



An Coimisiún
um Rialáil Fóntais
**Commission for
Regulation of Utilities**

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Commission for Regulation of Utilities

Price Review Five (PR5)

**TSO and TAO Transmission Revenue for
2021 - 2025**

Draft Determination Paper

Reference:

CRU/20/076

Date Published:

22/07/2020

Closing Date:

18/09/2020

CRU Mission Statement

The Commission for Regulation of Utilities ('CRU') mission is to protect the public interest in Water, Energy and Energy Safety.

The CRU is guided by four strategic priorities that sit alongside the core activities we undertake to deliver on the public interest. These are:

- Deliver sustainable low-carbon solutions with well-regulated markets and networks;
- Ensure compliance and accountability through best regulatory practice;
- Develop effective communications to support customers and the regulatory process; and
- Foster and maintain a high-performance culture and organisation to achieve our vision.

Executive Summary

The *Climate Action Plan 2019*¹ and the recently approved programme for government 2020 set the energy sector in Ireland a collective challenge to decarbonise electricity while facilitating consumer and community engagement, significant electrification of heat and transport and rapidly increasing demand. EirGrid (TSO), working closely with ESB Networks (TAO), has a crucial role to play in the successful delivery of this vision for Ireland's future. The Climate Action Plan 2019 sets targets that include 70% of electricity coming from renewable generation sources by 2030; increased uptake of micro-generation (including 'prosumers' selling power to the grid); and all new cars and vans sold in 2030 being electric (resulting in 950,000 EVs on the road by 2030).

Greater flexibility on the transmission network will be needed to securely accommodate more renewable generation, new technologies and new demands on the system for Price Review five ('PR5'). This will require transformational change within EirGrid and ESNB, entailing the embedding of innovation, agility and developing new ways of working and delivering network services. Both must have access to the resources to deliver this change.

To enable and sustain this transformation, the CRU expects the network companies to ensure that there is also an ambitious and systematic focus on increasing efficiency in terms of cost and quality of delivery while continuing to meet the needs of the network and protecting long and short-term customer interest. The proposed efficiencies in this paper 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 to build upon implemented efficiencies the CRU developed in previous price reviews.

¹ Climate Action Plan 2019: <https://www.dccae.gov.ie/documents/Climate%20Action%20Plan%202019.pdf>

In December last year, the CRU published a Discussion Paper² on the approach to PR5. This paper highlighted that, in the context of a rapidly changing energy system, there is a need for a more agile framework to accommodate future possibilities, while encouraging efficiency, innovation and the scope to make the necessary investments to support the energy system transformation that is taking place.

The PR5 Discussion Paper also set out the PR5 strategic objectives which build on the CRU's Strategic Plan.³ The CRU's objectives for PR5 (see Section 1.4.2 for more detail) aim to deliver a secure and sustainable system in a cost-effective manner that supports the delivery of our 2030 targets. These are summarised in Figure 1 below.

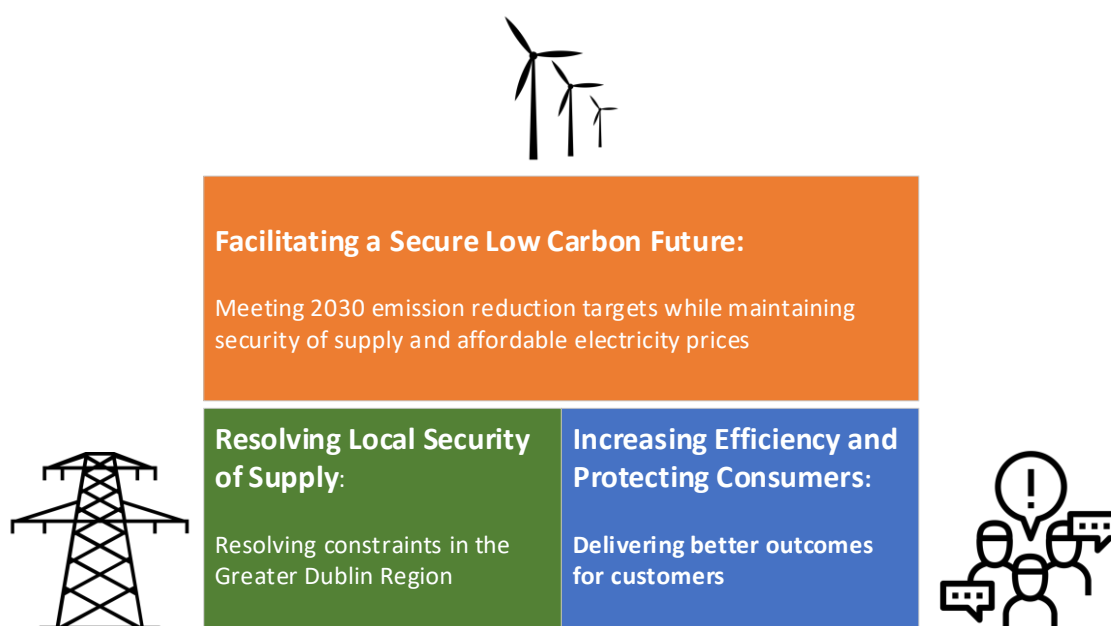


Figure 1 The CRU's PR5 Transmission Objectives

When considering these objectives and the need for a more agile framework to accommodate future possibilities, the CRU examined and proposed changes to the regulatory framework currently in place (see summary in Section 2). Some of the key aspects of these proposals include:

- An increased focus on consumer outcomes;
- Enhanced Performance Incentive Framework; and

² PR5 Discussion Paper: <https://www.cru.ie/wp-content/uploads/2019/12/CRU19152-Discussion-Paper-on-the-Approach-for-Transmission-Distribution-Price-Review-5.pdf>

³ Strategic Plan 2019 – 2021: https://www.cru.ie/document_group/strategic-plan-2019-2021/

- An Agile Investment Framework to provide for more flexibility for the network companies within PR5.

The goal of enhancing the current regulatory framework is to ensure that PR5 enables network companies to deliver on the Climate Action Plan and Clean Energy Package whilst also ensuring that consumers are protected. The pace of changes will depend on how fast needs evolve. The CRU is conscious that establishing a more agile investment framework for PR5 involves some level of risk. This risk must be managed by network companies and must not be improperly transferred to consumers. It is incumbent on network companies to manage its costs.

This paper puts forward the CRU's proposals on the TSO's and TAO's revenue for the 2021 to 2025 period. The TSO's and TAO's costs and performance over the previous five years are also examined. The following sub sections set out a brief summary of the CRU's historic (2016 – 2020) and future (2021 – 2025) review of TSO and TAO costs. Also summarised is the proposed weighted average cost of capital ('WACC') for PR5. The CRU is seeking stakeholder views on all aspects of the CRU's proposals, on how uncertainty should be considered and what the likely trends will be for PR5. Responses will be considered prior to the publication of the CRU's Final Determination.

PR4 Historic Review (2016 – 2020)

Overall, the TSO's expected Opex outturn for PR4 is €740m (including incremental Opex costs). This is €218m (42%) above the CRU allowance of €521.9m. The overspend is driven by the TSO's spend on non-controllable Opex. In contrast, the TSO is forecast to underspend its PR4 controllable Opex allowance by €1.7m (1%). While the TSO has exceeded its PR4 allowance in some areas, the CRU recognises that the TSO has overall operated within its PR4 Opex allowance and has delivered Opex savings across staff and related costs, contractor costs and professional services. Accordingly, the CRU is proposing to allow the TSO to retain €1.7m over and above its expenditure. However, this award of €1.7m is dependent upon the incremental Opex relating to ISEM included as a placeholder during the PR4 period as being efficiently incurred. If the TSO does not provide sufficient information to demonstrate the efficiency of this placeholder, the CRU will reconsider the proposed €1.7m efficiency award.

The TAO's overall expected Opex outturn for PR4 is €298.2m. This is €0.1 million lower than the CRU allowance of €298.3m. This outcome has been delivered through an overspend on controllable Opex of €13.9m and an underspend on non-controllable Opex of €14.0m. In PR4, the TAO is expected to spend more than its planned maintenance allowance in four out of five years of PR4. The CRU is proposing a disallowance on TAO maintenance costs.

Table 1 provides a breakdown of the draft determination for the TSO and TAO's historic Opex. A more detailed explanation of the CRU's proposals is set out in Section 3.2.

Table 1 TSO and TAO Historic Opex Executive Summary (2016 – 2020)

PR4 TSO Ex-Post Opex Allowance	PR4 Total (€m)
Categories	
Total TSO Controllable Opex Outturn/Forecast	240.7
Total TSO Ex-Post Controllable Opex Allowance	242.4*
Total TSO Non-Controllable Opex Outturn/Forecast	499.2
Total TSO Ex-Post Non-Controllable Opex Allowance	499.2
Total TSO Ex-Post Allowance	741.6
PR4 TAO Ex-Post Opex Allowance	PR4 Total (€m)
Categories	
Total TAO Controllable Opex Costs Outturn/Forecast	171.3
1. Disallowed Maintenance Cost	-10.4
Total TAO Ex-Post Controllable Opex Allowance	161.2
Total TAO Non-Controllable Opex Outturn	126.9
Total TAO Ex-Post Non-Controllable Opex Allowance	126.9
Total TAO Opex Ex-Post Allowance	288.4

*Includes deferred (PR5 to PR4) telecommunications costs and recognition of Opex savings.

The TSO's net outturn total capital expenditure is expected to be €117m, an underspend of €31m or 20.8% of the PR4 allowance, noting that the 2019 and 2020 outturn is forecasted. Network capital expenditure is forecast to be €87m (2019 & 2020 forecast values), an underspend of €22m or 19.9% of the CRU PR4 allowance. Non-network PR4 capital expenditure forecast to be €30m, an underspend of €9m or 23.5% of the CRU PR4 allowance. Deferred non-network Capex and a partial allowance related to facilities over-expenditure are included within the CRU's proposals. Accordingly, it is proposed that the TSO be allowed to retain €0.7m above its expenditure subject to the completion of the deferred activities (resulting in a clawback of those allowances in PR5 if not completed).

The TAO's expected net outturn for PR4 is €675m which is an underspend of €200.8m when compared to the PR4 allowance. The underspend is primarily driven by the delay or re-scoping of large 400kV developments. The CRU's proposed disallowances relate to a 3% efficiency reduction on gross capex due to evidence of inefficient design and other adjustments. Table 2 provides a breakdown of the draft determination for the TAO and TSO's historic Capex.

Table 2 TSO and TAO Historic Capex Executive Summary (2016 – 2021)

PR4 TSO Ex-Post Capex Allowance	PR4 Total (€m)
Categories	
TSO Total Network Capex Allowance	87.0
TSO Non-Network Capex Actual/Forecast	30.3
1. Deferred Energy Management System Costs	+2.3
2. Deferred TUoS & Metering Costs	+0.4
3. Deferred Reserve Constrained Unit Commitment Software Costs	+0.5

4. Partial allowance of Facilities Non-Network Capex Costs overspend ⁴	-2.5
TSO Total Non-Network Capex Allowance	31.0
Total Ex-Post TSO Allowance	118.0
PR4 TAO Ex-Post Network Capex Allowance	PR4 Total (€m)
Categories	
TAO Network PR4 Outturn and Forecast (Net)	674.6
1. Uncapitalised Line Project Assessment Report	+0.2
2. Evidence of Inefficient Design	-24.3
3. TAO 'Other' Adjustments PR4 Outturn and Forecast	-37.7
Total Ex-Post TAO Allowance	613.0

PR5 Forecast Review (2021 – 2025)

For Opex, the CRU has recommended a considerable increase (circa 21%) when compared to the TSO's PR4 outturn. The TAO's Capex requirement has also increased by circa 28% when compared to PR4 outturn. This reflects the CRU's commitment to ensure that the TSO and TAO have the resources and capability to deliver on the PR5 strategic objectives.

However, the CRU is cognisant of the need to protect customers and has set out a number of cost challenges related to TSO and TAO proposals. Cost challenges are applied where there is insufficient justification or where either some or all of the PR5 assessment gateways (need, additionality and efficiency of costs) have not been met. These cost challenges indicate the potential for a change in revenues between Draft Determination and Final Determination. This is subject to additional, targeted, information being submitted by network companies, which will be considered during the consultation period and prior to Final Determination.

A cost challenge of circa €18m and €3m has been applied to the TSO and TAO's Opex proposals respectively. While for Capex a cost challenge of circa €45m and €50m has been applied to the TSO and TAO's Capex proposals. This is on the basis that the information provided by the network companies has not fully met some or all of the gateways of need, additionality or cost efficiency. More detail on the cost challenge is set out in Section 3.4.

The CRU's PR5 Opex and Capex draft determination proposals are summarised in Table 3 and Table 4 respectively. It should be noted again that if the TSO and the TAO are able to provide sufficient justification for the requests subject to the cost challenge in this Draft Determination these costs will be included, in full or in part, in the allowances set as part of the PR5 Final Determination.

⁴ The CRU has proposed including 50% of the TSO's overspend on its PR4 facilities allowance (€0m).

Table 3 TSO and TAO Forecast Opex Executive Summary (2021 – 2025)

TSO PR5 Opex (€m 2019 prices)	Request (€m)	Recommendation (€m)	Variance (€m)
TSO Controllable Opex Baseline	275	267.3	-7.7
1. Sustainability and Decarbonisation	+15.4	+13.2	-2.21
2. Operate, Develop and Enhance the Grid & Market	+14.3	+10.8	-3.5
3. Engage for better outcomes for all	+7.0	+3.6	-3.4
4. Non-Network Capex Opex Requested	+5.8	+5.2	-0.6
5. Other	-0.40	-0.40	0.00
Total TSO Controllable Opex PR5	318.6	300.9	-17.7
Total TSO Non-Controllable Opex	957.1	957.1	0.0
Total TSO PR5 Opex (Excl. Ongoing Productivity)	1,275.6	1,258.0	-17.6
Total TSO PR5 Opex (Incl. Ongoing Productivity)	1,287.4⁵	1,254.8	-32.6
TAO Opex (€m 2019 prices)	Request (€m)	Recommendation (€m)	Variance (€m)
Total TSO Controllable Opex PR5	160.3	157.3	-3.0
Total TAO Non-controllable Opex	168.0	168.0	0.0
Total TSO PR5 Opex (Excl. Ongoing Productivity)	328.3	325.3	-3.0
Total TSO PR5 Opex (Incl. Ongoing Productivity)	319.9	319.8	-0.1

Table 4 TSO and TAO Forecast Capex Executive Summary (2021 - 2025)

TSO PR5 Capex (€m 2019 prices)	Request (€m)	Recommendation (€m)	Variance (€m)
TSO Network Capital Expenditure	81.02	68.32	-12.69
Total TSO Network Capex	81.02	68.32	-12.69
TSO BAU Non-Network Capital Expenditure	32.77	19.31	-13.46
TSO Non-Network Capex (PR4 Deferred)	-3.20*	-3.20*	0.00
1. Sustainability and Decarbonisation	+21.7	+10.75	-10.9
2. Operate, Develop and Enhance the Grid & Market	+13.89	+9.28	-4.6
3. Engage for better outcomes for all	+3.75	0.0	-3.75
Total TSO Non-Network Capex	68.9	36.14	-32.7
Total TSO PR5 Capex	149.9	104.46	-45.4
TAO PR5 Capex (€m 2019 prices)	Request (€m)	Recommendation (€m)	Variance (€m)
TAO Network Capital Expenditure Total	1,126.2	1,075.5	-50.7
Interest During Construction Total	-56.3	-56.3	0.00
Customer Contributions	-100	-100	0.00
Other' Adjustments	0.00	0.00	0.00
Total TAO Adjustments	-156.3	-156.3	0.00
Total TAO Net Network PR5 Capex	969.9	919.2	-50.7

⁵ Includes TSO Real Price Effect request.

Regulatory Framework and Uncertain Costs

More flexibility will be required for PR5 and the CRU is proposing an Agile Investment Framework to accommodate this requirement. The CRU's Price Review determination will not capture costs, projects or initiatives that remain uncertain, or are deemed uncertain to include within the Final Determination. Optimal transmission expansion/reinforcement strategies may change over time and it's important to consider how best to address this uncertainty. The CRU recognises that in order to facilitate the necessary transformational change within the PR5 period and beyond, an agile investment framework must be introduced.

As a means of reducing uncertainty for cost recovery in relation to projects with a scope and/or need that cannot be fully defined at the start of PR5 but is likely needed to be progressed during PR5, the CRU considers there to be merit in a mechanism that reviews and considers such projects. This approach will ensure that the network companies will have access to the necessary revenues to deliver on the CAP.

The CRU has published a Consultation Paper (CRU/20/078) reviewing changes to the current regulatory framework and how best to address uncertainty. The proposal include the establishment of a Monitoring Committee to progress large and uncertain projects. The CRU is seeking stakeholder views on this uncertainty mechanism and how best to address uncertainty within PR5.

Weighted Average Cost of Capital

The CRU's proposed Weighted average cost of capital for PR5 is set out in Table 5 and further details are set out in Section 4.2.

Table 5 Weighted Average Cost of Capital Executive Summary

	CRU Recommendation	TSO Proposal	TAO Proposal
Weighted Average Cost of Capital	3.8%	4.0%	4.2%

COVID-19 Note

This Price review determination is being conducted in the context of changing economic circumstances as a result of COVID-19. The CRU has continued to engage with network companies on the potential impact on COVID-19, however, uncertainty remains. With respect to the potential impact on demand, EirGrid estimated (in June) that the total electricity demand for 2020 could be 3% down on 2019, assuming a relaxation of COVID-19 restrictions. There may also be additional impacts related to changing work practices for network companies.

For the weighted average cost of capital, our advisors have noted that it is not possible to draw long-term inferences about the cost of capital for PR5 from market movements since the start of the COVID-19 crisis. The CRU will further assess any long-term impacts when the final determination is made.

Public/ Customer Impact Statement

Ireland's electricity networks deliver secure electricity supplies to homes and businesses in the country. The CRU allows EirGrid and ESB Networks ("the network companies") to charge money towards the cost of building, safely operating and maintaining the electricity system in Ireland. These charges are reflected in customers' electricity bills and make up the network companies' revenue allowances. The revenue allowances are collected from suppliers via the use of system charges and charges per unit of electricity that they buy, which is then passed on to customers in their electricity bills. Depending on other factors (for example the cost of wholesale electricity and fuel) the use of system charge typically accounts for about one third of an average residential customer's electricity bill.

The CRU's role is to protect electricity customers by ensuring that the network companies spend customers' money appropriately and efficiently to deliver necessary services and make necessary investments in infrastructure. The CRU does this through what is called a Price Review which is carried out every five years. The current Price Review (PR4) started in 2016 and will end in 2020. PR5 will follow PR4 and will determine the use of system charges for the period 2021 to 2025, and therefore, will have an impact on customers electricity bills over that period.

PR5 comes at an important time for the evolution of the electricity networks and will play an important role in enabling the transition to a low carbon system by 2030. We can expect significant changes over this period which will transform the way electricity customers think about and use electricity. Advancement in smart technologies such as smart meters will increase customer participation rates where electricity customers will become more active in energy markets.

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Glossary of Terms and Abbreviations

Acronym	Definition or Meaning
ALO	Agriculture Liaison Officer
BAU	Business as Usual
BPQ	Business Plan Questionnaire
Capex	Capital Expenditure
CEER	Council of European Energy Regulators
CEPA	Cambridge Economic Policy Associates
CLO	Community Liaison Officer
CORES0	COoRdination of Electricity System Operators
CRE	Commission De Regulation De L'Energie
CRU	Commission for Regulation of Utilities
DSO	Distribution System Operator
DUoS	Distribution Use of System
EA	External Affairs
ENTSO-E	European Network of Transmission System Operators for Electricity
ESB	Electricity Supply Board
FTE	Full Time Equivalent
GHD	Gutteridge Haskins and Davey Ltd.
HICP	Harmonised Index of Consumer Prices
IA	Infrastructure Agreement
IDC	Interest During Construction
IP	Internet Protocol
I-SEM	Integrated Single Electricity Market
KPI	Key Performance Indicator
LPAR	Line Project Assessment Reports
MW	Mega Watt
OGSC	Ongoing Service Charge
Opex	Operational Expenditure

PR	Price Review
QRA	Qualitative Risk Assessments
RAB	Regulated Asset Base
RAV	Regulated Asset Value
RIDP	Renewable Integration Development Project
RPE	Real Price Effects
TAO	Transmission Asset Owner
TLA	Transmission Line Assessment
TSO	Transmission System Operator
TUoS	Transmission Use of System
WACC	Weighted Average Cost of Capital

Part 1 – Introduction

1 Introduction

Greater flexibility on the transmission network will be needed to securely accommodate more renewable generation, new technologies and new demands on the system for Price Review five ('PR5'). This will require transformational change within EirGrid and ESBN, entailing the embedding of innovation, agility and developing new ways of working and delivering network services. Both must have access to the resources and capability to deliver this change. This section sets out the structure, background, objectives and assumptions; and the Review Process of the Draft Determination Paper.

This Draft Determination Paper puts forward the CRU's proposals on the TSO's and TAO's revenues for the 2021 to 2025 (PR5) period and examines the cost and performance over the previous five years (2016 to 2020). The Review sets out the transmission revenue that can be collected from the TUoS (Transmission Use of System) customer.

The CRU has established a number of strategic objectives for PR5 which aim to deliver a secure and sustainable system in a cost-effective manner that supports the delivery of Ireland's 2030 targets.

1.1 Related Documents

Further background relevant to this consultation document can be found in the following documents:

CRU/19/152	Electricity Networks Price Review Five 2021 –2025	CRU Discussion Paper
CRU/20/076a	Consultancy Support for Electricity Transmission Revenue Controls (2016 – 2025)	Advisors Report
CRU/20/076b	EirGrid PR5: Executive Summary	EirGrid Report
CRU/20/077b	ESB Networks Submission: Business Plan	ESBN Report
CRU/20/076c	PR5 TSO Revenue Model	CRU Model
CRU/20/076d	PR5 TAO Revenue Model	CRU Model
CRU/20/078	PR5 Regulatory Framework, Incentives and Reporting	CRU Consultation Paper
CRU/20/079	PR5 cost of capital estimation	Advisors Report
CRU/20/080	Real price effects and ongoing improvements for PR5	Advisors Report

1.2 Structure of Paper

The main structure of the Draft Determination Paper is as follows:

- **Part 1: Introduction**
 - Introduction;
 - Background, Objectives and Assumptions;
 - The Review Process;
- **Part 2: The Regulatory Framework**
- **Part 3: Allowed Expenditure**
 - Review of Historical Capital Expenditure;
 - Review of Historical Operational Expenditure;
 - Review of Forecast Capital Expenditure;
 - Review of Forecast Operational Expenditure;
- **Part 4: Allowed Revenues & Finance**
 - The Regulatory Asset Base;
 - The Cost of Capital;
 - Allowed Revenues;
 - Tariffs;
- **Part 5: Conclusion**
- **Part 6: Appendices**

1.3 Responding to this Draft Determination:

Responses to this paper should be returned by email by 17:00 Friday 18 September 2020 and marked with the reference CRU/20/076.

Responses by e-mail should be sent to CRU at pricereview5@cru.ie.

Please note the CRU intends to publish all submissions received. Unless marked confidential, all responses may be published on the CRU's website. Respondents may request that their response is kept confidential. The CRU 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. Responses from identifiable individuals will be anonymised prior to publication on the CRU website unless the respondent explicitly requests their personal details to be published. Our privacy notice sets out how we protect the privacy rights of individuals and can be found [here](#).

Information on the CRU's role and relevant legislation can be found on the CRU's website at www.CRU.ie

1.4 Background, Objectives and Assumptions

This section summarises the following information:

- The CRU's role and powers under which the CRU will make its determination;
- The CRU's objectives for the 2021 to 2025 price review;
- The Price Review;
- The System Operator and Owner Functions; and
- The key assumptions underpinning the review.

1.4.1 The CRU's Role in the Determination of this Price Review

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

35 – (1) Subject to *subsection (2)*, within such time as the Commission may direct, the Board shall prepare a statement for the approval of the Commission setting out the basis upon which charges are imposed —

(a) for use of the transmission or distribution system of the Board, and

(b) for connection to the transmission or distribution system of the Board.

In accordance with Section 35 of the Act, this document outlines the CRU's proposals on the revenue that the TSO and TAO will be allowed to recover from TUoS customers during the period from 2021 to 2025.

The rationale for the CRU's proposals is explained in detail in the remainder of this paper. The level of revenue (historical and future) is detailed in Section 3 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 CRU for approval and will not take effect until approved by the CRU. In accordance with Section 36 of the Act, the TSO's approved statement of charges for each year of PR5 will be published annually in August for the upcoming 1st October to 30th September tariff period. The tariffs set out in the annual statement of charges will not reflect the annual allowed revenues set out in the PR5 Final Determination. A decision on TUoS revenues was expected by 19 June 2020. This was on the basis of EirGrid submitting the 2021 revenue forecast by 17 April and the electricity demand forecast by 29 May. However, as a result of uncertainty and delays to the regulatory work programme caused by the COVID-19 outbreak, EirGrid has not been in a position to provide a revenue forecast and was delayed in its submission of the demand forecast.

1.4.2 CRU Objectives for Price Review Five

On 11 July 2019 the CRU issued a PR5 launch letter to both EirGrid and ESBN. This letter set out the CRU's objectives and vision for PR5 and also requested a commitment from EirGrid and ESBN to deliver on these. As stated in the letter, The Climate Action Plan 2019 set out a collective challenge to decarbonise the electricity sector while facilitating consumer and community engagement, significant electrification of heat and transport and rapidly increasing demand. EirGrid, working closely with ESB Networks, has a crucial role to play in the successful delivery of this vision for Ireland's future. Greater flexibility on the network will be needed to securely accommodate more renewable generation, new technologies and new demands on the system. This will require transformational change, entailing the embedding of innovation, agility and developing new ways of working and delivering network services. EirGrid and ESBN must have the resources and capability to deliver this change.

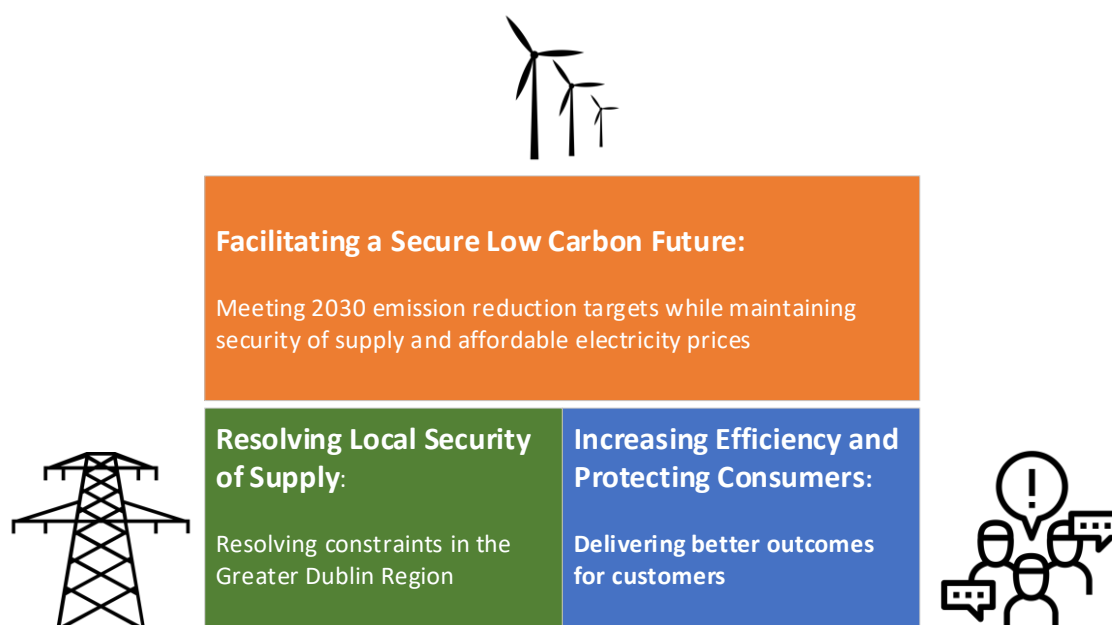


Figure 2 The CRU's PR5 Objectives

The CRU's strategic objectives for PR5 aim to deliver a secure and sustainable system in a cost-effective manner that supports the delivery of Ireland's 2030 targets.

- **Facilitating a Secure Low Carbon Future**

The need to meet carbon emission reduction targets by 2030 must be achieved while maintaining security of supply and affordable electricity prices. This will require substantial changes to Ireland's electricity networks and the way we consume electricity. Measures are required to:

- Provide energy customers with better and more accurate information regarding their consumption;

- Facilitate active consumers;
- Allow for greater flexibility of the network; and
- Efficiently manage and develop the networks in order to increase the penetration of renewables.

Innovative solutions and approaches will be required to do this; including facilitating greater use of third parties and market-based solutions.

- **Increasing Efficiency and Protecting Consumers**

As set out within the CRU's Reporting and Incentives Decision Paper (CRU/18/087), network companies must focus on delivering better outcomes for customers, using innovation to deliver services more efficiently and meeting key national strategic objectives. The scale of the challenge of achieving the 2030 targets, and the likely upward pressure on costs associated with them, means that incremental improvements to business-as-usual processes will simply not be enough to ensure an economically sustainable transition to a secure low carbon future.

The CRU expects the network companies to ensure that there is an ambitious and systematic focus on increasing efficiency in terms of cost and quality of delivery of services while continuing to meet the needs of the network and protecting long and short-term customer interest. Addressing the challenges associated with the transformational change on the system will require investment and changes to the network companies' current processes.

The CRU will require the network companies to review their current processes and take into consideration best practice internationally and the deliverables necessary to achieve the 2030 targets. In addition, the network companies should embed continual efficiency improvements into their approach to all of their areas of responsibility. Additionally, the CRU committed to examining ways to enable greater flexibility for the network companies within the PR5 framework to facilitate innovation and better outcomes for consumers.

- **Resolving Local Security of Supply**

The significant forecasted growth in demand in the Greater Dublin Region will require innovative solutions both in the short and the long term. The constraints in the Greater Dublin Region represent a security of supply risk for Dublin. Given the national importance of maintaining a secure electricity supply in Dublin the CRU considers that these constraints must be resolved as a matter of urgency. Resolving constraints must not be achieved to the detriment of other regions.

Delivering on PR5 will ultimately lay the foundation to transition to a sustainable, low-carbon electricity system and will be a key factor in meeting Ireland's 2030 targets.

1.4.3 System Operator and Owner Functions

The Transmission System Operator (TSO) within Ireland is EirGrid. Its 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, it 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 Table 6 below.

Table 6 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

The current structure and arrangements have been maintained and 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. In case of delay or default, EirGrid has rapid step in rights to arrange for the work to be undertaken by an approved contractor by direction of the CRU.

It should be noted that both companies must 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.

A key benefit of this structure is in the alignment of incentives around the needs of the system, particularly in relation to system planning. In other systems with a TSO that also owns the

infrastructure regulators have raised concerns in relation to a potential bias towards capex projects over capex deferral or non-wire solutions – to the detriment of consumers. For example Ofgem in Great Britain has sought to address capex bias when developing its RIIO approach to network revenue regulation. The CRU has taken the structure of the network companies into consideration when developing its proposals for the PR5 Regulatory Framework.

1.4.4 Price Review

The CRU 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. This Draft Determination Paper puts forward the CRU's proposals on the TSO's and TAO's revenues for the 2021 to 2025 (PR5) period and examines the cost and performance over the previous five years (2016 to 2020). The Review sets out the transmission revenue that can be collected from the TUoS (Transmission Use of System) customer.

This revenue is collected by the TSO and distributed between the TSO and TAO as per SI 445 of 2000 and the Infrastructure Agreement between the two bodies. The transmission revenue is set at a level that would allow an efficient business to finance its activities and is determined by assessing the network companies' business plans and examining the specific underlying costs of the TSO and TAO.

The CRU adopts an incentive-based model to separately determine the TSO's and TAO's allowed revenues. Both utilities internal operating costs are fixed for five years. 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 efficiently incurred surplus made any one year for 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.

The CRU places incentives on the TSO and TAO to increase the security, reliability and quality of its service, while operating in an increasingly efficient manner. Alongside this paper, the CRU has published a consultation on proposals for the incentives that the TSO and TAO would be subject to over the PR5 period.

The current Price Review period ends on 31st December 2020. This Draft Determination Paper sets out the CRU's proposals for the revenue that the TSO and TAO, separately, should be allowed to earn from 1st January 2021 to 31st December 2025.

The PR4 period was characterised by the initiation of a large-scale infrastructure delivery programme to meet the 2020 targets. The PR5 and PR6 periods will be characterised by the initiatives and transformation required to meet the 2030 targets. Therefore, PR5 must build upon the successes of PR4 and initiate the transformation of the system that will be completed in PR6. Accordingly, the five years from 2021-2025 will require continued investment in the transmission system, delivering ongoing infrastructure projects, and transformational change. The transmission network also needs ongoing investment to ensure it operates securely and effectively.

1.4.5 Key Assumptions

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

Transmission System Owner and Operator Structure

As with PR4, 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 (see Table 6 above).

Therefore, the transmission allowed revenues for 2021 to 2025 have been set on the basis of the current industry structure and the CRU is assuming that this structure will be in place for the entire PR5 period. Should this position change, or is likely to change, at some point over the five years of this price review period (2021 to 2025), the CRU will take the appropriate steps to review the regulatory structures and revenues in place for transmission.

Therefore, the policies outlined in this Draft Determination Paper are on the basis that EirGrid will remain as TSO and ESB Networks will remain as TAO for the 2021 to 2025 PR5 period. Information is provided above regarding the effective unbundling of the transmission system operator and transmission system owner functions during PR4.

1.4.6 Interconnector Ownership

As with PR4, it is assumed that any interconnectors developed during PR5 will have separate ownership, at least in terms of legal entity, from both the licensed TSO and TAO. And will consequently have funding arrangements separate from the PR5 process.

If there is a change to this assumption, the CRU may need to reconsider the TSO allowances. In particular, there may be a need to ensure its financial model, designed for an asset light utility, is not over remunerating the TSO. It is noted that the CRU is currently engaging with EirGrid on the appropriate regulatory framework for Celtic.

1.4.7 PR4 Outturn Figures

Within this paper, the figures provided by the TSO and TAO on their respective expenditure during the PR4 period have been labelled as actual or outturn values. This is not strictly correct. In some cases the 2019 and 2020 values are the TSO's/TAO's best estimate of the expenditure they will incur in both years.

The final values for 2019 and 2020 will be reviewed when these are available in 2021 and if necessary, any under or over-recovery from the TUoS customer will be corrected at that time to reflect the actual outturn values.

1.5 The Review Process

This section provides information on the process that led to the proposals outlined in this Draft Determination Paper. It provides:

- A brief overview of the process;
- Information on how the project has been conducted to date;
- Information on the scope of this review; and
- A summary of the expertise procured.

1.5.1 Overview of Process

A high-level summary of the approach the CRU has adopted to determine the revenue that the TSO and TAO can recover from TUoS customers during the period 2021 to 2025 is set out below. The form and structure of the Price Review is set out in Appendix 2

1. Review of Historic Operational Expenditure

The operational expenditure incurred by the TSO and TAO over the period 2015 to 2020⁶ was reviewed to ensure expenditure was efficiently incurred.

2. Review of Historic Capital Expenditure

The capital expenditure incurred by the TSO and TAO over the period 2015 to 2020⁷ was reviewed to ensure expenditure was efficiently incurred.

3. Review of Forecast Operational Expenditure

The operational expenditure program required for the PR5 period, as forecasted by the TSO and TAO was examined, with particular focus on ensuring value for money and the CRU's PR5 objectives set out in Section 1.4.2.

4. Review of Forecast Capital Expenditure

The capital expenditure program required for the PR5 period, as forecasted by the TSO was examined, with particular focus on ensuring value for money and the CRU's PR5 objectives as set out in Section 1.4.2.

⁶ Please note that 2019 and 2020 figures are forecast.

⁷ Please note that 2019 and 2020 figures are forecast.

5. 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 RAB was also adjusted to allow for the proposed forecast capital expenditure. This adjusted RAB will be used for the forthcoming review period (2021 to 2025) and is published as part of the CRU's Price Review model, alongside this paper.

6. 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 4.2 of this paper.

7. Determining the appropriate Incentives

The Incentives for PR5 build on the Incentive and Reporting framework put in place in PR4. The network companies proposals and a review conducted by our advisors are published alongside this Draft Determination Paper (CRU/20/078).

8. Determining the Allowed Revenue

The output of the above steps is fed through to develop the allowed revenues for the TSO and TAO (which will be recovered from the TUoS customer) for each calendar year within the period 2021 to 2025. This revenue feeds through into the setting of TUoS tariffs, which cover the period 1st October to 30th September.

9. Determining TUoS Tariffs

The TUoS tariffs for the period 1st October 2020 to 30th September 2021 are being calculated based on 2021 revenue assumptions separate from the PR5 process. Any difference between those assumptions and the allowed revenues set out in the PR5 Final Determination will be corrected through the established k-factor mechanism.

1.5.2 Conduct of the Review

To facilitate this review, the CRU 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 1.5.4.

To ensure that the CRU and its advisors attained an adequate understanding of the TSO's and TAO's business, the CRU engaged with both parties to ensure that the relevant data was provided in a useable format. Figure 3 sets out the CRU's PR5 engagement with network companies prior to the publication of this Draft Determination Paper.

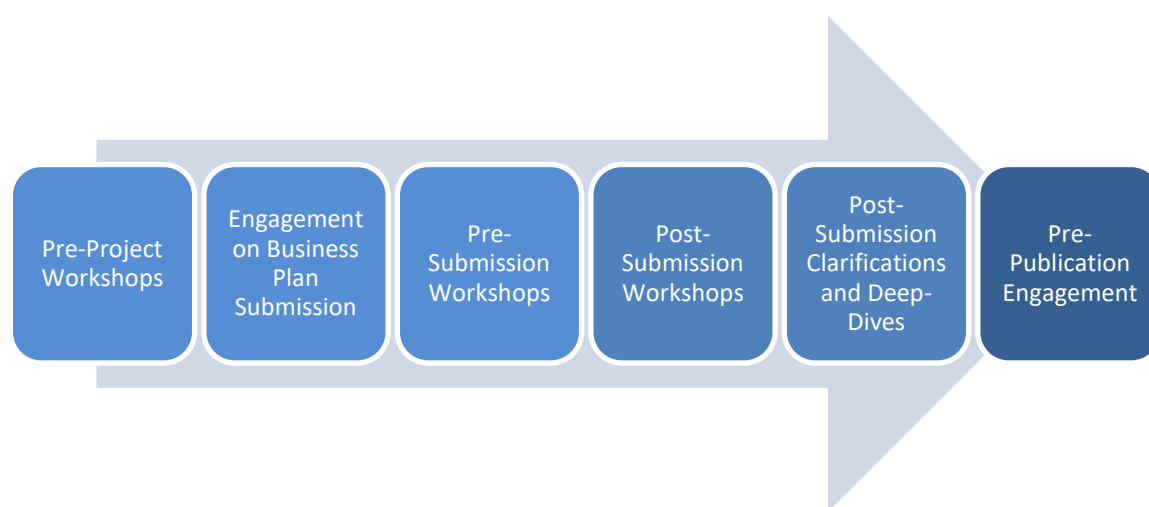


Figure 3 Engagement with Licensees

Engagement for PR5 had some notable changes to PR4, including pre-submission engagement to determine and agree the structure of the Business Plan Questionnaire ('BPQ'). The finalised and agreed questionnaire was issued to the TSO and TAO outlining the technical, economic and financial data required by the CRU. The TSO and TAO then separately completed the questionnaire in two stages: providing historic first and then progressing to the forecast information. The questionnaires with supporting submissions were to be full and final submissions – no further submissions were envisioned in the process. Notwithstanding the extensive engagement in advance of the network companies' submissions, following the submissions there was a protracted period of interaction between the CRU and the TSO and TAO during which clarifications and further information was sought. The aim of this engagement was to clarify significant points related to each network companies' submissions. This process did not seek further justifications on proposals. A number of 'deep-dive' video conferences were also held on a weekly basis on specific topics to better understand proposals submitted by the network companies.

This interaction allowed the CRU, with the assistance of its advisors, to complete a comprehensive review of the TSO's and TAO's historic and forecast submissions and

ultimately lead to the development of the proposals outlined in this paper. Prior to the publication of these proposals for consultation, they were discussed with both parties and reviewed for technical and factual accuracy. It should be noted that during the CRU's "pre-publication engagement" phase, network companies submitted further additional updated information, not previously included in their final PR5 submissions, to clarify/justify their proposals. This new information is currently under review and was not considered for the publication of this draft determination, as to do so would have further delayed the process. New information will be assessed holistically along with the responses to this Draft Determination as part of the formal consultation phase and will be carefully considered by the CRU in its preparation of the Final Determination.

The next steps in this process, as detailed in Section 6 of this paper, invites interested parties to provide comments regarding the proposals outlined in this paper. The CRU will consider all comments received prior to publication of the Final Determination Paper.

1.5.3 Scope of Review

The review and proposals outlined in this paper relate to the regulated aspects of the TSO's and TAO's activities. To see the final costs to be recovered from the TUoS customer, the CRU has also taken into its analysis:

- Transfer of costs and revenue between separate business units, for example in respect of ESBN's 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.

1.5.4 The Objective of the PR4 'Lookback' Analysis

The main objectives in the PR4 review of the TAO's and TSO's historical expenditure are to assess whether the expenditure has been incurred efficiently and the expected benefits for customers have been achieved. Consistent with previous price reviews, the following areas were examined in detail:

- Comparing the outturn expenditure (and currently projected for 2019 and 2020) with the allowed expenditure;
- Understanding the differences between allowed expenditure and the outturn expenditure; and
- Assessing cost drivers and their impact on performance.

To note, the CRU also established an active and ongoing Capex monitoring process, which is of particular merit in relation to transmission projects, which by their very nature can span more than a single revenue review period.

1.5.5 Expertise Procured

The CRU 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 PR4.

Gutteridge, Haskins and Davy ('GHD') and Cambridge Economic Policy Associates ('CEPA') were procured to provide advices on the technical aspects of the review. Specifically, GHD reviewed and provided advice on the TSO and TAO's Capex costs while CEPA reviewed and provided advice on the TSO and TAO's Opex costs and the Cost of Capital.

The advice put forward by the CRU's consultancy support has fed through into the proposals outlined in this Draft Determination Paper. In addition, the reports put forward by both GHD and CEPA are published alongside this paper. To avoid repetition, the CRU's Draft Determination Paper does not repeat the analysis carried out by GHD and CEPA but focuses on their conclusions. Accordingly, CRU's Draft Determination Paper should be read in conjunction with the GHD and CEPA reports (CRU/20/076a) in order to gain a full understanding of all aspects of the review of the TSO and TAO business.

Part 2 – Regulatory Framework

2 Regulatory Framework

As set out within the CRU's PR5 objectives (Section 1.4.2), the CRU is committed to examining ways to enable greater flexibility for the network companies within the PR5 framework to facilitate innovation and better outcomes for consumers. The Climate Action Plan 2019 sets ambitious targets and the network companies have an important facilitation role. It is important that the regulatory framework enables them to do so while protecting consumers' interests.

Each network company was requested to consider changes to the current regulatory framework in line with a number of guiding principles⁸. EirGrid and ESBN both submitted proposals related to enhancing the current regulatory framework. A high-level overview of proposals and the CRU's views are set out in Section 2.2 below.

Proposals and the CRU's assessment are detailed in the CRU's PR5 Regulatory Framework, Incentives and Reporting Consultation Paper published alongside this Draft Determination (CRU/20/078).

2.1 Current Regulatory Framework

At present, the CRU sets, at the beginning of each price review, *ex-ante* Opex and Capex allowances to deliver a set of outputs determined at that time. These allowances and outputs are informed by business plans submitted by each network company, which are then assessed by the CRU.

Then, at the beginning of the next price review, the CRU conducts a look-back assessment of outturn Opex and Capex. The CRU determines whether any adjustments to the companies' allowances are required for any efficient over- or under-spend. This involves consideration of how the outputs delivered by each network company may be different from those assumed to set the *ex-ante* allowance. The look-back assessment is also informed by a submission by each network company. This *ex-post* review seeks to ensure that only efficiently incurred costs are passed on to the customer. For example, the CRU must ensure that an under-spend is due to the network company delivering their planned activities rather than simply because they did less. Similarly, an over-spend can be allowed as part of the *ex-post* review if it can be clearly demonstrated to have been a necessary and efficient cost that could not have been foreseen at the beginning of the price review period. Costs that are deemed outside the network company's control (e.g. the CRU levy and, for the TSO only, the costs of ancillary services to balance the system) are pass through charges. Additionally, annual revenues and the Regulatory Asset Base is indexed to a measure of general inflation (HICP). The CRU also has the power to re-open the price review entirely if required. This has only been done in extreme circumstances such as when the CRU revised the Capex programme during PR3 in

⁸ A letter to both network companies was issued on 29 August 2019.

response to the financial crisis. This protected both consumers and the network companies from the costs of a large investment programme at a particularly difficult economic period.

2.2 TSO and TAO Proposals

The TSO and TAO's have proposed the following changes:

- Two new TSO uncertainty mechanisms: a Monitoring Committee for major initiatives and indexation of real price effects (RPEs).⁹
- Twelve TSO outputs for PR5, each of which with a financial incentive. The outputs covered, in the TSO's terminology, the following areas: decarbonisation, grid security, costs and performance.
- A 3% TSO allowance over its proposed costs to account for what the TSO says is "asymmetric risk" inherent in the CRU's *ex-post* review (i.e. costs incurred can be disallowed but there is no mirroring reward for costs not spent unless the TSO can deliver more efficiently than its allowance).
- A TSO and TAO joint incentive assessing quality and rigor of application of joint processes for identifying and implementing efficiencies in project and programme delivery and other areas of collaboration.

2.2.1 CRU Views

The CRU has proposed to largely retain the core features of the TSO's regulatory proposals. However, the following proposals are highlighted, and stakeholder views are sought on the following:

- SNSP and Renewable Dispatch Down incentives proposed for PR5.
- Incentive values, as proposed, revised downwards with the removal of the TSO's cap and collar and a more appropriate balance between risk and reward.
- CRU's Balanced Scorecard (TSO) and KPI framework (TAO) to be enhanced to include joint incentives, deployment of new technology and project handover.
- Strategic incentives to include discretionary allowance aimed at Security of Supply and Imperfection costs.
- Monitoring Committee proposed to progress large uncertain projects. However, as proposed by the TSO the process would put an excessive amount of risk onto the customer and would be unlikely to effectively control costs. Therefore, the CRU has proposed several key changes to the structure and process. Projects would be subject

⁹ RPE's are discussed as part of this paper in Section 3.4.4.2

to 'sign-off' by the monitoring committee in terms of need, scope and delivery but would be within allowances set by CRU and reviewed *ex-post*. For example, the TSO has identified two known projects (Electricity Balancing Guidelines and Multi-NEMO Arrangements in the SEM) with need and scope yet to be defined. These projects may be defined and progressed through the Monitoring Committee and submitted to the CRU for consideration within the annual tariff review process.

- An RPE mechanism is not considered appropriate, the CRU considers that the TSO is best placed to manage its costs
- Asymmetric risk allowance is not being considered. To provide the TSO with an allowance to cover their expected inefficient expenditure would undermine the purpose and function of the Price Review processes and the CRU's duty to protect the consumer interest. Oversight is an integral part of the review process and cannot be reasonably construed as a risk by the TSO.

2.3 PR5 Proposed Regulatory Framework

The CRU's proposals in relation to the PR5 Regulatory Framework are set out in greater detail in the CRU's Consultation Paper published alongside this Draft Determination. In developing its proposals the CRU has had regard to the PR5 objectives in addition to the guiding principles for the regulatory framework set out in (CRU/20/078) and shared with the network companies last year in advance of their PR5 submissions.

Together, each of the building blocks work as a package to facilitate, incentivise, and monitor the delivery of the PR5 objectives by the network companies. In order to do this the CRU considers that continuing the move to a more outcome-focussed process; providing flexibility within the framework for the network companies and requiring best-in-class performance will facilitate the necessary levels of innovation and transformation needed to deliver the ambitious 2030 targets in a sustainable manner minimising the cost for consumers.

The building blocks of the proposed Regulatory Framework are the ex-ante setting of inputs, outputs and efficiency challenges for opex and capex respectively; the provision for cost incentives, performance incentives and the Agile Investment Framework; on-going reporting and monitoring; and the ex-post review. It is proposed that these building blocks apply to each

of the network companies, TSO, TAO and DSO. However, some elements of this framework are less relevant to particular network companies.

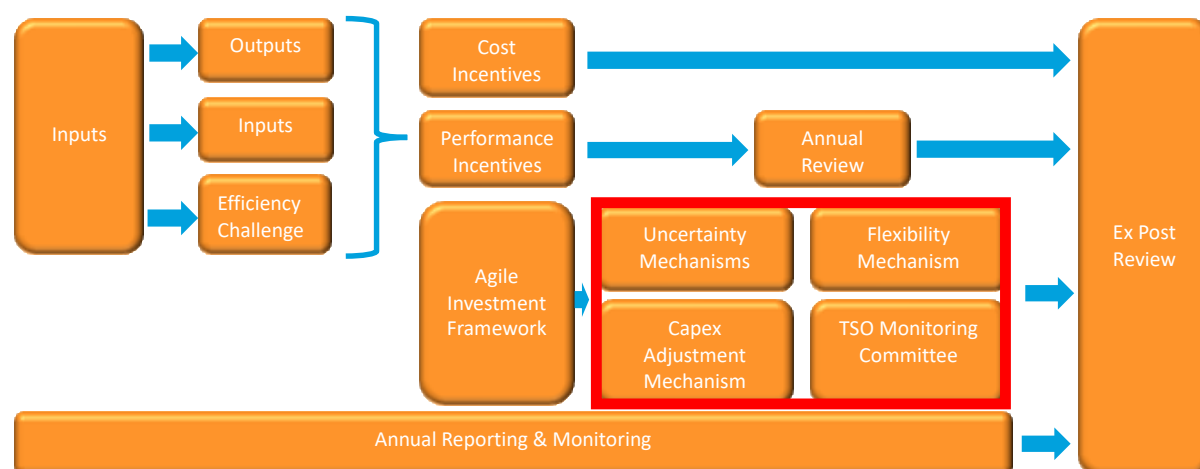


Figure 4: PR5 Regulatory Framework Building Blocks

2.3.1 Ex-Ante Output Setting

It is proposed that the PR5 inputs, or network company activities, be set separately for opex and capex, as set out in Part 3 of this paper, and where possible linked to defined outputs that relate to the outcomes that those activities are aiming to achieve. Where it is not possible to robustly link a set of inputs to an output, or the output is difficult to define, the network companies will be required to deliver those inputs – as is the case under the current PR4 framework. In these cases the CRU proposes that reporting and monitoring be established around possible output definitions with a view to gathering sufficient information over the course of PR5 to allow for an expanded use of outputs in PR6.

Where a set of inputs can be robustly linked to an output the CRU proposes that the network companies be assessed against the delivery of that output and the total combined allowance of the associated inputs. This approach provides additional flexibility to the network companies to make the appropriate spending decisions and trade-offs to efficiently deliver against the outcomes that provide value for the consumer. In terms of the ease of implementation this approach does require additional work to build upon the existing input-based approach and in particular the definition of outputs that are sufficiently robust to be relied upon in the context of a five-year revenue review has challenges. However, it is expected that this process will improve over time with the information and experience gained through the reporting and monitoring process. In the case of the TSO, only a limited application of output-based allowances is likely to be possible. The TSO’s submission focussed on defining outputs in terms of performance incentives; an approach the CRU welcomes and considers complementary to a move to a more outcome-based approach.

Against the overall PR5 allowances the CRU proposes the application of an efficiency challenge; an annual percentage reduction applied to total Opex and more targeted efficiencies for capex. This is a proven and effective regulatory approach and the CRU considers it a core building block as it ensures the monopoly network businesses work

systematically to become more efficient, replicating competitive pressures and delivering value for the customer.

2.4 Incentives

The CRU proposes to use two broad categories of incentives in the PR5 Regulatory Framework; cost incentives and performance incentives. As discussed above it is proposed to link sets of inputs to outputs where possible. Where this is possible it is proposed that the cost incentive be applied at the level of the output. If the network company delivers the output for less than the combined allowance of the associated inputs, the network company would be permitted to retain the difference between the actual expenditure and the allowance set for that output. If the output was not delivered, or there was an over-expenditure for that output, the network company would recover only efficiently incurred costs determined during the ex-post review. The ex-post review would assess the costs in all cases, including where the network company retains the efficiency benefit, in order to inform the setting of the baseline for the next price review period.

Where inputs cannot be linked to an output it is proposed that the cost incentive be applied at the level of the input. The CRU also proposes to monitor such inputs against potential outputs where possible with a view to developing a robust output for additional inputs in PR6.

The CRU considers that this approach strikes a balance between providing sufficient oversight over the expenditure of the network companies and providing the network companies additional flexibility to most efficiently deliver outcomes for the customer.

The second incentive category the CRU proposes for the PR5 Regulatory Framework is performance incentives. Performance incentives have proven to be an effective mechanism to improve the quality and efficiency of service that customers receive. As set out in the accompanying consultation paper the CRU proposes to retain many of the PR4 incentives and build on the outcome focussed approach taken in the PR4 framework for the new, or modified, incentives. Given the scale of challenge in meeting the 2030 targets, the CRU considers it necessary that the PR5 performance targets reflect this and are appropriately stretching. Therefore, in the case of existing incentives the targets have been improved taking past performance into account; and in the case of new incentives proposed by the TSO the CRU has proposed alterations that better ensure an outcome-based approach reflective of the 2030 challenge.

The CRU also proposes to increase the overall incentive amounts to 11% upside and circa 5% downside. This is a significant change from PR4, particularly in the balance of upside relative to downside, which is asymmetrically positive for the TSO and remains symmetric for the TAO. The CRU considers that this move towards an asymmetrically positive framework for the TSO is justified on the basis of the nature of the incentives. The targets relate to areas where innovation and new approaches will be necessary to achieve them. The CRU considers that symmetric, asymmetric negative, performance incentives are better suited to targets that relate to core and well-defined functions.

While the proposed PR5 incentive package is significantly larger than the PR4 incentive package it is not as asymmetrically positive as proposed by the TSO. In the CRU's view the TSO proposal does not represent the appropriate balance of risk and reward between the network company and the customer. The CRU considers it important that the incentive framework incentivises enhanced performance across the full range of performance targets. In addition to monetary performance targets, the CRU also proposes the use of reputational incentives through the reporting and monitoring framework.

2.5 Agile Investment Framework

The proposed Agile Investment Framework is a package of mechanisms, some retained from PR4 and some proposed for PR5, that provide additional flexibility to the network companies to deliver investments in response to the changing needs of the system. The framework consists of four main mechanisms:

- Uncertainty Mechanisms
- The Capex adjustment mechanism
- The DSO Flexibility Mechanism; and
- The TSO Monitoring Committee

The Uncertainty Mechanisms relate to allowances that will be provided for in the PR5 Determination but will not be included in the allowed revenues until they are triggered by a defined need on the system. The Capex Adjustment Mechanism was put in place in PR4, this mechanism allows the TSO and TAO to request an increase, or decrease, to the overall capex envelope in response to changing system needs. This process also aligns with the capex reporting framework introduced in PR4. The DSO Flexibility Mechanism is a new mechanism proposed for PR5 to allow the DSO to access opex from its capex allowance where this is in the consumer interest. While this has been proposed for the DSO, views are sought on whether a similar mechanism should be considered for transmission.

Lastly, the TSO Monitoring Committee was proposed by the TSO as a means of reducing uncertainty for cost recovery in relation to projects with an scope and/or need that cannot be fully defined at the start of PR5 but is likely needed to be progressed during PR5. The CRU considers there merit in a mechanism that reviews and considers such projects. However, as proposed by the TSO the customer would take an excessive portion of risk and there would be insufficient cost controls in place. Therefore, the CRU has proposed that the work of the Committee be focussed on the scope, need, and project delivery of initiatives; and that the costs would be considered by the CRU. It is intended that this process can provide the CRU with additional comfort that the necessity and scope of initiatives have had an independent review. In relation to the setting of allowances it is proposed that the TSO would submit a request to the CRU following endorsement by the Committee and the CRU would set a budget estimate along with a target allowance. The TSO would receive cost recovery for expenditure within the budget estimate provided the agreed milestones and deliverables had been

achieved. Additionally, it is proposed that the cost incentive mechanism discussed above would be applied against the target allowance.

2.6 Reporting and Monitoring, and the Ex-Post Review

The CRU proposes to retain the PR4 reporting and monitoring framework with additional annual reporting to facilitate the introduction, and expansion, of the output-based approach. The CRU also proposes enhanced performance reporting requiring the network companies to compare their performance against their own historic performance, as currently, and the performance of the best performing utilities internationally. Further details on the CRU's reporting and monitoring proposals are set out in the accompanying consultation paper.

The CRU proposes to retain the ex-post review, it is intended that the ex-post review will operate in PR5 similarly to previous price reviews. The key change in PR5 is in relation to the definition of the ex-ante allowances against which the review will be conducted; which has introduced additional flexibility and certainty for the network companies.

Part 3 – Allowed Expenditure

3 Allowed Expenditure

This section sets out the CRU’s draft determination of allowed TSO and TAO revenues for PR4 (2016 – 2020) and the forecast revenues for PR5 (2021 – 2025). The following sections will summarise the:

- Review of Historical Capital Expenditure;
- Review of Historical Operational Expenditure;
- Review of Forecast Capital Expenditure; and
- Review of Forecast Operational Expenditure.

3.1 Review of Historical Capital Expenditure

The following examines the historical Capex undertaken by the TSO and TAO over the PR4 period 2016 – 2020 compared with the Capex allowed by the CRU in the PR4 Decision Paper. The outturn expenditure is assessed, looking at the output in terms of delivery and efficiency. A more detailed description and breakdown is provided in an accompanying Report (CRU/20/076a). Table 7 summarises the outcome of the historic Capex review for TSO and TAO.

Table 7 Summary of Historical Capex (2016 - 2020) Review

	PR4 Decision	PR4 Outturn	PR4 Allowed Outturn
TSO Capex	148.2	117.3	118.0
TAO Capex	875.4	674.6	613.0
Capex Total	1,023.6	823.2	731.0

Please note that all costs set out in the review of historic capital expenditure are in 2014 prices and some costs are rounded to the nearest €m.

3.1.1 Summary of PR4 Improvements

There have been some notable improvements implemented by the TSO and TAO in PR4 to business working practices, these are summarised below.

- As part of the lessons learned from the review of the PR3 period, the CRU established enhanced reporting as part of the PR4 framework. Since the start of the PR4 period, the TSO (in conjunction with the TAO) has provided an annual Network Capital Expenditure Outturn Report to update project delivery progress;
- The PR4 framework required that only projects that had been defined could be included in the capex programme and provided for additional (adequately defined) capex to be added to the programme over the course of PR4. Relative to PR3 this ensured greater discipline in the capex programme;

- The PR4 incentive framework also moved from a milestone-based approach to an outcome-based approach using a balanced scorecard and encouraged closer TSO/TAO collaboration;
- In this context the TSO and TAO made a number of improvements to their capex delivery in PR4:
 - The TSO has increased the level of engagement with external stakeholders and members of the public through a number of initiatives including the Framework for Development of the Grid publication and additional increased engagement forums for specific projects;
 - EirGrid has appointed specific Agricultural Liaison Officers (ALOs) to work closely with local communities where new transmission plant is proposed to be developed.
 - During PR4 a Community Gain Fund was established by the TSO to make payments to affected communities, impacted by the installation of new transmission infrastructure;
 - The TAO and TSO have collaborated earlier in the project identification process during the PR4 period as part of the pre-project agreement (pre-PA) phase. This has resulted in forecast cost estimates in the PR4 period improving significantly from previous period;
 - EirGrid developed a Multi-Year Delivery Programme (MYDP) with the TAO to manage the programme of transmission projects and the pipeline of new projects that will enter the programme;
 - The TAO developed transmission assessments (Line Project Assessment Reports, Qualitative Risk Assessment and Transmission Line Assessment) to support the TSO in project decision making and inform project requirements for the TAO. These schemes have saved or deferred Capex; and
 - By the end of 2018, 17 new transmission substations have been connected along with 62 km of new overhead line transmission circuits, 149 km of new underground cable circuits, 101 km of refurbished transmission circuits and a further 242 km of updated transmission circuits.

3.1.2 Summary of Revenue

The CRU allowed just over €1bn of net Capex related to network and non-network investments for both the TSO and TAO. This includes €148m in network and non-network capex for the TSO and €875m in network capex for the TAO.

The final outturn for the PR4 period is estimated as €791m, which results in a total Capex underspend of €232m relative to the allowed Capex revenue approved by the CRU. Having reviewed the advice of GHD, the full underspend appears largely due to the slower than

expected delivery of capital programmes rather than efficiencies. It is noted that in PR3 there was also an underspend due to slower than expected delivery. The CRU proposes to allow €118m¹⁰ of TSO Capex and €613m of TAO Capex as efficiently incurred in PR4 (a total of €731m).

Land access and planning issues have continued to be a key issue during project delivery of PR4 and this has had an impact on the projects delivered by the TSO and TAO, specifically large scale 400kV projects. Another point of note is the introduction of the Integrated Single Electricity Market (I-SEM) in 2017 which was provided for in the PR4 Determination but was not included in the TSO's allowed revenues as the full costs were not known at the time of the Determination.

The total PR4 capital expenditure (TSO and TAO) compared to the PR4 allowance is set out in Table 8 below.

Table 8 PR4 Transmission Capital Expenditure (as per Advisor Report)

	Category	2016 € m	2017 € m	2018 € m	2019 € m	2020 € m	PR4 Total € m
TSO	TSO Network Capex Stage 1 Invoicing	12.1	41.96	7.59	7.37	16.56	85.6
	TSO Network Capex Adjustments	1.00	0.14	0.28	0	0	1.4
	TSO Network Capex Total	13.1	42.1	7.87	7.37	16.56	87.0
	TSO PR4 Network Capex Allowance	30.86	15.24	3.89	29.79	28.81	108.6
	TSO Network Capex Variance	-17.75	26.86	3.98	-22.42	-12.25	-21.58
	TSO Non-Network Capex Total	5.01	4.28	4.35	6.06	10.59	30.3
	TSO PR4 Non-Network Capex Allowance	10.35	9.79	7.21	6.52	5.71	39.6
	TSO Non-Network Capex Variance	-5.34	-5.51	-2.86	-0.46	4.88	-9.3
TAO	TAO Network Capex	163.9	143.4	199.6	143.4	152.6	803
	TAO Customer Contributions	-9.42	-20.7	-13.4	-30.6	-16.53	-90.7
	TAO Interest During Construction	-20.8	-15.7	-17.5	-14.3	-7.1	-75.4
	TAO Adjustments	4.8	9.7	4.6	5.1	13.6	36.5
	TAO Network Net Capex Total	138.5	116.7	173.3	103.6	142.5	674.6
	TAO Network Net Capitalised PR4 Allowance	171.8	168.9	190.3	182.4	161.9	875.4
	TAO Network Capex Variance	-33.3	-52.2	-17	-78.8	-19.5	-200.8

¹⁰ Includes non-network Capex initiatives that the TSO proposed to defer to PR5. The allowances are allowed within the PR4 period with the expectation that these projects will be delivered in PR5.

3.1.3 Reforecasting

The submissions received for PR5 included a baseline capital expenditure that reflected the PR4 decision. The TAO has subsequently requested that, as part of the PR5 process, the CRU consider a submission made in 2016 as opposed to either the PR4 Decision or the TAO's PR5 submission. The PR5 submissions were to be complete, accurate, and contain all relevant information including material previously submitted to the CRU through other processes (see Section 1.5.1). However, it is noted that the TAO has informed the CRU that it considers the 2016 submission to be relevant to its PR5 submission. Therefore, the CRU will consider the relevance of the information and may take it into consideration in the Final Determination, particularly in the context of ensuring that allowed revenues are no higher than needed.

It should also be noted that the CRU has taken into account the TAO's 2019 outturn historic capex and various other updates to its PR5 submission in this Draft Determination. The TAO has also provided a large volume of additional material in the months after its final PR5 submission, which the CRU will consider holistically along with the TAO's response to this consultation.

3.1.4 Review of TSO Capital Expenditure

As acknowledged in our advisor's report, the electricity transmission system in Ireland has experienced a significant period of change and new developments during PR4 – delivering significant benefits for consumers. These included, I-SEM, Increased wind generation, increase in system non-synchronous penetration (SNSP) and increased system demand.

Outturn PR4 network capital expenditure has seen annual variations ranging from circa €7 m (2019 forecast) to €43 m in 2017¹¹. The significant variance in annual outturn network capital expenditure experienced by the TSO during the PR4 period, and in comparison with the original PR4 forecast, is illustrative of the ongoing challenges the TSO continues to experience relating to obtaining planning consents and reaching Stage 1 invoicing milestones as per the IA, particularly for legacy projects. As acknowledged previously, the TSO has introduced revised processes, particularly in relation to stakeholder engagement i.e. through new ALO's and CLO's to help streamline the planning, consenting, environment assessment and stakeholder engagement process in future years.

During PR4 two large 400kV transmission projects did not proceed, the Grid Link and Grid West Projects. Grid Link, was replaced by a regional investment solution composed of seven individual projects while Grid West was cancelled following a reduction in transmission capacity needed, which meant that the overall system needs to be met by a single project (North Connaught Overhead Line).

¹¹ The high capital spend in 2017 was a result of the North-South Interconnector project reaching Stage 1 invoicing milestones.

Non-network Capex resulted in an underspend of circa €9m or 23.5% against the PR4 allowance. Non-network Capex has also varied through each year of PR4, particularly when compared with the annual PR4 allowance. The outturn non-network capital expenditure is forecast to range from an under-spend of circa €5m in 2017, principally due to underspend in non-network telecoms and an over-spend in un-forecasted Facilities refurbishment expenditure. The CRU is proposing to allow the non-network capex costs associated with deferred projects in PR4. The TSO is required to deliver these projects in PR5, if they are not delivered a clawback of €3.2m will be applied. It remains unclear whether non-network Capex underspends in individual non-network expenditure categories are due to efficiencies achieved by the TSO or in whole or part due to reduced delivered volumes. Further detail and supporting information is needed from the TSO to justify noted expenditure underspends.

The unplanned capital expenditure related to facilities represents an over-spend on the TSO's PR4 allowance. The core issue associated with this expenditure is that it is unclear from the TSO's historic submission (October 2019) what the driver(s) for undertaking the work were. Based on the information submitted as part of the review process, on balance, an allowance of 50% of the over-spend could be considered reasonable. During pre-publication engagement with the TSO the CRU confirmed that if the TSO can fully demonstrate the underlying need for the works it would consider a full or partial allowance of the facilities over-spend following a review of new information provided by the TSO prior to publication. However, the CRU notes that the PR4 Final Determination did not approve the TSO's requested facilities allowance on the basis that it was not sufficiently defined. That EirGrid subsequently spent significantly more on facilities than that requested, and disallowed, in the PR4 Final Determination does raise concerns regarding the TSO's ex-ante forecasts.

However, the CRU proposes a partial allowance of the over-spend in line with our advisor's recommendation. It is noted that the CRU will include in its consideration, the responses to this consultation, additional justification provided by EirGrid, and the considerations set out above when reaching a final decision on the facilities over-spend.

Further analysis of the TSO's network and non-network Capex is detailed in our advisor's report and a summary of the TSO's PR4 Capex allowance is set out in Table 9 below.

Table 9 TSO Ex-Post PR4 Capex Allowance

PR4 TSO Ex-Post Capex Allowance		PR4 Total (€m)
Categories		
TSO Network Capex Outturn/Forecast		87.0
TSO Non-Network Capex Actual/Forecast		30.3
1. Deferred Energy Management System Costs		+2.3
2. Deferred TUoS & Metering Costs		+0.4
3. Deferred Reserve Constrained Unit Commitment Software Costs		+0.5
4. Disallowed Facilities Non-Network Capex Costs		-2.5
TSO Total Non-Network Capex Allowance		31.0
Total Ex-Post TSO Allowance (€)		118.0

Variance Compared to Actual/Forecast (€)	+0.7
Variance Compared to Actual/Forecast (%)	+0.6%

3.1.5 Review of TAO Capital Expenditure

Building on the challenges summarised in Section 3.1.4 for the TSO, the TAO set out the a number of factors as challenges to delivering projects which have become more prevalent in PR4. These included outage constraints, land access and scope complexity associated with developing more ‘brownfield’ sites.

Net outturn network Capex for the TAO is expected to be €675m for the PR4 period. This represents 77% of the allowance which was set at €875m. Gross annual outturn expenditure has been consistently below the CRU PR4 allowance throughout the period. Similar to the TSO, the variance in outturn expenditure is illustrative of the ongoing challenges faced by the TAO during the PR4 period, as summarised above.

Three 400kV projects accounted for an anticipated €491m in the TAO PR4 forecast but have resulted in only €20m of outturn expenditure. These three projects dominate the reduction in expenditure due to delay in re-scoping and cancellation. This highlights land access to be a key issue during project delivery of PR4. PR4 saw an increase in the volume of underground and subsea cables compared to PR3. This increased the installation costs per km compared to new overhead line. The asset delivery profile reflects the investment decisions which needed to be made in PR4 to overcome planning and land access issues.

A review of project documentation illustrates that in some cases, projects were delayed due to planning and land access issues. As set out in our advisor’s review, some of these issues could have been mitigated prior to commencement. Correspondingly, a number of project delays resulted in additional costs being incurred. These could have been mitigated with improved project scoping by the TAO. In some cases, damage caused during construction had to be rectified. In each of the cases assessed, where a project delay occurred, additional costs for materials were required. Additional costs related to contractor costs are also borne as a direct result of the delays. Given this assessment, a portion of the TAO’s capital expenditure has been deemed inefficient. The CRU is proposing a 3% efficiency reduction to reflect these findings. This equates to a disallowance of circa €24m.

The TAO has included circa €38m of ‘Other Adjustments’. These costs were not included in the PR4 forecast and were not explained within the TAO’s historic submission. Subsequent to its final PR5 submission the TAO has submitted additional information. This information will be considered along with the responses to this Draft Determination. The CRU considers that it may be appropriate to allow the recovery of costs associated with the ‘Other Adjustments’ line item if upon review, the costs have been explained and demonstrated to have been efficiently incurred.

Further analysis of the TSO’s network and non-network Capex is detailed in our advisor’s report and a summary of the TSO’s PR4 Capex allowance is set out in Table 10 below.

Table 10 TAO Ex-Post Capex PR4 Allowance

PR4 TAO Ex-Post Network Capex Allowance	PR4 Total (€m)
Categories	
TAO Network PR4 Outturn and Forecast (Net)	674.6
1. Uncapitalised Line Project Assessment Report	+0.2
2. 'Other' Adjustments	-37.8
3. Evidence of Inefficient Design	-24.1
Total Ex-Post TAO Allowance (€)	613
Variance Compared to Actual/Forecast (€)	-93
Variance Compared to Actual/Forecast (%)	-13%
Total Ex-Post TAO Allowance (if 'Other' Adjustments is allowed) (€)	650.8

3.1.6 Proposed Allowed PR4 Capex and PR5 Recommendations

The total proposed allowed transmission capex is set out in Table 11 below.

Table 11 Total Allowed PR4 Capex

	PR4 Decision	PR4 Outturn	PR4 Allowed Outturn
TSO Capex	148.2	117.3	118.0
TAO Capex	875.4	674.6	613.0
Capex Total	1,023.6	823.2	731.0

As part of the PR4 Capex review, there are a number of recommended enhancements which the CRU will introduce for PR5. These are:

- The TAO is asked to include the price review forecasts within capital approval documentation to illustrate any variance that may have occurred internally and to the CRU, including evidence of why variance may have occurred.
- Line Project Assessment Reports (LPAR), Qualitative Risk Assessments (QRA), and Transmission Line Assessment (TLA) processes have been shown to be beneficial. The TAO should not be dis-incentivised to conduct such works pre-project agreement with the risk that such costs will not be capitalised if the outcome results in a capital project deferral. As such, the CRU will be assessing how to treat these costs prior to the final determination.

3.2 Review of Historical Operational Expenditure

This section examines the historical Opex undertaken by the TSO and TAO over the PR4 period 2016 – 2020 compared with the Opex allowed by the CRU in the PR4 Decision Paper. The outturn expenditure is assessed, looking at the output in terms of delivery and efficiency. Table 12 summarises the outcome of the historic Opex review for TSO and TAO.

Table 12 Summary of Historical Opex (2016 - 2020) Review

	PR4 Decision	PR4 Outturn	PR4 Allowed Outturn
TSO Opex	521.9	739.9	741.6*
TAO Opex	298.3	298.2	288.4

*Recognition of efficiency savings as part of PR4

A more detailed description and breakdown is provided in the accompanying Report (CRU/20/076a).

3.2.1 TSO Opex

The TSO's actual/forecast expenditure for PR4 is set out in Table 13. Overall, the TSO's expected Opex outturn for PR4 is circa €740m (Incl. incremental I-SEM costs). This is €218m (42%) above the CRU allowance of €522m. This overspend is primarily driven by the outturn non-controllable costs exceeding what was forecast during the PR4 determination. Overall, the TSO is expected to spend €499m in non-controllable costs over PR4. This represents a €219m (79%) overspend relative to the PR4 allowance. Incremental Opex requested as part of I-SEM was included as a placeholder within the PR4 period as the costs could not be accurately determined at that time. The TSO's I-SEM incremental Opex request was €14.5m, which includes I-SEM project costs.¹² The CRU will be seeking additional information from the TSO on I-SEM over the consultation period. The incremental Opex request relates to a placeholder that was approved by the CRU in 2017 subject to a full review for efficiency as part of the PR5 process. However, the TSO did not submit separate information detailing the expenditure against the placeholder allowance. Further, the costs appear to relate to project costs that did not meet the requirements for approval by the Regulatory Authorities as part of the approval of the ISEM project costs. Notwithstanding this the CRU has included the incremental Opex request in the proposed allowances pending the review of the placeholder as per (CRU/18/195).

Table 13 TSO PR4 Expenditure (Incl. I-SEM)

PR4 Costs	PR4 Allowance (€m)	Actual / Forecast (€m)
Staff and Staff Related Costs	147.9	138.9
Telecommunications	30.6	24.9
Premises	23.8	26.4
IT Costs	20.6	22.3

¹² I-SEM costs and non-network underspend will be considered during the consultation.

Professional Services	15.8	19.8
Contractors	9.8	6.5
Grid Maintenance & Client Engineering	5	3.3
Rates	3	2.4
Research, development & demonstration	2.2	1.8
Promotion of research	1	0.7
Insurance and Compensations	1	1.3
Selling and Advertising	0.5	8.6
Other	0	-0.6
Intercompany – Corporate Recharges	-18.7	-15.6
Total Controllable Opex	242.4	240.7
Non-Controllable Costs		
Total non-controllable	279.5	499.20
Total PR4 Opex	521.9	739.9

There are two points to note regarding the review of the TSO's PR4 Opex review.

- **Professional Services:** Between 2017 and 2020, annual spend on professional services is forecast to increase by €3.8m (151%). This is considerably higher than the total additional Opex allowance of €1.3m for professional services that the TSO submitted for the introduction of the I-SEM.
- **Telecommunications:** Underspend relates to the delay in the delivery of three programmes.¹³ The TSO has also outlined some of the efficiencies in telecoms that it achieved in PR4 through its Group Operating Model - e.g. a 40% discount on servers and a 53% discount on storage. The full allowance (as set in PR4) is proposed to be allowed and the CRU expects the three programmes to be delivered within this allowance.
- **Selling and Advertising:** A new External Affairs (EA) Directorate was established within EirGrid that is responsible for all external communications, stakeholder engagement and public consultation. Overspend on Advertising and Selling comes against underspends in a number of other categories. The CRU's advisor's recommendation for Advertising and Selling costs is based on taking an in-the-round view of outturn costs against the Opex allowance.

Taken as a whole, the TSO's controllable Opex (excluding I-SEM related costs) is projected to fall within the PR4 allowance. However, some areas of significant overspend are of concern.

¹³ The three programmes includes the replacement of remote telemetry unit, transfer over to new internet protocol network and the expected replacement of the National Control Centre telephone system.

Notwithstanding these concerns, on balance the CRU is proposing to set the PR4 allowance to reflect the efficiency achieved over PR4. As such, the ex-ante allowance is retained for controllable Opex (including the incremental Opex costs which is still subject to review).

The CRU's recommended allowance for PR4 is set out in Table 14 below.

Table 14 PR4 TSO Ex-Post Opex Allowance Summary

PR4 TSO Ex-Post Opex Allowance	PR4 Total (€m)
Categories	
Total TSO Controllable Opex Outturn/Forecast	240.7
Total TSO Ex-Post Controllable Opex Allowance	242.4
Total TSO Non-Controllable Opex Outturn/Forecast	497.6
Total TSO Ex-Post Non-Controllable Opex Allowance	497.6
Total Ex-Post Allowance (€m)	741.6

3.2.2 TAO Opex

The TAO's expected Opex outturn for PR4 is €298m and is set out in Table 15. This is just €0.1m higher than the CRU allowance. There is an expected overspend of €14m (9%) in controllable Opex costs. The three activities, which are driving much of this overspend are:

- Miscellaneous costs (forecast overspend of €18.9m);
- Maintenance (forecast overspend of €6.3m); and
- Corporate costs (forecast overspend of €4.5m).

Table 15 TAO PR4 Expenditure

PR4 Costs	Ex-Ante Allowance (€m)	Actual / Forecast (€m)
Maintenance	88.50	98.95
Professional Fees	24.1	23.3
Corporate Costs	13.4	18.3
Transmission Operations	13.4	12.6
Telecom Fees	7.7	7.5
Asset Management	5.6	4.2
Pension	2.1	2.0
Insurance	1.8	2.9
Legal	0.8	1.8
Other	0.0	-0.3
Total Controllable	157.4	171.3
Non-Controllable Costs		
Total non-controllable	140.9	126.9

Total PR4 Opex	298.3	298.2
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In contrast to the controllable Opex, the TAO forecasts total non-controllable Opex of circa €127m compared to an allowance of €141m, mostly as a result of rates expenditure being €14m (10%) lower than forecast at the start of PR4.

A disallowance has been applied to the TAO's maintenance cost (Planned and Unplanned). Planned maintenance is a key area of overspend that is not reflected in the recommended ex-post allowance. This is due to the overspend on the planned maintenance programme. The TAO has stated that the increase in costs over PR4 is solely due to the higher volume of planned maintenance work undertaken in PR4. While it is acknowledged that this is an uplift on what was delivered during PR3, it is noted that the TAO's outturn delivery in PR4 was below the forward transmission maintenance plan set out by the TSO. Underspends associated with efficiency savings were identified in relation to telecoms and pensions administration, which have been allowed.

A summary of the CRU's recommended allowance for PR4 is set out in Table 16 below. Any additional response submitted by the TAO will be considered by the CRU prior to its final determination.

Table 16 PR4 TAO Ex-Post Opex Allowance Summary

PR4 TAO Ex-Post Opex Allowance	PR4 Total (€m)
Categories	
Total TAO Controllable Opex Costs Actual/Forecast	171.3
1. Disallowed Maintenance Cost	-10.4
Total TAO Ex-Post Controllable Opex Allowance	161.2
Total TAO Non-Controllable Opex Actual/Forecast	126.9
Total TAO Ex-Post Non-Controllable Opex Allowance	126.9
Total Ex-Post Allowance (€m)	288.4

3.2.3 Conclusion

The network company's outturn Opex was found to be broadly efficiently incurred, notwithstanding some concerns around certain individual line items highlighted above. Therefore, the CRU proposes to allow €741.6 m in TSO Opex and €288.4 m in TAO Opex.

3.3 Review of Forecast Capital Expenditure

This section sets out the CRU’s proposals in relation to the TSO and TAO Capex for PR5. As with PR4, where it is not possible for the network companies, at the beginning of the period, to provide sufficiently detailed forecasts/evidence on the projects that will be undertaken during the period, an allowance will not be provided for ex-ante. However, the CRU recognises the potential need for projects within the PR5 period and has considered how best to progress projects through an uncertainty mechanism (see Section 2). Table 17 summarises the outcome of the future Capex review for TSO and TAO.

Table 17 Summary of Future Capex (2021 - 2025) Review

	Request	CRU Recommendation	Cost Challenge
TSO Capex	149.8	104.5	-47.1
TAO Capex (Net)	969.9	919.2	-50.7

The cost challenge indicates the potential for change in revenues between Draft Determination and Final Determination. Information submitted by network companies will be considered during and after the consultation period.

A more detailed assessment and breakdown of each network company’s proposals is set out in the accompanying Report (CRU/20/076a). Please note that all costs set out in the review of forecast capital expenditure are in 2019 prices.

3.3.1 Introduction

As part of EirGrid’s submission, it put forward its assessment of the network and non-network Capex needs for PR5. The CRU’s review of EirGrid’s network and non-network Capex proposals are set out in Section 3.3.2.1 and 3.3.2.2 respectively.

The Network Capex submission included three scenarios. Each scenario is briefly summarised and assessed below, and the total expenditure associated with each scenario is set out in Figure 5.

1. **Unconstrained:** The *Unconstrained* scenario assumes no constraints in delivery, funding, resources, planning consent, land access or outages.
 - would require a level of transmission infrastructure development and project expenditure over PR5 on an unprecedented scale;
 - annual capital spend would be significantly above the outturn annual values in PR4; and
 - it is unlikely that such high levels of capital expenditure (and associated project delivery) could be delivered by either organisation.
2. **Embracing Change, Delivering Targets [Proposed]:** The *Embracing Change, Delivering Targets* scenario is a more ambitious investment profile, which will provide

a pathway for delivery of the 2030 Climate Change Targets. This scenario represents EirGrids proposed network Capex plan.

- would see an increase in annual capital expenditure during PR5 in comparison with PR4;
- the lowest forecast annual spend in PR5 (€191m in 2023) would be slightly above the highest annual spend experienced during PR4 (€185m in 2018);
- capital expenditure is similar to that delivered during PR3, with the average spend in PR5 being only 4% higher than during PR3; and
- Some of this significant increase in forecast 2021 planned spend is due to projects that were not sufficiently progressed during PR4, including some legacy projects.

3. Business as Usual ('BAU'): The *Business as Usual* scenario would replicate the PR4 allowance for PR5.

- focussed on a sub-set of 150 low risk projects and assumes similar delivery constraints and model as PR4;
- would result in a slightly lower factored spend through PR5 of €944m;
- TSO expects that the focus would be on more business as usual investment projects and activities which would lead to a lower expected connection of future renewable generation than the Embracing Change, Delivering Targets scenario (by around a half i.e. 1500 MW rather than 2900 MW).

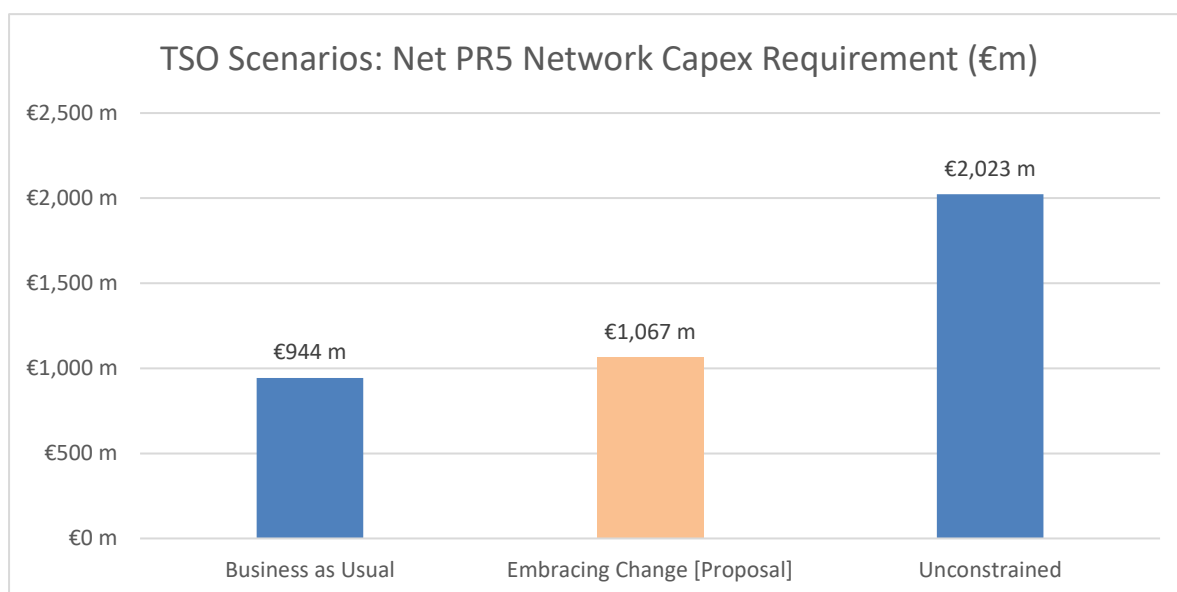


Figure 5 Capex Scenarios and Forecast Capex Requirement

For its non-network Capex proposals, EirGrid has set out its request in two parts.

- Business as Usual non-network Capex; and
- Proposed initiative groups (business plans) for Capex entitled:
 - Sustainability & Decarbonisation;
 - Operate, Develop and Enhance the Grid & Market; and
 - Engage for Better Outcomes for All.

3.3.2 TSO Capex

This section summarises the TSO’s proposals for network and non-network Capex during PR5. The total Capex requested by the TSO for the PR5 period is summarised in Table 18 below.

Table 18 TSO PR5 Capex Request

Embracing Change, Delivering Targets	PR5 Total (€ m)
Network Capital Expenditure (Scenario 1)	81.02
Non-Network BAU Capex (Gross)	34.53
1. Sustainability & Decarbonisation	21.7
2. Operate, Develop Grid & Market	13.89
3. Engage for Better Outcomes for All	3.75
Non-Network Capex (PR4 Deferred)	-3.20
Non-Network Capital Expenditure Total	70.6
Total PR5 Total Capex Request	151.6

Section 3.3.2.1 and 3.3.2.2 below sets out the network and non-network capex reviews. Each subsection summarises the key points of the review and a concluding table setting out the draft determination. Please note that these numbers are subject to review once responses to this consultation have been received and considered.

3.3.2.1 TSO Network Capex

As set out in Section 3.3.1, the TSO has proposed an investment scenario entitled ‘*Embracing Change, Delivering Targets*’. The breakdown of network expenditure related to this scenario is set out in Table 19 below.

Table 19 TSO Network Capex Request

Network Capital Expenditure	Request (€m)
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System Reinforcement	6.65
Asset Refurbishment	8.38
New Connections (Excl. Offshore Wind)	22.58
New Connections (Offshore Wind)	1.23
Ongoing Projects	32.12
DSO Projects	8.07
Other & Undefined Projects	1.98
PR5 Network Capex Request	81.02

Following a review of the TSO PR5 submission in relation to network capital expenditure, the following points are noted:

- The planned allowances for offshore wind projects are significant for the PR5 period, representing circa 25% of the total TSO and TAO forecast connections spending (€264m).
- Forecast spending on “DSO Projects” has increased by over 300% from PR4. The proposed increase in spending has not been adequately supported by documentation provided by the TSO in its 2019 submission.
- The RIDP project was originally forecast to begin during the PR4 period, but was put on hold after delays, and now has no anticipated expenditure over the period. A re-evaluation of the project need is now being undertaken. Given the status of the project, it is recommended that the expenditure associated with RIDP is removed from the PR5 allowance until the updated status is known.
- TSO forecast allowance for Dunstown 400kV Series Compensation project of €37m in its *Embracing Change, Delivering Targets* scenario. A review of similar projects within EirGrid’s proposed scenario and the TAOs submission showed a difference in project costs. It is not clear from the TSO’s original submission as to why this difference exists. A reduction to this project has been recommended.

The CRU agrees with the view that the forecast network Capex spending in EirGrid’s *Embracing Change, Delivering Targets* scenario is appropriate. However, while the other two scenarios provided useful reference points neither are appropriate for PR5 on the basis that one would not meet the 2030 targets and the other is not deliverable. Therefore, the TSO’s submission would have benefited from additional central scenarios to provide a range of plausible PR5 scenarios and better demonstrate the appropriateness of the TSO’s preferred scenario. There is a greater focus on use of existing assets including land, with considerably more spending on asset refurbishment and renewal than in previous price review periods, and a drop in reinforcement spending forecast. This does suggest that the TSO expects to make more use of existing assets, and rely less on network buildout. The decline in total spend on both system reinforcement and asset refurbishment projects between price review periods suggests savings will be realised as a result of this approach.

Analysis of the costs proposed in the development of the capex plans have (where currently allowed) been deemed to be at an efficient level.

3.3.2.2 TSO Non-Network Capex

A total of 40 projects representing circa €34m are included in the TSO's BAU non-network Capex submission and a further 15 strategic initiatives representing €39m are proposed as part of PR5. These projects are broken down into six categories, which are summarised in Table 20. The number of initiatives proposed is set out in the brackets.

Table 20 TSO BAU Non-Network Capex Request

TSO BAU Non-Network Capex	PR5 Total (€ m)
End of Life IT Assets (23)	20.51
Transition to Cloud (1)	2.5
Review of IT Operating Model (1)	0.8
Simplify and Standardise IT Solutions (7)	4.24
Cyber Security (6)	3.45
Workplace Assets Reaching End of Life (2)	3.03
PR5 Non-Network BAU Capex Request	34.5
TSO PR5 Non-Network Capex Strategic Initiatives	PR5 Total (€ m)
Sustainability & Decarbonisation (6)	21.7
Operate, Develop Grid & Market (8) ¹⁴	13.8
Engage for Better Outcomes for All (1)	3.7
PR5 Non-Network Strategic Initiatives Capex Request	39.2

Each project has been reviewed within the categories set out in the Table above, assessing the needs likely to arise over the PR5 period. A detailed breakdown of the Non-Network Capex recommendations is also set out in Appendix 4. A number of points related to the BAU non-network Capex review are summarised below.

- End of Life IT Assets: Most of the projects within this category represent justifiable expenditure on replacing aging assets as a normal part of business operations. The cost challenges recommended are due to the technology required likely to be superseded by other initiatives (Dynamic AX upgrade) or a lack of sufficient detail in plans provided to implement the item (Website Tender Replacement). Industry best practices have also been reviewed to determine where allowances are excessive compared to requirements.
- Transition to Cloud: the analysis has indicated that this project appears broadly self-funding, i.e. operating costs savings of €1m p.a. should offset the requested capital

¹⁴ Excluding Electricity Balancing Guidelines and Multi-NEMO Arrangements in the SEM initiatives.

and operating costs within the PR5 period. As a result, it is recommended that the requested funding is disallowed due to the self-funding nature of the works.

- Review of IT Operating Model: The proposal for a review of the TSO IT operating model has identified that the proposed plans are at an early stage of development. Additionally, the project is expected to yield efficiency savings (as noted by the TSO). It is then expected that the TSO would fund this initiative through baseline expenditure and hence no separate allowance should be needed during PR5.
- Simplify and Standardise IT Solutions: Cost challenges have been applied to this initiative due to insufficient detail to explain why the associated funding was requested i.e. Application Rationalisation, or where it was unclear whether expenditure would be covered in other categories regardless i.e. Application Upgrades and Changes. Where clear drivers and sufficient detail exists for line items the full allowance requested has been allowed, but other allowances have been reduced where timing or responsibilities are unclear.
- Cyber Security: It is recommended that spend be reduced where there appears to be overlap with other initiatives proposed by the TSO. On the other line items regarding more specific programs the full expenditure has been allowed. The CRU notes the interaction cybersecurity has with the Clean Energy Package.¹⁵
- Workplace Assets Reaching End of Life: Refurbishment works required to make better use of existing space have also been accepted at a reduced (50%) allowance compared to the PR5 request. This is because the TSO has also incurred expenditure in PR4 for similar office refurbishments and has not fully demonstrated the need for the PR4 investment hence it is unclear how the proposed PR5 investment relates to the works already undertaken.

The TSO has proposed 15 non-network Capex strategic initiatives in its PR5 submission. These are grouped these into three themes:

1. Sustainability and Decarbonisation;
2. Operate, Develop, and Enhance the Grid & Market; and
3. Engage for Better Outcomes for All.

Appendix 4 details the key rationale for adjustments/cost challenges made to the TSO's proposed initiatives. In summary:

- Sustainability and Decarbonisation: Six initiatives with Capex costs are included as part of this business plan. The total requested additional allowance is circa €22m.

¹⁵ Please see CEER paper on '*Cybersecurity in the Clean Energy for All Europeans Package*': <https://www.ceer.eu/documents/104400/-/-/d70764d8-9cab-9f4a-848b-6c3a4e1bd6b0>

- Three initiatives with cost challenges applied.
- Three initiatives with cost allowances not included.
- Operate, Develop, and Enhance the Grid & Market: Eight initiatives with Capex costs are included as part of this business plan. The total requested additional allowance is circa €13.8m.
 - One initiatives' costs allowed in full.
 - Six initiatives with cost challenges applied.
 - One initiative with cost allowances not included.
- Engage for Better Outcomes for All: One initiative with Capex costs are included as part of this business plan. The total requested additional allowance is €3.5m.
 - One initiative with cost allowances not included.

Where insufficient detail has been put forward for analysis to determine whether an allowance is appropriate, more detail can be provided by the TSO during this consultation. This will in turn be considered by the CRU prior to Final Determination. The CRU is also proposing flexible investment arrangements within PR5 to progress uncertain projects, strategically important initiatives and non-wire solutions during the period. This is discussed within the CRU's Regulatory Framework, Incentives and Reporting Consultation Paper.

3.3.3 TAO Capex

The objective of the TAO forecast Capex review is to assess the TAO proposed efficiency in achieving the required outputs during the PR5 period and advise on allowances to be provided for the upcoming period. The TAO's Capex submission is based on the TSO's '*embracing change and delivering targets*' as the recommended scenario. This scenario recognises constraints which limit the ability to achieve the '*Unconstrained*' scenario whilst also recognising that business as usual in the PR5 period is unlikely to provide the necessary investment to achieve 2030 targets and is briefly summarised in Section 3.3.1. The total request is summarised in Table 21.

Table 21 TAO Network Capex Request

TAO Capex (€m 2019 prices)	Request (€m)
TAO Network Capital Expenditure Total	1,126.20
Interest During Construction Total	-56.30
Customer Contributions	-100.00
Other' Adjustments	0.00
Total TAO Adjustments	-156.30

Total TAO Net Network Capex Request	969.90
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Following the review of the TAO's PR5 submission in relation to network capital expenditure and the needs likely to arise over the PR5 period. A number of points are noted:

- PR5 net expenditure is forecast to increase by €255m (36%), from circa €715m in the PR4 outturn to €970m in the PR5 forecast. The forecast expenditure profile anticipates a significant increase in expenditure in 2021 and 2022. Average annual expenditure increases from PR4 outturn of €143m to €194m in the PR5 forecast.
- Ten projects (of the 220 projects) form approximately 40% of total gross PR5 forecast expenditure in the period. Expenditure against project categories show a 36% reduction in ongoing projects from PR4 to PR5, a 20% increase in the number of new connections and a 17% increase in asset refurbishment.
- The number of new assets proposed to be delivered in PR5 is less than in PR4. There is a higher proportion of 400 kV works compared to 110 kV in previous periods.
- Driven by the review of the TSO submission, a total of circa €51m is proposed to be removed from the TAO forecast expenditure, owing to insufficient justification of DSO projects and the superseding of the North West (RIDP) project.
- Unit Cost Assessment: although some discrepancies have been identified following the review such as 400kV unit costs, the materiality of those discrepancies is very limited within the PR5 budget forecast due to the insignificant quantity of affected assets within the PR5 programme. The unit costs used by the TAO (and TSO) are therefore considered to be reasonable for the purposes of PR5 budget pricing.
- An assessment of the TAOs ability to deliver the PR5 Capex plan has shown evidence of historic flexible development and delivery approaches which can be utilised as necessary to deliver the most complex projects in a timely manner.

The review has identified some proposed changes that impact on the TAO's forecast expenditure and without additional information, the CRU is minded to accept the recommendation to remove €50.7 m from the TAO forecast expenditure. The CRU is also satisfied of the TAO's ability to deliver the PR5 Capex plan, however it will need to introduce and focus on flexible development and delivery approaches to deliver projects in a timely manner.

3.3.4 Conclusion

The tables show the proposed allowed PR5 Capex revenue for the TSO and TAO. The CRU has sought to ensure that the companies have the necessary revenues to meet carbon emission reduction targets while maintaining the security of supply and affordable electricity prices.

The CRU has allowed those revenues where the companies have clearly identified the scope and requirement for Capex. Those revenue requests which are not sufficiently defined have not been allowed as the CRU considers that to do so imposes a risk on the consumer in terms of higher than necessary transmission costs. The CRU has however recognised the potential need for uncertain projects to be progressed within PR5 and has proposed an uncertainty mechanism to account for strategically important projects during the period. This is further discussed in the CRU's Regulatory Framework, Incentives and Reporting Paper published alongside this Draft Determination.

The approach proposed by the CRU will allow for a meaningful comparison of outputs at the end of PR5 with the stated scope of the projects, which will allow for a determination of the efficient expenditure of the companies. For a further breakdown of non-network Capex projects and the CRUs proposed allowed revenues, please refer to Appendix 4.

For this draft determination, the CRU has established a Capex cost challenge of circa €41m for the TSO and €51m for the TAO. The CRU will consider additional information provided by network companies as part of the consultation process. Therefore, respondents should note that in the Final Determination the CRU may fully or partially allow the costs subject to the cost challenge if the network companies provide sufficiently robust justification.

3.3.4.1 TSO Capex

Table 22 PR5 Proposed Allowed Network Capex for TSO

Network Capital Expenditure	Request (€m)	2021	2022	2023	2024	2025	Proposed allowed Revenues (€m)
System Reinforcement	6.65	0.00	0.49	0.65	2.19	3.33	6.65
Asset Refurbishment	8.38	0.74	2.34	2.11	1.97	1.22	8.38
New Connections (Excluding Offshore Wind)	22.58	8.32	6.47	4.44	2.30	1.04	22.58
New Connections (Offshore Wind)	1.23	0.03	0.15	0.37	0.52	0.16	1.23
Ongoing Projects	32.12	9.33	8.37	5.53	2.01	0.25	25.50
DSO Projects	8.07	0.40	0.40	0.40	0.40	0.40	2.00
Other & Undefined Projects	1.98	0.78	0.25	0.35	0.30	0.30	1.98
PR5 Total	81.02	22.54	22.7	17.7	10.292	6.731	68.32

Table 23 PR5 Proposed Allowed Non-Network Capex for TSO

Category	Request (€m)	Proposed allowed Revenues (€m)
End of Life IT Assets – BAU	20.51	12.79
Transition to Cloud – BAU	2.50	0.00
Review of IT Operating Model – BAU	0.8	0.00
Simplify and Standardise IT Solutions – BAU	4.23	1.14

Category	Request (€m)	Proposed allowed Revenues (€m)
Cyber Security – BAU	3.45	3.35
Workplace Assets Reaching End of Life - BAU	3.04	2.03
Sustainability & Decarbonisation	21.7	10.75
Operate, Develop Grid & Market	13.89	9.28
Engage for Better Outcomes for All	3.75	0
Minus Deferred from PR4	-3.20	-3.20
PR5 Total	70.6	36.1

3.3.4.2 TAO Capex

Table 24 PR5 Proposed Allowed Network Capex for TAO

TAO Capex (€m 2019 prices)	Request (€m)	Proposed allowed Revenues (€m)
Ongoing Project	445.9	415.9
Under Consideration/Provisions - System Reinforcements	73.8	73.8
Under Consideration/Provisions - Shallow Connection	0	0
Under Consideration/Provisions - Asset Refurbishment	198.9	198.9
Under Consideration - DSO	30.7	10.0
Under Consideration/Provisions - Protection, Telecoms & Station Security	0	0
New Connection Project*	376.3	376.3
Other Project	0.7	0.7
Unknown	0	0
Subtotal	1,126.2	1,075.5
Customer Contributions	-100	-100
Interest During Construction	-56.3	-56.3
Other Adjustments	0	0
PR5 Total	969.9	919.2

3.3.5 Capex Monitoring for PR5

The Capex monitoring will remain consistent with PR4. Please refer to the Incentives and Reporting Paper for PR5, published alongside this Draft Determination.

3.4 Review of Forecast Operational Expenditure

This section provides an overview of the CRU's proposals in relation to allowable Opex for PR5. Table 25 summarises the outcome of the future Opex review for TSO and TAO.

Table 25 Summary of Future Opex (2021 - 2025) Review

	Request	CRU Recommendation	Cost Challenge
TSO Opex	1,275.5	1,258.0	-17.6
TAO Opex	328.3	325.3	-3.0

The cost challenge indicates the potential for change in revenues between Draft Determination and Final Determination. Information submitted by network companies will be considered during and after the consultation period.

A more detailed assessment and breakdown of each network company's proposals is set out in the accompanying Report (CRU/20/076a). Please note that all costs set out in the review of forecast operational expenditure are in 2019 prices.

3.4.1 Introduction

The approach taken to assess the PR5 Opex costs is the 'Base-Trend-Step' methodology. This is a well-established approach that accounts for specific challenges of assessing EirGrid and ESBNs efficient costs.

The following three steps are undertaken:

1. Identify an efficient baseline which forms the starting point for future PR5 costs;
2. Project a forward trend in costs based on cost drivers and other assumptions; and
3. Identify step changes that would build on the efficient baseline.

The structure of the subsequent sections follow the above approach and further details can be found in the CEPA/GHD Report.

3.4.2 TSO Opex

The TSO has requested a total of circa €319m in controllable Opex (excluding RPEs and Ongoing productivity) for PR5, and €957m in non-controllable Opex. The conclusion and summary of the CRU's PR5 recommendations are set out in Section 3.4.4.

3.4.2.1 TSO Opex Baseline and Trend

The baseline for Opex costs is typically based on outturn costs with an adjustment, where relevant. Based on the evidence submitted, the CRU recommends using 2019 and 2020 figures to set the baseline. This would allow for the adjustment in activities taken in 2019 and

2020. The introduction of I-SEM means that costs between 2016 and 2018 are not representative of the TSO's business-as-usual activities. Additionally, the TSO's outturn costs for 2019 are close to forecast costs submitted for 2019 (TSO's regulatory accounts). Given the uncertainty on setting the baseline, our advisors consider that the average of 2019 and 2020 represents a more robust baseline compared to setting the baseline just on 2019 or 2020. However, the CRU notes that the average of 2019 and 2020 may include some one-off and non-business-as-usual costs. Therefore, the CRU will take this into consideration in the Final Determination particularly in relation to the risk of double counting costs that relate to steps or trends in the PR5 period and in relation to the appropriate weighting of the years 2019 and 2020.

The following summarises key points related to the assessment and recommendations on the TSO's PR5 baseline Opex costs:

- Staff and Staff Related Costs: Baseline number of FTEs set equal to the average level forecast by the TSO for 2019 and 2020. Estimated cost for the baseline is then set by multiplying baseline FTE numbers in by the 2019 unit cost per FTE. Note that FTEs are used as a proxy for expenditure units in this analysis. It is up to the network company to use the allowance in line with its business plan to deliver required outputs.
- IT Costs: IT Opex varied significantly across PR4. The TSO has stated that the increase in costs is due to the introduction of the I-SEM. Difference in the request and recommendation is due to an increase in IT costs from €6m in 2020 and €6.6m in 2022. The understanding is that this is not associated with any of the new initiatives proposed by the TSO for PR5. The TSO has forecast that baseline costs will decline over the second half of PR5 back to the recommended baseline level.
- Premises Costs: Requested increase in costs not part of baseline. TSO's 2022 rent review considered as part of the Opex step change assessment.
- Contractor Costs: Contractor Opex varied in the year-on-year outturn spend during PR4. Difference between requested allowance and recommendation is primarily due to a forecast decrease in contractor costs from circa €2m in 2019 and €1.4m in 2020.
- Selling and Advertising: The TSO has reallocated funds from other functions and activities within the business to fund a new directorate for selling and advertising during PR4. Difference between requested allowance and recommendation is primarily due to a forecast decrease in selling and advertising costs from circa €2m in 2019 and €1.8m in 2020.
- Professional Fees: ENTSO-E fees included within professional services costs and have not been treated as non-controllable,

3.4.2.2 TSO Opex Step Change

The TSO has proposed 21 initiatives in its PR5 submission for which step-changes in the Opex allowance are identified. As with its Capex proposals, TSO has grouped these into three themes:

4. Sustainability and Decarbonisation;
5. Operate, Develop, and Enhance the Grid & Market; and
6. Engage for Better Outcomes for All.

The TSO has also proposed that costs associated with cloud adoption and the IT operating model ('Non-Network Capex Business as Usual (BAU)') should be considered as part of the PR5 baseline. These costs are additional and are considered within the step-change assessment.

Appendix 5 details the key rationale for adjustments/cost challenges made to the TSO's proposed initiatives. In summary:

- Sustainability and Decarbonisation (Table 40): Five initiatives with Opex costs are included as part of this business plan. The total requested additional allowance is circa €15m.
 - Three initiatives with cost challenges applied.
 - Two initiatives with cost allowances not included.
- Operate, Develop, and Enhance the Grid & Market (Table 41): Ten initiatives with Opex costs are included as part of this business plan. The total requested additional allowance is circa €14m.
 - Two initiatives' costs allowed in full.
 - Six initiatives with cost challenges applied.
 - Two initiatives with cost allowances not included.
- Engage for Better Outcomes for All (Table 42): Two initiatives with Opex costs are included as part of this business plan. The total requested additional allowance is €7m.
 - One initiative with cost challenge applied.
 - One initiative with cost allowances not included.
- Non-Network Capex Business as Usual (Table 43): Two initiatives with Opex costs are included as part of this business plan. The total requested additional allowance is circa €6m.

- Two initiatives with cost challenges applied.
- Transmission System Development and Maintenance (Table 44): One initiative with Opex costs included. The total requested allowance is €1.5m.
- A cost challenge has been applied.

Also set out in the TSO's submission are two changes in Opex not related with any business case. The first relates the European Network of Transmission System Operators for Electricity (ENTSO-E). The TSO requested €0.5m in professional fees be reallocated from controllable Opex to non-controllable Opex. The CRU is of the view that this ENTSO-E fees should remain as part of controllable Opex.

The second change relates to a downward step in premises Opex costs. This relates to a saving of €0.5 million per annum. The impact of changes is a negative step change of €0.1 million per annum between 2023 and 2025. The TSO has demonstrated an efficiency saving and as such the step change (downwards) is included.

3.4.3 TAO Opex

The TAO has requested a total of €160m in controllable Opex for PR5, and €168m in non-controllable Opex.

3.4.3.1 TAO Opex Baseline and Trend

Opex costs for the TAO are typically based on outturn 2018 costs with an adjustment, where relevant. Outturn 2018 costs were selected given the fact that it is the last year of outturn data available for the TAO (based on its 2019 submissions).¹⁶ Costs reported in 2018 are assessed and an adjustment is considered for atypical costs (i.e. incremental costs that are not expected to continue) and/or inefficiency.

The following summarises the key points related to the assessment and recommendations on the TAO's PR5 baseline costs:

- Planned Maintenance Costs: The 2018 planned maintenance expenditure was €17m. This was slightly lower than the average annual expenditure on planned maintenance during PR4 of €18m. Using network length to project planned maintenance costs applying the trend, the PR5 planned maintenance baseline increases from €89.5m to €93.6m (+€4m).
- Telecoms Costs: Telecoms Opex was relatively variable over the course of PR4, between between €1m and €2m. As a result of the significant variability over the PR4

¹⁶ Please note, that a further TAO submission was received in February 2020. This submission included updated 2019 outturn costs, changes to maintenance costs and additional minor adjustments. This update was not considered for the Draft Determination but will be assessed prior to Final Determination.

period, the baseline is set equal to the average annual expenditure expected over PR4. There is no evidence of a volume driver for telecoms Opex. This is reflected in the TAO's forecast PR5 telecoms Opex, which does not follow any noticeable trend.

3.4.3.2 TAO Opex Step Change

The TAO has not set out its proposals in the same way as the TSO. As such, there are no business plans or specific initiatives to assess, rather, the individual Opex costs categories are assessed. In summary, the key rationale for adjustments/cost challenges made to the TSO's proposed initiatives are:

- **Planned Maintenance Costs:** As noted within our advisors' report, the existing transmission system asset base continues to age and, as a result, it expects the quantity of maintenance activity to increase going forward. The baseline plus trend allowance already reflects a volume of planned maintenance activity consistent with the maintenance plan given that we have not adjusted the baseline for outturn planned maintenance in PR4 being lower than the transmission maintenance plan.
- **Telecoms Costs:** ESB Networks forecasts telecoms Opex of circa €94m for PR5, of which approximately 10% is allocated to the TAO. ESB Networks does not specify what percentage of the telecoms Opex forecast relates to business as usual activities and what percentage relates to new outputs or activities. This makes it challenging to apply a step-change adjustment.

3.4.4 Ongoing Efficiency

The CRU aims to ensure that customers only pay for the efficient costs of developing, maintaining and operating the electricity transmission systems. This is done by setting the network companies challenging but realistic and achievable targets and incentives. The CRU applies ongoing productivity (or 'frontier shift efficiency') to define expected evolution of productivity for an already efficient company over time. The TSO proposal includes ongoing productivity and an additional mechanism to account of RPE's. The TAO also proposes an ongoing productivity assumption and it is also noted that the TAO expect RPEs for Opex and Capex. More detail can be found in the accompanying CEPA report (CRU/20/080). Stakeholder views are sought on each below.

3.4.4.1 Ongoing Productivity

The TSO and TAO have proposed an ongoing productivity assumption 0.3% and 0.9% respectively. The assessment undertaken by our advisors CEPA has noted that there is evidence to support an ongoing productivity challenge to baseline TSO and TAO Opex costs in PR5. A number of sources to estimate ongoing productivity were used. The analysis in Table 26 shows a wide range of productivity estimates. Overall, CEPA consider that an achievable base assumption for the ongoing productivity target in PR5 is 1% per annum. This is consistent with the assumptions that many UK and Irish regulators have previously made

on ongoing productivity targets for network utilities and falls within the range of UK and Irish regulatory precedent on this issue.

Table 26 Summary of Productivity Estimates

Source	Range
Productivity trend analysis	0.6% to 2.8%*
Productivity forecasts	0.7% to 1.5%
EU KLEMS (1988-2007)	0.1% to 0.9% (TFP) 0.7% to 2.0% (LP)
EU KLEMS (2008-2017)	2.5% to 5.4%
ESB Networks' advisors	0.0% to 1.0%
EirGrid's advisors	0.3% to 1.0%
Regulatory Precedent	0.0% to 1.1%

Source: CEPA analysis

The efficiency challenge is in-line with regulatory precedent and is informed by CEPAs review of evidence of total factor productivity ('TFP') and partial factor productivity growth rates in Ireland. The impact of the adjustments for capital substitution¹⁷ and transformational change are also considered in the PR5 base ongoing productivity challenge. Table 27 below summarises the CRU's PR5 recommendations for ongoing productivity.

Table 27 Ongoing Productivity

Network Company	PR5 Proposal
TSO Ongoing Productivity (per annum)	0.4% ¹⁸
TAO Ongoing Productivity (per annum)	1.0%

The CRU considers the ongoing productivity recommendation achievable. An assumption above 1% would require a stronger interpretation of the transformational opportunity in PR5 and the applicability of certain historical evidence on productivity evolution in Ireland to setting a target for the network companies in PR5. It is also noted that a key PR5 objective is increasing efficiency and protecting consumers. Therefore, the CRU considers it important that a stretching, but achievable, efficiency challenge is put on the network companies. By setting the efficiency challenge at (and not above) our advisor's estimate for ongoing productivity the CRU notes that the efficiency challenge is reasonable. However, the CRU will

¹⁷ Capital substitution is a theoretical basis that demonstrates how an increase in the share of capital inputs relative to labour inputs – can be expected to result in higher productivity growth.

¹⁸ TSO proposal lower due to the acknowledgement that it may currently have less scope for capital substitution (the use of capital / technologies to carry out functions previously done by labour) in the delivery of its Opex.

consider the appropriateness of an upward revision in the Final Determination in the context of the approved PR5 allowances.

3.4.4.2 Real Price Effects

The TSO proposed an RPE assumption of 1.3% (Opex) while the TAO expect RPEs of 2.1% for Opex and 1.9% for Capex. The CRU is not proposing to include a mechanism for RPEs in PR5. The current regulatory regime already acknowledges that the network company's efficient cost level would be influenced by macroeconomic cost pressures by way of HICP indexation. While it is recognised that at any given time input prices may not track with HICP, either higher or lower, there are a number of issues which highlights the uncertainty surrounding the application of RPEs for PR5. The CRU does not consider the additional complexity that such a mechanism (with the associated methodological and calculation issues) to be appropriate or beneficial to the process. However, aside from the issue of additional complexity, the CRU does not consider the introduction of such a mechanism to be in the consumer interest or in accordance with the principles the CRU set out in relation the PR5 Regulatory Framework.

By adjusting for changes in prices, over and above inflation, the mechanism would involve a transfer of risk from the companies on to the customer. The CRU considers that the companies are better placed to manage that risk and to adapt their strategies and practices accordingly. The CRU is not proposing the introduction of an RPE mechanism.

3.4.5 Conclusion

The proposed Opex allowances for the TSO and TAO are detailed in Table 28 and Table 29 below. The PR5 recommended Opex allowance will see a circa 21% increase in TSO controllable Opex compared to PR4, while the TAO will see a decrease of 5% compared to PR4. The non-controllable Opex is also forecast to increase for both TSO and TAO by 89% and 13% respectively.

For this draft determination, the CRU has established an Opex cost challenge of circa €18m for the TSO and €3m for the TAO. The CRU will consider additional information provided by network companies as part of the consultation process.

Also proposed, but not addressed as part of PR5, is the TSO request for the removal of the Ongoing Service Charge (OGSC). This is a matter of wider policy relating to connection policy and is therefore not within the scope of PR5. The matter of OGSC will be considered separately.

Table 28 PR5 Proposed Allowed Opex for TSO

TSO Opex (€m 2019 prices)	TSO PR4 Outturn	TSO PR5 Request	Proposed Allowed Revenues (€m)	% Variance
Staff and related costs	141.1	175.4	167.5	-4%

Premises	26.9	31.2	28.5	-9%
IT Costs	22.7	43.2	40.2	-7%
Telecom Costs	25.3	27.6	27.6	0%
Professional Services	20.1	21.7	21.1	-3%
Selling and Advertising	8.7	15.1	13.5	-10%
Contractors	6.6	9.5	8.4	-12%
Grid Maintenance & Client Engineering	3.4	3.5	3.4	-4%
Rates	2.4	3.0	2.5	-18%
Insurance	1.3	1.5	1.5	0%
Promotion of Research	2.6	2.5	2.3	-5%
Intercompany Recharges	-15.8	-15.5	-15.5	0%
Total Controllable Opex	245.2	318.6	300.9	-6%
Non-controllable Costs				
Inter TSO Compensation	7.7	10.5	10.5	0%
CORES0 subscription	1.3	2.8	2.8	0%
Interconnector services	3.9	4.1	4.1	0%
CRU Levy	5.4	4.9	4.9	0%
DUoS costs	12.5	16.2	16.2	0%
Ancillary Services	475.0	918.6	918.6	0%
Total Non-Controllable Opex	505.7	957.10	957.10	0%
PR5 Total (Excl. Ongoing Efficiency)	750.9	1,275.6	1,258.0	-1%
PR5 Total (Incl. Ongoing Efficiency)		1,287.3	1,254.8	-3%

Table 29 PR5 Proposed Allowed Opex for TAO

TAO Opex (€m 2019 prices)	TSO PR4 Outturn (€m)	TAO PR5 Request (€m)	Proposed Allowed Revenues (€m)	Variance %
Planned maintenance	89.5	94.3	93.6	-1%
Unplanned maintenance	11.1	6.4	6.4	0%
Operations	12.8	10.0	10.0	0%
Wayleaves	4.3	2.5	2.5	0%
Professional fees	23.7	12.9	12.9	0%
Telecoms Opex	7.6	9.3	7.6	-18%
Corporate overheads	18.6	18.2	18.2	0%
Insurance	2.9	3.4	2.9	-14%
Legal	1.8	1.1	1.1	0%
Pensions admin	2.0	2.2	2.0	-10%
Total controllable	174.3	160.3	157.3	-2%
Non-controllable Costs				
Rates	123.4	162.4	162.4	0%
CRU Levy	5.6	5.6	5.6	0%

Total non-controllable	129.0	168	168	0%
PR5 Total (Excl. Ongoing Efficiency)	303.3	328.3	325.3	-3%
PR5 Total (Incl. Ongoing Efficiency)		319.9	319.8	

*Please note the CRU has not proposed including a mechanism for 'Real Price Effects'.

Part 4 – Allowed Revenues

4 Allowed Revenues and Finance

This section provides an overview of the CRU's proposals in relation to the regulatory asset base, cost of capital, allowed revenues and tariffs for PR5. Please note that all costs set out in the review of forecast operational expenditure are in 2019 prices.

4.1 The Regulatory Asset Base

This section sets out the details related to the TSO's and TAO's Regulatory Asset Base ('RAB') for the PR5 period.

4.1.1 Introduction

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

1. Revenue to recover the TSO's and TAO's Opex costs during the 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 Regulated Asset Base 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 sets out 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) the clawback of revenue earned on assets that were not put in place (i.e. the PR4 Capex underspends).

4.1.2 Composition of Regulated Asset Base

Please see the CRU's revenue models published alongside the Draft Determination for detailed composition of the TSO's and TAO's regulated asset base. Information on the value of the assets is provided within the asset base itself.

Table 30 TSO RAB 2021-2025 (Real)

	2021	2022	2023	2024	2025
OAV	74,531,291	60,245,596	45,127,251	29,529,094	27,882,722
Capex	7,165,189	7,165,189	7,165,189	7,165,189	7,165,189
Depreciation	-21,450,883	-22,283,534	-22,763,346	-8,811,561	-8,514,946
CAV	60,245,596	45,127,251	29,529,094	27,882,722	26,532,965

Table 31 TAO RAB 2021-2025 (Real)

	2021	2022	2023	2024	2025
OAV	2,522,393,009	2,693,111,558	2,848,092,635	2,957,822,615	3,044,102,526
Capex	241,836,845	230,733,425	189,580,789	169,639,495	155,829,446
Depreciation	-71,118,296	-75,752,349	-79,850,809	-83,359,585	-86,454,669
CAV	2,693,111,558	2,848,092,635	2,957,822,615	3,044,102,526	3,113,477,303

4.1.3 Valuation of the Regulatory Asset Base

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 CRU 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 valuation of the RAB. This was the established practice during the last four price control periods.

This approach allows the CRU 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 following sections provide further information.

4.1.4 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 were set out in PR4 and still hold true.

1. Acquisition Cost

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

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 asset to allow for inflation; and (b) revaluing the asset base using a modern equivalent asset value (MEAV) approach.

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.

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).

The CRU is proposing that the TSO and TAO's RAB would continue to be valued using a replacement cost approach for the period 2021-2025. This aligns with the approach taken in the previous price reviews and provides significant regulatory stability.

4.1.5 Asset Lives Applied to the Regulatory Asset Base

The decision on asset lives that apply to assets within the RAB feeds through to the level of depreciation that the TSO and TAO receive separately on those assets within each price review (or indeed year).

In line with established practice, the CRU is proposing to continue using average assets lives as determined in PR4. PR4 reviewed the appropriateness of the asset lives, taking account of the economic and technical lives of the assets on the TSO and TAO RABs. This review found no strong justification to change the asset lives for PR4.

Asset	PR4 (yrs)
Network Assets	50
Telecoms	50
Office Equipment	10
Scada Telecoms	15
Premises	50
Grants	50
IT	5
Customer Contributions	50

4.1.6 Depreciation Methodology

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

The CRU is proposing to maintain the straight-line method during the PR5 period covering 2021 to 2025. This methodology ensures regulatory stability and the full depreciation of assets over a period of time.

4.1.7 Replaced Assets

Given the significant investment in replacing TAO assets, the CRU is aware that this could possibly lead to a situation where an asset and its subsequent replacement would be included in the RAB at the same time. That is, the asset has been physically replaced before its value in the RAB has been fully depreciated. In previous price reviews, the CRU affirmed its view that assets included within the RAB that have been replaced should be removed from the RAB at the time of their replacement. This policy prevents a situation arising where there is “double-counting” of assets or double payment by the consumer.

The CRU is proposing to maintain this policy during the PR5 period, covering 2021 to 2025, where material values of assets are replaced before being fully depreciated. However, the

CRU will also take into consideration that using the average life for a class of assets may extend a subset of assets beyond their economic life.

4.1.8 Additions to TSO and TAO Regulatory Asset Base

The regulatory treatment of additions to the TSO and TAO RAB's is an important issued in a price review.

This section explains and proposes the regulatory approach to the 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 PR4 (once approved).

4.1.8.1 Interest During Construction

The CRU maintains the view that IDC should not be added to the respective RABs. This is due to the TSO and TAO receiving a return on the assets from the middle of the year in which the costs were incurred, rather than when the asset was commissioned. Depreciation is also provided as expenditure on assets incurred. This means that that the expenditure on assets still under construction during any given year will be included in the calculation of that year's annual depreciation. The CRU proposes to maintain this policy during the PR5 period, covering 2021 to 2025.

The CRU also proposes to maintain the policy that assets which have been added to the RAB, but have not been energised within five years (except in the case where the programme of work was scheduled to be longer than five 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. At this point, this does not result in any current reductions or removals from the TAO RAB.

4.1.8.2 Capital Contributions and Grants

In the last four price reviews, capital contributions and grants were subtracted from capital expenditure in the relevant year. The CRU proposes to continue this policy during the PR5 period, covering 2021 to 2025.

4.1.8.3 Variations between Allowed and Actual PR4 Capex

The information provided jointly by the TSO and TAO has indicated that there will be an underspend on Capex during PR4 period relative to the amount allowed at the time of the

CRU's PR4 decision. The rationale for the underspend is included in Section 3.1 and are detailed fully in the accompanying advisors' report.

4.2 Cost of Capital

The CRU, with the assistance of expert financial advisors, sets the fair rate of return that the regulated network companies can earn on the efficiently incurred capital investments in its regulated asset base. This return is known as the Weighted Average Cost of Capital ('WACC').

4.2.1 Introduction

The WACC is a weighted average of the cost of debt and the cost of equity. It is the CRU's role to set a WACC that gives a fair deal to customers and the companies. If the CRU sets a rate of return that is too high, customers end up paying too much. If the CRU sets it too low, utilities cannot raise the finance to deliver the necessary level of network investment, which can result in a reduced quality of service for customers. Setting a fair rate of return helps the utilities manage their challenges, such as financing their investment programme.

This year, the CRU published an Information Paper (CRU/20/029) setting out how the WACC has been applied over the past number of price reviews in regulating the electricity, gas and water sectors in Ireland¹⁹. This paper noted that the CRU continues to review its methodology with the aim of ensuring it provides the best outcomes for customers. In recent decisions the CRU has placed greater weight on shorter-term observable market data when calculating the WACC. The CRU expects that this approach may more appropriately reflect conditions over the upcoming regulatory period.

As with previous price reviews, the CRU is proposing that the same cost of capital is applied to both the TSO and TAO for the PR5 period, covering 2021-2025. Any change to this approach would require a detailed and fundamental review. No proposals to review this approach have been received from either the TSO or TAO.

This Draft Determination Paper presents the conclusion of the work that was completed when deriving a proposed cost of capital. The report provided by CEPA has been published alongside this paper and interested parties should refer to that document for further information on these issues.

4.2.2 Methodology for Setting the Cost of Capital

The estimates and methodology are detailed in the accompanying CEPA report. Some of the key points to note are:

¹⁹ Cost of Capital – CRU Approach: <https://www.cru.ie/wp-content/uploads/2020/02/CRU20029-Cost-of-Capital-CRU-Approach-Information-Paper.pdf>

- Most of the differences between PR4 and PR5 are due to the movement of market data.
- CEPA has used Eurozone data rather than Ireland-only. The rationale for this is that CEPA considers:
 - That investors are more likely to view Irish regulated companies as part of a class of European utilities; and
 - the European dataset is richer and is more likely to produce statistically robust estimates.
- The upper quartile of the range is selected, which is consistent with PR4.

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 CRU's intention to continue using these methodologies to calculate the appropriate cost of capital for both the TSO and TAO for the 2021 to 2025 period.

4.2.3 CEPA Point Estimate

This section lists the cost of capital recommendations provided by CEPA to the CRU for the period 2021-2025. It also lists the values of the factors that underpin this value. As part of the CEPA report, both the TSO and TAO proposals are summarised. These figures are also included in Table 32 below

Table 32 Cost of Capital Estimates and Proposals

	CEPA PR5		Network Company	
	Lower (%)	Upper (%)	TSO	TAO
Benchmark cost of debt	0.8%	1.5%	1.3%	2.1 - 2.7%
Small company premium	-		0.4%	N/A
Issuance costs	0.1%	0.2%	0.2%	-
Cost of debt	0.9%	1.7%	1.9%	2.1% - 2.7%
Risk-free rate	-1.2%	-0.8%	-0.6 - 0.5%	1.50%
Total market return	5.7%	6.75%	6.0 - 7.0%	6.70%
EMRP	6.9%	7.55%	5.5 - 7.6%	5.20%
Asset beta	0.35	0.4	0.35 - 0.45	0.30 - 0.37
Equity beta	0.78	0.89	0.78 - 1.00	0.67 - 0.82
Cost of equity (post-tax)	4.2%	5.9%	4.8 - 7.0%	5.0 - 5.8%
Tax	12.5%			
Cost of equity (pre-tax)	4.8%	6.8%	5.5 - 8.0%	5.7 - 6.6%
Notional gearing	55%			
WACC (pre-tax)	2.65%	4.0%	3.5 - 4.6%	3.7 - 4.5%
Adjustment for inflation expectation	0.4%			
WACC (pre-tax) after adjustment for inflation expectations	2.65%	4.4%	3.4% - 4.6%	3.7% - 4.5%

Cost of Capital	3.8%	4.0%	4.2%
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As highlighted in our advisor’s report, the estimation of the WACC is inherently uncertain. Notably highlighting the considerable volatility in financial market as a result of the COVID-19 crisis. CEPA has included an addendum to its report that shows how estimates would have changed had its methodology been updated (31st March 2020). This showed that overall, there would be a slight increase in the lower bound WACC range and a slight reduction in the upper bound. The long-term impacts that arise from the COVID-19 will be assessed prior to final determination.

The CRU is minded to accept this approach and accordingly the WACC for the period 2021 – 2025 subject to respondents views and the updated assessment to be undertaken by CEPA prior to final determination. It is noted that this represents a material decrease to the WACC set for PR4. This follows the trend in market data in recent years.

In addition to the return on its RAV, the TSO earns a margin on working capital required to manage cost volatility and external (non-controllable) cash flows. In PR4, an additional margin was also included for the TSO higher operational gearing. At this stage, the CRU recommends using a working assumption that is based on the PR4 approach.

4.2.3.1 Celtic Interconnector

In 2019 the National Regulatory Authorities, CRU in Ireland and CRE in France, published their coordinated Cross-Border Cost Allocation (CBCA) Decision supporting the Celtic Interconnector project.²⁰ For the purpose of PR5 draft determination, it is assumed that any interconnectors developed during PR5 will have separate ownership, at least in terms of the legal entity, from both the licensed TSO and TAO. And will consequently have funding arrangements separate from the PR5 process.

The CRU is currently engaging with EirGrid on the appropriate regulatory framework for Celtic. Depending on the outcome this engagement, it may require consideration of the cost of within PR5. It may also require a reopener within PR5 to account for additional costs associated with the development of the interconnector. If there is a change to this assumption, the CRU may need to reconsider the TSO allowances. In particular, there may be a need to ensure its financial model, designed for an asset light utility, is not over remunerating the TSO. It is noted that the CRU is currently engaging with EirGrid on the appropriate regulatory framework for Celtic.

²⁰ CRU/19/125

4.2.4 Financeability

The CRU is required to have regard to the ability of network companies to finance their operations. The CRU has consistently interpreted this as to ensure that an *efficient* licence holder, in this case the TSO and TAO, can finance their activities. The CRU has made a some assumptions in this respect which are:

- that the TSO and TAO does not exceed the allowance for operating costs;
- that the financeability assessment is based on the notional capital structure assumed by the CRU; and
- the effects of any unfinanced pension deficit are a matter for the network companies.

The CRU considers these assumptions are reasonable given that (a) the proposed allowed operating costs are set at the level of an efficient can achieve, (b) it is not the function of the CRU 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 any pension deficits within both utilities will not be dealt with as part of the PR5 process.

The financeability test is based on the TSO and TAO achieving an investment grade credit rating. Rating agencies take a number of factors into consideration when determining the rating of a company.

ESB currently finances its network investments through ESB Group and as such any rating ESB Networks as the TAO is notional. ESB's current credit ratings are: Standard and Poor's A- (Stable) November 2019, and Moody's A3 (Stable June 2020). 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 they are part of), the CRU does not consider it appropriate, nor is it in any case possible, to replicate all the factors that the credit rating 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 taken into consideration, and importantly the financial metrics associated with the different credit ratings. The financial ratios consistent with an investment Grade Credit Rating are set out in Table 33 below.

Table 33 Financial Ratios Consistent with an Investment Grade Credit Rating

Moody's			S&P		
Metric	A	Baa	Metric	A ('Significant financial risk profile')	BBB ('aggressive financial risk profile')
FFO + Interest / Interest	4-5.5	2.8-4	FFO / Cash Interest	2-3	1.5-2
FFO / Net Debt	18-20%	11-18%	FFO / Debt	9-13%	6-9%
AICR	2-3.5	1.4-2	Debt / EBITDA	4-5	5-6
RCF / Net debt	14-21%	7-14%	EBITDA / Interest	2.5-4	1.5-2.5

The CRU 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 CRU 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. The CRU, having engaged with its advisors, is of the view that the proposed WACC of 3.8% is consistent with both network companies being adequately financeable.

4.2.5 CRU Proposal

The CRU proposes to allow a real pre-tax cost of capital of 3.8% for both the TSO and TAO in the PR5 period. The CRU seeks respondents' views on this proposal.

4.3 Allowed Revenues

The subsections below set out the proposed allowed revenues for the TSO and TAO, as determined within the CRU's revenue model.

Table 34 PR5 Proposed Allowed Revenues for the TSO

€m's 2019 prices	2021	2022	2023	2024	2025
Opex (€m)	260.7	288.1	278.6	272.6	261.8
Depreciation (€m)	21.5	22.3	22.8	8.8	8.5

Return on Stage 1 Working Capital (€m)	1.3	1.1	1.2	1.1	1.0
Return on other working capital (€m)	6.6	6.9	6.6	6.3	6.1
Return on fixed assets in the RAB (€m)	2.5	2.0	1.4	1.1	1.0
Incentives (€m)	-	-	-	-	-
PR4 adjustments (€m)	-	-	-	-	-
Revenue Requirement Including Cost Challenge (€m)	292.59	320.38	310.51	289.77	278.47
Revenue Requirement Excluding Cost Challenge (€m)	297.97	329.41	322.06	304.47	295.07

Table 35 PR5 Proposed Allowed Revenues for the TAO

€m's 2019 prices	2021	2022	2023	2024	2025
Opex (€m)	59.85	64.48	65.11	64.13	65.85
Depreciation (€m)	71.12	75.75	79.85	83.36	86.45
Return (€m)	116.8	113.7	106.3	102.4	92.5
Incentives (€m)	-	-	-	-	-
PR4 adjustments (€m)	-2.29	-6.15	-6.15	-6.15	-6.15
Revenue Requirement Including Cost Challenge (€m)	245.48	247.78	245.14	243.71	238.65
Revenue Requirement Excluding Cost Challenge (€m)	249.92	252.26	249.57	248.11	242.97

4.5 Summary and Average Unit Price (TUoS)

The CRU's Average Unit Price (AUP) for PR5 is calculated by dividing the total allowed revenue by the total forecast units of electricity sold (measured in kWh). Table 36 below compare using the proposed allowed revenue and EirGrid's demand forecast.

Table 36 Revenue Model AUP Impact

Category	2021	2022	2023	2024	2025
Draft Determination Revenues (Incl. Cost Challenge)	536,710,477	566,812,143	557,323,624	534,594,363	517,229,961
Draft Determination Revenues (Excl. Cost Challenge)	546,531,556	580,325,468	573,352,896	553,658,319	538,128,248
EirGrid's Demand Forecast					
Annual Consumption (GWh)	30,490	32,058	33,038	34,214	34,900
Annual Consumption Growth (%)	-	5.14%	3.05%	3.56%	2%
AUP Cost Challenge (c/KWh)	1.76	1.77	1.69	1.56	1.48
AUP Growth (%)	-	0.6%	-4.7%	-8.3%	-5.4%
AUP No Cost Challenge (c/KWh)	1.79	1.81	1.74	1.62	1.54

The PR5 revenues are higher relative to PR4 and is driven by the ambition and goals of the Climate Action Plan. The increase in the AUP in the first two years of PR5 are linked to the depreciation of I-SEM and the decline in the AUP is caused by the expected increase in demand. It should be noted that costs may increase over the PR5 period as additional investments are made through the Agile Investment Framework. Therefore, the AUP seen over PR5 will be significantly impacted by the speed of transition driven by the Climate Action Plan and the overall demand levels over the period. Please note that the impact of COVID-19 has not been considered as it is not possible at this time to accurately predict the impact this will have. The CRU will consider this further in the Final Determination.

In light of the significant changes that can be expected in the electricity system from now until 2030 and beyond, the CRU plans to review network tariff structures. Relevant changes that are expected include an increase in the use of electricity for heat and transport, an increase in distributed generation and participation from consumers (microgeneration, demand response etc.). In order to facilitate these changes, the CRU will review the tariff structures with the aim of ensuring that network tariffs are equitable and fit for purpose.

5 Conclusion

This paper, together with the supporting documents published alongside, has outlined the CRU's proposals on the revenue that the TSO and TAO should be allowed to collect from the TUoS customer over the Price Review period. The Climate Action Plan 2019 set the energy sector in Ireland a collective challenge to decarbonise electricity while facilitating consumer and community engagement, significant electrification of heat and transport and rapidly increasing demand. The five years from 2021-2025 will require significant new investment in the transmission system.

Greater flexibility on the transmission network will be needed to securely accommodate more renewable generation, new technologies and new demands on the system. This will require transformational change within EirGrid and ESNB, entailing the embedding of innovation, agility and developing new ways of working and delivering network services.

This investment due to be undertaken in PR5, 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. However, tariffs may not increase in line with this increase in investment, this is due to the expected impact of increased demand.

The overall Capex and Opex allowances are higher than the PR4 outturn allowance. This reflects the CRU's view that this investment is necessary and will deliver benefits to consumers in the medium to long term. The CRU is also very aware of the need to ensure the delivery of that investment and changes required to facilitate the governments decarbonisation objectives are done so as cost-effectively as possible.

Interested parties are invited to provide comments regarding the proposals outlined in this paper. The CRU will consider all comments received prior to publication of the final Decision Paper.

6 Next Steps

The next steps will include the consideration of respondents' views and the publication of a Final TSO and TAO Transmission Revenue Determination. With respect to the cost challenges presented within this draft determination, the CRU will assess new and additional information presented by the network companies and will decide on whether changes are warranted and justified.

The CRU will also consider updated market data and consider its impact on the Weighted Average Cost of Capital.

7 Stakeholder Views

The CRU is seeking stakeholders' views on all aspects of the draft determination, including but not limited to:

1. the likely trends will be for PR5.
2. the TSO and TAO regulatory framework proposals (including incentives) and the CRU's proposed Agile Investment Framework, Incentives and Reporting.
3. the TSO and TAO's PR4 operational expenditure request and the CRU's draft determination.
4. the TSO and TAO's PR4 capital expenditure request and the CRU's draft determination.
5. the CRU's proposed ongoing productivity for TSO and TAO.
6. the TSO and TAO's PR5 operational expenditure request and the CRU's draft determination.
7. the TSO and TAO's PR5 capital expenditure request and the CRU's draft determination.
8. the proposed CRU cost challenges.
9. the proposed WACC figure of 3.8% and the CRU's financeability assessment.
10. the draft determinations' allowed revenues.
11. the draft determinations' average unit price.
12. alternative technical solutions that can be used to facilitate low carbon technology take-up.

1. Appendix 1 - Discussion Paper on PR5 Approach

In December 2019, the CRU published a Discussion Paper²¹ to inform and seek comments from consumers and relevant stakeholders on the approach proposed for PR5.

The CRU received a total of nine responses, all of which were non-confidential. These responses have been published in full on the CRU website and a summary of the key points are set out in the Table below.

Area		Response Overview
1	CRU's approach to PR5 and issues to consider.	<ul style="list-style-type: none"> - Both of the network companies were supportive of the objectives identified in the Approach paper. The need to ensure the companies were adequately financed was identified. - Respondents were broadly in support of the objectives. Some additional objectives were suggested, as well as details on how performance against objectives may be measured. - The degree of ambition in the CRU's objectives was welcomed.
2	What performance targets should be considered for ESBN and EirGrid?	<ul style="list-style-type: none"> - EirGrid suggested an enhancement of the current KPI framework with enhanced benefit delivered for customers. Similarly, ESBN's submission stated that incentives should reflect the greatest value to customers. - Respondents welcomed more engagement between the network companies and more engagement with industry. - Several respondents supported a framework with clear and transparent targets based around key metrics. Some respondents included recommendations for appropriate metrics.
3	What outputs and outcomes should be considered for ESBN and EirGrid?	<ul style="list-style-type: none"> - Most respondents included recommendations for metrics and outputs which should be measured throughout PR5. - The recommended outputs were focused around electrification and the removal of obstacles to the uptake of low-carbon technology. - Some recommendations focused on supporting a transition to renewable energy with proposed metrics such as SNSP forecasts and reduction of RES curtailment. - Connections were identified by multiple respondents as an area to focus on for outputs. - ESBN suggested the adoption of Health and Load Indices to ensure quick and cost-effective customer access to electricity. - Some respondents stated that the quantity of outputs required to deliver on the objectives was significant.
4	Comments on the proposed regulatory framework.	<ul style="list-style-type: none"> - EirGrid's response stated that though the framework was generally robust and well-designed it could benefit from several changes. - ESBN's response stated that input-based regulation would not support the level of transformative change required during PR5.

²¹ Discussion Paper on the Approach for Transmission & Distribution Price Review 5: <https://www.cru.ie/wp-content/uploads/2019/12/CRU19152-Discussion-Paper-on-the-Approach-for-Transmission-Distribution-Price-Review-5.pdf>

		<ul style="list-style-type: none"> - Respondents were generally in favour of a framework which support flexible responses from the network companies to challenges emerging over the PR5 period. - Several respondents wish to see a regulatory framework which mitigates the risk faced by renewable developers particularly in the context of 2030 renewable targets. - One respondent supported a transition to a regulatory framework approach consisting of annual submissions from the network companies detailing work plans which would be consulted on by stakeholders. - Some respondents identified innovation as an area which should be supported through the design of the regulatory framework.
5	Issues to consider to ensure the regulatory framework delivers on objectives.	<ul style="list-style-type: none"> - Respondents supported an approach similar to Stakeholder Engagement panel which was introduced in the PR4 Reporting and Incentives process. - Respondents also identified the removal of potential RES barriers (such as constraint and curtailment) as a means to measure the effectiveness of the regulatory framework.
6	PR4 methodologies which should be retained for PR5.	<ul style="list-style-type: none"> - Many respondents had no strong views on the retention of PR4 methodologies provided the network companies were adequately funded and resourced throughout the period. - ESBN's response identified a potential need for future assessments of the framework due to the high-level of uncertainty expected over the PR5 period. - EirGrid's response stated that an asymmetric risk existed in the regulatory framework and that a premium should be applied to allowances in order to balance this risk.

2. Appendix 2 - Form of the Control

This appendix describes the overall form of the price review, specifying the approach taken by the CRU and the incentives that it intends to create and how the base and subsequent year revenues have been determined.

During the PR5 period, it is intended that consistent with the previous reviews, yearly updates would be completed as detailed below. During the PR4 revenue control, the CRU published an information note, rather than holding a formal consultation, outlining the effect of implementing the yearly updates detailed below. This approach will be maintained for PR5.

Incentives

The CRU has published a Consultation Paper (CRU/20/78) reviewing the Incentive and Reporting framework in place for PR4 and proposals received from the TSO and TAO.

Structure of Revenue Control

The CRU is of the view that the price review for both TSO and TAO businesses should be broadly consistent with previous revenue reviews. However, the CRU has considered changes to the regulatory framework and set these out in Section 2. This change recognises the need to consider ways to enable greater flexibility for the network companies within the PR5 framework to facilitate innovation and better outcomes for consumers.

In developing the detailed proposals for PR5, the CRU has substantially retained the model used in PR4. The PR5 model will contain:

- Incentive regulation based broadly on the HICP-X model.
- A rolling retention of benefits achieved through costs lower than target. As in the current price review, 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 CRU 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 PR5 period, the TSO and TAO will be required to demonstrate that expenditure incurred during PR4 was on an efficient basis. **The CRU will reserve the right to clawback any expenditure that cannot be demonstrated as being efficient.**
- Incentives and incentive mechanisms linked to system performance, quality of service, continuity of supply, connection of renewables, achievement of targets, stakeholder engagement and network development.
- Uncertain costs, such as those relating to change in legislation or other aspects of regulation, may be reviewed on a case by case basis by the CRU.

- Pass-through costs such as TSO Ancillary Services costs and TAO local Authority Rates should be kept to a minimum. Incentives to minimise pass through costs (e.g. Imperfections) will be applied where practical.
- The inter-year adjustments broadly as in PR4 will be applied to the TAO and TSO.

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

HICP-X

In the PR4 transmission decision, HICP-X was used as the basis for the price review. A core issue in setting the trajectory of prices was the relative values of X and the starting price level in 2016. In its Decision the CRU noted that in the calculation of the allowed Opex and Capex, efficiency improvements had already been incorporated.

The CRU 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.

Benefit Retention

The CRU 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 price review. For Opex, the CRU 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 CRU'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 CRU will consider the cost, volume and quality of the investment made and information provided by the network company. 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 price review 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.

Uncertain Costs

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

The CRU 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 and may be treated as placeholders to be reviewed *ex-post*.

Pass-through Items

The previous price review 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 CRU proposes to retain use this approach.

However, as with “uncertain costs”, the CRU'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.

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 CRU proposes to retain this mechanism for the PR4 period.

Base Year Revenue and Profiling

In general terms, the CRU 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 price review 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;

Key Principles

Ensuring that the TSO and TAO have sufficient revenues throughout the period to maintain effective operations is core to the price review. Specifically, the transmission utilities should be able to finance their planned investment, operating costs, financing costs and taxation liabilities. The CRU has therefore developed a cash-flow model each for the TSO and TAO designed to ensure the compatibility of the price review with these objectives.

However, as noted above the CRU 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 CRU proposes to include a set of incentives linked to key performance indicators within the price review 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.

Indexation

As mentioned above the CRU 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 CRU used the Consumer Price Index (CPI) as the index to inflate revenue.

In PR3 (2011-2015) and PR4 (2016-2020) the CRU used the Harmonised Index of Consumer Prices (HICP) as the index to inflate revenue. The rationale for the change 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 CRU proposes to continue to use the Irish HICP as the inflation index for PR5 period.

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 4.1.

- Allowed Capex is then added and depreciation subtracted from the respective RABs for each successive year of the price review 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 price review 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 2021. By changing the value of X, the price review 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 CRU 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 price review period.

Section 4.3 shows the values calculated by the CRU for each of the above for the TSO and the TAO. Interested parties should refer to the published PR5 transmission model for further information.

TSO Revenue Control Formula

The CRU proposes to use the same revenue control formula as was used in PR4 when calculating allowed revenue.

The formula is as follows:

$$R_t = \prod_{2021}^t \left[\frac{1 + inf_t - X}{100} \right] * B_t + INCENT_t + KINCENT_{t-1} \Delta P_t + \Delta U_t + K_{t-1} + K_{t-2}$$

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.

- **Inft** 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 CRU 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.
- **Bt** is the level of allowed revenues in 2019 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 CRU.
- **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 CRU 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 CRU 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 CRU 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 CRU on an annual basis.

TAO Revenue Control Formula

The CRU proposes to use the same revenue control formula as was used in PR4 when calculating allowed revenue.

The formula is as follows:

$$R_t = \prod_{2021}^t \left[\frac{1 + inf_t - X}{100} \right] * B_t + INCENT_t + KINCENT_{t-1} \Delta P_t + \Delta U_t + K_{t-1} + K_{t-2}$$

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 CRU 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.
- **INCENT_t** 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:

FINCENT_t is the final value of **INCENT_t**, 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 **INCENT_t**, yet to be determined in respect of year t.

- **ΔP_t** is the change in pass-through costs from those included in B_t, as available when setting tariffs in year t. This includes, changes in Local Authority Rates etc. which the CRU 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 CRU 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 CRU 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 CRU on an annual basis.

3. Appendix 3 - Context of this Price Review

This Draft Determination Paper sets out the CRU's proposals on the revenue that the TSO and TAO should be allowed to recover from the TUoS customer over the period 2021 to 2025. This will be the fifth such transmission price review to be set by the CRU.

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 price review 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 CRU 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.

PR2: 2006 to 2010

The second five-year review covered the period from 2006 to 2010. Again, when setting this review, the CRU'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 CRU'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 CRU set incentives that were challenging but achievable.

The review was set in a manner that aimed to keep the day-to-day intervention by the CRU 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.

PR3: 2011 to 2015

The third five-year price review 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.

PR4: 2016 to 2020

The PR4 period saw the introduction of the I-SEM (Integrated Single Electricity Market) in 2017, with the first capacity auctions being held along with three others to date. PR4 saw the continued growth in wind generation with 621 MW connected to the transmission network and 598 MW connected to the distribution system. Variance in annual outturn network capital expenditure experienced by the TSO during the PR4 period, is illustrative of the ongoing challenges that the TSO is still experiencing relating to obtaining planning consents and reaching Stage 1 invoicing milestones. The change in asset delivery profile (underground cables and line uprates vs new lines) reflects a change in the types of assets delivered to overcome planning and land access issues.

4. Appendix 4 - TSO PR5 Non-Network Capex Review

TSO PR5 BAU Non-Network Capex Review

Category	TSO Request (€m)	Proposed allowed Revenues (€m)
End of Life IT Assets		
Telecoms Refresh	7.86	3.93
Desktop Equipment Refresh	0.35	0.35
VMware / Citrix Upgrades	0.16	0.16
Server OS Upgrades	0.54	0.54
Oracle Vault Refresh	0.08	0.08
Data Centre Switching Upgrade	0.36	0.36
Floor Access Switching Upgrade	0.36	0.36
Wireless IS Upgrade	0.33	0.33
Server & Storage Expansion	0.32	0
Storage Area Networks (SANs)	0.83	0.83
Oracle Database Refresh	0.34	0.34
Dynamic AX Upgrade	0.76	0
CSB Standing Data Automation	0.23	0.23
Private Communication Network	0.15	0.15
Data Centre Consolidation	0.09	0
Replacement AV Equipment	0.16	0.16
Additional Business Projects	1.62	0
Office Upgrade Changes	0.40	0.4
Guarantees of Origin Tender	0.23	0
Website Tender Replacement	0.38	0
Oracle Upgrade Application Changes	0.16	0.16
Control Centre Equipment Refresh	0.25	0.13
EMS Refresh	4.75	4.28
Summated (Requested) Total	20.71 (20.51)	12.79
Transition to Cloud	2.50	0.00
Review of IT Operating Model	0.8	0.00
Simplify and Standardise IT Solutions		
Application Rationalisation	0.90	0.0
Application Upgrades & Changes	1.20	0.0
Remit / ENTSO-E Transparency	0.40	0.4
(MMS Environment	0.08	0.08
Capacity Market Platform (CMP)	0.55	0.28
Customer Relationship Management (CRM)	0.75	0.38
Middleware Changes (OSB & GDY)	0.40	0
Summated (Requested) Total	4.28 (4.24)	1.14
Cyber Security		
Enterprise Backup Enhancements	0.20	0.1
Enterprise Refresh	1.90	1.9

Category	TSO Request (€m)	Proposed allowed Revenues (€m)
Firewalls	0.57	0.57
Email and Web Protection	0.16	0.16
Intrusion Prevention / Detection Systems	0.32	0.32
Cyber Security Awareness Training	0.30	0.3
Summated (Requested)Total	3.45 (1.69)	3.35
Workplace Assets Reaching End of Life		
Routine Building Replacement Work	1.03	1.03
Workplace Redevelopment	2.00	1.00
Summated Total	3.03	2.03
PR5 Total BAU (Requested)	32.77	19.31
Minus Deferred from PR4	-3.2	-3.2
Total for PR5	29.57	16.11

TSO PR5 Non-Network Capex Initiatives Review

Table 37 TSO PR5 Non-Network Capex Initiatives Review

Sustainability & Decarbonisation		
Category	Request (€m)	Proposed allowed Revenues (€m)
Renewables Strategy DS3+	12.0	8.4
Control Centre Tools	4.4	2.2
Outage Management Systems	1.7	0.0
Clean Energy Package	0.4	0.0
IP Migration	2.9	0.0
Data Services	0.3	0.15
Total for PR5	21.7	10.75
Operate, Develop & Enhance Grid & Market		
Category	Request (€m)	Proposed allowed Revenues (€m)
Control Centre Training	2.9	1.45
Physical Security	1.7	1.7
Cyber Security	0.5	0.43
Capacity Market Secondary Trading	1.5	1.12
DSU Compliance	2.8	2.1
MIP Solver	0.9	0.68
State Aid Cross Border Capacity	0.8	0.0
Metering Systems	2.8	1.8
Electricity Balancing Guideline (EBGL)	26.5	0.0
Multi-NEMO Arrangements in the SEM	10.5	0.0
Total for PR5 (Excl. EBGL and Nemo)	13.9	9.28

Total for PR5 (Incl. EBGL and Nemo)	50.9	-
Operate, Develop & Enhance Grid & Market		
Category	Request (€m)	Proposed allowed Revenues (€m)
Developing the Grid Framework	3.7	0.0
Total for PR5	3.7	0.0

Table 38 TSO Non-Network Strategic Initiatives Review

Category	Commentary	Recommendation	Status
Renewables Strategy and Implementation Programme (DS3+)	Need is understood and accepted, works are largely additive although some elements could be argued to be covered under BAU or other initiatives (EU-SysFlex), and whilst cost breakdown is provided the exact output scope has yet to be fully defined.	€8.4m	Cost Challenge
Control Centre Tools	Need understood, option detail and scope at early stage, some tools may be impacted by changes / upgrades to other systems i.e. EMS, therefore costs uncertain and potentially could change significantly. Deliverability within PR5 timeframe may also be challenging to introduce all of the proposed new tools.	€2.2m	Cost Challenge
Outage Management	Whilst the requirements for improved outage management is understood we are the view that such improvements would be expected to form part of ongoing business as usual efficiency improvements and work practices that the TSO is already funded for.	€0m	Cost Challenge on Full Request
Clean Energy	The legislative requirements and obligations on the TSO are understood however these form the backdrop to the PR5 regulatory period and on which the main TSO PR5 business case and funding	€0m	Cost Challenge on Full Request

	request should have been developed.		
IP Migration	As the existing non-IP telecommunications equipment is anticipated to be partially or entirely phased out over the PR5 period this work is considered to constitute a baseline work activity that should have been included in the main TSO PR5 business case and funding request.	€0m	Cost Challenge on Full Request
Data Services	Broad need understood and the work is related to functions / tools that are in addition to current / normal functions. However, the work is essentially a scoping / review exercise and hence final costs, outputs.	€0.15m	Cost Challenge
Control Centre Training	The need for control centre training is understood however the proposal is also at an early stage of development and some elements could also be argued should be covered under BAU or other initiatives.	€1.45m	Cost Challenge
Physical Security	Need for this investment is driven by legal and statutory requirements and the capital costs have been split into twelve individual items and associated costs benchmarked by external inputs / market testing.	€1.7m	Full Allowance
Cyber Security	Quoted costs are based on existing supplier provided information and external verification they appear to have undergone internal review and challenge however the exact hardware / capital assets to be purchased remains unclear.	€0.43m	Cost Challenge

Capacity Market Secondary Trading	Need for secondary capacity market trading is understood however based on the EirGrid provided data the specific design options and working have yet to be determined.	€1.12m	Cost Challenge
DSU Compliance	Need understood and linked to known market issues associated with DSU and state aid compliance decision. However, there is clearly significant work to do to define and specify the systems needed for calculating and monitoring DSU metered quantities and comparing with reference profiles which may take some time to implement.	€2.1m	Cost Challenge
MIP Solver	Need is understood and the proposed tool is clearly additional. However, given the time take to implement the proposed solution, noted by the TSO, and the early stage of the initial proposals it is unclear exactly what will be delivered	€0.68m	Cost Challenge
State Aid Cross Border Capacity	Requirement for this investment is understood however it is not currently clear how and when the fully State Aid requirements will mandate this. Additionally, the current TSO proposal is largely a placeholder to secure funding later within the PR5 period and that or may not be required, and the costs and outputs of any such work cannot be sufficiently detailed at this time.	€0m	Cost Challenge on Full Request
Metering Systems	Need for additional metering systems and interfaces is understood however currently there are a number of different options that could be adopted, and the associated costs and technical	€1.8m	Cost Challenge

	benefits of each have not been provided.		
Developing the Grid Framework	Accept there is a broad need for some investment during PR5 in this area the current proposed plans by the TSO are still not sufficiently developed to the point where there is a clearly defined need and robustly demonstrated investment option with a quantifiable set of defined expected outputs	€0m	Cost Challenge on Full Request

5. Appendix 5 - TSO PR5 Step Change Opex Strategic Initiatives Review

Table 39 TSO PR5 Strategic Initiatives

Sustainability & Decarbonisation		
Category	Request (€m)	Proposed allowed Revenues (€m)
Renewables Strategy DS3+	12.3	11.1
System Planning	1.8	1.5
Control Centre Tools	0.7	0.6
Promoting Change	0.4	0.0
Outage Management	0.2	0.0
Total for PR5	15.4	13.2
Operate, Develop & Enhance Grid & Market		
Category	Request (€m)	Proposed allowed Revenues (€m)
Physical Security	2.3	2.3
Cyber Security	3.8	3.8
Capacity Market Secondary Trading	2.0	1.8
State aid Cross Border Capacity	1.4	0.0
Operation Support for IT Projects	1.5	0.0
Enduring access Planning	0.9	0.8
Governance, Risk Management and Compliance	0.7	0.6
Implementing a MIP Solver	0.6	0.5
European Network Codes	0.5	0.5
Metering System	0.3	0.3
Total for PR5	14.3	10.8
Operate, Develop & Enhance Grid & Market		
Category	Request (€m)	Proposed allowed Revenues (€m)
Education & Engagement Campaign	4.6	3.6
Customer Journey	2.5	0.0
Total for PR5	7.0	3.6

Table 40 TSO Step Change Opex: Sustainability and Decarbonisation

Category	Commentary	Recommendation	Status
Renewables Strategy and Implementation Programme (DS3+)	Challenging to establish the additionality or cost efficiency of the TSO's request for additional resources. The TSO acknowledges that there is uncertainty surrounding what the Opex requested for the DS3+ programme will ultimately be spent on. Unable to confirm that the TSO's request for additional Opex costs is cost efficient.	€11.1m	Cost Challenge
System Planning	Challenging to establish the additionality or cost efficiency of the TSO's request for additional resources. The TSO states that in the past, much of the work associated with the planning of the system has been outsourced to consultants at a premium rate. As such, bringing this role in-house could result in a decrease in professional fees and a decrease in overall Opex.	€1.5m	Cost Challenge
Control Centre Tools	Challenging to establish the additionality or cost efficiency of the TSO's request for additional resources. Drivers behind this initiative (e.g. increasing demand side participation and further RES integration) are the same issues as what the TSO has faced during PR4. Some of the processes and tools required to manage changes in the electricity network are likely to already be in place from PR4.	€0.6m	Cost Challenge
Promoting Change	Additional cost not to robustly evidenced. Creating a culture in which sustainability plays a central role could be achieved with existing resources.	€0m	Cost Challenge on Full Request

Outage Management	Appears that there is a degree of uncertainty surrounding the cost of this initiative. The TSO said that the first step of its preferred delivery approach is to identify the target processes including interface requirements.	€0m	Cost Challenge on Full Request
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Table 41 TSO Step Change Opex: Operate, Develop, and Enhance the Grid and Market

Category	Commentary	Recommendation	Status
Cyber security	Need, additionality and cost efficiency understood.	€3.8m	Costs Included in Full
Physical security	Need, additionality and cost efficiency understood.	€2.3m	Costs Included in Full
Capacity Market Secondary Trading	Challenging to establish the additionality or cost efficiency of the TSO's request for additional resources. Unclear why 4 FTEs are required to run a secondary market and could become surplus to requirements once the programme ends.	€2.0m	Cost Challenge
State Aid Cross Border Capacity	TSO has not demonstrated the need for this initiative. At present, participation of foreign capacity is only possible indirectly from GB through the interconnectors and not to Europe. Celtic interconnector, is not due to be operational until 2026. Situation may change pending the outcome of ongoing negotiations between the UK and EU.	€0m	Cost Challenge on Full Request

Operational Support for IT Projects	TSO says that it is likely that a number of teams will be required to provide input on an ad-hoc basis, which would not be directly captured within cost estimates of that specific initiative. TSO has not demonstrated the needs case for this initiative.	€0m	Cost Challenge on Full Request
Enduring access planning & connection management	TSO has not demonstrated the cost efficiency of their request.	€0.8m	Cost Challenge
Governance, Risk Management, and Compliance	Challenging to establish the additionality or cost efficiency of the TSO's request. TSO expects synergies for delivering this initiative alongside similar market operator requirements, using existing operational processes and tools. But it has not detailed the level of cost savings that are expected through these operational synergies. TSO has also not provided external benchmarking to determine the efficient level of staff required for this initiative	€0.6m	Cost Challenge
Mixed Integer Programming Solver	Uncertainty around the need for the ongoing licence support as it depends on successful delivery of the MIP optimisation approach. We are also unable to confirm the additionality of the associated Opex given that licence support Opex will also be incurred for Auction Format B and Auction Format C.	€0.6m	Cost Challenge
European Network Codes	Challenging to establish the additionality or cost efficiency of the TSO's request.	€0.5m	Cost Challenge
Metering System	Advisors have queried the additionality and efficiency of this request. For example, the TSO has not outlined why two metering operations will need to	€0.3m	Cost Challenge

	operate in parallel until 2024 or whether the decommissioning of the existing metering system in 2024 will result in Opex cost savings.		
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Table 42 TSO Step Change Opex: Engage for Better Outcomes for All

Category	Commentary	Recommendation	Status
Education & Engagement Campaign	Challenging to establish the additionality or cost efficiency of the TSO's request. We note that the TSO has incurred a large step-change relative to selling and advertising spend in PR4. Given the large step-increase in spend in PR4, we would query the additionality of the costs associated with this new initiative in PR5.	€3.6m	Cost Challenge
Enhanced Customer Journey	TSO has not demonstrated the additionality of its request. For example, the TSO has not demonstrated that its proposed costs for a new CRM tool are net of the costs of any current system. Also, early customer feasibility studies would imply that the TSO will incur costs for connection requests that are not ultimately made. This would mean that electricity consumers as a whole would underwrite costs.	€0m	Cost Challenge on Full Request

Table 43 TSO Step Change Opex: Non-Network BAU

Category	Commentary	Recommendation	Status
Cloud Adoption	Challenging to establish the additionality or cost efficiency of the TSO's request. The TSO outlined indicative server costs to show that over a five-year period, running a physical server costs over	€2.8m	Cost Challenge

	twice as much as a cloud-based alternative. The TSO did not provide evidence to show how they arrived at this cost differential and do not identify the cost savings that they expect to generate from this project in the PR5 submission.		
IT Operating Model	Challenging to establish the additionality or cost efficiency of the TSO's request. Similar to the transition to the cloud, the TSO has not identified the cost savings that it expects to be generate from this project in the PR5 submission	€2.4m	Cost Challenge

Table 44 TSO Step Change Opex: Transmission System Development and Maintenance

Category	Commentary	Recommendation	Status
Cloud Adoption	The TSO has not provided information to explain why three additional FTEs are required to fulfil the commitments listed above.	€1.3m	Cost Challenge

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