7 March, 2014.
operating costs plus a return on capital and thus facilitates cost recovery and avoids pricing above costs. Yet, as all costs are covered, incentives for grid operators to increase their efficiency in service provision are limited. Thus, incentive regulation is implemented within the EU.

Under the traditional cost of service or rate of return regulation the regulator reviews the operator’s overall price level in response to a claim by the operator that the rate of return that it is receiving is less than its cost of capital, or in response to a suspicion of the regulator or claim by a consumer group that the actual rate of return is greater than the cost of capital. Critical issues for the regulator include how to value the base, whether to add investments to the rate base as they are made or when the facilities go into service, the amount of depreciation, and whether expenditures have been prudently made and whether they relate to items that are used and useful for providing the utility service.

Prices under rate of return regulation are considered fair and reasonable because they give the company an opportunity to recover the costs it has appropriately incurred in providing gas or electricity service, and customers are protected from paying prices that would provide the company with monopoly profits. On the other hand, rate of return regulation is sometimes criticised for not providing companies incentives to operate efficiently and over-investments.

In performing this form of regulation, the regulator determines the appropriate amount for the company’s rate base, cost of capital, operating expenses, and depreciation. Based on these amounts, the regulator determines the amount of revenue the company needs to cover its operating expenses, depreciation, and cost of capital. The emphasis on cost recovery in rate of return regulation is the source of the concern that companies may not operate efficiently. For example, if the regulator allows a rate of return that is higher than what the company actually needs to ensure that shareholders continue to provide capital for investment, the company could increase its returns to shareholders by making unnecessary investments (if the regulator does not catch the company doing so). This is called the Averch-Johnson effect. However, rate of return regulation is also generally viewed as having the advantage of restricting opportunities for regulators to arbitrarily lower companies’ prices.

The most prominent forms of incentive regulation are price cap and revenue cap regulation where an upper limit on the price or the revenue of the grid operator is placed. Prices – or revenues – are set in advance for each regulation period whereas annual prices or revenues are adjusted subject to an X-factor which captures the cost changes the regulator assumes as a reasonable productivity growth. Besides this direct incentive to increase its productivity, the grid operator faces an incentive to cut costs below the set price as it is allowed to retain associated profits. Only at the end of the regulation period is the base price for the next period reset to the actual cost level of the grid operator. Typically this regulation period covers some 3-5 years. Figure 3.1 illustrates the two main price control methods.

9 M.Jamison. Rate of return regulation. PURC, University of Florida.
The price (revenue) cap regulation has its drawbacks when we speak about investments. There are potential under-investments as company wants to save costs and receive higher returns, investment incentives strongly depend on the design of the regulatory model and it requires supplementary quality regulation. Indeed, under a price cap, the firm may be able to increase profit by reducing costs without regard to service quality, particularly if it is difficult for consumers to directly discern delivered service quality levels.

3.2 Regulatory treatment of investments

Regulators have to recognise the importance to regulated service providers of recovering sufficient levels of costs. Failure to include adequate costs as part of the revenue requirements may discourage investments and deteriorate quality of supply. However, it is important that the regulated service provider does not incur excessive or unnecessary costs in providing services. The main issue to be considered in relation to the inclusion of capital expenditure into the regulatory asset base is what measure of new assets is appropriate to incorporate into the asset base at the beginning of the regulatory period.

There is information asymmetry present that must be acknowledged at the outset in relation to capital expenditure. The regulator will not accurately know the appropriate amount of capital expenditure required by the regulated service providers and often will rely on the regulated company to supply this information. In this case, there may be incentives for the regulated entity to inflate the reported capital expenditure relative to the true cost. Therefore, the investments may be examined from two perspectives: ex-ante and ex-post.

Ex-ante the regulator may conduct an assessment of the accordance and efficiency of a company’s proposed investment program for the forthcoming regulatory period considering future demand growth, asset configuration and any other relevant information. One option

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10 Determination of the regulatory asset base after revaluation of license holder’s assets. ERRA Issue paper. Kema, 2009
for capital intensive businesses would be for the regulator to ask the business to submit its capital expenditure projections broken down into the following categories with explanatory notes:

- extension expenditure;
- asset replacement expenditure;
- exceptional investments, e.g. resulting from new legal obligations.

This classification should facilitate the regulator’s assessment of the CAPEX projections, e.g.:

- For the capacity extension CAPEX, the regulator can check whether the data are consistent with the formal investments approvals that have been given to the business and/or study the major extension investment drivers;
- For the replacement category, the regulator can determine perhaps on the basis of comparison with replacement CAPEX in previous years, cumulated available depreciation volumes, asset age structure and other supporting information supplied by the business, whether the levels of proposed replacement CAPEX are reasonable; and
- For the exceptional investments, the regulator can check whether any such investments, perhaps over a certain level of CAPEX, are actually required.

Ex-post assessment may be undertaken to supplement the ex-ante investment reviews. In this way regulators aim to identify differences between the capital expenditures allowed in the ex-ante review and the actual investments undertaken by the regulated company. In case the actual investments are lower than the allowed investments, they may be two reasons for this: the difference results from strategic investment deferrals; or the difference results from efficient procurement and management of investments. While the latter represents eligible efficiency gains, the former are associated with strategic behaviour and, therefore, do not represent benefits resulting from management efforts towards efficiency increase. Regulators should also consider that there may be capital expenditures undertaken in good faith that prove to be imprudent with the benefit of hindsight.

Regulatory ex-post checks can also be undertaken without any previous ex-ante approval of the investments. In this case, the companies are confronted with the uncertainty of whether the undertaken investments will be recognised by the regulator ex-post. The threat that investments may be rejected, or partially disallowed by the regulator would provide an incentive to the regulated company to only undertake efficient investment. On the other hand, the regulatory threat that investments could be disallowed, and then excluded from the regulatory asset base, could discourage regulated companies to implement even good investment projects.

The transparency of the regulatory ex-post tests is an essential factor for the overall credibility of the regulatory regime. Ex-post assessment tests with a high degree of regulatory discretion would increase the regulatory risks and probably discourage even prudent investments. In contrast, formalised and transparent rules on how to carry out the
ex-post tests would strengthen the credibility of the regulatory regime and support investment activities.

For instance, the regulators in the UK, Slovenia or Romania check investments ex-ante before inclusion in the price control. Generally, two components of capital expenditure are distinguished and analysed: “load-related” and “non-load-related” expenditure. The former is linked to the connection of new customers (partly financed by connection charges which lie outside the price control) and network reinforcement. The latter consists principally of replacement expenditure, also including expenditure on IT, environmental improvement, and quality of service improvement. Increased efficiency in investment is a result of improved procurement, improved design and better information about the condition of assets. In contrast, the regulators in Germany, Austria and Norway do not check investments separately but rather include them ex-post in their benchmarking models. However, this inclusion is rather complicated and a number of issues resulting form the long-term nature of CAPEX, should be solved before the regulator decides to apply this method. Notable examples of challenges to ensure CAPEX comparability relate to differences in depreciation policy, capitalisation policy and network asset age of the regulated companies.

3.3 Appraisal of investments

3.3.1 Selection and appraisal of investments by network companies

Investment (project) appraisal is a means to assess and evaluate whether a proposed project is worth pursuing or not. It is used in both private and public sectors. Key considerations in making investment decisions are:

- What is the scale of the investment - can the company afford it?
- How long will it be before the investment starts to yield returns?
- How long will it take to pay back the investment?
- What are the expected profits from the investment?
- Could the money that is being ploughed into the investment yield higher returns elsewhere (opportunity cost)?

The investment process consists of the three main stages: identification of the investments needed, evaluation of them and monitoring/control after the implementation. During the identification process one defines the investment needs in various areas and with different aims:

- maintenance - replacing old or obsolete assets,
- profitability - quality, productivity or location improvement,
- expansion - new products, markets and so on,
- indirect - social and welfare facilities.

The evaluation process covers appraisal of different alternatives, selection of the best of them using different appraisal techniques. Among the most popular appraisal techniques are: calculation of the net present values, dynamic payback and internal rate of return.
3.3.2 Appraisal of investments by the regulators\textsuperscript{11}

There are several main types of criteria that can be used by the regulator to assess whether the capital expenditure should be included in a network operator’s RAB and hence allowed for in the revenue stream allowed under the price regulation. The main types of criteria include engineering models, total cost benchmarking and standard cost approach.

**Engineering models** are an alternative benchmarking approach and are useful to fill the gap that traditional benchmarking models cannot cover. If benchmarking is defined as the comparison of the existing with the optimal option, traditional benchmarking models aim to identify the optimal options by means of comparing existing options and choosing the best one. Engineering models on the other hand do not need existing options, but rather create these options on the basis of predetermined economic and engineering criteria. Thus, an engineering model can be used without the need of a sample in principle, which significantly adds to the flexibility of the regulatory process.

The **Total cost** (TOTEX) approach is based on the idea that all (controllable) costs are subject to incentives and efficiency analysis; i.e. no differentiation is made between OPEX and CAPEX. These two cost items are treated in the similar way and for both costs, a single efficiency target is set.

From the regulatory perspective, the advantage of the TOTEX approach is that it can capture the trade-off that is generally present between the two categories of cost i.e substitution. Secondly, and more importantly, is that it removes the incentive for over-capitalisation. Under a TOTEX approach there is no need to explicitly evaluate the companies’ future CAPEX projections. In principle one would not distinguish between OPEX and CAPEX in the economic sense, however in practice it is still needed to measure these costs. This means that the regulator still needs to collect information about both OPEX and CAPEX cost elements. Even more, it becomes increasingly important that these costs are measured uniformly throughout the industry in order to make sure that the efficiency scores from the benchmarking analysis are driven by genuine performance differences and not influenced by errors in the data.

The main issue with the TOTEX approach is to find a methodology that captures the differences in several aspects of cost across the industry. This is especially true in the way CAPEX is standardised in order for it to be comparable throughout. The main reason why CAPEX is not normally used in the economic benchmarking of cost for revenue requirements’ setting purposes is that CAPEX is not easy at all to standardise across different companies. Benchmarking CAPEX only is difficult due to data problems.

The **standard cost** approach prescribes certain maximum unit prices for investment group components. In this way the regulators attempt to ensure that investments are procured in an economic way. This method resembles the replacement cost method, however in this

\footnote{Ibidem}
case it’s application is not to revalue the existing assets but ex-ante towards the new investments. The notion of ‘standard cost’ implies that to each part (‘unit’) of the network is assigned a standard cost, depending on the type and characteristics of the installation. These units or standard costs are determined for the entire industry and are then applied to each company; they cover both capital and operating expenses. The sum of these standard costs then serves as the basis for the allowed revenues of a particular company. As a result, an individual company’s allowed revenues are thus not related to its actual costs.

This concept of applying generalised cost to an individual network company might be further extended by the envisaged use of a so-called ‘area reference network’. The underlying principle is to relate a company’s allowed revenues to the standardised cost of a theoretically ‘optimal network’. Hence, an individual company’s remuneration would not be based on the (standardised) cost of its real networks but on the cost of the (theoretical) area reference network instead.

Under the standard cost approach, actual investment costs are allowed, based on unit costs for different types of equipment, such as overhead and cable lines (€/km), substations (€/unit) and transformers (€/MVA). These values are differentiated by voltage level and may be subject to further correction factors.

3.4 Allowed Return on Assets – WACC

The Allowed Revenues of a regulated business include, among others, a return that the company is allowed to recover in order to compensate their debt and equity holders for the return and risk they assume in financing the assets with which the regulated company provides regulated services. The allowed return is equivalent to the product of the sum of all assets used and useful for providing regulated service (Regulatory Asset Base) with the Weighted Average Cost of Capital (WACC). The latter should be set at such a level which provides the regulated company with the opportunity to earn a reasonable return on the assets invested. This implies the company should not gain an economic profit nor sustain an economic loss from the WACC value allowed by the Regulator. The WACC is typically calculated via the following formula:\(^{13}\):

\[
WACC = g \cdot r_d + (1 - g) r_e / (1 - t)
\]

Where

- \(WACC\) is the weighted average cost of capital
- \(r_d\) is the allowed return on debt
- \(g\) is the gearing ratio (expressed as the ratio of debt to the total assets)
- \(r_e\) is the allowed return on equity
- \(t\) corporate income tax rate

\(^{12}\) Economic profit differs from accounting profit as it takes into account the opportunity cost of financing for the regulated utility.

\(^{13}\) Pre-tax WACC (the formula includes an increase of the WACC to include the corporate income tax rate applied in the country)
The formula denoted above includes a tax allowance which, when multiplied with the RAB, generates sufficient cash flows to cover the tax liabilities of the company and to satisfy the needs of the investors in the company.

3.4.1 Gearing ratio

The gearing ratio applied in the calculation of the WACC is determined by taking into account the ratio of total liabilities to the total assets in the utility’s portfolio. If the total assets of a utility are equity financed, then the gearing ratio is zero and the WACC is equal to the investors allowed return on equity. As utilities gear up to gain access to cheaper debt financing, the gearing ratio increases and the weighted average of the debt and equity leads to a lower WACC. However, if gearing increases to a high level then both debt and equity holders will perceive more risk in the utility and require higher returns for the values invested in the company. In some cases, the Regulator may choose to provide incentives for the utility to operate within a range of gearing ratios they consider properly account for both the risk of a high gearing ratio and for the cost of capital of a low gearing ratio. The Energy Regulatory Office (ERO) of Kosovo, for example, applies the actual cost of WACC to calculate the allowed return if the actual gearing ratio is between 0.3 and 0.7. If companies have a gearing ratio above or below these values, then ERO applies gearing ratios of 0.3 (for lower cases) or 0.7 (for higher cases). The Competition Authority of Estonia\(^{14}\) applies a 50% debt and 50% equity financing based on the rate applied in Electricity Transmission, Distribution and Gas Transmission in Luxembourg and gas distribution networks in Luxembourg and Portugal.

3.4.2 Return on debt

The allowed Return on Debt represents the expectations of debt holders to provide debt finance to the regulated utility and comprises of the risk free rate, the country risk premium and the risk premium associated with providing finance to the utility itself.

The ‘risk free’ represents the return expected by debt holders for investments in which they perceive to be riskless such as government bonds. The Estonian Competition Authority (CA), for example, calculates this rate as the 5-year average interest rate for 10-year bonds issued by the German Government\(^{15}\). In a 2006 paper, when the regulated utilities had a relatively small portfolio of debt financing, Energy Regulatory Office (ERO)\(^{16}\) of Kosovo used an average interest rate for government bonds with a similar credit rating as that of Kosovo. In 2012 this approach was changed as the total cost of debt is calculated as the average cost of debt incurred by the utility and may change between different utilities. The Irish Commission for Energy Regulation (CER) applies the interest rate for bonds issued by the German

\(^{14}\) The Estonian Competition Authority’s guidelines for the determination of the Weighted Average Cost of Capital (WACC) available at [http://bit.ly/1zKYBeO](http://bit.ly/1zKYBeO)

\(^{15}\) The interest rates for the German Government issued bonds was used as, at the time of the preparation of the Guidelines paper by the Competition Authority, the Estonian Government had not issued long term bonds.

\(^{16}\) ERO’s Position Paper on the Weighted Average Cost of Capital issued in 2006. ERO later provided an update to these values but based on the same principles applied to the 2006 paper. The Position Paper is available at [http://ero-ks.org/Price%20and%20Tariffs/WACC_Assumptions_FINAL_eng.pdf](http://ero-ks.org/Price%20and%20Tariffs/WACC_Assumptions_FINAL_eng.pdf)
government as, they argue, that Ireland and Germany are both part of a single Eurozone area therefore they should have the same risk-free rate\textsuperscript{17}.

The Country Risk Premium represents the additional desired return expected by investors in a particular state compared to another state with a higher credit rating. A simple way of undergoing this calculation is to compare the differences between the interest rates of governmental bonds issued in different countries. In Estonia\textsuperscript{18}, the CA uses the interest rate for a 10 year bond issued by the Government of the Czech Republic as they assessed that the Czech Republic should have a similar credit rating with Estonia. The final country risk premium is calculated by subtracting the interest rates for 10 year bonds issued by the Czech Government and the German Government. Initially, ERO used a sample of EU and Australian regulators which applied debt risk premiums between 0.84-1.75%. ERO used this as a basis but increased the debt risk premium for their utilities to reflect the poorer commercial performance of the Kosovo utilities compared to EU countries. The final debt risk premium was therefore set between 2.0% and 2.5%. As of 2012, ERO uses the actual average cost of debt incurred by the regulated utilities, as explained previously.

The company debt risk premium in Estonia is calculated based on the experience of European Regulators as reported in a Council of European Energy Regulators’ (CEER) report\textsuperscript{18}. They calculate the risk premium of an undertaking by taking the arithmetic mean of the risk premiums of CEER countries. The Irish CER were advised by their consultants to set the debt premium by comparing the regulated utilities with a similar credit rating\textsuperscript{19}.

3.4.3 Return on equity

The Return on Equity component of the WACC calculation represents the expected return of the shareholders for providing equity finance to the regulated utility. Energy Regulators commonly apply the Capital Asset Pricing Model (CAPM) to estimate the appropriate level of return on equity that should be used as an input to the WACC calculation:

\[ r_e = r_f + \beta \times ERP_m \]

where

- \( r_e \) is the allowed return on equity
- \( r_f \) is the risk free rate
- \( \beta \) is the equity beta which represents the covariance between the returns on the individual equity asset and those of the market as a whole
- \( ERP_m \) is the equity risk premium applicable to whole market

\textsuperscript{17} The CER Decision on WACC available at http://www.cer.ie/docs/000801/CER14026%20WACC%20Review%20Decision%20Paper%20Final.pdf
\textsuperscript{18} The Estonian Competition Authority’s guidelines for the determination of the Weighted Average Cost of Capital (WACC) available at http://bit.ly/1zKYBeO
The risk-free rate applicable in Estonia, Ireland and in Kosovo follows the same calculation approach as in the risk free rate used for calculating the allowed Return on Debt, as elaborated in Section 6.2, above.

The beta coefficient (otherwise known as the equity beta) is the covariance between the returns on the asset of the company compared to the expected returns of the market as a whole. It is effectively an index which indicates whether the risk of the particular company is higher or lower than the risk level of an average company operating in the market. In Estonia and Finand, the energy undertakings are not quoted in a stock exchange. The Estonian Competition Authority therefore uses the unlevered arithmetic mean of Betas applied by CEER countries to electricity and gas undertakings. Similarly, ERO referred to the average Betas applied by European energy regulators. ERO decided to slightly inflate the latter in order to reflect the potential volatile nature of the utilities’ demand growth relative to the expected GDP growth of the country.

The Equity Risk Premium represents the additional risk associated with holding equity of the regulated utility compared to a riskless asset. Usually, this is measured by the difference between returns on government bonds and the stock market index. In the absence of a stock market, ERO has referred to international proxies by looking at the average rate applied by regulators in EU, Australia and New Zealand. Similarly, CA calculates the ERP by taking the arithmetic mean of the values allowed by CEER members.

3.4.4 Tax wedge

Regulated companies should be allowed to recover the taxes incurred by doing business. This can be done either by allowing a separate line item for the forecast taxes incurred by the company or, the more common approach, by adjusting the cost of equity upwards in order to allow the company to earn a higher return through which it would pay tax duties and still earn enough profit to satisfy shareholders. This adjustment is done by applying a tax wedge which is multiplied with the allowed return on equity and which reflects the expected corporate tax rate applied to the company.

3.4.5 WACC levels in selected EU countries

This section of the Report provides an overview of the WACC levels applied by National Regulatory Agencies of selected member states of the European Union.

The following chart displays the average nominal vanilla (post-tax) WACC and pre-tax WACC in selected EU countries.

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20 The Estonian Competition Authority’s guidelines for the determination of the Weighted Average Cost of Capital (WACC) available at http://bit.ly/1zKY8eO
ITS experts during the second mission were asked an additional question by the Beneficiary: how changes in the investment plans are treated during the regulatory period. This section of the report provides guidance as to how changes in the implementation plans are treated by regulators. Most of the Regulators analysed follow a similar approach however this section reviews the practice of the Energy Regulatory Office (ERO) of Kosovo.

In a multi-year tariff setting environment, Regulators require that the Regulated Utilities provide their proposals of the planned investments to prior to the commencement of the next Regulatory Period. The level of approved investments is then subsequently added to the Regulatory Asset Base (RAB) and the associated Depreciation and Allowed Returns are included in the Allowed Revenues of the regulated utilities.

During the implementation phase of the Investment Plans, there may be differences between the forecast and actual cost of the investments approved by the Regulator and this may occur for different reasons, some of which are noted below:

- **Differences due to strategic deferrals from the Base Plan** – The Investment Plans are approved based on a range of different assumptions about load forecast and energy consumption growth patterns. If, during the implementation phase, any of these key assumptions changes significantly then the utility company may consider revising the initial plan;

- **Differences due to the (in)efficient investment procurement and management** – The utility may succeed to conclude supply contracts which provide them with lower unit costs than the forecast costs approved in RAB, and vice-versa. Alternatively,
some investments may not have been implemented due to procurement or management related issues.

- **Differences due to changes in unit costs** – Differences in the cost of investment plans may occur for reasons which are beyond the control of the regulated utility. For example, a change in the price of copper in the market may lead to an increase of the unit costs of the investment plan which may increase the cost of the plan for reasons beyond the control of the utility.

Regulators should reflect upon these changes and respond with regulatory policy which provides incentives for efficient investment proposals which add value to customers but also provides the proper risk-mitigating mechanisms which enables the utilities to raise finance effectively.

ERO’s regulation governing investments is an annex to the main Rule which sets the principles upon which the Maximum Allowed Revenues are calculated. The investments are treated as follows:

- Investments may go into the Regulatory Asset Base from the moment their construction is finished and they are used and useful to the customer. Interest during construction is capitalized. The value of the asset in the Asset Base is equal to the cost allowed by the Regulator.
- At Periodic Reviews, the regulated utility may ask that the actual rather than the allowed cost of the investment is added to the RAB. The Regulator reviews the request to ensure that the differences in costs were for reasons outside of the control of the utility and that the management made their best efforts to minimize cost increases.
- The Regulator does not make retroactive reductions in revenues earned during the recently completed Regulatory Period if the cost of implementing a particular project were lower than initially forecasted by the Regulator. In these cases the Regulator will refer to the actual cost in approving investments for future Periodic Reviews.
- If a project is not brought into service during the current Regulatory Period then the investment is removed from the Regulatory Asset Base and any depreciation and return allowances which may have been earned during the recently completed Regulatory Period are deducted from the Allowed Revenues of the utility with interest during the next Regulatory Period.
- The regulated utility may apply to the Regulator to substitute an approved investment project with an alternative one if they can provide convincing evidence that the alternative investment will bring equal or better results to customers than the original one. In such cases, the alternative investment project replaces the original one in the RAB.
- If the regulated utility substitutes an approved investment project with an alternative project without the prior consent of the Regulator then the Regulator has the right to review the alternative project but is not obliged to allow the utility to recover the costs of the alternative project.

Any changes and delays in the implementation of the Investment Plan are regularly reported to the Regulator. It should be emphasized that, despite the fact that the Regulator constantly
monitors the implementation of the Investment Plan, no changes to the approved plan are made until the end of the Regulatory Period.
4 Examples: experiences of EU and ECT countries

In reviewing the Investment Plans of the Regulated Utilities, Regulators are faced with the challenging task of identifying the appropriate level of capital investments which they should allow the utilities to recover from Regulated charges and fees. The Regulations adopted for this purpose tend to have mechanisms which mitigate exposure to risk arising from a considerable asymmetry of information while providing a general overview of the plans, focusing attention on the necessity and cost of the major projects and avoiding detailed analysis and micro-management of the regulated utilities. The selected examples generally tend to suggest that the general structure of the price controls as well as the Regulator’s involvement in approving investment plans depends on, among others, the degree of requirement for intensive investment programmes into the network.

This section of the Report reviews the experiences of selected EU countries and Energy Community Treaty (ECT) Signatory Parties on reviewing and assessing the Investment Plans of the Regulated Utilities.

4.1 United Kingdom (Ofgem)

The Office for Gas and Electricity Markets (Ofgem) sets price controls for companies which operate the gas and electricity networks in Great Britain. After twenty years of applying RPI-X regulation, Ofgem initiated a major review of their approach under the RPI-X@20 consultation. The result of this consultation produced a new regulatory approach known as RIIO (Revenues = Incentives + Innovation + Outputs) which, as the name suggests, aims to link the revenues allowed by the Regulator with the delivery of outputs. Ofgem states that RIIO built on the success of the previous regulation but adapted to reflect the challenges faced ahead and to enable building sustainable networks of the future. The RIIO system increases the regulatory period of regulation from 5 to 8 years, places a greater emphasis on the long-term value for money as it protects the interests of current and future customers and enables companies to be “fast-tracked” through the Regulatory Review process. The overall review process may last up to 30 months however some applications may be “fast-tracked” if they comply with the criteria set by the Regulatory Body in the “Strategy for the Review”. This strategy for the review is developed by Ofgem in the first three months of the review during which period the regulated companies draft their Business Plans.

On overview of the RIIO Review process is provided in the following figure22:

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Figure 3 Overview of the RIIO review process and indicative timing

The Handbook for Implementing RIIO provides guidance as to the criteria that business plans need to meet in order for them to be considered ‘well justified’. In such Plans, Network Companies have to demonstrate, among others:

**Focus on output delivery** – the Regulator has to be satisfied that the proposals focus on delivering output results and provide long-term value for money;

**Consideration of secondary deliverables** – details of the activities to ensure the delivery of primary outputs and value for money should be provided to the Regulator;

**A clear case for proposals** – the companies should demonstrate to Ofgem that their approach is the best option in reaching the objectives of the RIIO model;

**An open minded consideration of available options** – the company should demonstrate that they have considered alternative approaches but the proposed approach provides long-term value for money;

**Link between costs and outputs** – the company should demonstrate how the revenues collected from customers will allow it to reach the delivery of outputs;

**Consideration of the long-term** – the company should set out how their proposal is aligned with a long-term strategy of providing sustainable network services;

**Value for money** – the company should demonstrate how its proposed approach provides long-term value for money for electricity customers;

**Stakeholder consultation** – the company should demonstrate how they’ve taken into
consideration the views of stakeholders in developing their plan;

Working with others – the companies need to demonstrate how they have worked with other players in the industry to seek to find common solutions and thereby provide long-term value for money.

Ofgem reviews the Business Plans of the network companies upon their submission under the price review and undergoes an “initial” sweep to identify which companies may qualify for fast tracking (Category A) and those which may be subject to more intensive scrutiny. This categorization is based on Ofgem’s review of the quality of the business plans, the performance of the company during previous controls and the results of a benchmarking analysis of the business plans. Companies that score lower on these criteria are placed in Category B with a more intense level of scrutiny or Category C with the highest level scrutiny.

In the latter case, Ofgem may engage engineering experts to conduct detailed studies of the business plans of the company. The focus of the Regulator in these cases may focus on areas where the company has not performed well in the past or in areas which are flagged as potentially inefficient compared to other regulated companies.

In one of their Strategy Decision documents, Ofgem identified 15 criteria that they would use to assess the Business Plans of the Regulated Companies. These 15 criteria contribute to five broad indicators with which the business plans are reviewed: Process, Outputs, Resources (efficient expenditure), Resources (efficient finance) and Uncertainty and Risk. The criteria are summarized in the following table:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 1: Key content?</td>
<td>Has the company included main elements of a well-justified business plan?</td>
</tr>
<tr>
<td>C 3: structure and proportionality</td>
<td>Is the business plan well-structured?</td>
</tr>
<tr>
<td>C 8: Effective engagement</td>
<td>Has the company engaged with stakeholders and explained how this has influenced its business plan?</td>
</tr>
<tr>
<td>C 11: Accurate, timely and complete business plan templates</td>
<td>Has the company submitted and justified all templates and the financial model?</td>
</tr>
</tbody>
</table>

Outputs: Does the plan deliver the required outputs?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 2: Reflection of Ofgem policies</td>
<td>Does the business plan conform to the outputs specified in the Strategy Document and are any departures well-justified?</td>
</tr>
<tr>
<td>C 5: long-term context</td>
<td>Does the business plan provide a strategy for long-term delivery?</td>
</tr>
<tr>
<td>C 7: Output delivery</td>
<td>Has the company explained resource implications for output delivery and demonstrated these are efficient?</td>
</tr>
<tr>
<td>C 12: Quality of info on primary outputs</td>
<td>Has the company explained how it will deliver outputs and justified output baseline/forecast?</td>
</tr>
<tr>
<td>C 13: Quality of info on secondary deliverables</td>
<td>Has the company explained and justified use of secondary deliverables?</td>
</tr>
</tbody>
</table>

Resources (efficient expenditure): Are the costs of delivering the outputs efficient?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 4: Efficiency of costs</td>
<td>Has the company demonstrated that cost projections are efficient?</td>
</tr>
<tr>
<td>C 10: Reflecting best</td>
<td>How does the plan compare with others/best practice?</td>
</tr>
</tbody>
</table>
The incentive based regulation is based on a revenue-cap building block methodology. CPI-X

Table 4.1 Criteria for assessing the Business Plans of network companies

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria 14: Evidence</td>
<td>Has the company provided evidence costs (including financial costs) which are efficient? For example through market-testing?</td>
</tr>
<tr>
<td>Criteria 15: Linking forecasts to historical performance</td>
<td>Has the company explained cost projections in the context of historical performance?</td>
</tr>
<tr>
<td>Resources (efficient financing): Are the proposed financing arrangements efficient?</td>
<td></td>
</tr>
<tr>
<td>Criteria 2: Reflection of Ofgem policies</td>
<td>Does the business plan conform to the financial policies specified in the strategy document and are any departures well justified?</td>
</tr>
<tr>
<td>Criteria 4: Efficiency of costs</td>
<td>Has the company demonstrated that the cost projections are efficient?</td>
</tr>
<tr>
<td>Criteria 14: Evidence</td>
<td>Has the company provided evidence that costs (including financial costs) are efficient, for example through market-testing?</td>
</tr>
<tr>
<td>Criteria 15: Linking forecasts to historical performance</td>
<td>Has the company explained cost projections in the context of historical performance?</td>
</tr>
<tr>
<td>Uncertainty and risk: How well does the plan deal with uncertainty and risk?</td>
<td></td>
</tr>
<tr>
<td>Criteria 6: Reflect uncertainty</td>
<td>Has the company considered how it will address uncertainty (for example by including uncertainty mechanisms)?</td>
</tr>
<tr>
<td>Criteria 9: Risk</td>
<td>Has the company considered risk and how to mitigate that risk?</td>
</tr>
</tbody>
</table>

For larger scale projects Ofgem requires companies to demonstrate that they have considered all possible options. Furthermore companies have to demonstrate efficiency of cost forecasts by internal or external benchmarking analysis. For certain expenditure items Ofgem may require itemizing unit costs, conducting a full engineering reassessment of asset replacement strategy or requiring companies to undertake further market testing.

Ofgem underwent a public consultation process in order to identify the data reporting formats which they will use during a particular price control. The data collection templates are similar in format for all regulated network companies as this enables Ofgem to compare the data of one company to that of another. The reporting formats allow companies to provide 15 years of data: 8 for the price control period under review, 5 forecast years and the remaining data can be provided for the current price control period.

Ofgem uses the Information Quality Incentive (IQI) to provide financial incentives to the network companies to provide a higher level of the quality of the data than then would provide in the absence of IQI. Particularly, the IQI provides an additional financial incentive for the companies to allocate the appropriate time and resources required to produce accurate financial forecasting and business plans. Alternatively, the IQI is used as a financial deterrent if Ofgem considers that the companies have overestimated the cost of their investment program.

4.2 Croatia (HERA)

The Croatian Energy Regulatory Agency (HERA) applies a rate-of-return approach for the regulation of the electricity networks (since 2006) and incentive-based regulation for the regulation of gas networks (since 2013). The Electricity Network regulation Regulatory Period is set to one year whereas that of the gas networks is set to 3 years for the first regulatory period and 5 years for the next two regulatory periods.

The incentive based regulation is based on a revenue-cap building block methodology. CPI-X
is applied to Operating and Maintenance costs with a 50% profit sharing applied at the end of the Regulatory Period. The efficiency target has been set at zero for the first regulatory period. The target is identified through a benchmarking analysis.

Capital investments are recovered through the application of a depreciation charge on the Regulatory Asset Base and financed through an Allowed Return equivalent to the estimated Weighted Average Cost of Capital of the company. The Regulatory Asset Base is calculated as:

\[ RO_{T+i-1}^P = RO_{T+i-2}^P + I_{T+i-1}^P - A_{T+i-1}^P - S_{besp}^P - OR_{T+i-1}^P; \quad i=0...n \]

Where:
- \( RO_{T+i-1}^P \) - Planned value of regulated assets at the end of the T+i-1 (kn) regulatory year,
- \( RO_{T+i-2}^P \) - Planned value of regulated assets at the end of the T+i-2 (kn) regulatory year,
- \( I_{T+i-1}^P \) - Planned value of new investments in the distribution system which will be useful in the T+i-1 (kn) regulatory year,
- \( A_{T+i-1}^P \) - Planned depreciation for the Regulatory Year t+i-1, excluding the depreciation of non-repayable funds (kn),
- \( S_{besp}^P \) - Planned value of non-repayable funds in the T+i-1 (kn) regulatory year,
- \( OR_{T+i-1}^P \) - Planned value of asset disposals in the T+i-1 (kn) regulatory year,
- \( n \) - Number of years in the Regulatory Period.

Croatia does not have a special legislation which would address the evaluation, assessment and methodologies for approval of an investment plan. Nevertheless the Act on the Gas Market\(^\text{24}\) lays out some general information of what information should be provided in the Development Plan.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Planning period</th>
<th>Required Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission System Operator (TSO)</td>
<td>10 years</td>
<td>A plan for the construction and replacement of the distribution system, a plan to put to use pipelines and other facilities in the distribution system and physical and financial indicators; A feasibility study for the planned investments, supply and demand projections, a timeline for connecting users into the system and financing sources of planned investments;</td>
</tr>
<tr>
<td>Gas Storage System Operator</td>
<td>Regulatory Period with a 10 year projection</td>
<td>A plan for the construction and replacement of the distribution system, a plan to put to use pipelines and other facilities in the distribution system and physical and financial indicators; A feasibility study for the planned investments as well as a projection of needs for capacity storage in the Republic of Croatia as well as assumptions about capacity storage needs in the region. The funding of the planned investments</td>
</tr>
<tr>
<td>Distribution</td>
<td>Regulatory</td>
<td>A plan for the construction and replacement of the distribution system, a plan to put to use pipelines and other facilities in the distribution system and physical and financial indicators; A feasibility study for the planned investments as well as a projection of needs for capacity storage in the Republic of Croatia as well as assumptions about capacity storage needs in the region. The funding of the planned investments</td>
</tr>
</tbody>
</table>

\(^{23}\) The below-given formula is applied in the Methodology for determining the Tariff Items for Gas Distribution. The Electricity Distribution Methodology applies the same principle

\(^{24}\) Official Gazette 28/13, 14/14
System Operator (DSO)  Period with a projection for the next Regulatory Period (3+5)  system, a plan to put to use pipelines and other facilities in the distribution system and physical and financial indicators; A feasibility study for the planned investments as well as a projection of needs for capacity storage in the Republic of Croatia as well as assumptions about capacity storage needs in the region. The funding of the planned investments

**Table 2.3 General provisions of Development Plans provided in the Gas Act**

The Gas Act also provides general guidance as to the Energy Regulator’s Role in approving the TSO Development Plan. As such the Regulator is obliged to ensure the compliance of the Development plan with the Energy Strategy and the Strategy Implementation Programme. Furthermore, the Regulator verifies compliance with the non-binding development plan of the European Union Regulation No. 715/2009, where the agency may consult the Agency for Cooperation of Energy Regulators. Finally the Regulator conducts a 15 day public hearing to consult stakeholders prior to the approval of the Development Plan.

### 4.3 Ireland (CER)

The Commission for Energy Regulation (CER) applies a five-year incentive based (Revenue Cap) model in executing its regulatory mandate on the network companies. During Periodic Reviews, the CER reviews both the capex incurred by the Regulated Companies in the previous 5 year Regulatory Period as well as the forecast capex for the forthcoming period.

Historical Capital Expenditures are monitored through a special capital expenditure monitoring programme. This stipulates that a Capital Expenditure Report is provided to CER by the Regulated Companies on an annual basis. The projects in the annual report are broken down into three separate categories:

- Projects over €1 million which were identified in the previous Regulatory Period;
- Projects over €1 million which were provisionally identified under the previous Regulatory Period and are now being implemented;
- Aggregated figures for undertaken projects under €1 million.

The CER requires detailed explanations to be provided for the following cases:

- Delays in implementation of 6 months or more for projects with an associated cost of €1 million or above;
- Difference of 20% or more compared to the forecasted expenditure. The difference can be both negative or positive and does not prevent the CER from requiring detailed explanations for differences lower than 20% if the CER determines that a particular project requires further investigation;
- Internal or external problems which may have arisen in a specific project which may affect other projects with similar characteristics (for example if the issue is related to a location, has similar material requirements as other projects, or there are delays in obtaining permits)
In reviewing the future capital expenditure programme submitted by the regulated companies, CER – with the aid of their engineering advisors – focuses their review on:

- The policies and standards applied by the Transmission System Operators (TSO) that underpin the network and non-network capital expenditure programmes;
- The strategies adopted to ensure that the planned expenditure is needed, represents best value for the customer and can be delivered within the planned timeframe;
- The benefits that the capital expenditures will bring to the system and whether these benefits are valued by customers.

CER uses benchmarking results to assess both forecast and historical capital expenditure performance and this influences the value of the assets which are eventually allowed into the Regulatory Asset Base. CER does this in order to reflect the prospect of efficiency savings. For example, in their latest regulatory period CER advisors suggested the TSO could improve their efficiency in their capital expenditure programme by as much as 10%. Rather than breaking down in line items where this efficiency can be obtained, CER took the position that it is the company that should be innovative and find ways in which the expected reduction in costs will be distributed among the different line items. For example, by benchmarking the network’s DSO and 110 kV Transmission Asset Owner (TAO) Operating Expenditures and non-network capex, it was indicated that the TAO costs are 7.5% above the Upper Quartile of the Great Britain Distribution Network Operator costs and 16% above the efficiency frontier.

4.4 Kosovo (ERO)

The Energy Regulatory Office applies Incentive Based Regulation (5 year revenue cap for Transmission and Distribution networks). The capital expenditure programme of the regulated utilities is reviewed at Periodic Reviews and is approved for the length of the Regulatory Period (5 years).

During Periodic Reviews, regulated network companies provide their 5 year Investment Plans with an additional 5 year forecast for ERO’s review and approval. Periodic reviews entail an ex-post revision for the implementation of the investment plan in the previous regulatory period as well as an ex-ante revision of the capital investment plan for the forthcoming regulatory period. An asset enters the Regulatory Asset Base at the value approved by the Regulator on the forecasted year of its implementation. During the implementation of the Investment Plan, companies may propose an alternative plan compared to the one approved by ERO in the RAB. In such cases, companies have to demonstrate, to ERO’s satisfaction, that the alternative plan brings equal or better benefit to customers than the original plan. Companies may also unilaterally decide to implement a new project or amend an existing plan without ERO’s approval. In such cases the companies run the risk that this investment project is not approved by the Regulator.

4.4.1 Ex-post investment plan revisions

Under the ex-post capex revision exercise, ERO reviews whether the capital projects approved in the previous Periodic Review were commissioned at the time planned and at the
cost approved by ERO and recovered through the Regulatory Asset Base. If there were major delays in the implementation of the investment projects, and this delay was within reasonable control of the regulated network company, then ERO makes retroactive adjustments to reflect the fact that a certain amount of revenues should have been earned, for instance, in year 4 rather than in year 2 of the Regulatory Period.25

The Regulator applies an asymmetric treatment with regard to treating differences between forecast and actual capital expenditure cost. In case a certain capital investment project was implemented in a timely manner but the cost of the implementation was higher than the initially approved cost, ERO may allow the company to recover the difference in costs if there is convincing evidence that the cost increase was outside of the control of the licensee (rise in the costs of materials of the project, rise in expropriation costs etc.). However, if the actual cost of implementation of a particular project is lower than the allowed cost by ERO then no retroactive adjustment is made. The Regulator allows the company to retain the difference as an efficiency incentive however uses the lower value as a benchmark for assessing investment plans in the future.

4.4.2 Ex-ante investment plan revisions

Under the ex-ante assessment, ERO reviews whether the investment plan proposed by the regulated companies to be recovered in the forthcoming Regulatory Period represents best value for customers. The network companies are requested to provide an investment plan separated by project. ERO may also request to review the asset age profile, expected asset lives and unit costs for the forecasted investment plan.

In assessing the capital expenditure ERO:

- Reviews the submission against the Development Plan to assess whether the submission was derived from the regulated entity’s investment planning process and targeted at the areas identified as priority areas;
- Reviews forecast expenditure and compares against historic expenditure;
- Reviews the unit costs provided in the investment plan and compares these with similar international projects.26

Under the latest Periodic Review (conducted in 2012), ERO underwent rigorous investigation to assess whether the unit costs of each of the projects proposed by the DSO, valued at €114.1 million, were in line with international comparators. The technical evaluation data suggested that the DSO’s unit costs were higher than international comparators, particularly those related to the 0.4 kV overhead lines. ERO therefore adjusted the capital investment plan downwards by 12.7% to reflect a price which they estimated better reflected the value of the investments proposed by the company. The total value of these investments and ERO’s

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26 ERO’s provisional TSO MAR assessment http://ero-ks.org/Tarifat/2012/Provisional_Evaluation_KOSTT_eng.pdf
corrected values are shown in the following figure:\textsuperscript{27}

![DSO Requested Capital Expenditure (’000 EUR)](image)

Figure 4.2 ERO’s final capex allowance under the last Periodic Review

\section*{4.5 Slovenia (EARS)}

The Energy Agency of the Republic of Slovenia (EARS) applies incentive based regulation to their regulated network companies. These companies are required to submit their investment plan on an annual basis which should reflect the network development plan of the companies\textsuperscript{28}. The length of the investment plan is three years.

The investment plan submitted to the Agency for approval must contain at least the following information:

- Purpose, Objective and Investment Strategy for the Business Plan;
- A calculation of the cost that the DSO will need to finance through the next Regulatory Period;
- A list of all investment organized by priority;
- Criteria used in determining the priority of the investments;
- A presentation of the ongoing investments; and,

\textsuperscript{27} ERO’s final DSO MAR assessment \url{http://ero-ks.org/Tarifat/2012/Provisional_Evaluation_DSO_PES_eng.pdf}

\textsuperscript{28} Act on the Methodology for setting Network Charges \url{http://www.uradnilist.si/1/objava.jsp?urlid=201281&objava=3196}
• An economic assessment of the investment plan.29

For the Transmission System Operator, investments have to be separated into three separate categories depending on the value of the investment (the first category consists of all of the investments under 5 million euros, the second between 5 and 25 million and the third consists of investments exceeding 25 million).

In determining the efficiency of the Investment Plan the Agency reviews the criteria in the following table:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of funding</td>
<td>The Agency determines whether the total value of the investments is being financed from the depreciation cash stream from the Regulatory Asset Base, other dedicated sources of finance, receivables from asset disposals, net profit of the network operator dedicated for financing of investments or new loans</td>
</tr>
<tr>
<td>Financial criteria</td>
<td>The Investment Plan is justified if the Net Present Value (NPV) of the investments is greater than zero and the Internal Rate of Return (IRR) is greater than the financial discount rate determined by the Agency</td>
</tr>
<tr>
<td>Economic Criteria</td>
<td>The economic criteria include not only direct effects (the costs of the benefits) of the investment but also the indirect effects on society as a whole (for example, impacts on the environment, health and safety). The same criteria for NPV and IRR hold.</td>
</tr>
<tr>
<td>Security of supply</td>
<td>The investment contributes to increasing of the security of supply, contributes to the N-1 criteria and reduces risks30. Projects may be considered efficient even if they have a negative NPV but they contribute to a significant increase in the security of supply.</td>
</tr>
<tr>
<td>Development criteria</td>
<td>The investments made contribute to general development in a national, regional or cross-border context. The Agency reviews whether the investment plan aligns well with the Development Plan and whether the Network Companies have undergone proper stakeholder consultation. The impact of the investment plan should be “positive” or at least “neutral” as far as the utilization of the existing energy infrastructure is concerned. Cross-border investments should be coordinated with the European Union Network Development Plan (in the case of TSOs).</td>
</tr>
</tbody>
</table>

Table 3.3 Criteria for review of investment plans

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29 The guidelines for developing an economic assessment of the investment plan are provided in a separate decision of the Agency

30 Article 9 of the EU Regulation No. 994/2010 of the European Parliament.
4.6 Lithuania (NCC)

Investments into the regulated activities in the gas, electricity and district heating sectors should be approved by the national energy regulator – National Control Commission for Energy and Prices (Commission). The Law on Energy, the main law regulating activities in the energy sector, declares that if some investments were done but not approved by the Commission the related costs may not be accepted as reasonable when setting the regulated prices.\(^{31}\)

The Commission in 2009 has approved the document called „The Rules for the assessment and approval of the energy company’s investments at the National Control Commission“ (inserted in the Annex 1). The purpose of these Rules is to determine the planned investments’ evaluation criteria and principles of the approval procedure.

The Rules differentiate between the long-term and short-term investments’ plans – the approval procedures are different. The long-term programme of activities of the regulated company shall be drawn up taking into account the priorities set out in the National Energy Strategy, concerning energy security of supply, quality, consumer protection and environmental protection requirements. In the long-term programme the investments during the regulatory period must be planned, the funds required for the implementation of, funding sources, and time limits for implementation. The short-term (annual) investment plans with the concrete list of objects should be presented to the Commission for approval together with the documents and data submitted for setting or adjustment of the regulated prices.

The Commission has set the minimal threshold for the investments required approval. An electricity transmission company submits investment projects to the Commission, where the investment value of the project is € 3.5 million or more, for the distribution company - €1.5 million or more.

The Rules define requirements as for the list of documents needed for submission to the Commission asking for the approval of certain investments. After receiving all documents the Commission appraises the investment project, taking into account the security of supply and social protection aspects of the project as also financial justification and economic assessment of the project.

Financial analysis of the project evaluates the costs and revenues over the entire period of the project implementation (payoff), shows the financial viability of the project. Financial analysis of the project analyses the cash flow forecast and provides the number of financial indicators: financial net present value (FNPV) and financial internal rate of return (FIRR). An economic assessment of the investment project is carried out to calculate the payback period of the project and the impact of the investment project on the regulated prices with

an assessment of social and security of supply aspects.

Commission controls implementation of the approved efficient investments, using the indicators given in the approved projects. If an efficient investment, which was approved by the Commission, does not reach the set values of indicators agreed and due to that the essential criteria for the assessment of the project change the Commission shall assess the efficiency of investments made, taking into account the indicators approved by the Commission.

Investments in supply. In the case of the provision of public supply (which is regulated by the National Control Commission) the regulatory asset base consists of a fixed assets, calculated in accordance with the usual methodology and the average annual amount of working capital required for the public supply of electricity, taking into account the public supply money flows, i.e. the assessment of amounts receivable and payable over a reference period of a month.