Commission for Energy Regulation
An Coimisiún um Rialáil Fuinnimh

Consultation on TSO and TAO Transmission Revenue for 2016 to 2020

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Abstract:

This paper outlines and invites comments on the CER's proposals on the revenue to be recovered by EirGrid as Transmission System Operator (TSO) and ESB Networks as Transmission Asset Owner (TAO) from the Transmission Use of System (TUoS) customer over the period 2016 to 2020. The monies recovered through the TUoS tariff are used to cover their costs as TSO and TAO, respectively. For clarity this is Price Review 4 (PR4) for the transmission companies, 2015 is the final year of Price Review 3 (PR3).

Comments are invited as detailed in Section 2.4 of this paper.

Target Audience:

This consultation paper is for the attention of all members of the public and the energy industry. It will be of particular interest to parties that directly pay TUoS charges to EirGrid and end-user customers to whom these charges are passed onto.

Related Documents:

CER/14/026	Mid-term review of WACC applying to the Electricity TSO, TAO and ESB Networks Ltd for 2014 and 2015
CER/14/427	Information Note on 2015 Transmission revenue
CER/13/189	Information Note on 2014 TSO and TAO Revenue
CER/12/150	Information Note on 2013 TSO and TAO Revenue
CER/11/167	Information Note on 2012 TSO and TAO Revenue
CER/11/128	Decision on 2011/2012 Transmission Incentives
CER/10/206	Decision on TSO and TAO transmission revenue for the period 2010 to 2015
CER/05/143	Decision on TSO and TAO transmission revenue for the period 2006 to 2010
CER/01/131	Decision on TSO and TAO transmission revenue for the period 2001 to 2005

1 Executive Summary

The Commission for Energy Regulation (the 'CER') is the independent body responsible for regulating the natural gas and electricity sectors in Ireland. Part of the CER's responsibilities involves regulating the level of revenue which the monopoly electricity Transmission System Operator (TSO) EirGrid and the monopoly Transmission Asset Owner (TAO) ESB Networks in Ireland, can recover from the Transmission Use of System (TUoS) customer to cover their respective costs.

This paper puts forward the CER's proposals on the TSO's and TAO's revenue for the 2016 to 2020 (PR4) period. The TSO's and TAO's costs and performance over the previous five years are also examined.

The transmission network consists of the major electricity wires that connect different parts of the country and ensures that electricity from generators is transported to the distribution network, which in turn ensures it is delivered to end-users. As it would be wasteful and inefficient to have duplicate sets of transmission wires, the transmission network is a "natural monopoly". Unregulated monopolies may be inefficient and impose prices that are too high so, as set-out in legislation, the CER regulates the TSO and TAO's activities to protect the interest of electricity consumers, while ensuring that they can fulfil their obligations and deliver secure electricity supplies.

The nature of such regulation is that every five years the CER puts in place a revenue control that sets the transmission revenue that can be collected from the TUoS (Transmission Use of System) customer. This transmission revenue is collected by the TSO and distributed between the TSO and TAO as per SI 445 of 2000[1] and the Infrastructure Agreement between the two bodies. Transmission revenue is set at a level that would allow an efficient business to finance its activities and is determined by a combination of benchmarking against organisations in other countries and examining the specific underlying costs of the TSO and TAO.

This five year approach is best international practice, and is used by a number of European regulators as well as in a number of other regulated sectors. CER notes Ofgem's change in approach in the UK and its adoption of the RIIO model[2]. CER considered alternative approaches at the start of the price review process and

[1] http://www.irishstatutebook.ie/2000/en/si/0445.html
[2] https://www.ofgem.gov.uk/network-regulation-riio-model

ultimately decided to retain the current approach. It ensures that consumers are protected, while offering the regulated business a clear and stable environment to make the necessary investments to ensure a modern and efficient transmission system.

The CER also places incentives on the TSO and TAO to increase the security, reliability and quality of its service, while operating in an increasingly efficient manner.

The current price control expires on 31st December 2015. This consultation paper sets out the CER's proposals for the revenue that the TSO and TAO, separately, should be allowed to earn from 1st January 2016 to 31st December 2020. The CER will be consulting separately on proposals for the incentives that the TSO and TAO would be subject to over that period.

Financial data in this consultation paper is expressed in 2014 price levels, unless otherwise stated.

1.1 Overview

The companies requested €1.22bn in capex and €861m in opex for PR4 relative to a PR3 outturn of €1.03bn, and €686.3m respectively. The CER has considered the companies' submissions and has imposed significant efficiencies, resulting in a reduction of €196.7m in capex and €60.8m in opex against the requested allowances. Transmission tariffs will increase by an average of 2.5% year on year, due to the nature and timing of the expenditure 2015/2016 will see a 0.1% increase to the transmission average unit price (AUP) in comparison to the 2014/2015 tariff period. The scale of change the electricity system will undergo between now and 2020 will require investment and innovation. This increase in revenue is required in order to achieve this by further developing and reinforcing the electricity network, which is increasingly important as the system transitions to one with a high penetration of renewables.

An important finding from the CER's review of the PR3 process is that there is a greater need for monitoring and reporting throughout the process. The CER intends to address this by putting in place a more robust monitoring and reporting framework tied to operational and strategic incentives. This will benefit the consumer as it ensures that at risk revenue will not be funded by the consumer where the key objectives have not been achieved. The approach will facilitate the CER in ensuring that planned expenditure is incurred efficiently and delivering a consumer benefit. Also the reporting requirement will facilitate the companies in

providing their PR5 submissions and give greater clarity in relation to PR4 expenditure.

Table 1.1 PR4 Summary of Transmission Revenues

	Companies Requested	CER Allowed	Variance (Requested-Allowed)
Operating Expenditure	€861	€800.2	€60.8
Capital Expenditure	€1,222.48	€1,025.77	€196.71
Total	**€2083.48**	**€1825.97**	**€257.51**

Table 1.2 PR4 Transmission AUP

	2016	2017	2018	2019	2020
Average unit price (c/kWh)	1.39	1.41	1.44	1.47	1.50

1.2 The Five-Year Period

The five years from 2016-2020 will require continued investment in the transmission system and delivering ongoing infrastructure projects. The PR3 period was characterised by the initiation of a large scale infrastructure delivery programme in order to meet the 2020 targets. Given the nature of electricity infrastructure the capital project spans more than the five year control period, with large scale projects often taking up to 10 years to complete. The transmission network also needs ongoing investment to ensure it operates securely and effectively. This necessary investment will mean that the overall revenues to be recovered by the TSO and TAO over the period of the review will rise from their current levels, and that the TUoS charges levied to consumers will rise somewhat.

While the CER is of the view that this investment is necessary and will deliver benefits to consumers, the CER is aware of the need to ensure it is delivered as cost-effectively as possible. To that end, and mindful of the general economic difficulties, it is proposing to require major efficiencies from the TSO and TAO. This is through proposing cuts to the operating expenditure (Opex) required to run the system, as well as ensuring that capital expenditure (Capex) is fully scrutinised in terms of it being necessary, as well as being procured in an efficient manner.

These proposed efficiencies will ensure that end-users are protected as much as is possible, while still allowing for the required level of investment to take place, and continues the pattern of the CER having implemented significant efficiencies in previous price reviews. In accordance with the principle of incentivising efficiencies, if the regulated companies manage to make even greater efficiency improvements over the review, they are allowed by the CER to retain some of the benefits for five years on a rolling basis.

The CER adopts an incentive based model to separately determine the TSO's and TAO's allowed revenues. Both utilities internal operating costs are fixed for a five year period. If either utility spends more than it is allowed, it bears the cost. On the other hand if the utility spends below what it is allowed it can keep the surplus made any one year for a period of five years as a means of incentivising efficiency. Customers benefit in the medium term by the progressive decrease in operating costs allowed at subsequent price reviews. In PR4 the CER is proposing to implement strategic incentives whereby some TSO revenue would be at risk, within the period, where the TSO does not deliver on key objectives. The detailed mechanism for this process will be consulted upon after the publication of the PR4 Decision.

1.3 The Process

These proposals have been brought forward following a lengthy period of engagement with both the TSO and TAO. This has involved the analysis of multiple submissions by the TSO and TAO on both their historic and forecast costs, multiple meetings with the TSO and TAO to clarify those submissions, site visits to transmission installations and the benchmarking of the TSO's and TAO's costs and performance against international best practice.

To provide advice and complete analysis over the course of the review, the CER engaged the services of Jacobs (previously Sinclair Knight Mertz) (a leading international engineering, sciences and project delivery firm) to review efficiency levels, and both historic and forecast operating costs and capital investment. Europe Economics (a London based consultancy with expertise in economic regulation) has been engaged to provide advice on the allowed rate of return required on capital investments to ensure that the capital programme can be funded. The consultants' reports are published alongside this consultation paper, with the substantive points and recommendations summarised within this paper.

The CER is now consulting on its proposals and will consider all responses received prior to making a final decision on this matter.

1.4 Performance

A historic period of underinvestment throughout the 1980's and 1990's in the transmission network in Ireland has been followed in recent years by an increased level of expenditure on capital, maintenance and network renewal programmes. This has been required to cater for new connections (both demand and generator) during the recent boom and to make up for a previous lack of work in this area. This expenditure, coupled with the TSO's response to incentive mechanisms put in place by the CER, has greatly increased the quality of the electricity supply that the TUoS customer receives. Evidence of this can be seen in the annual Transmission System Performance reports published by EirGrid[3]. These reports show that system performance parameters such as System Minutes Lost and management of System Frequency levels have improved over the last number of years.

The CER will be separately consulting in the near future on the incentives to apply for the PR4 period. The effective roll-out of Gate 3 and the Government's target of 40% of Ireland's electricity consumption coming from renewable generation by 2020 is key to the setting of these incentives for both TSO and TAO.

1.5 Review of 2010-2015 PR3 Costs

1.5.1 Capex

The CER proposes to allow €42.05m of TSO expenditure and €982.3m of TAO expenditure as efficiently incurred capital expenditure in PR3 (a total of €1,024.3m).

The final outturn forecast for the PR3 period is estimated as €1.027bn, which results in an underspend of circa €422.8m of network capex relative to the originally allowed revenue (€1.45bn). Having reviewed the advice of Jacobs, the full underspend for the PR3 period appears largely due to the slower than expected delivery of the transmission capital programme. Opposition from landowners to new construction, particularly of overhead lines and cost pressures encountered by the transmission utilities led to delays in projects during the PR3 period. Additionally reduced demand on the system impacted the system's infrastructure requirements.

[3] Please see following link:
http://www.eirgrid.com/aboutus/publications/

Having considered the Jacobs recommendation the CER proposes to allow the PR3 capex outturn as proposed by Jacobs.[4] The CER proposes to allow €42.05m of TSO expenditure and €982.3m of TAO expenditure as efficiently incurred capital expenditure in PR3 (a total of €1,024.3m).

Uncertainty over forecast capex at the beginning of PR3, particularly with regard to the volume and timing of the Gate 3 process has created difficulty in determining if expenditure was efficiently incurred in this review. The CER acknowledges the need to place further emphasis on addressing such uncertainties throughout the PR4 period. In this regard, the outcome of PR3 has informed the proposed approach for PR4 by which the CER proposes a more comprehensive and active capex monitoring framework. There will be a greater emphasis on ex-ante specification of capex projects, and on-going reporting, in order to facilitate an ex-post assessment of the efficiency, or otherwise, of the costs.

1.5.2 Opex

A TAO overspend of 8% or €17m has been identified due mainly to increases in operational and repairs/maintenance costs and a failure to meet high level efficiency targets set in PR3. The impact of external events as discussed in the Jacobs report is noted in relation to this overspend. The CER is proposing a total TAO opex allowance of €240.5m (in 2009 prices) as recommended in the Jacobs report.

There was a TSO underspend on internal operating costs of circa €7.6m which EirGrid ascribes to efficiency gains and the integration of SONI. Having considered the Jacobs recommendations and the TSO's views, the CER proposes to allow a total TSO opex of €207.7m (in 2009 prices) allowable for the PR3 period.

1.6 Proposed Opex Costs for 2016-2020, PR4 Period

As outlined above, the CER expects that the proposed Opex for PR4 will be incurred as efficiently as possible by the transmission utilities over the PR4 period. The CER believes that the efficiencies we have built into the proposed PR4 Opex will minimise the burden on the TUoS customer in the period.

[4] This includes a reduction associated with the NSIC as discussed in section 7.3

1.6.1 TAO

The revenue proposed by the CER to cover the TAO's costs during the 2016 to 2020 period is outlined below in Table 1.3. These have been proposed following a review of the TAO's performance, both past and forecast, and against international best practice. Each of the components is discussed in turn below in the following chapters, where comparisons and analysis between proposed PR4 and actual PR3 are provided.

Table 1.3 PR4 Proposed TAO Opex

(€m's in 2014 prices)	Proposed PR4 TAO Opex						Variance Request – CER Proposed	%
	2016	2017	2018	2019	2020	Total		
OPEX								
Operations Allowance	€2.6	€2.7	€2.7	€2.7	€2.7	€13.4	€0.0	0.0%
Maintenance Allowance	€17.7	€17.7	€17.7	€17.7	€17.7	€88.5	-€6.5	-6.8%
Asset Management Allowance	€1.0	€1.1	€1.1	€1.2	€1.2	€5.6	€0.0	0.0%
Other Allowance	€10.0	€10.0	€10.0	€10.0	€10.0	€50.0	-€3.5	-6.5%
Controllable Costs Allowance	**€31.3**	**€31.4**	**€31.5**	**€31.5**	**€31.6**	**€157.4**	**-€10.0**	**-6.0%**
Rates	€22.1	€26.3	€28.3	€30.4	€32.5	€139.7	€0.0	0.0%
CER Levy	€1.2	€1.2	€1.2	€1.2	€1.2	€6.0	€0.0	0.0%
Uncontrollable Costs Allowance	**€23.3**	**€27.5**	**€29.5**	**€31.6**	**€33.7**	**€145.7**	**€0.0**	**0.0%**
Total	**€54.6**	**€58.9**	**€61.0**	**€63.2**	**€65.4**	**€303.1**	**-€10.0**	**-3.2%**

1.6.2 TSO

The revenue proposed by the CER to cover the TSO's costs during the 2016 to 2020 period is outlined below in Table 1.4. These have been proposed following a review of the TSO's performance, both past and forecast, and benchmarking of its costs and performance against international best practice. Each of the components is discussed in turn below in the following chapters, where comparisons and analysis between proposed PR4 and actual PR3 are provided.

Table 1.4 PR4 Proposed TSO Opex

(€m's in 2014 prices)	Proposed PR4 TSO Opex						Variance Request – CER Proposed	%
	2016	2017	2018	2019	2020	Total		
Staff Costs	26.1	26.1	26.1	26.1	26.1	130.4	-19.2	-12.8%
Staff Related Costs	1.9	1.9	1.9	1.9	1.9	9.50	-0.5	-5.0%
Contractors	1.6	1.6	1.6	1.6	1.6	8.0	-2.00	-20%
Telecommunications	4.3	4.3	4.9	5.4	6.1	25.1	-5.6	-18.2%
Premises	4.6	4.8	4.8	4.8	4.8	23.7	-1.0	-4.0%
IT Costs	2.7	2.7	2.9	3.0	3.2	14.5	-2.5	-14.7%
Insurance and Compensations	0.2	0.2	0.2	0.2	0.2	1.0	-0.5	-33.3%
Selling and Advertising	0.1	0.1	0.1	0.1	0.1	0.5	-0.7	-58.3%
Professional Services	2.9	2.9	2.9	2.9	2.9	14.5	-1.8	-8.5%
Grid Maintenance	1.0	1.0	1.0	1.0	1.0	5.0	-0.6	-10.7%
Intercompany – Corporate Recharges	-3.7	-3.7	-3.7	-3.8	-3.8	-18.6	-5.0	-21.2%
Rates	0.6	0.6	0.6	0.6	0.6	2.9	0.0	0.0%
Promotion of Research	0.2	0.2	0.2	0.2	0.2	1.0	-2.5	-71.4%
Research, Development & Demonstration	0.0	0.0	0.0	0.0	0.0	0.0	-18.9	-100.0%
Operating Costs (excl Depn)	**42.5**	**42.6**	**43.4**	**44.1**	**44.8**	**217.4**	**-60.8**	**-22.7%**
Pass through costs								
Inter TSO Compensation	1.3	1.3	1.3	1.3	1.3	6.5	-	-
CORESO subscription	0.0	1.0	1.0	1.0	1.0	4.0	-	-
Interconnector services	1.0	1.0	1.0	1.0	1.0	5.1	-	-
CER Levy	1.0	1.0	1.0	1.0	1.0	5.0	-	-
Ongoing service charge	1.3	1.3	1.3	1.3	1.3	6.5	-	-
DUoS costs	1.3	1.3	1.3	1.3	1.3	6.5	-	-
Ancillary Services	49.2	49.2	49.2	49.2	49.2	246.1	-	-
Total pass through costs	**55.1**	**56.1**	**56.1**	**56.1**	**56.1**	**279.7**	**-**	**-**
Total Opex	**97.6**	**98.8**	**99.6**	**100.1**	**101.0**	**497.1**	**-60.8**	**-22.7%**

1.6.2.1 East-West Interconnector Charge

This cost item was introduced in the PR3 period. The East-West Interconnector (EWIC) charge is not a TSO related cost but recoverable under TUoS in accordance with the interconnector licence. The EWIC charge is treated in the exact same fashion as all the external TSO cost items listed above, i.e. this charge will be allowed as pass through in PR4. However, the CER will undertake an annual ex-post adjustment to take account of actual outturn costs and revenues earned by the EWIC. This ex-post adjustment will subsequently be reflected in the following year's allowed revenue.

Table 1.5 Proposed EWIC Costs

(€m's in 2014 prices)	2016	2017	2018	2019	2020	Total
E-W Interconnector charge	33.46	33.46	33.46	33.46	33.46	167.3

1.7 Proposed Capex for 2016-2020, PR4 Period

The purpose of the PR4 Capex review is to ensure that the correct, appropriate and fully justified level of network investment takes place in order to continue the delivery of the network capacity required for Gate 3[5] and to meet Ireland's 2020 renewable targets[6] in the consumer interest while maintaining safety, reliability, efficiency and relevant statutory obligations. The CER's approach, as detailed in section 4 of this paper, is to deliver increased network capacity is a multi-faceted approach involving enhancing capacity on existing networks, the development of new lines where justified and the operation of the network to deliver more.

As outlined above, the CER believes that the significant capex investment, allowed in PR3 and continuing in PR4, in the Irish transmission system is necessary for consumer welfare and particularly so as to transition to a more renewable-based electricity system.

While the CER believes that this investment in the Irish transmission system is necessary, the CER will seek to ensure that the TSO and TAO are incentivised such that PR4 capex will be incurred efficiently. This will be done through use of a revised annual Capex monitoring program, ex-ante reviews of capital expenditure

[5] Please refer to the CER's Gate 3 Decision paper which provides for 40% of Ireland's electricity consumption coming from renewable generation by 2020. Gate 3 does so by including circa 3,900MW of renewable generator projects in Gate 3 through a defined rule set.
[6] Please refer to the Government's Energy White paper.

not sufficiently defined at the beginning of PR4, and a cost benefit analysis (CBA) template for all transmission projects over a certain level of expenditure.

The CER is proposing to adopt “scenario one”, as recommended by Jacobs for the purpose of setting allowed revenues and tariffs. In the event that portions of transmission infrastructure are undergrounded as a result of planning or other requirements any additional costs will be assessed by the CER and allowed where they are efficiently incurred. This scenario envisages a total allowed capex of €1.026bn, compared to the PR3 outturn current forecast of €1.027bn.

1.8 Proposed PR4 Rate of Return (WACC)

The CER also sets the level of return allowed to the transmission utilities over the course of the review. This return, known as the Weighted Average Cost of Capital (WACC), is chosen to allow the regulated company to make a fair, but not excessive, return on its capital investments over the period of the review. For the period in question, the CER, in accordance with the recommendations of its consultants Europe Economics, is proposing a basic WACC of (real pre-tax) **4.8%** for the TSO and TAO, which includes an “aiming up allowance” of 0.22%.

The CER is proposing that the additional “aiming up allowance” of 0.22% on WACC would be subject to review, and potential clawback. This should again incentivise efficient behaviour, and is in accordance with a number of recent regulatory decisions. This may lead to higher charges for the TUoS customer initially. However, the CER believes that this will ensure adequate financing of the capital programme in addition to driving long term savings for the consumer.

1.9 Proposed Transmission Revenue for 2016 & 2015/2016 AUP

The CER has approved revenue of €331.64m in 2014 prices for the transmission businesses in 2016. This was approved in advance of a final decision for PR4, in order to facilitate the implementation of tariffs by October 1st 2015.

1.10 Conclusion

The CER believes that although TUoS charges rise by a year-on-year average of 2.5% during PR4, its proposals should allow for the continued roll-out of necessary infrastructure investments that will enable the transition to a renewables-based electricity system to be conducted effectively and at an efficient level of cost. To that end, the proposals contained in this paper suggest significant efficiencies that will benefit end-users, as well as provide the regulated companies

with a stable regulatory environment and the chance to earn an appropriate rate of return consistent with effective performance.

Comments are invited from interested parties as detailed in Section 2.4 of this consultation paper.

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2 Introduction

2.1 The Commission for Energy Regulation

The Commission for Energy Regulation (CER) is Ireland's independent energy and water regulator. The CER was established in 1999 and now has a wide range of economic, customer protection and safety responsibilities in energy. The CER is also the regulator of Ireland's public water and wastewater system.

The CER's primary economic responsibilities in energy cover electricity generation, electricity and gas networks, and electricity and gas supply activities. The overall aim of the CER's economic role is to protect the interests of energy customers. The CER has an important related function in customer protection by resolving complaints that customers have with energy companies.

The CER's core focus in safety is to protect lives and property across a range of areas in the energy sector. This includes safety regulation of electrical contractors, gas installers and gas pipelines. In addition the CER is the safety regulator of upstream petroleum safety extraction and exploration activities, including on-shore and off-shore gas and oil.

In 2014 the CER was appointed as Ireland's economic regulator of the Irish public water and wastewater sector. The CER's role is to protect the interests of water customers, ensure water services are delivered in a safe, secure and sustainable manner and that Irish Water operates in an economic and efficient manner.

Further information on the CER's role and relevant legislation can be found on the CER's website at www.cer.ie

2.2 Purpose of this Paper

This consultation paper sets out the CER's proposals on the revenue that EirGrid (the Transmission System Operator, TSO) and ESB Networks (the Transmission Asset Owner, TAO) should be allowed to recover from the TUoS[7] customer over the period 2016 to 2020. This revenue will allow the TSO and TAO to finance their activities as the monopoly electricity transmission system operator and system owner, respectively, in Ireland.

The purpose of this paper is to invite comments from interested parties on these matters.

[7] Transmission Use of System

2.3 Structure of this Paper

The structure of this consultation paper is outlined in this section.

- Section 2 details the purpose of, and how to respond to, this paper;
- Section 3 provides relevant background information. It also provides information on the CER's objectives for this review period and key assumptions;
- Section 4 outlines the process through which this review has been conducted to date;
- Section 5 provides information on how the proposed TSO and TAO Regulatory Asset Bases (RABs) have been derived for the 2016 to 2020 period;
- Section 6 provides information on the cost of capital that is proposed for application to the TSO's and TAO's RAB over the 2016 to 2020 period.
- Section 7 outlines a review of the TAO's and TSO's historical capital expenditure for the 2010 to 2015 period;
- Section 8 outlines a review of the TSO's forecast capital expenditure for the 2016 to 2020 period;
- Section 9 outlines a review of the TAO's and TSO's historic operational expenditure for the 2010 to 2015 period;
- Section 10 outlines a review of the TAO's and TSO's forecast operational expenditure for the 2016 to 2020 period;
- Section 11 outlines the TSO's and TAO's allowed revenues;
- Section 12 provides information on how the proposals outlined within the previous sections feed through into the revenue that would be collected each year by the TSO and TAO;
- Section 13 provides information the TUoS tariffs that will be in place for the 1st October 2015 to 30th September 2016 tariff period; and
- Section 14 provides a conclusion to the proposals outlined in this paper.

Reports provided by two consultancy advisors engaged by the CER to assist with this project have also been published alongside this paper[8]. These are:

- Two reports by Jacobs recommending the appropriate level of revenue required to finance the technical aspects of the TSO's and TAO's activities; and
- Two reports by Europe Economics on the appropriate cost of capital for the TSO and TAO.

The views put forward in this consultation paper draw from the recommendations provided in those reports.

2.4 Responding to this Paper

Responses to the proposals set out in this paper should be sent by **17.00hrs, Monday 14th September, 2015**. Responses should be sent, preferably by email to:

Aoife Parker-Hedderman
aparkerhedderman@cer.ie

Electricity Networks
Commission for Energy Regulation
The Exchange
Belgard Square North
Tallaght
Dublin 24

Unless marked confidential, all responses will be published on the CER's website. Respondents may request that their response is kept confidential. The CER shall respect this request, subject to any obligations to disclose information. Respondents who wish to have their responses remain confidential should clearly mark the document to that effect and include the reasons for confidentiality.

[8] Further information on the role of these advisors is provided in Section 4.4.

3 Background, Objectives and Assumptions

3.1 Introduction

This section provides the following information:

- Relevant areas of the CER's role and the powers under which the CER will make its determination on the price control are outlined;
- The manner in which this price control follows on from previous controls is discussed;
- The CER's objectives for the 2016 to 2020 revenue control are detailed; and,
- The key assumptions underpinning the review have been documented.

3.2 The CER's Role in the Determination of this Control

Under Section 35 of the Electricity Regulation Act 1999 ("the Act"), the CER approves charges for the use of the electricity transmission system in Ireland.

In accordance with Section 35 of the Act, this document outlines the CER's proposals on the revenue that the TSO and TAO will be allowed to recover from TUoS customers during the period from 2016 to 2020.

The rationale for the CER's proposals is explained in detail in the remainder of this paper. The level of revenue is detailed in section 12 of this paper.

Section 36 of the Act states that the TSO's statement of charges, prepared in accordance with Section 35, must be submitted to the CER for approval and will not take effect until approved by the CER. In accordance with Section 36 of the Act, the TSO's approved statement of charges for the 1st October 2015 to 30th September 2016 tariff period will be published in August 2015 and will include allowed revenues for 2016 as outlined in this paper.

3.3 Context of this Price Review

This consultation paper sets out the CER's proposals on the revenue that the TSO and TAO should be allowed to recover from the TUoS customer over the period 2016 to 2020. This will be the fourth such transmission revenue control to be set by the CER.

3.3.1 PR1: 2001 to 2005

The first five-year review covered the period from 2001 to 2005. This period saw many fundamental changes in the Irish electricity system relative to the preceding period. Load growth continued apace as the economy expanded. These developments followed on from a period from the mid-eighties through the late nineties which saw curtailed investment in the electricity network in Ireland. Against that background, the revenue control set in 2001 was intended to support the substantial new investment required while at the same time incentivising efficiency improvements in the transmission businesses.

At a general level, the CER believes that the review was successful in providing the basis for system expansion and renewal. Significant improvements were achieved in addressing the effects of the historical lack of investment in the transmission system, with good progress made in increasing reliability and safety. The transmission network was extended and reinforced to accommodate rising demand and new connections.

3.3.2 PR2: 2006 to 2010

The second five-year review covered the period from 2006 to 2010. Again, when setting this control, the CER's objectives included ensuring that the transmission businesses were able to maintain the transmission network to an adequate standard to meet customers' expectations. Coupled with this was the need to ensure that the interests of final customers were protected, in the short and long term, by delivering efficient network investment and containing tariffs to the maximum extent possible. During PR2 (and indeed previously in PR1) substantial levels of renewables and other new generation have connected, resulting in the need for significant expansion and reinforcement of the system.

During PR2 load growth continued apace as the economy expanded. However, for both 2009 and 2010, due to the economic circumstances at the time, load growth and by extension energy throughput figures were in the negative.

The CER's objectives also included ensuring that the transmission businesses were able to attract the necessary level of capital investment to support the approved level of renewal and extension of the network. Appropriate incentives were included to encourage the TSO to improve both its efficiency and the quality of its service to customers. The CER set incentives that were challenging but achievable.

The control was set in a manner that aimed to keep the day-to-day intervention by the CER in the TSO's and TAO's business to a minimum. This allows the TSO and TAO to manage its own costs in an efficient and independent manner while adhering to the principles and allowed revenues outlined in this paper.

Generally, this revenue review was successful in that the TSO responded to the PR2 incentive mechanisms by increasing the quality of its service to customers while some important network development projects were commenced. Details on improvements in System Minutes Lost, System Frequency, and Fault Clearance are provided in the TSO's annual system performance reports.

3.3.3 PR3: 2011 to 2015

The third five-year control covers the period from 2011 to 2015. The PR3 period was characterised by the requirement for a significant investment in transmission in order to connect a large volume of new generator connections, predominately wind. The PR3 outturn is discussed in further detail in this paper and in the Jacobs reports. In summary, while a significant amount of infrastructure was built there was also significant variation from the programme of expenditure forecast at the beginning of PR3. This is in large part due to delays in projects and changes to the capital programme over the period. This has created an issue for the ex-post review of PR3 as it is difficult to assess whether or not expenditure has been incurred efficiently due to the lack of a detailed ex-ante capital plan. This issue will be addressed in the PR4 process.

3.3.4 PR4: 2016 to 2020

The PR3 revenue control ends in December 2015. The next control period, PR4, will cover the period from 2016 to 2020. Proposals in relation to this control are contained in this paper. The objectives of PR4 are outlined in the following section.

3.4 Objectives for this Revenue Control

The CER's objectives for this revenue control are detailed below:

- To ensure that the work being carried out by the TSO and TAO in PR4 represents value for money for consumers;
- To complete this review and document the decision making process in a transparent manner with full and adequate consultation with interested parties;
- To maintain regulatory certainty;

- Ensure that the TSO and TAO are able to develop and maintain the transmission network to a high standard;
- Ensure that the interests of final customers are protected, in the short and long term. This involves ensuring that transmission costs and the tariffs set to recover these costs are contained to the maximum extent possible, while at the same time delivering efficient network investment;
- Ensure that ESB Networks as Transmission Asset Owner (TAO) and EirGrid as Transmission System Operator (TSO) are able attract the necessary level of capital investment to support the approved level of renewal and extension of the network. In doing so, the CER wishes to ensure that the TSO's investment plans provide value for money for customers in terms of the benefits they add. The CER also wishes to ensure the successful completion of the roll-out of Gate 3 network infrastructure with a firm focus on achieving the 2020 targets as per the CER's 2008 direction[9]. This direction provides for the connection of sufficient renewable generation capacity to facilitate the target of 40% of Ireland's electricity consumption coming from renewable generation by 2020. There has been significant uptake of Gate 3 offers. Based on the uptake of Gate 3 offers it is expected that enough renewable generation will connect to meet the 40% target. In PR3 the CER allowed sufficient capital expenditure to progress the efficient delivery of the necessary network reinforcements (new lines and refurbishments) to facilitate the connection of a large volume of renewable generation. The PR4 period will be characterised by the continuation of the network delivery programme and the connection of a large volume of renewables.
- The PR4 period will also be characterised by the transition of the Single Electricity Market (SEM) to the European target model, delivered in Ireland through the I-SEM (Integrated – SEM) project. In addition, with the connection of significant volumes of wind generation between 2016 and 2020, the DS3 project (Delivering a Secure, Sustainable Power System) will play an important role in ensuring that the system can be operated securely with a large volume of non-synchronous generation. The TSO in particular will be heavily involved in these projects during the PR4 period. Some of the costs associated with this work are reviewed in this paper, while the project implementation costs have been submitted separately by the TSO to the SEM Committee and so are not included in this paper.

[9] http://www.cer.ie/en/electricity-transmission-network-decision-documents.aspx?article=fb726a75-7365-4dfb-9e16-ff5c5d2d363a

- Appropriate incentives are provided for the TSO and TAO to improve their efficiency and that appropriate savings gained through these incentives are passed through to consumers. The CER is continuing to work on the appropriate incentives for the PR4 period and will publish a separate consultation paper on these matters; and
- The day-to-day intervention by the CER in the TSO's and TAO's businesses is kept to a minimum.
- In addition, during the PR4 period, CER is of the view that it is appropriate to transition the regulatory model to include more output based reporting by the regulated companies (Output Based Regulation). Accordingly the CER will work with the TSO and TAO post decision on PR4 revenues (in Q3 2015) to develop a set of annual metrics and reports which the TSO and TAO will be required to report to CER on. This will build upon the monitoring and reporting requirements already in place but will focus primarily on financial reporting to indicate performance and efficiency by the regulated companies on an annual basis against the allowed revenues set in the PR4 decision paper. Output based regulation will ensure the following:
    - that efficiency and performance remains central to the regulated companies operation of their businesses over the five year period;
    - that CER can build up a set of useful metrics and results which can feed into analysis and decisions for future revenue review periods;
    - that customers can be confident that the are receiving value for money for their investments in the TSO and TAO business against established metrics;
    - In addition, ongoing reporting and measurement on an annual basis should reduce the regulatory burden on the regulated companies at the time of the next revenue review. This is because the companies will have already prepared much of the information required for a five-year review.

3.5 System Operator and Owner Functions

The Transmission System Operator (TSO) within Ireland is EirGrid, a role that was initiated in 2006. The TSOs responsibilities include the operation, maintenance and development of Ireland's electricity transmission system in a safe, secure, reliable, economical and efficient manner. The Transmission Asset Owner (TAO) within Ireland is ESB Networks. The TAO is required to maintain the transmission system and carry out construction work for its development in accordance with the

TSO's Transmission Development Plan. The relationships and responsibilities stated in the Infrastructure Agreement, 2008, between TSO and TAO are summarised in the following table.

Table 3.1 2008 Infrastructure Agreement Summary

ACTIVITY	TSO	TAO
Identification of Need	X	
Provision of Standard Costs		X
Selection of Optimal Solution	X	
Obtaining Planning Permission	X	
Obtaining Wayleaves	X	
Outage Planning	X	
Detailed Design		X
Procurement of Materials		X
Procurement of Resources		X
Management of Site Works		X
Commissioning		X

When CER was carrying out the PR3 analysis (in 2010), it was expected that the TAO and TSO roles would be combined into a single company with EirGrid owning and operating transmission system assets. However, the Irish Government subsequently decided to maintain the current structure and arrangements; this was subsequently certified by the European Commission in 2013 under Directive 2009/72/EC. As a result of maintaining separate transmission system businesses (asset owner and operator) there is a clear need for effective communication and transparent management processes in order to achieve successful investment outcomes for consumers.

The TSO and TAO investment responsibilities can be summarised as follows:

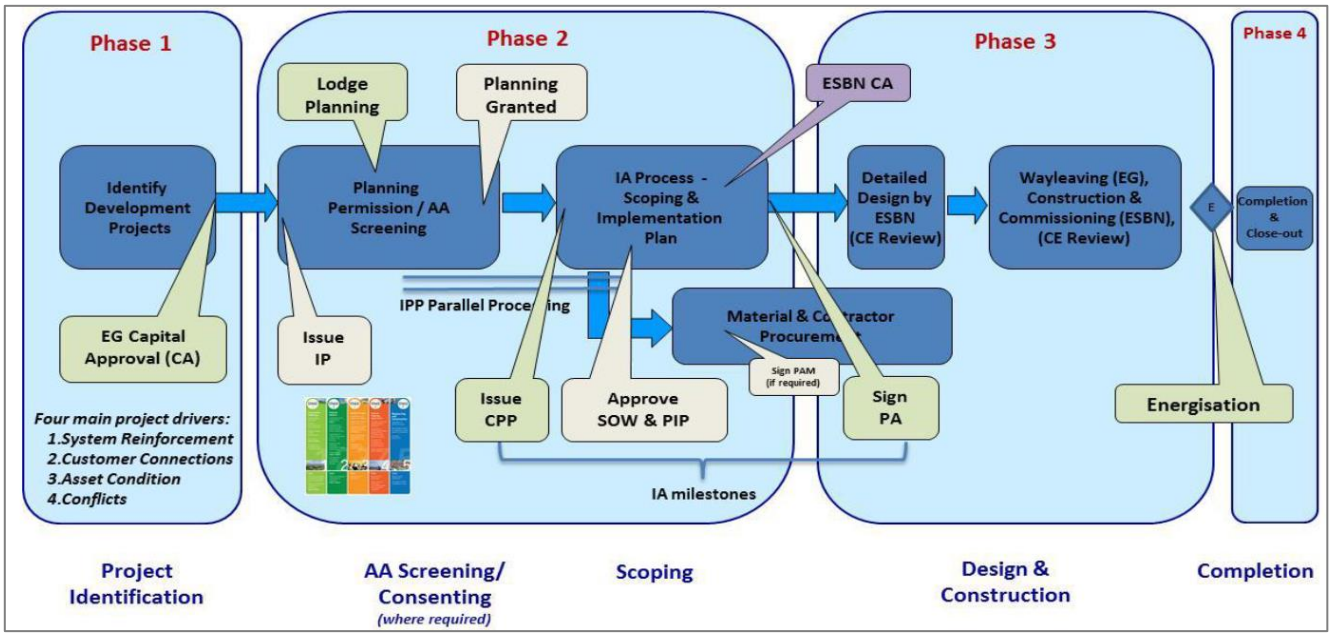
- EirGrid (TSO) is responsible for planning investments for the Irish transmission system and ensuring that system security and quality of service standards are met.
- ESB Networks (TAO) is required to finance and implement the plans developed by EirGrid and is under a legal obligation to do so.

With this in mind, it should be noted that both companies are expected to work together to provide the most efficient development and delivery of the Irish transmission system and both companies have significant influence and control over efficient delivery.

Initially the responsibilities outlined have tended to make the network development process overly sequential, however arrangements have been improved following discussions between the companies and CER and projects are now progressing more quickly with respect to inter-business responsibilities and early purchase of materials, etc. Figure 3.1 also provides further details of advances in TSO / TAO engagement activities to facilitate future planning approvals.

Figure 3.1 illustrates the current transmission project lifecycle, which highlights how whilst both EirGrid and ESBN have primary roles in specific phases (EirGrid Phase 1 & 2, ESBN in Phase 3), both companies are involved where required across all project phases.

Figure 3.1 Current EirGrid View of Transmission Project Life Cycle



3.6 Key Assumptions

Inevitably, given the five-year scope of the review, it has been necessary to make a number of assumptions regarding the environment within which the TSO and TAO will operate for the price control period. Changes in the assumptions outlined in this section could lead to a reopening of the transmission revenue control (or aspects therein), where the CER considers this appropriate. The key assumptions made by the CER are as follows.

3.6.1 Transmission System Owner and Operator Structure

The transmission system operator and owner functions will continue to remain as semi-state enterprises for the duration of the review and there will be no substantial changes made to its structure. Therefore the transmission allowed revenues for 2016 to 2020 have been set on the basis of the current industry structure and the CER is assuming that this structure will be in place for the entire PR4 period. Should this position change, or is likely to change, at some point over the five years of this revenue control period (2016 to 2020), the CER will take the appropriate steps to review the regulatory structures and revenues in place for transmission.

Therefore, the policies outlined in this consultation paper are on the basis that EirGrid will remain as TSO and ESB Networks will remain as TAO for the 2016 to 2020 PR4 period. Information is provided above regarding the effective unbundling of the transmission system operator and transmission system owner functions during PR3.

For the assumptions outlined in Paragraphs 3.6.2 to 3.6.4, the process through which the revenue control will adapt to cover changes has been outlined.

3.6.2 TSO and TAO Functions

There will be no substantial changes in the functions of the TSO and TAO.

3.6.3 PR3 Outturn Figures

Within this paper, the figures provided by the TSO and TAO on their respective expenditure during the PR3 period have been labelled as actual or outturn values. This is not strictly correct. The 2015 values are the TSO's/TAO's best estimate of the expenditure they will incur in 2015.

The final values for 2015 will be reviewed when these are available in 2016 and if necessary the revenue that the TSO and TAO should be allowed to collect from the TUoS customer will be adjusted at that time to reflect the outcome of the review.

3.6.4 Other

For the purposes of setting tariffs for the forthcoming period assumptions have been made regarding:

- the level of GWhs that will be consumed; and
- the 2015 and 2016 indexation values.

Revenue over or under-recoveries due to inaccuracy of these assumptions will be corrected through the use of a “k – factor” mechanism, which will be netted off the revenue to be collected in subsequent tariff periods. This process is detailed within section 12 of this paper.

4 The Regulatory Review Process

4.1 Introduction

This section provides information on the process that led to the proposals outlined in this consultation paper. It provides:

- A high level overview of the process;
- Information on how the project has been conducted to date;
- A summary of the expertise used;
- Information on the scope of this review.

4.2 Overview

This section provides a high level summary of the approach the CER has adopted to determining the revenue that the TSO and TAO can recover from TUoS customers during the period 2016 to 2020. Section 4.3 provides more detail on the steps taken as part of this process.

4.2.1 Review of historic operational expenditure

The operational expenditure incurred by the TSO and TAO over the period 2011 to 2015[10] was reviewed. This involved assessing improvements in efficiency made by the TSO and TAO during that period, bearing in mind developments that occurred over that period.

4.2.1.1 Review of forecast operational expenditure

The operational expenditure which the TSO and TAO forecasts they will incur respectively during the period 2016 to 2020 was reviewed, with particular focus on ensuring value for money and efficiency improvements.

4.2.1.2 Review of historic capital expenditure

The capital expenditure incurred by the TSO and TAO over the period 2011 to 2015[11] was reviewed. The appropriateness and efficiency of the investments made during that period were assessed. This analysis included an assessment of actual versus planned capital expenditure over the period, in terms of the volume

[10] It should be noted that 2015 values are forecast.
[11] Ibid.

of, unit cost of, and need for the investment. This review took account of the efficiency and value for money of the out-turn expenditure compared to that forecast by the transmission businesses in advance of PR3.

4.2.1.3 Review of forecast capital expenditure

The capital expenditure program required for the PR4 period, as forecasted by the TSO was examined, with particular focus on ensuring value for money and developing the transmission network towards reaching the Government's 2020 renewables target and other security of supply, market integration and demand drivers.

4.2.1.4 Determining the regulatory asset base

Following the above reviews of historic capital expenditure any variances between the approved and actual expenditure which had been efficiently incurred by the TSO and TAO were reflected by adjusting the regulatory asset base (RAB). The original asset base had been put in place as part of the first five-year review (2001 to 2005) and adjusted for the second (2006 to 2010) and third (2011 to 2015).

The RAB was also adjusted to allow for the proposed forecast capital expenditure. This adjusted RAB is proposed for use for the forthcoming review period (2016 to 2020) and has been published alongside this paper as part of the CER's revenue control model.

4.2.1.5 Determining the appropriate cost of capital

A proposed cost of capital for application to both the TSO's and TAO's regulatory asset base, respectively, has been developed and this has been addressed in Section 6 of this paper.

4.2.1.6 Determining appropriate incentives

Using the reviews of the TSO's historic and forecast performance as a basis, proposed incentives will be developed by the CER. These proposals will be consulted on separately and as such are not considered in this consultation paper.

4.2.1.7 Determining the allowed revenue

The output of the above analysis was fed through to develop proposed revenue for the TSO and TAO (which will be recovered from the TUoS customer) for each calendar year within the period 2016 to 2020. This revenue feeds through into the setting of TUoS tariffs for each tariff period, 1st October to 30th September.

4.2.1.8 Determining TUoS tariffs

This paper includes information on demand TUoS tariffs for the next tariff period, from 1st October 2015 to 30th September 2016. They are based on three months (demand weighted) of 2015 calendar year revenue (set as part of the previous five-year review, PR3) and nine months of the proposed 2016 calendar year revenue. It is intended that the same methodology, for allocation of calendar year revenue for recovery during tariff periods, will be used for subsequent tariff periods. It should be noted that due to the short timeframe between now and implementation of the TUoS tariffs for 2015/16 (1st October 2015) and the need for electricity suppliers in particular to make changes to their tariff offerings and systems, the CER has decided that the TUoS tariffs for 2015/16 will be based upon the figures outlined in this consultation paper. To the extent that the final allowed revenues change in the CER's decision paper, these changes will be reflected through the use of "k-factor" adjustment mechanisms in future tariff periods.

Generator TUoS tariffs for the period 1st October 2015 to 30th September 2016 will be published by the SEM Committee during the consultation phase of this paper.

4.3 Conduct of this project

In order to ensure that there is clarity as to the underlying data and assumptions as well as the analysis itself, this project has involved a high level of interaction with the TSO and TAO[12]. The high level steps associated with this process are provided here.

To facilitate this review, the CER procured consultancy support for the provision of technical and financial advice over the course of the project. Detail on this is provided below in Section 4.4.

To ensure that the CER and its advisors attained an adequate understanding of the TSO's and TAO's business, the CER engaged with both parties to ensure that relevant data was provided in a useable format. A questionnaire was issued to the TSO and TAO outlining the technical, economic and financial data required by the CER. The TSO and TAO then separately completed the questionnaire in two stages: providing historic data first and then progressing to forecast information. Following submission there was a period of interaction between the CER and the

[12] Some aspects of the TAO's costs relate to services shared with other ESB business units. Separate information was sought and received from ESB Corporate in respect of those costs.

TSO and TAO during which clarifications and further information were sought. A number of site visits to key installations were also completed.

This interaction allowed the CER, with the assistance of its advisors, to complete a comprehensive review of the TSO's and TAO's historic and forecast performance, leading to the development of the proposals outlined in this paper. Prior to publication of these proposals for consultation, they were discussed with both parties and reviewed for technical accuracy.

Regarding the next steps in this process, as detailed in Section 2.4 of this paper, interested parties are invited to provide comments regarding the proposals outlined in this paper. The CER will consider all comments received prior to publication of a decision paper.

4.4 The Expertise Used

The CER has completed numerous reviews of regulated utilities since its foundation in 1999 and has developed its internal abilities over that period. To augment these skills, and reflecting the range of analysis required, the CER has acquired the services of economic and engineering experts to assist in the review of the TSO's and TAO's historic and forecast costs as well as their respective performances in PR3.

Jacobs Consulting (formerly Sinclair Knight Merz – SKM) was procured to provide advice on the technical aspects of the review. This includes reviewing the TSO's and TAO's capital and operational expenditure and providing advice on an efficient level which should be approved by the CER for recovery from the TUoS customer.

Europe Economics was procured to provide advice on the financial aspects of the review. The main body of work being completed by Europe Economics is the provision of advice on the approach to and the appropriate cost of capital for the TSO and TAO for the five year period 2016 to 2020.

The advice put forward by the CER's consultancy support has fed through into the proposals outlined in this Consultation Paper. In addition, the reports put forward by both Jacobs and Europe Economics are published alongside this paper. To avoid repetition, CER's Consultation Paper does not critique or repeat the analysis carried out by Jacob's and Europe Economics but focuses on their conclusions. Accordingly CER's consultation paper should be read in conjunction with the Jacobs and Europe Economics' reports in order to gain a full understanding of all aspects of the review of the TSO and TAO business.

4.5 Scope of this Review

The review and proposals outlined in this paper relate to the regulated aspects of the TSO's and TAO's activities. With regard to EirGrid's businesses, this means that the analysis refers only to EirGrid's TSO business. With regard specifically to the TAO, this work forms part of a wider review process in which the Distribution System Operator (DSO) business operated by ESB Networks has also been assessed by the CER. With relevance to the current review, to set the costs to be recovered from the TUoS customer, the CER has also taken into account:

- Transfers of costs and revenue between separate business units, for example in respect of ESB Networks DSO business and EirGrid's East West Interconnector or System Operator Northern Ireland business; and,
- The allocation of corporate centre costs and overheads to the regulated business units. Separate information was sought from ESB and EirGrid Corporate in respect of those costs.

5 The Regulatory Asset Base

5.1 Introduction

The revenue that is recovered from the TUoS customer during each review period can be divided into three separate categories:

1 Revenue to cover the TSO's and TAO's operational costs during that period;

2 A return on capital invested in the TSO's and TAO's assets; and,

3 Revenue to cover depreciation of the TSO's and TAO's assets.

The Regulatory Asset Base (RAB) plays a key role in the determination of the amount of depreciation that the TSO and TAO receives (item 3 above), and is the base to which the rate-of-return is applied when determining the return on capital for the TSO and TAO (item 2 above).

This section provides information on a number of interrelated issues that determine the TSO's and TAO's RAB respectively. Specifically, this section provides information on:

- the type of assets within the TSO's and TAO's RAB;
- the methodology used to value the assets within the TSO's and TAO's RAB;
- the length of asset lives applied to the assets within the TSO's and TAO's RAB;
- the depreciation methodology applied to the TSO's and TAO's RAB;
- the regulatory practice when an asset is physically replaced prior to being fully depreciated; and
- the regulatory treatment of (1) additions to the TSO's and TAO's RAB and (2) clawback of revenue earned on assets that were not put in place (i.e. the PR3 Capex underspend).

5.2 Composition of the RAB

Please see the CER's revenue model for detailed composition of the TSO's and TAO's regulated asset base at 1st January 2016. Information on the value of the assets is provided within the asset base itself. Please refer to Appendix B of the Jacobs TAO Report for a detailed discussion of the asset lives used for the RAB.

Table 5.1 TAO RAB 2016-2020

	2016	2017	2018	2019	2020
OAV	2,095,762,747	2,242,650,883	2,367,163,820	2,497,883,189	2,642,569,965
Capex	202,691,170	184,184,729	194,174,756	212,205,199	190,742,271
Depreciation	-55,803,033	-59,671,792	-63,455,387	-67,518,423	-71,547,897
CAV	2,242,650,883	2,367,163,820	2,497,883,189	2,642,569,965	2,761,764,338

Table 5.2 TSO RAB 2016-2020

(2014 prices)	2016	2017	2018	2019	2020
OAV	34,823,856	38,186,820	40,174,298	39,057,557	37,254,399
Capex	10,350,000	9,790,000	7,210,000	6,520,000	5,710,000
Depreciation	-6,987,035	-7,802,522	-8,326,741	-8,323,158	-8,204,551
CAV	38,186,820	40,174,298	39,057,557	37,254,399	34,759,848

5.3 Valuation of the Regulatory Asset Base

5.3.1 Introduction and proposal to continue current approach

The preceding section provides information on the composition of the TAO and TSO RAB. However, the approach to valuing the assets within the RAB is also an important decision within the revenue control process.

The CER intends to continue its current approach for valuation of the RAB through into the next review period. This decision is based on regulatory certainty and maintaining regulatory precedent regarding the methodology for valuation of the RAB. This was the established practice during the first three control periods.

This approach allows the CER to focus on reviewing other aspects of the TSO's and TAO's performance to ensure that the electricity network businesses are operated and developed in a cost-effective and efficient manner.

The CER is now restating its intention to continue with the current methodology for the valuation of the TSO's and TAO's RAB. The following sections provide further information on this issue.

5.3.2 Background

The core issue regarding the valuation of the TSO's and TAO's RAB is whether the RAB should reflect the value of the assets now (replacement value) or when they were built (acquisition cost). A number of variations on these approaches are outlined below. The advantages and disadvantages of each are detailed below.

5.3.2.1 Acquisition cost

Assets are valued at their original cost of construction /acquisition. The value of the assets is not indexed for inflation nor is the value linked to the cost of replacement.

5.3.2.2 Replacement cost

Assets are valued at what it would cost to replace existing assets. There are two approaches to replacement cost: (a) indexing the acquisition cost of the assets to allow for inflation; and (b) revaluing the asset based using a modern equivalent asset value (MEAV) approach.

5.3.2.3 Replacement cost less stranded assets

This is as per replacement cost (above) but those assets that are not utilised in the current system would be excluded. Effectively, this would be the cost of building a replacement system.

5.3.2.4 Deprival value

The assets would be valued at the lower of their replacement cost or economic value (in the event that they could not be replaced).

Table 5.3 Advantages and Disadvantages of Valuation Approaches

Approach	Advantages	Disadvantages
(1) Acquisition cost	This is the simplest approach to valuing the RAB. It requires no adjustments to the RAB, other than for new capital expenditure and depreciation.	It does not reflect the economic values of the assets and therefore is likely to reduce incentives to invest in the network. It may not provide sufficient cashflow to fund network investment.
(2) Replacement cost	There are two variations of this: **(a) Modern Equivalent asset** This ensures the RAB is directly linked to the costs of constructing a new transmission system. It provides a better indication of changes in market values. **(b) Indexed acquisition cost** This is simpler to apply than MEAV, as it does not require an in-depth review of the asset base.	**(a) Modern Equivalent asset** Complex, as in principle all assets within the RAB must be reviewed and valued. Assessment of networks used for valuation is controversial – specifically whether this should be the existing or an 'optimal network'. This approach risks deterring new investment if some existing assets are stranded when the RAB is revalued. **(b) Indexed acquisition cost** Simple indexation means that some assets may be overvalued and some undervalued relative to their true market value. This may be worsened by retirement/disposal of some assets. It does not take into account technological improvements that increase capital efficiency.
(3) Replacement cost less stranded assets	The advantages are as per those listed above for replacement cost. In addition, it has the benefit that any assets that are considered stranded – that is, where there is an unambiguous case that they are not required – would be removed from the RAB. This is correct as, in principle, these should be removed as they do not form part of the operational base of networks.	Identifying stranded assets is somewhat subjective. It would need to be demonstrated that a specific asset should not have been built based on reasonable assumptions. Excluding stranded assets from the RAB may deter investment. That is, the TSO/TAO may not invest in some cases if there is a risk that the asset may become stranded, for example, through expected load not appearing.
(4) Deprival value	Provides most accurate economic valuation of the network	Highly complex to apply as requires detailed modeling of system to determine asset values

Having balanced and considered all of the above, the CER decided that the TSO's and TAO's RAB would be valued using a replacement cost approach for the period 2001 to 2005. It was subsequently decided that the approach would be continued for the period 2006 to 2010 (PR2) and 2011 – 2015 (PR3) periods.

While it is recognised that there are advantages and disadvantages associated with each methodology, the replacement cost approach was taken as it is more likely to result in the correct level of network investment.

As documented above there are a number of variations of replacement cost that could be used. The version used by the CER is 2 (b) above - indexed acquisition cost, (i.e. acquisition costs indexed upwards to allow for inflation, as a proxy for the replacement cost).

5.3.3 Proposal

The CER intends to continue using this methodology to value the TSO's and TAO's regulated asset base for the 2016 to 2020 period. Firstly, the CER remains of the view that this approach is the most appropriate to value the Irish network assets. Secondly, maintaining this methodology, which has become established practice over the past three control periods, provides regulatory stability which is a significant advantage in itself.

5.4 Asset Lives Applied to the RAB

5.4.1 Introduction

The assets lives applied to assets within the RAB feeds through into the level of depreciation that the TSO and TAO receive separately on those assets within each control period (or indeed year).

In line with established practice from the PR2 and PR3 periods, the CER is re-stating its intention to continue using average assets lives of 50 years for the TAO's network assets. This was increased from average transmission and distribution asset lives of 40 years for PR1. The CER's decision to increase asset lives was based largely on the structure of the RAB at that time, i.e. that is predominantly made up of switchgear, transformers and overhead lines and the experience of network operators that showed equipment that has been correctly specified, installed and maintained will last longer than had been previously assumed.

In order to determine whether there was a requirement or a justification to change the asset lives for the PR4 period, CER requested that its consultants (Jacobs)

would carry out a review of the appropriate asset lives for PR4, taking account of the economic and technical lives of the assets on the TSO and TAO RABs. Jacob's report on asset lives for PR4 is included in Appendix B of the Jacob's TAO report. Having reviewed Jacob's conclusions, CER is satisfied that there is no strong justification to change the asset lives for PR4. Accordingly on the basis of regulatory certainty and maintaining regulatory precedent, the CER has decided to continue using average assets lives of 50 years for the TAO's network assets. The asset lives applied during PR3 to other types of assets within the TAO's and TSO's RAB are detailed below. It is intended that these will also be applied through the 2016 to 2020 period.

5.4.2 Background

There have been some changes in the length of the asset lives applied to the TAO's assets when moving from pre 2001, into PR1, PR2 and then PR3. The assets lives applied during each period are detailed in the table below.

Table 5.4 Asset Lives Applied to the TAO's Transmission Assets

Asset	Pre PR1	PR1	PR2	PR3
Network assets	30	40	50	50
Telecoms	30	40	50	50
Office equipment	10	10	10	10
Scada telecoms	15	15	15	15
Premises	50	50	50	50
Grants	30	40	50	50
IT	5	5	5	5
Customer Contributions	30	40	50	50

For the initial revenue control period covering 2001 to 2005 a uniform network asset life of 40 years was applied by the CER. When setting the revenue control period for 2006 to 2010, the CER decided that transmission network assets contained in the RAB should be depreciated over an average lifetime of 50 years. Most of the other asset lives were not changed when moving between periods.

Regarding the change from 40 to 50 year asset lives for the network assets, the PR2 decision paper noted that internationally in recent years there has been a

general trend towards extending the lifetimes of electricity transmission assets. This is based on the experience of efficient network operators, who have found that equipment that has properly specified, installed and maintained will last longer than had previously been assumed. Performance of older assets is generally adequate, not least due to the modest pace of technological advance in electricity transmission, and the risks of purely age-related failure are considered to be low. In addition, condition monitoring has replaced age-based techniques in determining effective asset lifetimes.

As noted by Jacobs, there is often a difference between the economic life of an asset and the useful technical life of an asset. Assets can, if correctly maintained and operated, continue to operate successfully, reliably and safely beyond their economic life. Assumed asset lives may drive replacement programmes; accordingly a consequence of the average asset lifetimes assumed by a utility is that assets older than the economic life may be automatically replaced regardless of asset condition or reliability. Such an approach could lead to sub-optimal outcomes for consumers, where assets are replaced before they need to be.

On the other hand, it may be argued that longer economic asset life-times will result in poor quality of supply issues. The CER does not accept this argument. Asset conditions should (and are) checked regularly by the asset owner; where an asset needs to be replaced in advance of the expiry of its economic life, there is provisions to do this.

The asset condition of the transmission network generally appears quite good, and in line with the expected condition of well-maintained assets according to their age and environment and bearing in mind significant levels of investment in recent years. Site visits conducted by the CER's advisors during the course of the PR3 and PR4 reviews provided considerable evidence of this.

Having considered the above, the CER has decided that network assets contained in the RAB should continue to be depreciated over an average lifetime of 50 years. The CER also decided that the changes in an asset's life should be implemented in accordance with paragraphs 17.18 and 17.19 of FRS 102[13], that is, the carrying amount (Net Book Value) of an asset at the time of the change should be depreciated over the revised remaining useful economic life of that asset.

The CER sees no reason to change this treatment for the 2016 to 2020 period.

[13] FRS 102 sets out the principles of accounting for tangible fixed assets, such as electricity transmission assets and is available here on the UK Financial Reporting Council's website

5.4.3 Proposal

For the control period covering 2016 to 2020, the CER intends to continue applying the assets lives used during PR3. Maintaining regulatory certainty by continuing this methodology is a significant advantage to this approach.

5.5 Depreciation Method

5.5.1 Background

Economic depreciation profiles the original capital cost of a project over its useful life. There are a number of possible methods through which asset bases may be depreciated; some relevant examples are straight-line, sum-of-years-digits and declining balance depreciation.

When setting the first revenue control, covering the period 2001 to 2005, the CER chose the straight-line method. The following benefits were noted:

- Straight-line fully depreciates the assets over a period of time. The declining balance method does not as it is calculated as a portion of the declining value of the asset.
- Due to the nature of the design life of network assets and the load profile of the use of network assets, the straight-line method was considered to be a reasonable representation of depreciation for network assets.

The straight-line approach to depreciation was then continued when setting the second (PR2) and third (PR3) revenue controls.

5.5.2 Proposal

For the control period covering 2016 to 2020, the CER intends to continue applying the straight-line method of depreciation used during PR3.

5.6 Replaced Assets

The CER notes that a significant amount of expenditure had taken place in the last decade on replacing assets in TAO's network. This could possibly lead to a situation where an asset and its subsequent replacement would both be included in the RAB at the same time, that is, the asset has been replaced before its value in the RAB has been fully depreciated.

In the PR2 decision paper, the CER stated its belief that assets included within the RAB that have been replaced should be removed from the RAB at the time of their

replacement. This policy was continued into the PR3 period and in effect prevents a situation arising where there is “double-counting” of assets or double payment by the consumer.

The CER proposes that this policy should also be applied during the PR4 period, covering 2016 to 2020, where material values of assets are replaced before being fully depreciated. However, CER will also take into consideration that using an average asset life for a class of assets may extend a subset of assets beyond their economic life.

5.7 Additions to TSO and TAO RABs

5.7.1 Introduction

The regulatory treatment of additions to the TSO and TAO RAB’s is an important issue in a revenue control. This section explains and proposes to continue the current regulatory approach to treatment of additions to the TSO and TAO RAB’s for:

- Interest During Construction (IDC);
- Capital contributions and grants; and,
- Variations between allowed and actual expenditure during PR3.

5.7.2 Interest During Construction (IDC)

In the three previous revenue controls, assets were added to the RABs as costs were incurred, not on the date of commissioning. The TSO and TAO received a return on the assets from the middle of the year in which the costs were incurred, rather than when the asset was commissioned. For this reason the CER did not allow IDC to be added to the respective RAB’s.

Depreciation was also provided as expenditure on assets is incurred. This means that expenditure on assets still under construction during any given year will be included in the calculation of that year’s annual depreciation charge.

The CER proposes to continue this policy during the forthcoming revenue control period, covering 2016 to 2020.

Notwithstanding this, CER is concerned that a small number of instances have arisen where assets have been constructed by the asset owners and added to the RAB, but full commissioning and energisation of the assets has been delayed, in some cases by a number of years. This leads to a concern that consumers are

paying for assets which they are not yet receiving a benefit from. In order to address this issue, CER is proposing that assets which have been added to the RAB, but have not been energised within 5 years (except in the case where the programme of work was scheduled to be longer than 5 years or where the TAO can satisfactorily show that the delay is beyond its control) would be temporarily removed from the RAB (with all return and depreciation paused) until the point at which the asset can be energised and utilised. As this point, this does not result in any current reductions/ removals from the TAO RAB.

5.7.3 Capital contributions and grants

In the three previous revenue controls, capital contributions and grants were subtracted from capital expenditure in the relevant year.

The CER proposes to continue this policy during the forthcoming revenue control period, covering 2016 to 2020.

5.7.4 Variations between allowed and actual PR3 Capex

5.7.4.1 PR3 Capex Underspend

The information provided jointly by the TSO and TAO has indicated that there will be an underspend on capex during the 2011 to 2015 period relative to the amount allowed at the time of the CER's PR3 decision. The reasons for this underspend are detailed fully in the accompanying Jacobs TSO and TAO reports. However, the high-level reasons include project re-design/ re-planning and optimisation, land access and planning delay issues, as well as some improved costs as a result of the economic downturn.

Subsequent to its PR3 decision, the CER put in place a capex monitoring process[14]. This process includes quarterly reporting to the CER on the progress of projects valued at over €10 million. TAO and TSO also provide an annual capex outturn report to the CER detailing the annual spend on each individual transmission project.

CER proposes to retain and expand this reporting process to increase its robustness through the provision of more in depth detail of project progression and expenditure. This capex monitoring process will be reviewed by CER as part of its development of output based monitoring which will be consulted upon following the CER's decision on the PR4 review.

[14] CER/11/116

5.8 Summary

This section provides a summary of the CER's proposals on a number of interrelated areas that impact on the setting of the TSO's and TAO's RAB and the level of revenue that the TSO and TAO are allowed to collect during each control period (or year) to cover their depreciation costs separately.

No changes in methodology relative to that employed during the 2011 to 2015 period are proposed for the 2016 to 2020 period.

5.8.1.1 Valuation methodology

The CER proposes to continue using the methodology employed during previous control periods. This is a variation of replacement cost approach, which uses the inflation cost, indexed upwards to allow for inflation, as a proxy for replacement cost.

5.8.1.2 Asset lives

The CER proposes to continue using the methodology employed during the previous control period which covered 2011 to 2015. Under this approach an average life of 50 years is applied to transmission network assets. These make up the majority of the TAO's asset base. The lifetimes applied to other assets, including that of the TSO's (e.g. IT), are detailed in the revenue model published alongside this paper.

5.8.1.3 Depreciation methodology

The CER proposes to continue using the methodology employed during previous control periods. This is straight-line depreciation.

6 Cost of Capital

6.1 Introduction

Like any other business the TSO and TAO separately compete for capital (finance) on national and international markets to finance their respective capital projects e.g. transmission infrastructure construction (Stage 1 and Stage 2). In line with common practice, the amount of revenue to be collected from the TUoS customer to cover this cost is set by applying a cost of capital to the TSO's and TAO's RAB.

This is a critical element of the revenue control. CER, with the assistance of expert financial advisors sets a Weighted Average Cost of Capital (WACC) for the five year period for the Regulated companies. This WACC takes account of the expected cost of equity and cost of debt finance for the business, taking account of historical and forecast metrics and indicators. For the period 2011 to 2015 the TSO's and TAO's cost of capital was set to 5.75%[15] with a further 0.2% allowed to take account of the significant economic uncertainty in November 2010 (the time of the PR3 decision). An additional operational expenditure (Opex) cut was required in order to mitigate the consumer impact of this higher WACC.

In January 2014, CER published a decision paper on the mid-term review of the PR3 WACC (CER/14/026). This decision resulted in a reduction in the allowed WACC from 5.95% to 5.2%, reflective of the significant stabilisation and improvement in the Irish economy from 2013 onwards.

Due to the limited size of the TSO RAB (mostly IT infrastructure), applying the same cost of capital has a significantly lesser impact on TUoS tariffs, while Operating Costs make up the majority of revenues associated with the TSO.

It is important that the cost of capital is set at a level that allows the TSO and TAO to finance their respective activities. Setting the cost of capital at a lower level could result in both transmission utilities being unable or possibly unwilling to finance their operations[16], including necessary maintenance and repair. It has been argued that while there is a risk that if the cost of capital is set too high consumers may pay marginally more than is necessary for the service received, the consequences of setting too low a cost of capital may be more severe. This is discussed further below.

[15] This is a real pre-tax rate.
[16] Due to debt funding obligations.

Setting the costs of capital too low may result in necessary projects (such as those designed to facilitate the Government's 2020 renewables target) not being completed, with the result being that the consumer would be worse off in the long run. This may occur where the business is unable to obtain finance from the markets at the low level which it is allowed. However, this must be balanced against the obvious disadvantage of setting the cost of capital at a level that is too high and allowing the transmission utilities to recover too much revenue from the TUoS customer.

The following sections provide:

- a brief outline of the model that has been used to derive the proposed cost of capital for the TSO and TAO; and,
- detail on the cost of capital proposed for the TSO and TAO for 2016 - 2020.

During the review process the CER considered whether to apply a different cost of capital to the TSO from that of the TAO or indeed whether a different methodology should be used to determine the funding model for the TSO business, given the asset-light nature of the TSO business. These issues are discussed in detail in the Europe Economics' report entitled "PR4 WACC for EirGrid and ESB Networks", and "EirGrid: The RAB-WACC Approach and Alternatives".

However, having carried out this review the CER is proposing that the same cost of capital is applied to both transmission utilities and the same "RAB – WACC" approach is taken for both utilities for the PR4 period. The justification for such is provided in the accompanying Europe Economics report. Nonetheless the CER has noted that TSO made significant arguments as to why a different approach, moving away RAB-WACC could be employed for its business. It is CER's view that a much more detailed and fundamental review would be required in order to consider adapting a change in approach, in particular given that the CER is satisfied that the TSO business has been able to finance all of its activities to date (and has not seen evidence to the contrary). However noting that there was not time in the PR4 review to consider developing separate methodologies for alternative funding models, the TSO may wish to make a full and detailed submission (including its proposal) on these matters over the course of PR4, in order that the outcome of such an analysis could be considered for the next five year price review (2021 – 2025). If the TSO decides to make such a submission to CER, then CER will review these matters and consult on TSOs proposals.

This consultation paper provides a high level discussion of the work that was completed when deriving a proposed cost of capital. The report provided by

Europe Economics has been published alongside this paper and interested parties should refer to that document for further information on these issues.

6.2 Methodology for Setting the Cost of Capital

At a theoretical level, there are several possible methodologies and approaches to setting the cost of capital. Consistent with many other regulators in similar environments, when setting the appropriate cost of capital for the three previous control periods the CER used the weighted average cost of capital (WACC) methodology. Within this, the cost of debt was set using the Capital Asset Pricing Model (CAPM). The CER proposes to continue this approach for PR4.

While market return analysis and dividend growth models were not specifically used as crosschecks, other information sources have been examined to ensure that the CER's proposals are robust. Details on this are provided in the separate cost of capital report which has been published alongside this paper.

The cost of capital value proposed in this paper has been derived using the WACC model and the CAPM, and as such this paper is restating the CER's intention to continue using these methodologies to calculate the appropriate cost of capital for both the TSO and TAO for the 2016 to 2020 period.

6.3 Europe Economics' Point Estimate

This section lists the cost of capital recommendations provided by Europe Economics to the CER for the period 2016 to 2020. It also lists the values of the factors that underpin this value. For further information on these values, interested parties should refer to the separate Europe Economics cost of capital report, which has been published alongside this transmission consultation paper.

The Price Review process has involved engagement with the companies and the TSO and TAO have provided information to the CER and its advisors regarding their activities. As part of that process, both the TSO and TAO provided reports containing their own proposals on an appropriate cost of capital[17]. These figures are also included in the table below.

It should be noted that the TAO requested that the CER approve a pre-tax real value of 4.98%. While, the TSO requested that the CER approve a pre-tax real value of 5.14%.

[17] Please note that as part of the TSO submission, EirGrid argued that a different WACC should be applied to it in PR4 from that of the TAO. This matter is addressed in the accompanying EE report and the recommendations/justifications for not doing so are also outlined.

Table 6.1 WACC (Cost of Capital) Calculations and Data Inputs

	PR1	PR2	PR3	PR4: 2016 to 2020			
	Decision	Decision	Decision	TSO view	TAO view	EE Range	**EE point estimate**
Cost of debt							
Debt premium	1.50	1.35	1.2	1.75	1.75	0.75 – 1.15	**1.0**
Pre-tax cost of debt	4.55	3.73	3.2	3.5	3.75	2.5 – 3.25	**2.90**
Cost of equity							
Real risk free rate	3.05	2.38	2.0	1.75	2.0	1.75 – 2.1	**1.90**
Equity risk premium	5.4	5.25	5.2	5.0	4.6	4.6 – 5.0	**4.75**
Asset beta	0.41	0.40	0.3	0.40	0.36	0.31 – 0.44	**0.37**
Equity beta	0.80	0.80	0.67	0.9	0.8	0.69 – 0.98	**0.82**
Cost of equity (pre-tax)	3.05	6.58	5.5	7.14	6.49	5.62 – 7.99	**6.63**
WACC							
Effective tax rate	0.125	0.125	0.125	0.125	0.125	0.125	**0.125**
Gearing	0.5	0.5	0.55	0.55	0.55	0.55 – 0.55	**0.55**
Pre-tax WACC	6.5	5.63	5.95	5.14	4.98	3.9 – 5.38	**4.58**

As highlighted by the CER's consultants, the estimation of the true value of WACC is inherently uncertain. The standard approach to setting an allowed WACC figure is to set a rate at the start of the period which applies for the entire period. The allowed WACC provides for this uncertainty in its calculation and while the true WACC will change throughout the period, by fixing it for the duration of the period the CER provides investment certainty for the companies.

Europe Economics' pre-tax WACC is 4.58% for the period 2016 – 2020. However regulators typically include a further "aiming up" allowance which provides for the inherent risk of getting the WACC figure wrong and the acceptance that the risk of getting it wrong is generally asymmetrical i.e. customer welfare suffers more by setting the WACC too low rather by setting it too high (although in both cases, outcomes are sub-optimal). Section 8 of the Europe Economics report outlines the explicit aiming up proposal and methodology proposed by Europe Economics.

CER is minded to accept this approach and accordingly set the WACC at 4.8% for the period 2016 – 2020. However as well as seeking the views of respondents on the proposed WACC figure (4.8%), CER is seeking the views of respondents to this consultation on the appropriateness of this aiming up approach. Notwithstanding this, CER is considering whether it would be appropriate to include an explicit ex-post review associated with the "aiming up allowance". This would provide for a full review and potential clawback of revenues associated with this additional 0.22%[18] on WACC. Alternatively, CER may consider imposing a further opex efficiency target on the companies associated with the "aiming up allowance".

6.4 Financeability

The CER has an obligation to ensure that all licensees are capable of financing their operations as specified by Section 9(4)(c) of the Act, which states that:

> "9(4) In the carrying out the duty imposed by subsection (3), the Minister and the CER shall have regard to the need:
>
> …
>
> (c) to secure that licence holders are capable of financing the undertaking of the activities which they are licensed to undertake;

The CER interprets this clause such that the obligation is to ensure that an efficient licence holder, in this case the TSO and TAO, are capable of financing their activities. The CER has made a number of assumptions in this respect which are that:

- the TSO and TAO does not exceed the allowance for operating costs;

[18] Note – the baseline WACC allowance (4.58%) would not be subject to this review

- the financeability assessment is based on the notional capital structure assumed by the CER; and
- the effects of any pension deficit are ignored.

The CER considers these assumptions are reasonable given that (a) the proposed allowed operating costs are set at the level an efficient company can achieve, (b) it is not the function of the CER to specify the capital structure of the TSO or the TAO, to the extent the actual differs from the notional any costs should be borne by the shareholder and not the final customer and (c) it is proposed that the treatment of the pension deficits within both utilities will not be dealt with as part of the PR4 process (this is discussed in further detail in Section 10).

The calculation of the cost of capital is based on the TSO and TAO achieving an investment grade credit rating. The rating agencies take a number of factors into consideration when determining the rating of a company. ESB currently finances its network investments through the ESB Group and as such any rating for ESB Networks as the TAO (or indeed combined TAO – DSO businesses) is notional. ESB Group is currently rated as A- (stable) by Standard and Poors, Baa1 (stable) by Moodys and BBB+ by Finch. EirGrid currently does not have a rating. In carrying out financeability assessments for the regulated companies (in this case the TSO and TAO businesses and not the Groups that they are part of), the CER does not consider it appropriate, nor is it in any case possible, to replicate all the factors that the credit ratings agencies take into consideration when developing a credit rating. However, the rating agencies do publish their methodologies for rating regulated utilities and this gives guidance on what factors are taking into consideration, and importantly the financial metrics associated with the different credit ratings. Rating agencies look at a similar range of financial ratios, 0 below sets out the ratios which are broadly consistent with an investment grade credit rating.

Table 6.2 Financial Ratios Consistent with an Investment Grade Credit Rating

	BBB
FFO interest cover	2.5 – 3.5
Net Debt/RAV	>70%
FFO/Net Debt	8% – 12%

Ofgem assesses financeability using a similar set of ratios, albeit with differing limits, which are set out in Table 6.3 below.

Table 6.3 Financial Ratios used by Ofgem for Financeability Assessment

FFO interest cover	not less than 3 times
Retained Cash Flow/Debt	not less than 9%
Debt/Regulatory Asset Value	not greater than 65%[19]

Ofgem has used these ratios in its draft determinations for the assessment of financeability in its RIIO-EDI price review. Further detail can be found in Section 9 of the Europe Economics report. It is also noted that Ofwat considers an FFO/Net debt of 9%-10% to be consistent with an investment grade credit rating.[20] [21]

It is noted that Ofgem does not have a specific credit rating target, rather that companies should have an investment grade rating. The CER considers that regulatory regime in Ireland is comparable to that in Britain, providing a stable and transparent framework within which both the TSO and TAO operates. In terms of the financial profile, the CER has assessed the TSO and TAO against the financial ratios set out above and consider that the proposed allowed revenues provide for an investment grade rating. While TAO has argued for the need for an A rating, CER is not convinced of this. CER has not been provided with an analysis by TAO that would suggest that the extra cost involved in achieving A status would be off-set by lower finance costs; indeed it would appear that only ESB Group and not the consumer would benefit from conferring an A rating on ESB. The consumer would have to pay a high WACC in order that ESB would obtain lower financing costs, without any guarantee that this benefit would be returned to the consumer. The CER, having considered the Europe Economics report and the CER models, is of the view that the proposed WACC of 4.8% is consistent with both companies being adequately financeable.

6.5 CER Proposal

The CER proposes to allow a real pre-tax cost of capital of 4.8% (including aiming up) for both the TSO and TAO in the PR4 period. The methodology used to

[19] In its recent review, DPCR5, Ofgem concluded that a higher level of debt to RAV - 70% - was consistent with an investment grade credit rating.
[20] https://www.ofwat.gov.uk/pricereview/pr14/det_pr20141212financeability.pdf.
[21] At the recent PR14 price review, Ofwat assessed financeability and financial ratios at the whole company level for Severn Trent Water and United Utilities. Ofwat recommended the range of 9-10% for the FFO/Net debt ratio to maintain an S&P BBB+ rating.

determine this cost of capital is broadly consistent with the approach previously taken by the CER's for setting the cost of capital used in price reviews. The CER seeks respondents views on this proposal.

7 Review of Historical Capital Expenditure

This section examines the historical capital expenditure undertaken by the TAO and TSO over the PR3 period 2011 to 2015 compared with the expenditure allowed by the CER in the PR3 Decision Paper. The outturn expenditure is assessed, looking at the output in terms of delivery and efficiency. As mentioned above, a more detailed breakdown and explanation of historic Capex is provided in the accompanying Jacobs transmission reports.

7.1 Summary

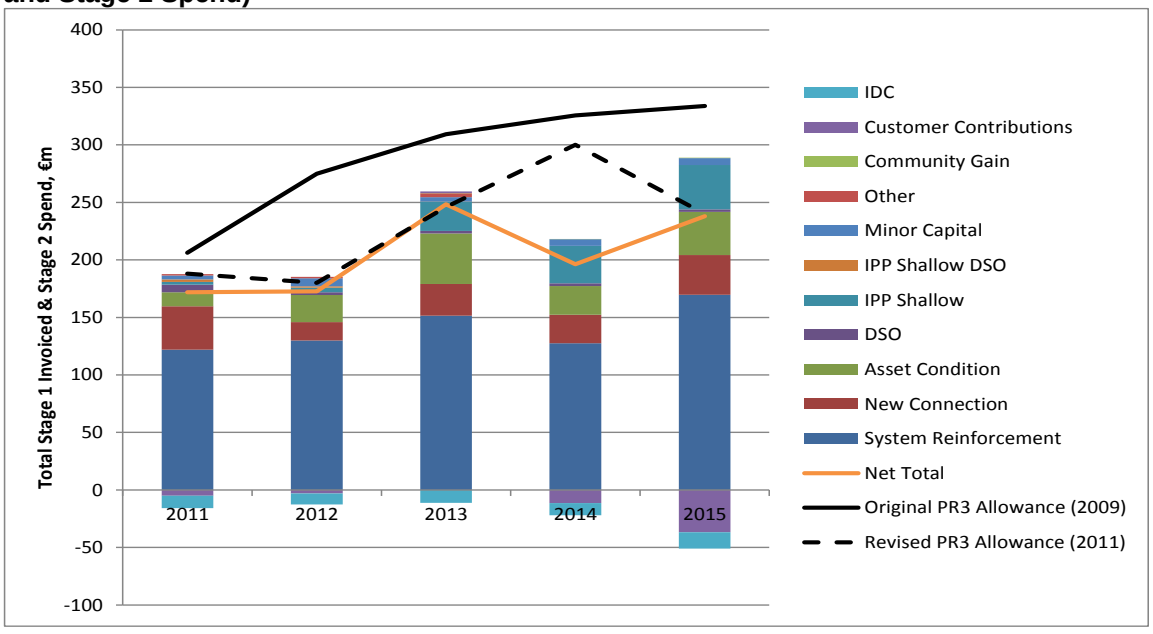
The CER allowed, in the PR3 determination under the "Stretch Network Needs" case, €1,339.5m of net capex related to network and non-network investments for the TAO. With respect to the TSO, the PR3 determination allowed for €110.4m of capex spend. This provided for a total transmission capex allowance of €1.45 billion.

The final outturn for the PR3 period is estimated as €1.027bn, which results in an underspend of €422.8m relative to the originally allowed revenue (€1.45bn) and an underspend of €130m relative to a revised allowance (€1.15bn) submitted by TSO and TAO in 2011 and accepted by CER. The revised allowance came about as a result of re-design and re-planning/ scheduling work by TSO, improved definition of projects compared to 2009 when the PR3 submission was being made as well as contractor and materials savings expected to occur as a result of the economic situation in Ireland and internationally in the early years of the PR3 period. Having reviewed the advice of Jacobs, the full underspend for the PR3 period appears largely due to the slower than expected delivery of the transmission capital programme as opposed to efficiency on the part of the companies. The CER proposes to allow €42.05m of TSO expenditure and €982.3m of TAO expenditure as efficiently incurred capital expenditure in PR3 (a total of €1,024.3m).

Table 7.1 Transmission Capex 2011-2015 as per Jacobs Report

		2011	2012	2013	2014	2015	PR3 Total
CER Allowance - Stretch Network Needs	EirGrid	€17.9	€21.6	€22.2	€22.5	€26.2	€110.4
	ESB	€188.4	€253.4	€287.0	€303.1	€307.6	€1,339.5
	Total	€206.3	€275.0	€309.2	€325.6	€333.8	€1,449.9
Network Gross	EirGrid	€4.3	€3.1	€5.7	€9.2	€21.7	€44.0
	ESB	€183.3	€182.1	€252.3	€208.9	€266.7	€1,093.3
	Total	€187.6	€185.2	€258.0	€218.1	€288.4	€1,137.3
Interest During Construction (IDC)	ESB	€10.6	€9.5	€11.3	€10.6	€14.1	€56.1
Actual Total (less IDC)	Total	€177.0	€175.7	€246.7	€207.5	€274.3	€1,081.1
	Variance	€29.3	€99.3	€62.5	€118.1	€59.5	€368.8
Customer Contributions (Allowance)	ESB	€10.5	€6.3	€8.4	€7.8	€1.4	€34.4
Customer Contributions (Actual)	ESB	€5.1	€3.0	-€1.5	€11.4	€36.8	€54.8
	Variance	€5.4	€3.3	€9.9	-€3.6	-€35.4	-€20.4
Community Gain	EirGrid	€0.0	€0.0	€0.1	€0.1	€0.5	€0.7
Network Net Capitalised (Gross less IDC & Cust. Contr. plus Comm. Gain)	**EirGrid**	**€4.3**	**€3.1**	**€5.8**	**€9.4**	**€22.2**	**€44.8**
	ESB	**€167.5**	**€169.5**	**€242.5**	**€186.9**	**€215.8**	**€982.3**
	Actual Total	**€171.9**	**€172.7**	**€248.3**	**€196.2**	**€238.1**	**€1,027.1**
	Variance	**€34.4**	**€102.3**	**€60.9**	**€129.4**	**€95.7**	**€422.8**
	% Allowance	**83.3%**	**62.8%**	**80.3%**	**60.3%**	**71.3%**	**70.8%**

Figure 7.1 Breakdown on Actual Total Expenditure Capitalised During PR3 (Stage 1 Invoice and Stage 2 Spend)



7.1.1 Reforecasting

During 2011 it became evident that as a result of delays in the progression of generation projects under Gate 3 along with a reduction in electricity demand and greater awareness and engagement of the public in relation to transmission network development projects, that the originally envisioned transmission system development expected during PR3 would not materialise as planned. As a result, ESBN in conjunction with EirGrid and the CER, agreed a revised PR3 transmission system expenditure forecast at October 2011, including estimates for years 2013 to 2015. The overall PR3 forecast expenditure was expected at that time to reduce by 21% to €1.15bn, as shown in Table 7.2. No specifics were provided on the projects which were removed or new projects which were included in the PR3 plan at the time of the reforecasting, just generic reasons for the overall reduction including demand reduction / reduced growth, slower renewable generation uptake, use of higher capacity overhead line conductor as an alternative to tower and line rebuilds, as well as internal reorganisation and refining of projects.

Table 7.2 PR3 Re-forecasted Transmission Capex

Expenditure Year	2011	2012	2013	2014	2015	Total
CER Allowance (CER/10/206)	€206m	€275m	€309m	€326m	€334m	€1.45bn
Revised Forecast (Oct. 2011)	€188m	€103m	€228m	€310m	€318m	€1.15bn
Final Revised Forecasts	€188m	€180m	€246m	€300m	€240m	€1.15bn

The annual capital expenditure in the years 2012 to 2014 was further revised during 2012, although the total expected PR3 expenditure remained as per the previously reduced total at €1.15bn. Again, no specific project expenditure variations were itemised.

7.2 Objectives of the PR3 "lookback" Analysis

In the PR3 determination the CER looked to ensure that sufficient capital allowance was made to provide for the significant network development and renewal programme envisaged by EirGrid to connect and provide deep capacity for the large number of (primarily renewable) generators expected to commence connecting to the network during the PR3 period. In addition to this, economic growth was expected to resume during the PR3 period with little expectation of either the depth or length of economic contraction which occurred between 2008 and 2013/14 (PR3 assumptions were developed in 2009).

The main objectives in the PR4 review of the TAO's and TSO's historical capex are to assess whether the expenditure has been incurred efficiently and the

expected benefits for customers have been achieved. In other words has the TSO and TAO delivered what it said it would and at the cost which had been forecast. The following areas were examined in detail:

- Comparing the outturn expenditure (and currently projected for 2015) with the allowed expenditure;
- Understanding the differences between the allowed expenditure and the outturn expenditure;
- Assessing cost drivers and their impact of performance of the capex programme;

It is important to clarify the respective roles of the TAO and the TSO in relation to transmission system development, and the implications of these roles for network Capex in the context of a price control. EirGrid as TSO plans the future development of the transmission network on an independent basis. Project design and initiation is the TSO's responsibility and this is referred to as Stage 1. Projects called for by the TSO must be funded efficiently and constructed in a timely manner by the TAO, which does not have a decision-making role in terms of the transmission projects to be undertaken. The construction and energisation of projects by the TAO is referred to as Stage 2.

Given the unique structure of the Irish transmission business (i.e. the separation of the operator and ownership functions), combined with the sizeable scale of many transmission projects, the CER has assumed a monitoring role in the rollout of significant transmission projects. While the CER reviews capital projects in detail at the end of the five-year review period, an active and ongoing annual capex monitoring process was put in place as part of the PR2 and PR3 determinations. This ongoing process is of particular merit in relation to transmission projects, which by their very nature can span more than a single revenue review period.

7.3 Review of TSO Capital Expenditure

The CER notes that it is inevitable that there will be changes to the plans upon which allowed revenue is determined and that a degree of flexibility within a Price Review period is desirable as it allows the companies to react appropriately to changed circumstances. The CER also notes that there was a considerable degree of uncertainty around the required capex at the time of the PR3 determination, in particular regarding the likely take up of Gate 3 offers, the timing of same, and the resulting impact on the capex programme.

However, such flexibility requires that the companies are able to clearly demonstrate at the end of the Price Review Period that any changes were justified and in the best interests of the consumer. Without such justifying evidence it is difficult for the CER to determine whether or not the expenditure actually incurred was efficiently incurred. The Jacobs report raises concerns that the TSO has not provided sufficient evidence to demonstrate that the outturn capital expenditure was efficient. In particular it appears to the CER that a certain level of inefficiency may have existed, particularly in the early years of PR3 when capital expenditure projects were less defined. In particular, CER is concerned that there was no attempt made to define what projects could and could not be delivered and prioritised within the €1.45 billion allowance, which resulted in a situation where the companies continued to work against earlier plans which should, in the CER's view, have been revised to account for the PR3 allowance. Further it does not appear to be until 2013 that an adequate change control process was defined, developed and implemented both internally in TSO and between TSO and TAO.

However Jacobs have acknowledged the difficulty that this lack of clarity around project and programme definition and measurement presents for the determination of whether expenditure was efficient or not. While CER is of the view that the burden of proof lies with the regulated companies to prove efficient expenditure, it is nonetheless difficult to fully determine if expenditure has been inefficient or the degree to which inefficiency occurred.

The CER accepts this recommendation and acknowledges the need to place further emphasis on addressing such uncertainties throughout the PR4 period. The CER intends to address this by putting in place a more robust monitoring and reporting framework tied to operational and strategic incentives. There will be a greater emphasis on ex-ante specification of capex projects, and on-going reporting, in order to facilitate an ex-post assessment of the efficiency, or otherwise, of the costs. This will benefit the consumer as it ensures that at risk revenue will not be funded by the consumer where the key objectives have not been achieved. The approach will facilitate the CER in ensuring that planned expenditure is incurred efficiently and delivering a consumer benefit. Also the reporting requirement will facilitate the companies in providing their PR5 submissions and give greater clarity in relation to PR4 expenditure.

On the basis of supplementary information provided by the TSO to explain the outturn cost variances, Jacobs have recommended that a PR3 capex outturn of €42.05m [22] be allowed. However, the report states that there are still questions in

[22] This includes a reduction associated with the NSIC as discussed in this section

relation to how successful TSO activities have been and ultimately, whether different outcomes could have been obtained through different activities and initiatives. Having considered the Jacobs recommendation the CER proposes to allow the outturn as proposed by Jacobs (€42.05m).

The CER notes additional expenditure, circa €54m, which has been incurred by the TSO but not yet invoiced, and hence not capitalised – this will happen in PR4 when the appropriate project milestones (as set out in the Infrastructure Agreement) have been reached. The CER proposes to allow this expenditure in PR4.

Notwithstanding the above discussion, the Jacobs report considers that the North South Interconnector project should be treated separately. In light of the requirement to withdraw the planning application in June 2010, the CER agrees with Jacobs view. Accordingly, the CER is proposing to disallow €2.755m as recommended by Jacobs. The CER requests respondents' views on the proposals above.

7.3.1 Considerations for PR4 TSO Capex

A key finding of the Review of the TSO's PR3 Capex is that the underspend appears to result from the significant divergence between the expected capital programme in 2009 and the actual project delivery over the PR3 period. For example, the Jacobs Report shows a 58% variance against the PR3 forecast for projects progressed during PR3 but not yet complete. While the CER accepts that plans must be adapted to account for changing circumstances, the CER notes that the degree of change over the PR3 period makes it difficult to determine how much of the TSO's expenditure was efficiently incurred. This level of change in projects can either be attributed to the lack of existence of any substantial project definition plans for these projects at the start of PR3 or that these plans were poorly developed and needed to be changed. Either way, CER questions the basis on which TSO made its PR3 submissions back in 2009 and 2010, noting that TSO should not have made submissions for work which was so poorly defined and accordingly it would have been impossible for TSO to accurately forecast costs for such projects. While TSO strongly argued in its submissions for PR3 that there was network need for expenditure up to €2.1 billion over the PR3 period, it is clear now, both in terms of PR3 outturn expenditure and the projects which were progressed that there was little basis for this figure.

While the CER believes that project defining, prioritisation and planning has improved significantly in the TSO, CER nonetheless is of the view that there is a need for enhanced regulatory oversight during PR4 in order to ensure that some

of these issues do not re-occur. Therefore the CER will put in place a more robust process for the forecasting and monitoring of capital expenditure for PR4 (see section 8.4). This will allow for a more comparable assessment of actual expenditure at the end of the period relative to allowed expenditure at the beginning of the period. This approach will increase the focus on examining outputs at the end of the PR4 period, however the CER proposes to retain the HICP-X approach used for previous price reviews.

Another issue raised in the review was the high volume of spending incurred but not invoiced (capitalised) and this has been considered in the assessment of the forecast capital expenditure for PR4.

The Jacobs report notes that there was a significant overspend on IT expenditure on certain categories. The CER notes the TSO's explanation that much of this expenditure was required due to European requirements and the integration of renewables, therefore the CER would expect that this expenditure should drive efficiencies in the PR4 period. Accordingly, the CER proposes to allow the overspend on the basis that this expenditure will reduce the required allowed revenue in PR4.

7.4 Review of TAO Capital Expenditure

As detailed in the Jacobs Report the actual TAO Capex for PR3 was €982.3m against a forecast at the beginning of the period of €1.4bn. Jacobs notes that it is difficult to assess how much of this was efficiently incurred given the extent of the divergence between forecast project delivery at the beginning of PR3 and actual project delivery. However Jacobs's examination of project level TAO costs suggests that the expenditure can be considered to be efficiently incurred. Jacobs recommends that €982.3m is allowed in respect of TAO Capex. The CER proposes to accept this recommendation. The CER does not propose to apply an efficiency factor to TAO Capex on the basis that the divergence in forecast and outturn project delivery, and the consequent difficulty assessing efficient expenditure, appears to be due, in large part, to the removal or addition of various transmission projects which is outside the TAO's responsibility. However, the CER notes the Jacobs finding that the TAO's reporting process should be improved and accordingly has made proposals in this regard below. The CER further notes that Jacobs considers that cost cuts in TAO capex are due to deferred expenditure as opposed to efficiencies implemented during PR3, this issue is considered further in relation to the PR4 allowance.

7.4.1 Considerations for PR4 TAO Capex

As discussed above in relation to TSO Capex a key finding from the Jacobs Report was the difficulty in comparing the PR3 forecast at the beginning of the period and the actual expenditure reported at the end of the period. Therefore, as discussed above, the CER will implement a more robust process for the forecasting and monitoring of Capex in PR4.

7.5 Proposed Allowed PR3 Capex

Table 7.3 PR3 Proposed Allowed Transmission Capex

	PR3 Decision	PR3 Outturn	PR3 Allowed Outturn
TAO Capex	€1339.5	€982.3	€982.3
TSO Capex	€110.4	€44.8	€42.05[23]
Capex total	**€1449.9**	**€1027.1**	**€1024.3**

[23] includes a reduction associated with the NSIC as discussed in section 7.3, which will be dealt with as an adjustment in the PR4 period

8 Review of Forecast Capital Expenditure

8.1 Introduction

This section sets out the CER's proposals in relation to the TSO and TAO Capex for PR4. In response to the CER's Price Review Questionnaire the TSO submitted a range within which the TSO felt actual expenditure would lie. The TSO derived its view based on its analysis of two scenarios (a scenario costed solely on the basis of overhead lines and a scenario costed on the basis of employing underground cables, in whole or in part). The TSO, in its submission, suggested that a range between the two scenarios was the most appropriate provision at this point recognising that the grid development landscape remains an evolving one and that that which is appropriate taking into account all considerations would not necessarily be the same in each and every case. It is important to note that the TSO did not suggest that the difference between its two scenarios represented the cost of undergrounding the associated network but rather that it represented the difference in revenue requirement in the PR4 period on a factored basis.

On either side of the TSO's range, the TSO provided point estimates of the cost for a wholly overhead build or one incorporating undergrounding. Given the uncertainty surrounding the required extent of underground solutions, the Jacobs report recommends basing the PR4 allowance on scenario one and making provision for the companies to make submission for adjustments for additional expenditure where undergrounding ultimately proves necessary. This approach in effect assumes a least cost approach for the purposes of setting baseline allowances. While undergrounding of elements of certain projects may emerge as being appropriate in some instances, it would not be appropriate for the CER to assume undergrounding costs will be incurred in advance of the determination of the appropriate approach and effectively have consumers pay such costs in advance of the decisions being taken.

For the avoidance of doubt, in employing scenario one at this time and for this purpose the CER is not taking a position on the appropriate use of technology, overhead or undergrounding, during PR4; this will ultimately be assessed by EirGrid and, where additional expenditure is required, assessed on a case-by-case basis by the CER and approved where such expenditure was efficiently incurred. In carrying out such an assessment the CER will take into consideration the least cost approach, planning and environmental requirements, and other relevant considerations. Rather, the CER is setting out the appropriate baseline provisions for allowances and tariff setting at the outset of PR4. Accordingly the discussion in this section relates to scenario one.

As discussed in Section 7, the review of PR3 Capex raised issues regarding the reliability of forecast expenditure at the beginning of the Price Review period. Therefore the CER has adapted its approach to PR4 relative to PR3 in order to ensure that efficient expenditure can be effectively assessed at the end of the PR4 period. Where it is not possible for the companies, at the beginning of the period, to provide sufficiently detailed forecasts on the projects that will be undertaken during the period a capex allowance will be made available during the PR4 period after detailed submissions have been received from the companies and approved – not at the beginning of PR4. This will allow the CER to determine whether the companies' expenditure has been efficiently incurred through a comparable assessment with the ex-ante identified project objectives and system needs.

8.2 TSO Capex

Overall TSO Capex for PR4 is somewhat higher than capex in PR3. This is notwithstanding the fact that TSO spend in PR4 is broadly in line with spending in PR3. The difference emerges due to the manner in which TSO expenditure is capitalised, as the TSO cannot invoice expenditure until set project milestones. Therefore the TSO had expenditure in PR3 but which it did not invoice for, this expenditure will now be capitalised during the PR4 period.

The Jacobs Report recommends that the capex for projects that are reasonably well defined (i.e. excluding "generic" projects) should be allowed as per the companies' request subject to an efficiency factor of 7.5% (on gross project value)[24]. This results in an allowed TSO Capex of €83.4m on a request of €88.53m. This includes network investment related to new technologies such as HTLS (High Tension Low Sag) conductors and SPS (Special Protection Systems), an additional allowance has not been made. However the CER will consider additional expenditure on new/uprated lines where the TSO makes a submission accompanied by a detailed business case.

CER considers the efficiency factor of 7.5% to be a challenging and aggressive target. It represents the fact that continued efficiency should be delivered by TSO and TAO in transmission project delivery, particularly as transmission investment has been increasing over the course of PR3 (i.e. the companies should be getting more experienced at transmission planning and development and be able to deliver these functions in a more efficient manner). In addition to this, CER notes the concerns around potential inefficiencies in aspects of the transmission

[24] Or 5.77% on factored values

development programme during PR3 and considers that challenging efficiency targets for the companies can ensure that any ground potentially lost in PR3 as a result of these inefficiencies can be made up in PR4. This ensures that value for money for consumers remains at the core of transmission system development.

The TSO has requested an increase in non-network capex. The requested increase is driven mainly by forecast new connections while other non-network capex is broadly in line with PR3. Jacobs have recommended an allowance that is €20.57m lower than requested. The CER notes the rationale for the revision set out in the Jacobs Report and the notable IT overspend in PR3 discussed in Section 7 and proposes an allowance of €40.74m on a request of €61.31m. For non-load related capex the CER proposes, as recommended by Jacobs, an allowance of €2.86m as requested.

In relation to the capex request for generic reinforcement projects the Jacobs Report notes that there is currently little available information regarding the specific cost, scope or benefit of these projects. The CER accepts that it is reasonable to assume that new reinforcement projects will be required over the period and that it is not possible for the TSO to accurately forecast the specifics of each possible project. Notwithstanding this the CER does not consider it prudent to allow revenues without sufficient information that will make it possible to conduct an ex-post assessment of the efficient level of expenditure, compared to the ex-ante scope and objectives of the projects. Taking the experience of the PR3 review into account, the CER agrees with the Jacobs recommendation and proposes to allow €0.61m, against a request of €6.1m, to provide sufficient revenues to commence work on these projects. Further revenue will be allowed during the PR4 period following a review of a detailed submission (including scope, timing, costs and benefits) supported by a detailed business case.

The TSO also made a capex request for revenue to support and trial/demonstrate specific new and emerging technologies. The CER agrees with the objectives of this proposal and considers that the evaluation of new technologies will be important over the PR4 period and beyond given the considerable technical challenges presented by the transition to a system with a very high penetration of renewables. However, by its nature the activities and projects supported by such a fund cannot be clearly specified in advance. This is problematic in terms of the ex-post review of PR4. A further difficulty is that there is no guarantee that a given technology trial will be successful in terms of delivering consumer benefits. Therefore, in line with the Jacobs recommendation, the CER proposes to allow €2.21m, against a TSO request of €22.1m, to provide sufficient revenues to investigate suitable projects. Further revenues will be provided on a case-by-case

basis where the TSO makes a detailed submission and business case. This business case should establish the problem that the trial is attempting to solve/ contribute to solving, the project governance structure, how success will be defined, the overall cost-benefit or multi-criteria analysis for the proposed project and the role that the TSO will have compared to external parties. While CER encourages the TSO to be innovative and explore options to improve the efficiency and effectiveness of system operation and development, it is important that any monies committed by consumers in this area are fully justified and analysed. In many cases, it may be more appropriate for external research bodies or agencies to be carrying out R&D activities rather than the TSO and in this case, it is important that TSO is involved most appropriately in identifying system challenges and problems and developing terms of reference for R&D projects rather than carrying out such work itself (in many cases). A key element of these submissions will be the demonstration of a robust ongoing evaluation process with clear objectives and decision milestones. It is important that the trials which are not delivering against objectives are identified and ended early and equally that trials proving successful can be assessed and their objectives refined at set milestones.

8.3 TAO Capex

The Jacobs Report recommends that Capex for reasonably well defined projects (i.e. excluding generic projects) should be allowed as requested subject to an efficiency factor of 7.5% on the gross project value[25]. The rationale for this efficiency factor is set out in Section 8.2. Given the importance of TSO and TAO working consistently together to deliver projects, CER believes that it is appropriate that the same efficiency target is set for both companies on network development. Accordingly the CER proposes to allow €825.27 against a request of €875.9m.

The TAO requested a significant increase in non-load related Capex due to increased workload, flood mitigation and increased site security. However, the Jacobs Report notes that there is insufficient evidence to substantiate this increase. Therefore, in line with the Jacobs recommendation, the CER proposes to allow revenues in line with PR3 expenditure plus 10% to facilitate the additional workload expected in PR4. In relation to site security and flood mitigation, an allowance of €20m is proposed. The CER may consider additional allowances where specific sites and detailed justification of costs are provided. Therefore the CER proposes to allow €198.06m against a request of €221.80m.

[25] Or 5.77% on factored values

In relation to the application of new technologies such as HTLS and SPS, the CER proposes to adopt a similar approach to that discussed above in relation to TSO Capex.

As discussed above in relation to TSO Capex, the CER does not consider it prudent to allow the requested Capex in relation to generic projects. The CER proposes a similar approach to that discussed in Section 9.3. Accordingly, the CER proposes an allowance of €8.84m, against a request of €88.4m.

In conclusion, the CER proposes to provide an allowance consistent with the Jacobs recommendations, this gives the sub-total for TAO as €1,032.29m against a request of €1,224.3m. This represents a reduction of €192.01m (or 15.68%), primarily driven by the realignment of non-load related expenditure to broad PR3 expenditure levels and the reduction in generic project allowances. Costs relating to Customer Contributions and Interest During Construction ("IDC") have been reduced on a pro-rata basis to provide a total PR4 allowance of €875.46m against a request of €1,038.2m.

8.4 Capex Monitoring for PR4

The CER proposes to further develop the monitoring process for capital project that was developed under PR3. The CER proposes that this includes:

- The development of outturn metrics for TSO and TAO which will be reported on quarterly throughout PR4. This will be discussed further with TSO and TAO following the conclusion of this review.
- The development of an annual process to allow for the inclusion of projects in PR4 which have become better defined since the start of the period (i.e. the generic projects discussed in Section 8.3 and 8.4 above). As part of this annual process the companies would also report on project delivery and any changes to the capital programme since the start of PR4, however, it is not proposed that the CER would carry out a full ex-post review of incurred expenditure as part of this annual process. This would be carried out as part of the PR5 review process.
- The also proposes to consult on the establishment of a Strategic Projects Review process which would provide a separate review and allowance process for large infrastructure projects that span several Price Review periods. It is proposed that this process would not apply to infrastructure projects which were included in the PR3 process.

8.5 Conclusion

The table below shows the proposed allowed Capex revenue for the TSO and TAO. The CER has sought to ensure that the companies have sufficient revenues to maintain and develop the transmission system while ensuring value for consumers. Therefore the CER has allowed those revenues where the companies have clearly identified the scope and requirement for capex subject to an efficiency factor. As the companies are regulated monopolies they do not face the competitive pressures of the market. The purpose of an efficiency factor is to some extent replicate this and create a focus within the companies on efficiently minimising costs.

Those revenue requests which are not sufficiently defined have not been allowed as the CER considers that to do so imposes a significant risk on the consumer in terms of higher than necessary transmission costs. The approach proposed by the CER will allow for a meaningful comparison of outputs at the end of PR4 with the stated scope of the projects, which will allow for a determination of the efficient expenditure of the companies.

8.5.1 TSO Capex

Table 8.1 PR4 Proposed Allowed Network Capex for TSO

Network Capex	**TSO Requested PR4**	**Proposed Allowed Revenues**	**Variance**	**%**
Ongoing Projects	€ 76.89	€ 72.45	-€ 4.44	5.77%
System Reinforcements	€ 8.84	€ 8.33	-€ 0.51	5.77%
Shallow Connections	€ 2.80	€ 2.64	-€ 0.16	5.77%
Asset Refurbishment	€ 1.55	€ 1.55	€ 0.00	0.00%
Minor Capital & Conflicts	€ 0.32	€ 0.32	€ 0.00	0.00%
DSO	€ 0.05	€ 0.05	€ 0.00	5.77%
Protection, Telecoms and Station Security	€ 0.99	€ 0.99	€ 0.00	0.00%
Generic Projects	€ 6.14	€ 0.61	-€ 5.53	90.00%
Subtotal	**€ 97.58**	**€ 86.95**	**-€ 10.64**	**10.90%**
Customer Contributions (factored)	-€ 4.00	-€ 3.56	€ 0.44	10.90%
Community Gain (Factored)	€ 22.07	€ 19.67	-€ 2.41	10.90%
Client Engineering Capex	€ 7.31	€ 6.51	-€ 0.80	10.90%
Total	**€ 122.97**	**€ 109.57**	**-€ 13.41**	**10.90%**

Table 8.2 PR4 Proposed Allowed Non-Network Capex for TSO

Non-Network Capex	TSO Requested PR4	Proposed Allowed Revenues	Variance	%
IS Infrastructure (incl Desktop)	€ 5.45	€ 4.95	-€ 0.50	9.17%
Corporate Systems	€ 3.53	€ 3.53	€ 0.00	0.00%
Energy Management Systems – All Island Operations	€ 3.19	€ 3.19	€ 0.00	0.00%
EDIL/RCUC/AMP	€ 1.44	€ 1.44	€ 0.00	0.00%
TUoS/Settlement/Metering	€ 2.81	€ 2.81	€ 0.00	0.00%
Big Data / Data Mining	€ 1.76	€ 1.76	€ 0.00	0.00%
DS3/Smart Grids	€ 4.80	€ 4.80	€ 0.00	0.00%
Operations Changes – Network Codes	€ 0.75	€ 0.75	€ 0.00	0.00%
Telecoms	€ 15.31	€ 15.31	€ 0.00	0.00%
Facilities	€ 0.18	€ 0.00	-€ 0.18	100.00%
Research, development & demonstration	€22.1	€2.21	-€19.89	90.00%
Total	**€ 61.31**	**€ 40.74**	**-€ 20.57**	**33.55%**

8.5.2 TAO Capex

Table 8.3 PR4 Proposed Allowed Capex for TAO

Capex	TAO Proposed PR4	Proposed Allowed Revenue	Variance	%
Ongoing Projects	€ 714.70	€ 673.37	-€ 41.33	5.78%
System Reinforcements	€ 123.58	€ 116.45	-€ 7.13	5.77%
Shallow Connections	€ 25.02	€ 23.58	-€ 1.44	5.77%
Asset Refurbishment	€ 199.59	€ 152.02	-€ 47.56	23.83%
Minor Capital & Conflicts	€ 23.20	€ 17.67	-€ 5.53	23.83%
DSO	€ 12.60	€ 11.87	-€ 0.73	5.77%
Protection, Telecoms and Station Security	€ 37.40	€ 28.49	-€ 8.91	23.83%
Generic Projects	€ 88.39	€ 8.84	-€79.55	90.00%
Sub Total	**€ 1,224.30**	**€ 1,032.29**	**-€ 192.01**	**15.68%**
Customer Contributions (factored)	-€ 121.00	-€ 102.02	€ 18.98	15.68%
IDC	-€ 65.10	-€ 54.81	€ 10.29	15.81%
Total	€ 1,038.20	€ 875.46	-€ 162.74	15.67%

9 Review of Historical Operational Expenditure

9.1 Introduction

This section provides an overview of the CER's proposals in relation to allowable Opex for PR3. Further detail is available in the Jacobs Reports. It should be noted that actual cost figures are used for 2011 to 2013 while 2014 and 2015 figures are estimated costs.

9.2 TSO Opex

The updated PR3 allowance for TSO Opex was €215.3m against a forecast outturn of €207.7m (in 2009 prices). This is due to reduced costs in some areas and efficiencies from the integration of SONI. EirGrid ascribe efficiencies to this integration of €4.4m in PR3 and a further €1m in PR4. The Jacobs Report considers these figures to be conservative and recommends that further efficiencies are sought in PR4; the CER's proposals in this regard are discussed further below.

Notwithstanding the headline reduction in Opex relative to the PR3 allowance, it is noted that staff costs increased significantly over the period. It is noted that the PR3 period was characterised by an economic recession which saw staff costs decline across the economy. The extent, and duration, of the economic downturn was not fully evident at the time of the PR3 Decision, therefore it would be reasonably expected that staff costs for the TSO business would be lower by the end of PR3 than forecast at the beginning of PR3. Overall staff costs increased by €16.1m against an allowance of €118.6 to a total of €134.7; this is a significant concern for CER given that a clear message was given to the TSO in the PR3 decision that staff costs needed to reduce (a cut of 5% was implemented at the time) and the TSO should be seeking significant efficiency in this area. The Jacobs Report goes on to argue that the performance targets do not appear to be linked to operational cost reductions and on this basis consider €6m-€7m in staff costs may have been incurred inefficiently.

The TSO stated that it takes a holistic approach to resourcing which may increase staff headcount but delivers overall cost reductions to the company and note the reduced professional fees and increased recharges in this regard. The CER, having taken the findings of the Jacobs report and the TSO's submissions into account, and noting that the overall opex outturn is below the PR3 allowance proposes to allow the outturn opex as requested and propose efficiencies for the PR4 period to address the issues raised during this review. In summary, the CER

proposes a total opex of €207.7m allowable for the PR3 period. The CER invites comments on this proposal.

9.3 TAO Opex

The total PR3 allowance for TAO opex was €223.5m against a forecast outturn of €240.5m (in 2009 prices). This equates to an overspend of €17m or 8%. The overspend is due to increased Repairs and Maintenance costs (€7.3m) and the failure to achieve high level efficiency targets of €10.1m (reduced from €16.2m in 2014 in CER/14/052). Notwithstanding the overspend in repairs and maintenance the Jacobs report expresses concern that the level of planned maintenance appears consistently below target and that furthermore the TAO does not have an overall view of the condition or health of their assets on a company wide basis. The Jacobs report recommends that the outturn costs be allowed. Jacobs views the incurred costs as reasonable on the basis that there have been significant external influences upon the TAO during PR3. On the basis of the Jacobs recommendation the CER proposes to allow the outturn opex of €240.5m The CER invites comment on this proposal.

9.4 Conclusion

The companies' outturn opex was found to be broadly efficiently incurred, notwithstanding some concerns around certain individual line items. Therefore the CER proposes to allow €207.7m in TSO opex and €240.5m in TAO opex.

9.5 PR3 Allowed Outturn

9.5.1 TSO Opex

Table 9.1 PR3 Proposed Allowed Outturn Opex for TSO

PR3 Costs (€m 2009 Prices)	PR3 Decision	TSO PR3 Outturn	Variance	Variance %	Allowed Outturn
Controllable costs					
Staff and related costs	118.6	134.7	16.1	14%	134.7
Contractors	6.0	6.8	0.8	14%	6.8
Telecommunications	19.2	19.4	0.1	1%	19.4
Premises	22.7	21.4	-1.3	-6%	21.4
IT Costs	12.0	11.8	-0.2	-2%	11.8
Insurance and compensation	1.4	1.4	0.1	7%	1.4
Selling and Advertising	1.7	0.7	-1.0	-60%	0.7
Maintenance and professional services	26.1	17.7	-8.4	-32%	17.7
Promotion of Research	2.0	2.0	-0.0	-2%	2.0
Other	5.7	4.6	-1.1	-19%	4.6
Recharges	-	-12.7	-12.7	-	-12.7
Total Controllable costs (excl Depn)	**215.3**	**207.7**	**-7.6**	**-4%**	**207.7**
Non Controllable costs					
CER Levy	4.8	4.7	-0.1	-2%	4.7
DUoS costs	2.0	4.3	2.3	113%	4.3
Interconnector costs	3.0	-	-3.0	-100%	-
Inter TSO Compensation	5.6	4.8	-0.8	-14%	4.8
Ancillary services	244.2	224.3	-19.9	-8%	224.3
Stage 1 working Capital	15.2	-	-15.2	-100%	-
Total Non Controllable costs	**274.8**	**238.1**	**36.7**	**-13.4%**	**238.1**
Total Allowance	**490.1**	**445.8**	**44.3**	**-9.0%**	**445.8**

9.5.2 TAO Opex

Table 9.2 PR3 Proposed Allowed Outturn Opex for TAO

TAO Operating Costs (€m 2009 Prices)	PR3 Decision	TAO PR3 Outturn	variance	Variance %	Allowed Outturn
Operations	10.5	13.6	3.1	29%	13.6
Repairs And Maintenance	73.7	80.9	7.2	10%	80.9
Asset Management	5.1	4.1	-0.9	-18%	4.1
Professional Fees	19.4	21.0	1.5	8%	21.0
Telecom Fees	7.6	8.0	0.4	5%	8.0
Corporate costs	13.2	11.3	-1.8	-14%	11.3
Other	5.6	2.9	-2.6	-48%	2.9
Controllable Costs Total	135.0	141.8	6.8	5%	141.8
Rates	92.9	93.5	0.6	1%	93.5
Cer Levy	4.0	4.9	0.9	23%	4.9
Uncontrollable Costs Total	96.9	98.4	1.5	2%	98.4
pass through adjustments	1.5	0.0	-1.5		0.0
Total Opex allowance	223.3	240.5	16.9	8%	240.5

10 Review of Forecast Operational Expenditure

10.1 Introduction

This section discusses the CER's proposals for the allowed opex revenue for TSO and TAO. Further detail is available in the Jacobs Reports.

10.2 TSO Opex

The TSO has requested a total of €268.2m in controllable opex for PR4, and €279.70m in non-controllable opex.

The non-controllable opex is forecast to be 2% higher (€4.84m) in PR4 than in PR3. This is driven mainly by increases in TAO payments and PSO related costs with increases of €130.3m and €96.4m respectively report. The CER, having considered the Jacobs recommendations, considers these to be reasonable estimates and are not within the control of the TSO. Accordingly the CER proposes that these costs are allowed on a pass through basis. It is important to note that while for the purposes of forecasting, a figure of €279.70m will be used, only the actual cost will be passed through to the TUoS customer each year.

The controllable opex is forecast by the TSO to be 25% higher (€54.3m) in PR4 than in PR3. The main drivers here are staff costs, telecoms and RD&D. The requested increase in staff costs is €21m relative to the PR3 outturn of €138.6m. The TSO argues that this increased staff requirement is due to the implementation of ISEM, European Network Code compliance, facilitation of renewables, and Grid 25 and new connections. The ISEM costs will be dealt with as part of a separate submission to the SEM Committee and so are not considered in this paper. In relation to the other areas that TSO propose as additional work, CER notes that there are a number of work areas in PR3 where work activity will reduce significantly in PR4 (e.g. Gate 3 offer issuance, WPDRS, ENTSO-E development of Network Codes). The Jacobs Report recommends an allowance of €139.9m, a reduction of €19.7m against the TSO's request of €159.6m. The CER notes that staff costs increased during PR3 and considers that much of the requested increase in staff numbers could be met with redeployment, reduction in activity in other work areas and efficiencies gained through the SONI integration, which as noted in Section 9, were not as large as CER would have expected. The CER agrees with the analysis of the Jacobs Report regarding salary levels and performance targets.

In relation to Telecoms, the TSO has requested €30.7m, however, as detailed in the Jacobs Report this expenditure is directly related to the roll out of new

infrastructure and the telecoms used on, and to analyse, the network. The Jacobs Report considers that based on historic experience this roll out will not occur at the pace forecast by the TSO. Therefore Jacobs recommends a reduction of €5.6m. Accordingly the CER proposes a PR4 allowance of €25.1m in relation to telecoms. It is important to note that CER is not proposing a "slow down" in roll out of telecoms infrastructure associated with, in particular Gate 3 connections. Rather CER is of the view that the forecast by TSO for the PR4 period was over-ambitious. If TSO ends up achieving the levels of roll-out that it had expected, then allowance will be made for this (subject to analysis of delivery levels).

The TSO requested an allowance in RD&D of €22.4m, this is comprised of promotion of research (€3.5m) and a discretionary innovation allowance (€18.9m). It is noted that these costs are in addition to those discussed in relation to TSO Capex. The Jacobs Report recommends a total allowance of €1m, which caps the cost at the 2013 level, as a more appropriate allowance to facilitate investigative work on research suitable for further funding. The CER agrees with the Jacobs recommendation and proposes to allow €1m for PR4 and will allow additional funding during the PR4 period subject to a submission including a detailed business case and appropriate governance structure. For further discussion on the CER's view on TSO capex allowance for RD&D, please refer to Section 8, earlier in this paper.

The TSO has requested a €10m contractor allowance. On the basis of the Jacobs Report the CER proposes to allow €8m. This is a 15% increase on PR3 as opposed to the requested 44% increase.

Regarding the cost of premises the TSO has requested €24.7m, a 12% increase on PR3 and anticipates a rent increase in 2017. The TSO has a 25 year lease on its current premises and is subject to five-year rent reviews, the next due in 2017. The CER notes the potential costs associated with relocating the National Control Centre and the risk of rent increases, potentially above comparable market rates. The CER considers that the TSO should put in place a longer term strategy to address the potential issues with its current location. The CER is of the view that customers should not bear the risk of any cost increases in this regard, that such additional costs cannot be considered as pass through costs and that this risk should fall solely on the TSO.

Noting this however, the CER accepts the Jacobs recommendation regarding the premises allowance and will allow increases up to the forecast in 2017, but not for the remainder of PR4. Accordingly the CER proposes an allowance of €23.7m against a request of €24.7m.

The TSO has requested €17m in IT costs and Jacobs has recommended a reduction of €2.5m against this request on the basis that little evidence has been provided to demonstrate that the company is endeavouring to extend the lifecycle of its IT systems and that this reduction reflects a more realistic timescale given typical IT related capex. In line with the Jacobs recommendation the CER proposes an allowance of €14.5m in IT costs for PR4.

The TSO has requested €1.5m for insurance and compensation costs, Jacobs has recommended a reduction on this request on the basis that SONI integration should provide opportunities to reduce costs. The CER therefore proposes an allowance of €1m for insurance and compensation. The TSO has requested a 65% increase in advertising expenditure, however, the TSO has not provided any indication of the benefits of this expenditure. Therefore, in line with the Jacobs recommendation, the CER is proposing an allowance of €0.5m against a request of €1.2m and a PR3 outturn of €0.7m.

As discussed in the previous section on the historic opex the TSO emphasised its holistic approach to resourcing as an explanation for its overspend on staff costs. However, notwithstanding this and the above discussion on the requested increase in staff costs for PR4 the TSO has requested an increase in the professional services allowance of 25%. The Jacobs Report recommends fixing the annual allowance at the 2014-2015 outturn. Accordingly the CER proposes an allowance of €14.5m against a request of €16.3m.

The TSO has requested an increase in Grid Maintenance but as this request has not been supported by sufficient evidence Jacobs recommend capping the allowance in line with the average 2013-2015 spend. Accordingly the CER proposes an allowance of €5m against a request of €5.6m.

10.3 TSO Pension Deficit

The CER is of the view that it is not appropriate for the TUoS customer to fund a pension deficit. Notwithstanding this, the TSO may, should it wish, make a full and detailed submission to the CER by end of Q1 2016, including a full evaluation of the pension deficit at end 2015. The CER will consider any such submission.

10.4 TAO Opex

The TAO Opex is forecast to increase by 23% in PR4, this is driven predominantly by rates, which are non-controllable costs. The increase in controllable costs is 8% relative to PR3 and is due mainly to increased maintenance costs. The non-

controllable costs are accepted to be outside the TAOs control and the CER proposes that they are allowed as pass through costs.

The TAO has requested €95m for maintenance (planned and faults)[26], this is predominately driven by the reduction in lone working and the implementation of health and safety processes. While the CER is fully supportive of the TAOs efforts to improve working conditions as regards health and safety, the CER shares the concerns raised in the Jacobs Report on the lack of clarity and uncertainty surrounding the cost estimates. To address this issue the CER may carry out a review when the new work practices have been bedded down. A further concern, as discussed in relation to the historical expenditure, is the lack of a high level assessment of the asset health of the portfolio of assets. The CER considers the TAO should address this during PR4. In line with the Jacobs recommendation the CER proposes an allowance of €88.5m against a request of €95m. However, the CER requests views on whether a general opex cut of €10m should be applied across the DSO and TAO allowances (€5m cut to each of DSO and TAO allowances) to take account of the overstated efficiencies reported in previous periods.

The TAO has requested a €15.4m contribution to corporate overheads, it is also noted that the ratio between DSO/TAO contributions has changed this period. However, the Jacobs Report notes that there has been no significant justification put forward by the TAO for the increase in corporate charges, and Jacobs recommends an allowance in line with current levels of expenditure. The CER therefore proposes an allowance of €13.4m, a reduction of €2m against the request.

The TAO has requested a significant increase in insurance, more than double the PR3 expenditure, citing the additional value of the network station assets. However, Jacobs notes that additional network station assets have been commissioned during the PR3 period and the spend profile remained relatively flat. Therefore Jacobs recommends an allowance broadly in line with current expenditure. Accordingly the CER proposes an allowance of €1.8m against a request of €3.3m. All other costs are proposed as requested, see the table below and the Jacobs report for further details.

[26] The TAO subsequently noted a request of €99m as per a submission made by the TSO

10.5 TAO Pension Deficit

The TAO in its submission requested that its current pension deficit be recovered from TUoS customers, the total ESB Networks (DSO and TAO) deficit is an actuarial deficit of €1,957m.

The CER is of the view that it is not appropriate for the TUoS customer to fund a pension deficit. Notwithstanding this, the TAO may, should it wish, make a full and detailed submission to the CER by end of Q1 2016, including a full evaluation of the pension deficit at end 2015. The CER will consider any such submission.

10.6 Conclusion

The proposed opex allowances for PR4 will see a modest increase in TSO and TAO controllable opex of 2% and 8% respectively. However, non-controllable opex is forecast to increase for both TSO and TAO by 2% and 44% respectively.

Table 10.1 PR4 Proposed Allowed Outturn Opex for TSO

Operating Costs (€m 2014 Prices)	PR3 Allowed Outturn	PR4 TSO Requested Opex	Variance PR3-PR4	Variance %	Proposed PR4 Allowance	Variance PR3-PR4
Staff costs	138.6	159.6	21.0	21%	139.9	4%
Contractors	6.9	10.0	3.1	44%	8.0	15%
Telecoms	19.9	30.7	10.8	54%	25.1	26%
Premises	22.1	24.7	2.6	12%	23.7	7%
IT Costs	12.1	17.0	4.9	40%	14.5	20%
Insurance and Compensation	1.5	1.5	0.0	0%	1.0	-34%
Selling and Advertising	0.7	1.2	0.5	65%	0.5	-28%
Professional Services	13.1	16.3	3.2	25%	14.5	11%
Grid Maintenance	5.1	5.6	0.5	9%	5.0	-2%
Corporate recharges	-13.0	-23.6	-10.6	81%	-18.6	43%
Provisions	0.4	0.0	-0.4	-100%	0.0	-100%
Rates	2.4	2.9	0.5	21%	2.9	21%
Other	2.0	0.0	-2.0	-100%	0.0	-100%
Promotion of research	2.0	3.5	1.4	70%	1.0	-53%
R&D	0.0	18.9	18.9	-	0.0	
Operating Costs (excl Depn)	**213.8**	**268.2**	**54.3**	**25%**	**217.4**	**2%**
Total Pass through costs	**274.86**	**279.70**	**4.84**	**2%**	**279.7**	**0%**

Table 10.2 PR4 Proposed Allowed Outturn Opex for TAO

Operating Costs (€m 2014 Prices)	PR3 Outturn	PR4 TAO Requested Opex	Variance PR4-PR3	Variance %	PR4 allowed	Variance to PR3
Operations Allowance	14.0	13.4	-0.6	-4%	13.4	-4%
Maintenance Allowance	83.3	95.0	11.7	14%	88.5	6%
Asset Management Allowance	4.2	5.6	1.4	32%	5.6	32%
Professional Fees Allowance	21.6	24.1	2.6	12%	24.1	12%
Telecom Fees Allowance	8.2	7.7	-0.5	-6%	7.7	-6%
Corporate Costs Allowance	11.6	15.4	3.7	32%	13.4	15%
Insurance Allowance	1.6	3.3	1.8	112%	1.8	17%
Legal Allowance	1.1	0.8	-0.3	-31%	0.8	-31%
Pension Allowance	2.0	2.1	0.2	8%	2.1	8%
Health & Safety Allowance	0.3	0.0	-0.3	-100%	0.0	-100%
Misc Allowance	-2.0	0.0	2.0	-100%	0.0	-100%
Controllable Costs	**146.0**	**167.4**	**21.5**	**15%**	**157.4**	**8%**
Rates	96.2	139.7	43.5	45%	139.7	45%
CER Levy	5.1	6.0	0.9	19%	6.0	19%
Uncontrollable Costs	**101.2**	**145.7**	**44.4**	**44%**	**145.7**	**44%**
Total	**247.2**	**313.1**	**65.9**	**27%**	**303.1**	**23%**

11 Allowed Revenues

11.1 TSO Allowed Revenues

Table 11.1 PR4 Proposed Allowed Revenues for TSO

(€m's 2014 prices)	2016	2017	2018	2019	2020
Internal opex (€m)	43.6	43.8	43.5	44.0	44.9
External opex (€m)	88.6	89.6	89.6	89.6	89.6
Depreciation (€m)	7.0	7.8	8.3	8.3	8.2
Return on Stage 1 working capital (€m)	2.8	2.7	2.8	2.8	2.5
Return on other working capital (€m)	3.0	3.0	3.1	3.1	3.1
Return on fixed assets in the RAB (€m)	5.0	3.1	1.6	-0.1	-1.3
Incentives (€m)	1.2	1.2	1.2	1.2	1.2
Strategic Incentives (€m)	0.0	2.0	2.0	2.0	2.0
PR3 adjustments (€m)	0.0	0.7	0.7	0.7	0.7
Revenue requirement (€m)	151.1	153.8	152.7	151.6	150.8

11.2 TAO Allowed Revenue

Table 11.2 PR4 Proposed Allowed Revenues for TAO

(€m's 2014 prices)	2016	2017	2018	2019	2020
Opex (€m)	54.1	58.5	60.5	62.7	64.8
Depreciation (€m)	55.8	59.7	63.5	67.5	71.5
Return (€m)	96.9	106.6	114.3	122.3	131.9
Incentives (€m)	2.2	2.2	2.2	2.2	2.2
Strategic Incentives (€m)	0.0	0.0	0.0	0.0	0.0
PR3 adjustments (€m)	0.0	0.0	0.0	0.0	0.0
Revenue requirement (€m)	209.0	227.0	240.5	254.7	270.5

12 Form of the Control

This section describes the overall form of the revenue control, specifying the approach taken by the CER and the incentives that it intends to create and how the base and subsequent year revenues have been determined.

During the PR4 period it is intended that, consistent with the previous controls, yearly updates would be completed as detailed below. During some previous controls the CER consulted on these yearly updates. For the forthcoming control the CER proposes to publish an information note outlining the effect of implementing the yearly updates detailed below, rather than holding a formal consultation.

12.1 TSO Incentives

The CER will carry out a review of the incentive mechanism that currently applies to the TSO and TAO in relation to service delivery and targets. Within this review it is proposed that the CER put in place strategic incentives separately to incentives focused on operational and service level targets. It is proposed that provision for these strategic incentives would be included in the TSO's baseline model and where the TSO achieved the relevant objective the TSO would be permitted to retain the revenue. (See Section 11).

Where the strategic objective was not achieved the revenue would be clawed back in the following year. A sliding scale arrangement may be introduced to account for partial achievements and to ensure a more mechanistic approach to the possible claw back. Therefore the baseline strategic incentive allocation would is a cap, with the revenue in its entirety considered "at risk".

It is the CER intention to consult on the objectives against which the incentives would be assessed and the details of the mechanism itself. However, the CER considers that the objectives should be time limited, clearly measureable, and be a strategic objective related to the TSO's role in the transition of the system to one with a large penetration of renewable energy. The TSO is central to the significant changes the industry is currently undergoing and it has been engaging proactively with industry through projects such as its DS3 Programme. The CER welcomes the approach taken to date by the TSO and considers that given the scale of the challenges and the importance for energy consumers and the wider industry that a strategic incentive allowance of €8m for the PR4 period is appropriate.

12.2 Structure of the Revenue Control

The CER's view is that the revenue control for both the TSO and TAO businesses should be set consistent with previous revenue controls. Applying different principles or models for each revenue control would risk creating an inconsistent set of incentives and uncertainty. Therefore, in developing the detailed proposals for PR4, the CER has substantially retained the model used in PR3.

The PR4 model will contain:

- Incentive regulation based broadly on the HICP-X model.
- A rolling retention of benefits achieved through costs lower than target levels. As in the current revenue control, the TSO and TAO will be able to retain these benefits for five years so that they remain neutral as to when in the regulatory cycle those efficiencies are gained. It is up to both the TSO and TAO to prove the creation of additional benefits and request their inclusion in the rolling retention. Where the CER deems that benefits gained have been as a result of forecasting error rather than efficiency gains, these benefits will be clawed back. For clarity, at the end of the PR4 period, the TSO and TAO will be required to demonstrate that expenditure incurred during PR4 was on an efficient basis. CER will reserve the right to clawback any expenditure that cannot be demonstrated as being efficient.
- Incentives linked to system performance and network development.
- Uncertain costs, such as those relating to changes in legislation or other aspects of regulation, will be reviewed on a case by case basis by the CER.
- Pass-through such as TSO Ancillary Services costs and TAO Local Authority Rates should be kept to a minimum. Incentives to minimise pass-through will be applied where practical.
- Incentive mechanisms to improve quality of service, continuity in supply and transmission network performance and connection of renewable generator.
- The inter-year adjustments broadly as in PR3 will be applied to the TAO and TSO.

The CER's position on each of the above is set out below in turn.

12.3 HICP-X

In the PR3 transmission decision, HICP-X was used as the basis for the revenue control. A core issue in setting the trajectory of prices was the relative values of X and the starting price level in 2011. In its Decision the CER noted that in the calculation of the allowed opex and capex, efficiency improvements had already been incorporated.

The CER intends to continue the application of an incentive based approach where efficiencies are built into the opex and capex allowances and the resulting revenue is profiled over the period.

12.4 Benefit Retention

The CER intends to use a five-year rolling retention mechanism since this will deliver the most even distribution of efficiency savings across the duration of the revenue control. For opex, the CER proposes that both the TSO and TAO will be permitted to retain the annual savings made for a period of five years, provided such savings have not been made at the expense of performance/ inefficiency and quality of service or as a result of poor forecasting.

However, as discussed above it is the CER's intention to continue to review certain pass through Opex costs (Ancillary Services, Local Authority Rates etc) on an annual basis.

In assessing the benefit to be retained on capex, the CER will consider the cost, volume and quality of the investment made. For example, no benefit will be retained if the transmission utilities were to make savings through reducing the volume of their respective investments, as this is independent of the benefits defined in their capex plans.

The efficiency savings (and indeed inefficient expenditures if they occur) will be reviewed as part of the next revenue control and as in this review inefficient expenditure will not be allowed into the RAB. Revenue earned on capex not spent will be clawed back, except where the TSO and TAO can show that the avoided spend is due to efficiencies on their own part.

12.5 Uncertain Costs

Uncertain costs are defined as those that could not reasonably be foreseen by the transmission utilities.

The CER proposes that such costs should be dealt with on a case-by case basis. In each case, the TSO or TAO would be expected to ensure that changes in opex or new capex would take place in an efficient manner and this would be reflected in the allowance provided – there would not be an automatic pass-through of such costs.

12.6 Pass-Through Items

The previous revenue control contained a provision for the pass-through of certain types of costs, such as Ancillary Services and Local Authority Rates, which are deemed to lie outside the business's control. The CER proposes to continue to use this approach.

However, as with "uncertain costs", the CER's view is that the TSO and TAO should provide evidence that they have attempted to minimise such costs through negotiation wherever possible. The transmission utilities, therefore, will be required to provide a detailed justification of this expenditure and to have demonstrated that it has taken reasonable steps to minimise their impact as part of the annual review process.

12.7 Additional Incentive Mechanisms

The TSO's PR3 revenue formula contained three key incentives:

- Revenue caps below which the savings may be retained for a period of 5 years;
- To improve the transmission system performance through system minutes lost, system frequency and fault clearance rates being kept within/below a target level.
- It is also incentivised with regard to the lodgement of planning permission for shallow connections assets for both generators and demand and the roll-out of transmission related Gate 3 offers

The CER intends to consult separately on the incentives that will apply to the companies in the PR4 period. Therefore, aside from the first bullet point above, the CER does not propose any incentive mechanism as part of this consultation process.

12.7.1 Inter-year Adjustments for Over- or Under-Recovery

Currently, the mechanisms for inter-year adjustments for the TAO and the TSO operate as follows:

For the TAO and TSO, there will be an annual correction factor that equilibrates actual and forecast revenues for the tariff year. The correction factor will take into account:

- Pass-through items;
- Uncertain cost items, where these relate to costs in the previous year; and
- Other over or under recovery.

Interest at the three-month average Euribor rate would be added to this over/under recovery amount.

The CER proposes to retain this mechanism for the PR4 period.

12.8 Base Year Revenue and Profiling

Subsequent sections of this document set out how the various components of the TSO's and TAO's regulatory revenue have been determined and how expected efficiency improvements have been used to determine the future path of regulatory revenue. In this section, the principles that have been applied to that calculation are set out.

In general terms, the CER has sought to strike a balance between:

- Allowing the TSO and TAO to make the investments required to develop the Irish transmission system and associated infrastructure (e.g. IT);
- Ensuring that the TSO and TAO provide Irish consumers with value for money;
- Incentivising efficiency gains on a continuous basis throughout the revenue control period;
- Providing the businesses with sufficient revenue to operate the transmission system, develop it and provide a reasonable return on their respective assets; and
- Ensuring that the TSO and TAO has sufficient cashflow to finance their operations;

12.9 Key Principles

Ensuring that the TSO and TAO have sufficient revenues throughout the period to maintain effective operations is core to the revenue control. Specifically, the transmission utilities should be able to finance their planned investment, operating

costs, financing costs and taxation liabilities. The CER has therefore developed a cash-flow model each for the TSO and TAO designed to ensure the compatibility of the revenue control with these objectives.

However, as noted above the CER also has the objective of improving the transmission utilities efficiency over time so that it more closely matches the performance of a business at the efficiency frontier. Therefore, the CER proposes to include a set of incentives linked to key performance indicators within the revenue control formula to encourage specific desirable behaviours. The penalties associated with these incentives will be capped at a level that does not endanger the companies' secure continued operation.

12.10 Indexation

As mentioned above the CER has used and proposes to continue to use incentive regulation to determine the TSO's and TAO's allowed revenue. The incentive model uses a base allowable revenue which is indexed to take account of price inflation. The index used should be the best reflection of the increases in prices faced by the transmission utilities, such as wage inflation or materials inflation etc. Also the index needs to be practical to implement, robust and transparent.

In PR1 (2001-2005) and PR2 (2006-2010) the CER used the Consumer Price Index (CPI) as the index to inflate revenue.

In PR3 (2011-2015) the CER used the Harmonised Index of Consumer Prices (HICP) as the index to inflate revenue. The rationale for the change was outlined in the PR3 decision paper, which noted that the HICP is likely to be less volatile than the CPI, leading to more stable revenues which would be of benefit to both the final customer and transmission utilities.

The CER proposes to continue to use the Irish HICP as the inflation index for PR4 period.

12.11 Allowed Revenue

The allowed revenue calculation for the TSO and TAO respectively is structured as follows:

- The calculation commences with the opening TSO RAB and TAO RAB, as defined in section 5.
- Allowed capex is then added and depreciation subtracted from the respective RABs for each successive year of the revenue control period.

- Allowed operating costs are added, together with any deferred (clawback) revenue from previous years, i.e. through the operation of a 'K' factor.
- The next stage of the calculation is to determine the NPV of the total cash required by the TSO and TAO separately, using the WACC as the basis for discounting.
- Finally, the NPV of the change in the TSO RAB and TAO RAB over the revenue control period (i.e. the opening value less the discounted value of the closing RAB, with the discount rate set at the cost of capital derived in section 6) is added to the total cash required to determine the net present value of the cash required by the TSO and TAO to finance the increase in the RAB over the regulatory period.

A core issue in setting the trajectory of prices would be the relative values of X and the starting price level in 2016. By changing the value of X, the revenue control formula would profile the distribution of revenues over time, while maintaining the same NPV of revenue for the TSO and TAO. It should be noted that X in these circumstances is not an efficiency factor. The CER has set efficient Opex and Capex allowances for each year of the period. The X factor is used to smooth out the allowed revenue over the period so consumers are not faced with volatile tariffs and also to ensure that the TSO and TAO has sufficient cash to meet their requirements over the revenue control period.

Section 11 shows the values calculated by the CER for each of the above for the TSO and the TAO. Interested parties should refer to the published PR4 transmission model for further information.

12.12 TSO Revenue Control Formula

The CER proposes to use the same revenue control formula as was used in PR3 when calculating allowed revenue.

The formula is as follows:

$$R_t = \prod_{2010} t \left[\frac{1 + Inf_t - X}{100}\right] * B_t + INCENT_t + KINCENT_{t-1}\,\Delta P_t + \Delta U_t + K_{t-1} + K_{t-2}$$

Where:

R_t is the maximum level of revenue allowed in year t and the revenues on which the next year's tariffs are based.

Inf_t is the annual average percentage change in the Irish (all-items) Harmonised Index of Consumer Prices (HICP) for the 12-month period January to December, as published by Eurostat and/or the Central Statistics Office.

X is the efficiency factor, set at 0. The CER has profiled allowed opex to reflect increased efficiencies year on year. This in practice will have the same effect as putting a value on X and profiling the allowed revenues over the control period to drive efficiencies.

B_t is the level of allowed revenues in 2014 prices for the TSO in each year of the revenue control.

INCENTt is the value of incentive penalties in year t in €millions in respect of the penalties or payments of the TSO's allowed internal opex in each year. The incentives will be consulted on separately by the CER.

KINCENTt-1 is the incentive correction factor, defined as:

$$KINCENT_{t-1} = FINCENT_{t-1} - PINCENT_{t-1}$$

Where:

FINCENTt is the final value of INCENTt, determined when all actual values of its component variables are known. This date shall be deemed to be by the end of year t+1.

PINCENTt is the provisional value of INCENTt, yet to be determined in respect of year t.

ΔPt is the change in pass-through costs from those included in Bt, as available when setting tariffs in year t. This includes any item which the CER has indicated will be allowed on a pass-through basis. These costs will be expressed in Nominal values in year t.

ΔUt is the change in Uncertain Costs allowed by the CER in year t.

Kt-1 is the correction factor, which ensures that revenues in year t are adjusted by an amount equal to the over or under recovery in the previous year. This amount is to be agreed between the TSO and CER on an annual basis.

Kt-2 is the correction factor, which ensures that revenues in year t are adjusted by an amount equal to the over or under recovery in two calendars year previous. This amount is to be agreed between the TSO and CER on an annual basis.

12.13 TAO Revenue Control Formula

The CER has reviewed the revenue control formula used currently and a number of changes may be made to reflect any additional incentives that may apply to the TAO.

The formula is as follows:

$$R_t = \prod_{2010} t \left[\frac{1 + Inf_t - X}{100}\right] * B_t + INCENT_t + KINCENT_{t-1}\, \Delta P_t + \Delta U_t + K_{t-1} + K_{t-2}$$

Where:

R_t is the maximum level of revenue allowed in year t and the revenues on which the next year's tariffs are based.

Inf_t is the annual average percentage change in the Irish (all-items) Harmonised Index of Consumer Prices (HICP) for the 12-month period January to December. Where j>t, Inf_j is a forecast value. Where j<=t Inf_j is the value for Irish (all items) HICP published by Eurostat.

X is the efficiency factor, set at 0. The CER has profiled allowed opex to reflect increased efficiencies year on year. This in practice will have the same effect as putting a value on X and profiling the allowed revenues over the control period to drive efficiencies.

B_t is the level of allowed revenues in 2014 prices for the TAO in each year of the revenue control.

INCENTt is the value of incentive penalties in year t in €m's in respect of the penalties or payments in respect of the incentives, which are to be consulted on separately.

KINCENT$_{t-1}$ is the incentive correction factor, defined as:

$$KINCENT_{t-1} = FINCENT_{t-1} - PINCENT_{t-1}$$

Where:

FINCENTt is the final value of INCENTt, determined when all actual values of its component variables are known. This date shall be deemed to be by the end of year t+1.

$PINCENT_t$ is the provisional value of INCENTt, yet to be determined by the CER in respect of year t.

ΔP_t is the change in pass-through costs from those included in Bt, as available when setting tariffs in year t. This includes, changes in Local Authority Rates etc. which the CER has indicated will be allowed on a pass-through basis. These costs will be expressed in Nominal values in year t.

ΔU_t is the change in Uncertain Costs allowed by the CER in year t.

K_{t-1} is the correction factor, which ensures that prices in year t are adjusted by an amount equal to the over or under recovery in the previous year. This amount is to be agreed between the TSO and CER on an annual basis.

K_{t-2} is the correction factor, which ensures that prices in year t are adjusted by an amount equal to the over or under recovery in two calendars year previous. This amount is to be agreed between the TSO and CER on an annual basis.

13 Tariffs for 1st October 2015 to 30th September 2016

13.1 Introduction and Background

In recent years, while allowed revenue has been set on a calendar year basis TUoS tariffs have been set for periods that span two calendar years. The most recent TUoS tariffs covered the period 1st October 2014 to 30th September 2015 (the present tariff period). This meant that the relevant portion of 2014 calendar year revenue and the relevant portion of 2015 calendar year revenue were allocated for recovery through TUoS tariffs during that period.

Similarly, within this paper the relevant portion of 2015 calendar year revenue and the relevant portion of 2016 revenue, have been allocated for recovery through TUoS within the 1st October 2015 to 30th September 2016 tariff period.

13.2 Revenue Related to the PR3 Period

13.2.1 The 2015 calendar year

The 2015 calendar year revenue was originally set as part of the PR3 decision paper and was updated last year to provide for the most recent assumptions for inflation, changes in customer numbers, etc. Allowed transmission revenue is €341.44 million in actual 2014 monies. 73% of the 2015 calendar year revenue was allocated for recovery during the current tariff period. It is proposed that the remaining 27% will be allocated for recovery through TUoS tariffs during the next tariff period. This 27% equates to €92.19 million.

13.2.2 Adjustments relating to PR3

A number of assumptions/forecasts were made/used when setting the 2014 calendar year revenue. For example, the HICP assumption for 2014 has been revised from 1.9% to an outturn figure of 0.3%.

As discussed above in any given year TUoS tariffs for the next tariff period will include a k-factor to allow for over or under recoveries during the previous tariff period. Therefore the 2015/2016 tariff period should include a k-factor for the 2014 calendar year revenue. This k-factor would reflect the differential in TUoS energy volume recovery (associated with the decline in consumption) against the assumed energy throughput forecast in 2014. The CER received a submission from the TSO setting out the level of this 2014 k-factor on 29th June, by which the TSO calculated to be €0.83m in 2014 prices. The CER will look to address this matter in the transmission PR4 decision paper and reflect the outcome in subsequent tariff periods.

13.2.3 AUP for 2015/2016 Tariff Period

The CER has approved revenue of €331.64m in 2014 prices for the transmission businesses in 2016. This was approved in advance of a final decision for PR4, for the purposes of preparing 2015/2016 tariffs. Any variation to this allowed revenue of €331.64m as a result of a final decision on PR4 revenues will be accounted for in a tariff adjustment next year. Based on the allowed revenues (2015 transmission revenue and the proposed 2016 transmission revenue of €331.64m) and the estimated consumption, the transmission average unit price (AUP) for the period from 1st October 2015 to 30th September 2016, is estimated to be approximately 1.32cent/kWh in 2015 nominal prices. This is an increase of 0.1% on the 2014/2015 tariff period transmission AUP. Details regarding tariffs will be published separately.

14 Conclusion

This paper, together with the supporting documents published alongside it, has outlined the CER's proposals on the revenue that the TSO and TAO should be allowed to collect from the TUoS customer over the 2015 to 2020 period.

The five years from 2015-2020 will require significant new investment in the transmission system, although capex is expected to be lower than the PR3 period. The Government target of ensuring 40% of Ireland's electricity is generated by renewable sources by 2020 means a major expansion of the transmission network. This will allow these new renewable generators to connect to the system. This expansion began in PR3 and will continue in the PR4 period. The transmission network also needs ongoing investment to ensure it operates securely and effectively. This necessary investment, carried out in PR3 and due to be undertaken in PR4, will mean that the overall revenues to be recovered by the TSO and TAO over the period of the review will rise from their current levels, and that the TUoS charges levied to consumers will rise somewhat. It should be noted that the overall capex allowance is lower than the PR3 outturn allowance. This is due to the reduction in the TAO capex requirement. TSO capex is rising due to the manner in which TSO revenue is capitalised so monies spent in PR3 are being capitalised in PR4. The opex allowance is rising however, this is due to a variety of factors but mainly as a result of non-controllable costs.

While the CER is of the view that this investment is necessary and will deliver benefits to consumers, it is very aware of the need to ensure it is delivered as cost-effectively as possible. Therefore the CER will be carefully monitoring capital infrastructure delivery and will only allow the inclusion of expenditure during the PR4 where the project is well defined and accompanied by a detailed business case.

The Demand TUoS tariffs for the 1st October 2015 to 30th September 2016 tariff period will be set out by TSO based on the allowed revenues discussed in this paper. The Generator TUoS tariffs for the 1st October 2015 to 30th September 2016 tariff period will be published during the consultation phase.

14.1 Next Steps

- Approval of Generator TUoS tariffs for the period 1st October 2015 to 30th September 2016 during the consultation phase.
- Demand TUoS tariffs for the 1st October 2015 to 30th September 2016 tariff period will have been put in place in advance of the final PR4 decision. This will ensure that the PR4 consultation process will not impact on suppliers'

timelines for the development of retail tariffs. Any subsequent adjustments to revenue as a result of the PR4 decision would be dealt with within subsequent tariff periods.

- While it is intended that the PR4 decision itself will be put in place in September, the exact timelines for this will be subject to the quantity and complexity of the responses received to this consultation paper.

15 Appendix: Breakdown of Allowed Revenues (as per Jacobs Report)

Table 15.1 PR4 Jacobs Allowed Network Capex for TSO

	TSO Requested PR4						Proposed Allowed Revenues						Variance	%
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total		
Network CAPEX														
Ongoing Projects	€ 29.34	€ 13.48	€ 2.77	€ 11.69	€ 19.60	€ 76.89	€ 27.65	€ 12.71	€ 2.61	€ 11.02	€ 18.47	€ 72.45	-€ 4.44	5.77%
System Reinforcements	€ 1.03	€ 0.06	€ 0.07	€ 7.13	€ 0.55	€ 8.84	€ 0.97	€ 0.06	€ 0.07	€ 6.72	€ 0.52	€ 8.33	-€ 0.51	5.77%
Shallow Connections	€ 2.20	€ 0.59	€ 0.00	€ 0.00	€ 0.00	€ 2.80	€ 2.08	€ 0.56	€ 0.00	€ 0.00	€ 0.00	€ 2.64	-€ 0.16	5.77%
Asset Refurbishment	€ 0.17	€ 0.74	€ 0.32	€ 0.32	€ 0.00	€ 1.55	€ 0.17	€ 0.74	€ 0.32	€ 0.32	€ 0.00	€ 1.55	€ 0.00	0.00%
Minor Capital & Conflicts	€ 0.07	€ 0.07	€ 0.07	€ 0.07	€ 0.05	€ 0.32	€ 0.07	€ 0.07	€ 0.07	€ 0.07	€ 0.05	€ 0.32	€ 0.00	0.00%
DSO	€ 0.01	€ 0.04	€ 0.00	€ 0.00	€ 0.00	€ 0.05	€ 0.01	€ 0.04	€ 0.00	€ 0.00	€ 0.00	€ 0.05	-€ 0.00	5.77%
Protection, Telecoms and Station Security	€ 0.21	€ 0.21	€ 0.22	€ 0.20	€ 0.15	€ 0.99	€ 0.21	€ 0.21	€ 0.22	€ 0.20	€ 0.15	€ 0.99	€ 0.00	0.00%
Generic Projects	€ 0.79	€ 1.44	€ 2.25	€ 1.11	€ 0.55	€ 6.14	€ 0.08	€ 0.14	€ 0.22	€ 0.11	€ 0.06	€ 0.61	-€ 5.53	90.00%
Subtotal	**€ 33.83**	**€ 16.63**	**€ 5.69**	**€ 20.52**	**€ 20.90**	**€ 97.58**	**€ 31.24**	**€ 14.52**	**€ 3.51**	**€ 18.44**	**€ 19.24**	**€ 86.95**	**-€ 10.64**	**10.90%**
Customer Contributions (factored)	-€ 2.17	-€ 0.86	-€ 0.79	-€ 0.17	€ 0.00	-€ 4.00	-€ 1.94	-€ 0.77	-€ 0.70	-€ 0.16	€ 0.00	-€ 3.56	€ 0.44	10.90%
Community Gain (Factored)	€ 0.52	€ 0.43	€ 0.00	€ 11.68	€ 9.44	€ 22.07	€ 0.46	€ 0.38	€ 0.00	€ 10.41	€ 8.41	€ 19.67	-€ 2.41	10.90%
Client Engineering Capex	€ 1.46	€ 1.46	€ 1.46	€ 1.46	€ 1.46	€ 7.31	€ 1.30	€ 1.30	€ 1.30	€ 1.30	€ 1.30	€ 6.51	-€ 0.80	10.90%
Total	**€ 33.64**	**€ 17.67**	**€ 6.37**	**€ 33.50**	**€ 31.80**	**€ 122.97**	**€ 31.07**	**€ 15.44**	**€ 4.11**	**€ 29.99**	**€ 28.96**	**€ 109.57**	**-€ 13.41**	**10.90%**

Table 15.2 PR4 Jacobs Allowed Non-Network Capex for TSO

	TSO Proposed PR4						Proposed Allowed Revenue						Variance	%
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total		
Non-Network CAPEX														
IS Infrastructure (incl Desktop)	€ 0.30	€ 2.18	€ 0.79	€ 1.65	€ 0.53	€ 5.45	€ 0.20	€ 2.08	€ 0.69	€ 1.55	€ 0.43	€ 4.95	-€ 0.50	9.17%
Corporate Systems	€ 1.27	€ 0.52	€ 0.88	€ 0.33	€ 0.52	€ 3.53	€ 1.27	€ 0.52	€ 0.88	€ 0.33	€ 0.52	€ 3.53	€ 0.00	0%
Energy Management Systems – All Island Operations	€ 0.69	€ 0.15	€ 0.15	€ 0.65	€ 1.55	€ 3.19	€ 0.69	€ 0.15	€ 0.15	€ 0.65	€ 1.55	€ 3.19	€ 0.00	0%
EDIL/RCUC/AMP	€ 0.48	€ 0.36	€ 0.25	€ 0.18	€ 0.18	€ 1.44	€ 0.48	€ 0.36	€ 0.25	€ 0.18	€ 0.18	€ 1.44	€ 0.00	0%
TUoS/Settlement/Metering	€ 0.79	€ 0.34	€ 0.94	€ 0.38	€ 0.38	€ 2.81	€ 0.79	€ 0.34	€ 0.94	€ 0.38	€ 0.38	€ 2.81	€ 0.00	0%
Big Data / Data Mining	€ 0.86	€ 0.75	€ 0.15	€ 0.00	€ 0.00	€ 1.76	€ 0.86	€ 0.75	€ 0.15	€ 0.00	€ 0.00	€ 1.76	€ 0.00	0%
DS3/Smart Grids	€ 0.60	€ 0.94	€ 1.69	€ 1.13	€ 0.45	€ 4.80	€ 0.60	€ 0.94	€ 1.69	€ 1.13	€ 0.45	€ 4.80	€ 0.00	0%
Operations Changes – Network Codes	€ 0.00	€ 0.75	€ 0.00	€ 0.00	€ 0.00	€ 0.75	€ 0.00	€ 0.75	€ 0.00	€ 0.00	€ 0.00	€ 0.75	€ 0.00	0%
Telecoms	€ 5.25	€ 3.69	€ 2.24	€ 2.10	€ 2.05	€ 15.31	€ 5.25	€ 3.69	€ 2.24	€ 2.10	€ 2.05	€ 15.31	€ 0.00	0%
Facilities	€ 0.02	€ 0.02	€ 0.02	€ 0.02	€ 0.10	€ 0.18	€ 0.00	€ 0.00	€ 0.00	€ 0.00	€ 0.00	€ 0.00	-€ 0.18	100%
Total	**€ 10.25**	**€ 9.69**	**€ 7.10**	**€ 6.42**	**€ 5.74**	**€ 39.21**	**€ 10.14**	**€ 9.58**	**€ 6.99**	**€ 6.32**	**€ 5.56**	**€ 38.53**	**-€ 0.68**	**1.73%**

Table 15.3 PR4 Jacobs Allowed Capex for TAO

	TAO Proposed PR4						Proposed Allowed Revenue						Variance	%	
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total			
CAPEX															
Ongoing Projects	€ 192.30	€ 156.20	€ 145.50	€ 115.40	€ 105.20	€ 714.70	€ 181.20	€ 147.19	€ 137.10	€ 108.74	€ 99.13	€ 673.37	-€ 41.33	5.78%	
System Reinforcements	€ 14.27	€ 17.41	€ 14.11	€ 37.86	€ 39.93	€ 123.58	€ 13.44	€ 16.40	€ 13.30	€ 35.68	€ 37.63	€ 116.45	-€ 7.13	5.77%	
Shallow Connections	€ 14.08	€ 5.26	€ 5.10	€ 0.47	€ 0.12	€ 25.02	€ 13.27	€ 4.96	€ 4.80	€ 0.44	€ 0.11	€ 23.58	-€ 1.44	5.77%	
Asset Refurbishment	€ 33.72	€ 38.94	€ 48.93	€ 45.15	€ 32.84	€ 199.59	€ 25.69	€ 29.66	€ 37.27	€ 34.39	€ 25.01	€ 152.02	-€ 47.56	23.83%	
Minor Capital & Conflicts	€ 2.90	€ 5.90	€ 5.90	€ 5.00	€ 3.50	€ 23.20	€ 2.21	€ 4.49	€ 4.49	€ 3.81	€ 2.67	€ 17.67	-€ 5.53	23.83%	
DSO	€ 2.50	€ 5.80	€ 3.60	€ 0.70	€ 0.00	€ 12.60	€ 2.36	€ 5.47	€ 3.39	€ 0.66	€ 0.00	€ 11.87	-€ 0.73	5.77%	
Protection, Telecoms and Station Security	€ 3.80	€ 8.40	€ 7.30	€ 10.80	€ 7.10	€ 37.40	€ 2.89	€ 6.40	€ 5.56	€ 8.23	€ 5.41	€ 28.49	-€ 8.91	23.83%	
Generic Projects	€ 6.97	€ 18.26	€ 22.81	€ 22.04	€ 18.31	€ 88.39	€ 0.70	€ 1.83	€ 2.28	€ 2.20	€ 1.83	€ 8.84	€ 8.84	90.00%	
Sub Total	€ 270.50	€ 256.10	€ 253.20	€ 237.40	€ 207.00	€ 1,224.30	€ 241.76	€ 216.39	€ 208.21	€ 194.15	€ 171.79	€ 1,032.3	-€ 192.01	15.68%	
Customer Contributions (factored)	-€ 68.70	-€ 42.60	-€ 8.30	-€ 1.10	-€ 0.30	-€ 121.00	-€ 57.93	-€ 35.92	-€ 7.00	-€ 0.93	-€ 0.25	-€ 102.02	€ 18.98	15.68%	
IDC	-€ 14.20	-€ 13.60	-€ 12.90	-€ 12.90	-€ 11.40	-€ 65.10	-€ 11.97	-€ 11.47	-€ 10.88	-€ 10.88	-€ 9.61	-€ 54.81	€ 10.29	15.81%	
Total	€ 187.60	€ 199.90	€ 231.90	€ 223.40	€ 195.40	€ 1,038.20	€ 171.86	€ 169.01	€ 190.33	€ 182.35	€ 161.92	€ 875.46	-€ 162.74	15.67%	

Table 15.4 PR4 Jacobs Allowed Opex for TSO

	TSO Proposed PR4						Proposed Allowed Revenue						Variance	%
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total		
OPEX														
Staff Costs	29.2	29.8	30.1	30.3	30.3	149.6	26.1	26.1	26.1	26.1	26.1	130.4	-19.2	-12.8%
Staff Related Costs	2.0	2.0	2.0	2.0	2.0	10.0	1.9	1.9	1.9	1.9	1.9	9.50	-0.5	-5.0%
Contractors	2.0	2.0	2.0	2.0	2.0	10.0	1.6	1.6	1.6	1.6	1.6	8.0	-2.00	-200%
Telecommunications	5.4	6.1	6.3	6.3	6.5	30.7	4.3	4.3	4.9	5.4	6.1	25.1	-5.6	-18.2%
Premises	4.6	4.8	5.1	5.1	5.2	24.7	4.6	4.8	4.8	4.8	4.8	23.7	-1.0	-4.0%
IT Costs	3.0	3.2	3.5	3.6	3.7	17.0	2.7	2.7	2.9	3.0	3.2	14.5	-2.5	-14.7%
Insurance and Compensations	0.3	0.3	0.3	0.3	0.3	1.5	0.2	0.2	0.2	0.2	0.2	1.0	-0.5	-33.3%
Selling and Advertising	0.2	0.2	0.2	0.2	0.2	1.2	0.1	0.1	0.1	0.1	0.1	0.5	-0.7	-58.3%
Professional Services	3.4	3.5	3.3	3.0	3.1	16.3	2.9	2.9	2.9	2.9	2.9	14.5	-1.4	-8.5%
Grid Maintenance	1.1	1.1	1.1	1.1	1.1	5.6	1.0	1.0	1.0	1.0	1.0	5.0	-0.6	-10.7%
Intercompany – Corporate Recharges	-4.7	-4.7	-4.7	-4.8	-4.8	-23.6	-3.7	-3.7	-3.7	-3.8	-3.8	-18.6	-5.0	-21.2%
Rates	0.6	0.6	0.6	0.6	0.6	2.9	0.6	0.6	0.6	0.6	0.6	2.9	0.0	0.0%
Promotion of Research	0.7	0.7	0.7	0.7	0.7	3.5	0.2	0.2	0.2	0.2	0.2	1.0	-2.5	-71.4%
Research, Development & Demonstration	1.5	2.0	4.1	5.6	5.7	18.9	0.0	0.0	0.0	0.0	0.0	0.0	-18.9	-100.0%
Operating Costs (excl Depn)	**49.3**	**51.6**	**54.5**	**56.1**	**56.6**	**268.2**	**42.5**	**42.6**	**43.4**	**44.1**	**44.8**	**217.4**	**-50.7**	**-18.9%**

	TSO Proposed PR4						Proposed Allowed Revenue						Variance	%
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total		
Pass through costs														
Inter TSO Compensation	1.3	1.3	1.3	1.3	1.3	6.5	1.3	1.3	1.3	1.3	1.3	6.5	0	0%
TAO Payment	202.4	202.4	202.4	202.4	202.4	1011.8	202.4	202.4	202.4	202.4	202.4	1011.8	0	0%
CORESO subscription	0.0	1.0	1.0	1.0	1.0	4.0	0.0	1.0	1.0	1.0	1.0	4.0	0	0%
Interconnector services	1.0	1.0	1.0	1.0	1.0	5.1	1.0	1.0	1.0	1.0	1.0	5.1	0	0%
CER Levy	1.0	1.0	1.0	1.0	1.0	5.0	1.0	1.0	1.0	1.0	1.0	5.0	0	0%
Ongoing service charge	1.3	1.3	1.3	1.3	1.3	6.5	1.3	1.3	1.3	1.3	1.3	6.5	0	0%
DUoS costs	1.3	1.3	1.3	1.3	1.3	6.5	1.3	1.3	1.3	1.3	1.3	6.5	0	0%
Ancillary Services	49.2	49.2	49.2	49.2	49.2	246.1	49.2	49.2	49.2	49.2	49.2	246.1	0	0%
PSO	203.2	203.2	203.2	203.2	203.2	1015.9	203.2	203.2	203.2	203.2	203.2	1015.9	0	0%
Total pass through costs	460.7	461.7	461.7	461.7	461.7	2307.4	460.7	461.7	461.7	461.7	461.7	2307.4	0	0%
Total Opex	**510.0**	**513.2**	**516.2**	**517.8**	**518.3**	**2575.5**	**503.2**	**504.3**	**505.1**	**505.8**	**506.5**	**2524.8**	**-50.7**	**-2.03%**

Table 15.5 PR4 Jacobs Allowed Opex for TAO

	TAO Proposed PR4						Proposed Allowed Revenue						Variance	%
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total		
OPEX														
Operations Allowance	€2.6	€2.7	€2.7	€2.7	€2.7	€13.4	€2.6	€2.7	€2.7	€2.7	€2.7	€13.4	€0.0	0.0%
Maintenance Allowance	€19.0	€19.0	€19.0	€19.0	€19.0	€95.0	€17.7	€17.7	€17.7	€17.7	€17.7	€88.5	-€6.5	-6.8%
Asset Management Allowance	€1.0	€1.1	€1.1	€1.2	€1.2	€5.6	€1.0	€1.1	€1.1	€1.2	€1.2	€5.6	€0.0	0.0%
Other Allowance	€10.7	€10.7	€10.7	€10.7	€10.7	€53.5	€10.0	€10.0	€10.0	€10.0	€10.0	€50.0	-€3.5	-6.5%
Controllable Costs Allowance	€33.3	€33.4	€33.5	€33.5	€33.6	€167.4	€31.3	€31.4	€31.5	€31.5	€31.6	€157.4	-€10.0	-6.0%
Rates	€22.1	€26.3	€28.3	€30.4	€32.5	€139.7	€22.1	€26.3	€28.3	€30.4	€32.5	€139.7	€0.0	0.0%
CER Levy	€1.2	€1.2	€1.2	€1.2	€1.2	€6.0	€1.2	€1.2	€1.2	€1.2	€1.2	€6.0	€0.0	0.0%
Uncontrollable Costs Allowance	€23.3	€27.5	€29.5	€31.6	€33.7	€145.7	€23.3	€27.5	€29.5	€31.6	€33.7	€145.7	€0.0	0.0%
Total	**€56.6**	**€60.9**	**€63.0**	**€65.2**	**€67.4**	**€313.1**	**€54.6**	**€58.9**	**€61.0**	**€63.2**	**€65.4**	**€303.1**	**-€10.0**	**-3.2%**