CUSC Modification Proposal Form

CMP433: Optimised Transmission Investment Cost model (OpTIC)

Overview: OpTIC replaces the Transport component of the Transport and Tariff (T&T) model with an economic market model that reflects proposed network investment, creating charges that aim to leave a market participant in the expected position that they would have been in had they been operating in a zonal wholesale market with assumed optimal network investment.

Modification process & timetable

1. **Proposal Form** 11 April 2024
2. **Workgroup Consultation** 13 March 2025 - 14 April 2025
3. **Workgroup Report** 23 October 2025
4. **Code Administrator Consultation** 04 November 2025 – 04 December 2025
5. **Draft Final Modification Report** 22 January 2026
6. **Final Modification Report** 10 February 2026
7. **Implementation** 01 April 2028

Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

This modification is expected to have a: High impact

Suppliers, Generators, Demand customers,

Proposer's recommendation of governance route	Standard Governance modification with assessment by a Workgroup

Who can I talk to about the change?	**Proposer:** Joe Dunn Joseph.dunn@scottishpower.com 07753 624494	**Code Administrator Contact:** cusc.team@nationalgrideso.com

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Overview

Currently locational TNUoS signals are sent based on an investment cost related pricing (ICRP) methodology. This is a complex and detailed methodology for determining locational network charges which are intended to drive more efficient investment decisions. However, there are concerns that the current approach may have limitations in its ability to deliver locational signals that are both cost reflective (today and as the system evolves) and sufficiently predictable to support efficient investment decisions.

Reforms to the methodology for calculating network charges that result in more accurate charges (i.e. cost reflective) and more investable charges (i.e. that can be taken into account in investment decisions), or result in a better balance between these attributes should reduce overall electricity system costs and the costs of meeting net zero.

This proposed code modification aims to address these concerns by reforming the methodology for charge setting. Electricity would continue to be traded on a national market, and network charges would be based on the Optimised Transmission Investment Cost model (OpTIC). In principle, the charges would aim to leave a market participant in the expected position that they would have been in had they been operating in a zonal wholesale market with assumed optimal network investment.[1] The purpose of this reform would be to improve the accuracy of charges relative to the current ICRP approach without exposing investors to risks from delays in network investment (to which they would be exposed in a zonal wholesale market).

Given some additional information required to gain a more comprehensive understanding of the rationale of this proposal, yet to ensure the key elements of this form are attended to in brief, several annexes are provided and listed under reference material at the end.
The annexes are also referred to throughout this proposal.

What is the Issue?

In GB, locational signals are currently provided via wider zonal TNUoS charges. Ofgem recently set out in its strategic transmission charging reform letter[2] its role in approving the design of network charges. In this letter Ofgem stated the importance of signals being:

1. *Cost reflective* i.e. that they send efficient locational signals for market participants to take into account when deciding how to use the network;
2. *Predictable* i.e. they send a signal that investors are able to take into account when making investment decisions;[3] and
3. Sent to groups of assets that have a reasonable *ability to respond* to them.

It is important to note that sometimes these objectives can be in tension. For example, truly cost reflective charges will vary over time as the spatial distribution of generation and demand changes. This can create uncertainty for investors, limiting the level of predictability. Therefore, any reforms will need to consider potential trade-offs between the objectives.

To develop the issue further, Annexes 1 and 2 respectively cover the ‘purpose of locational signals’ and a detailed look at the associated 'defects with the current ICRP methodology’, including how they relate to ESO recommendations for network upgrades beyond 2030.

Defects with the current ICRP methodology

To aid understanding of the defects identified, Annex 3 includes a description of the key building blocks of the current ICRP methodology.

A number of specific defects have been identified within the ICRP framework, which, while to some extent could be addressed within the model, a core defect relates to the overall concept of the ICRP approach which relies on simplified representations of the electricity system. This is increasingly

[1] optimal network investment is deemed to be what the network planning team process derives as the optimum set of investment proposals as they align with the OpTIC process and methodology.

[2] Open letter on strategic transmission charging reform: a summary (20 March 2024).

[3] Ofgem also refers to fairness, transparency and enabling net zero.

problematic for achieving cost reflectivity given a rapidly evolving energy system, with a rising need for network build and greater system complexity[4] due to the energy transition.

Table 1: Summary of ICRP defects

#	Defect	Description
1.	ICRP overly simplifies reality of complex system	Approach to estimating long run marginal costs remains a representation of reality based on a set of simplified assumptions and relationships, based on which it is hard to assess the accuracy, and hence cost reflectivity, of the overall locational signals that emerge.
1a	Two "representative" backgrounds	Behaviour by market participants that drives network investment is represented by two static background scenarios.
1b	"Shrink-wrapping" of the network	The ICRP model takes no account of spare capacity on the network, as network sized to just fit all flows implied by backgrounds.
1c	Need to fix location of reference node	The "location" of the reference node must be fixed, with important implications for the relative locational signal between high and low load factor plants at the same location.
1d	Single expansion constant	Costs of building out transmission network embodied in a single expansion constant (£/MWkm) and a set of expansion factors, which abstracts from project specific costs
1e	Sharing methodology	The approach simplifies significantly complex relationships which are likely to evolve (e.g. the amount of network build for a given capacity mix in a zone is likely to change over time) and potentially become more complex over time.
1f	Security factor	The security factor value is an estimate and applied as an uplift on all network elements even though not all network elements have the same requirement for redundancy.
1g	Demand not valued appropriately	Beneficial behaviour by demand (incl. charging of storage) for relieving constraints and hence year round costs not explicitly recognised.
2.	ICRP applies static relationships which are cumbersome to change as the system evolves	While the charging methodology could be made more cost reflective at any point in time, it is likely to be necessary to continue to update the methodology as the system evolves. To achieve this under the ICRP methodology would create significant uncertainty and require significant and time consuming on-going reform through the code modification process.

Table 1 is a summary version of the detail discussed in Annex 2.

[4] e.g. increasing storage deployment over time will increase the complexity of the optimised system as storage Short Run Marginal Cost (SRMC) is based on opportunity costs rather than fuel costs or climactic conditions

Why Change?

The purpose of locational signals is to incentivise investors in generation, load and flexible assets to site their investments in ways which reduce network costs. Therefore, the main driver for reform is to improve locational investment decisions (from a network perspective). Improving the efficiency of locational investment decisions will save scarce societal resources (through lower network capital expenditure (CAPEX), and potentially network operational expenses (OPEX)). In turn, this saving in system costs should result in lower customer costs over time.

Given the significant amount of new investment required in generation and network capacity to achieve Net Zero, ensuring networks are efficiently utilised and expanded, without undue increases in investor cost of capital, will be important for minimising the overall costs of the energy transition.

Locational signals could be improved on the basis that:

- they become more accurate, in the sense that they better represent the true forward-looking costs that a market participant creates because of their actions; and/or
- they become more investable, in the sense that investors are better able to predict their value and take them into account in their investment decisions.

Beneficial reforms are those which reflect a better balance between both attributes.

What is the proposer's solution?

Optimised Transmission Investment Cost (OpTIC)

This section describes an alternative to ICRP which derives charges from an electricity system optimisation model[5] called Optimised Transmission Investment Cost (OpTIC).

At the outset, it's worth setting out what is out of scope of this proposal, noting that certain elements are either likely or necessary to be raised as modification proposals at a future time to compliment OpTIC.

Out of Scope

The focus of this modification proposal is on the replacement of ICRP with OpTIC to derive £/kW wider TNUoS charges. This leaves some closely related areas out of scope of the OpTIC modification proposal which have been raised during discussions (work on OpTIC is able to progress independently of each of these areas):

- local circuits
- offshore charges
- the structure of final demand charges (e.g. triad charges, volumetric charges, etc)
- how charges impact embedded generators

For local circuits, it's important to note that ICRP is currently used to set local circuit tariffs and therefore, without a change to this, the ICRP model would still be required (in addition to OpTIC). This would of course be inefficient and therefore, it is expected that a local circuits modification would be raised in the future to run along-side OpTIC at an appropriate time following workgroup progress.

For offshore, OpTIC is flexible enough and can be extended to accommodate offshore network development in the same way it accommodates onshore. A modification would be raised when offshore development is more certain, again, to run alongside OpTIC.

Regarding the structure of final demand charges, there may be justification to align some or all of these with the intent of the OpTIC methodology.

[5] For the purposes of the analysis carried out to date and illustrations presented in this report, PLEXOS has been used which is an energy system optimisation modelling tool, although there are other optimisation models which could deliver the same results.

How charges impact embedded generators has not been considered in any detail at this time.

In principle description of OpTIC

Given the live discussion on zonal pricing being considered as part of REMA (Review of Electricity Market Arrangements), Annex 4 is used to consider a SRMC (Short Run Marginal Cost) based approach as an alternative and to provide background context as to why OpTIC as a proposal represents a practical option that strikes a balance between variations of the status quo (LRMC) and SRMC.

OpTIC will send a locational investment signal similar to that which generation, demand and storage would have faced under a locational SRMC market (e.g. zonal), but one which is less impacted by deviations from optimal levels of network investment, and is therefore more stable and predictable.

The OpTIC framework only amends the detail of transmission charging and does not impact the wholesale market. Therefore, there would continue to be a national wholesale electricity market, with compensation for constraint management and the application of annually set £/kW transmission network charges. However, OpTIC would amend how network charges are calculated which would be based on the difference between:

- estimates of a plant's revenues (demand user's costs) under a national market[6]; and
- estimates of a plant's revenues (demand user's costs) under an SRMC market with optimal transmission investment.[7]

In principle, OpTIC charges attempt to leave a market participant in the position that they would have been in had they been in a locational SRMC market with optimal network investment. In other words, market participants would not face the operational incentives in the wholesale market that would arise in a zonal market since the prices would not change every half an hour[8], but they would face an investment signal from network charges analogous to that which would be provided in a zonal market if network investment was optimal.

A key feature of OpTIC is that charges are calculated based on an assumption of optimal network investment. Optimal network investment relates to the expansion of the network to the point where the marginal cost of investment (i.e. the cost of the next MW of network capacity) is equal to the marginal benefit of investment (i.e. the savings in the costs of serving actual demand due to reduced congestion). In other words, an optimal network represents an efficient balance between physical congestion and network costs. Such a level of network investment is the aim of policymakers and network planners as it would contribute to minimising the overall system costs of decarbonising the electricity sector.

OpTIC cannot be described as either a pure LRMC or pure SRMC based approach. However, OpTIC represents a practical alternative that includes some of the benefits of LRMC and SRMC based approaches, while avoiding many of the challenges:

- OpTIC relates network charges to a model which could more accurately capture SRMC based locational signals arising from network congestion in charges, since it models the outcomes of a zonal wholesale market by modelling generation and demand behaviour across all hours of the year. Similar to a SRMC based approach, OpTIC does not require the development of simplified assumptions that create a static context as under ICRP such as backgrounds, a sharing methodology or the need to define a reference node as is the case under ICRP.[9] OpTIC assumptions will be made consistent with those used to determine the optimal network investment (more detail on this is provided below).

[6] Including compensation for curtailment.
[7] With no compensation for curtailment and market revenues based on zonal prices.
[8] While users do not face the same wholesale market signals as they would in a zonal market, the physical dispatch in a zonal and national market could be aligned following redispatch by ESO in the Balancing Market.
[9] The reference node would effectively be an output of the OpTIC model as the location where the charge is zero.

- Because the charges are derived based on optimal investment (i.e. efficient and timely investment, not actual investment), they are not subject to the unpredictability that arises due to delays to the build out of transmission, and which could be observed in markets with pure SRMC based locational signals.

Therefore, OpTIC would create a predictable signal to which investors can more readily respond.

How OpTIC addresses defects of ICRP:

OpTIC makes use of a modern energy system optimisation modelling tool that enables data streams to be unified into a single modelling and forecasting platform (the same type of tool that is used in determining optimal network investment proposals under the NOA).[10] Because of the capabilities of modelling tools like PLEXOS, and how information is modelled, it manages to address all of the defects noted above in Table 1.

Table 2: Summary of how OpTIC can address ICRP defects

#	ICRP Defect	Implication of OpTIC
1.	ICRP overly simplifies reality of complex system	OpTIC models outcomes of a zonal market across all hours of the year and therefore does not require the same simplifying assumptions applied in ICRP. Although other assumptions will be required these should be made consistent with those used to determine optimal network investment.
1a	Two “representative” backgrounds	Representative backgrounds are not required because market participant behaviour that drives congestion is modelled on hourly basis.
1b	“Shrink-wrapping” of the network	Charges are based on the outcome of a zonal market,[11] reflecting the implications of spare network capacity or congested network capacity on generator revenues and demand costs.
1c	Need to fix location of reference node	There is no need to determine location for reference node. A reference node is effectively an output of the model.
1d	Single expansion constant	Expansion constant is not needed. Charges are based on expected market revenues in SRMC market. The level of optimal network investment will be determined by the network planning process which takes, as an input, estimates of actual network expansion costs.
1e	Sharing methodology	There is no need to apply a static relationship between technology mix and degree of sharing – it is modelled directly. Market participant behaviour that drives congestion (i.e. sharing) is modelled on an hourly basis reflecting mix of technologies in each zone.
1f	Security factor	Investments required to ensure sufficient network redundancy are included in the network planning process (i.e. they are part of what is considered optimal).
1g	Demand not valued appropriately	Implication of demand behaviour on congestion directly modelled on hourly basis.
2.	ICRP applies static relationships which are cumbersome to change as the system evolves	Within OpTIC there is no need to fix static relationships. Relationships are directly modelled in the system optimisation model, which reflects the latest expectations for future development of the system.

[10] Network Options Assessment.

[11] In principle OpTIC could calculate charges on a zonal or nodal basis. However, as explained below, this proposal is for OpTIC to be delivered on a zonal basis.

Practical implementation of OpTIC

The following sub-sections set out:

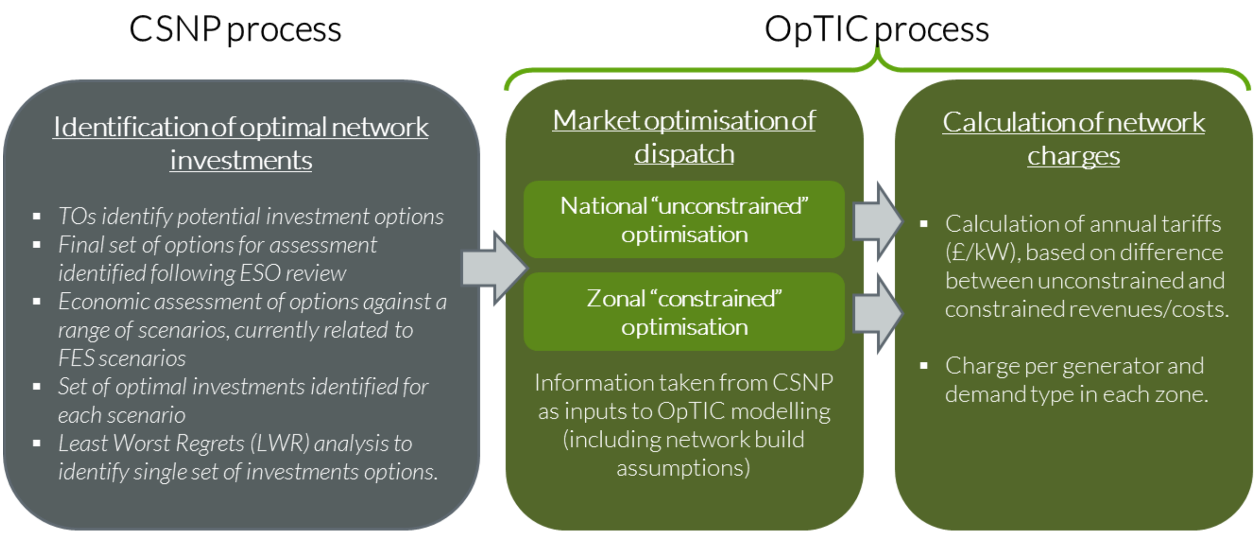
- an overview of the proposed design for each of the key steps in the OpTIC methodology; and
- how the OpTIC methodology links to the NOA/CSNP process

While the following provides significant background on how OpTIC would be practically implemented, a workgroup is required to further develop the OpTIC methodology in more detail.

Overview of the key steps to derive OpTIC charges

As shown in Figure 3 below, OpTIC sets charges based on the outputs from an electricity system optimisation model that models a future scenario for how the system is expected to develop, considering the optimal network investments identified as part of the network planning process. Therefore, the OpTIC methodology is linked to the process for identifying optimal network investments, which is currently the Network Options Assessment (NOA), but is expected to change to become the Centralised Strategic Network Plan (CSNP). For ease in this proposal the expected CSNP process is referred to whenever referring to the future network planning process.

Figure 3: Key Steps to derive OpTIC charges



The key steps in deriving OpTIC charges are:[12]

1. The CSNP process assesses and identifies a set of optimal investments over a future period (for NOA, it is currently 15 years), reflecting an economic assessment of the benefits of incremental network investment. Other wider considerations are also expected to be taken into account under the new CSNP process e.g. environmental impacts. This analysis is carried out across a range of scenarios (e.g. currently the FES scenarios), with a single set of investments identified based on a Least Worst Regrets (LWR) methodology.
2. The ESO determines the appropriate number of zones to be considered in modelling. In principle, the OpTIC system optimisation could be carried out assuming a zonal or nodal market. This proposal is for the modelling to be zonal and to retain the demand and generation zones currently used in ICRP. For note, the NOA process includes 38 zones. A zonal approach to OpTIC charges will help to avoid additional volatility and spurious

[12] With the exception of there being no requirement for Annual Load Factors, the tariff component of the transport and tariff model is still required to be run in the same manner as it is at the moment to derive the £/kW tariffs, i.e. while there will be a close interaction between the CSNP and OpTIC processes and the tariff model, the intention is to leave the tariff model process largely unchanged.

precision that could arise from a nodal approach and is more aligned with the current NOA process.[13]

3. The OpTIC model then carries out a system wide optimisation of dispatch, based on a future scenario for both an unconstrained and a constrained network (assuming a zonal market) with optimal network investment as identified by the CSNP.[14] The optimisation would be carried out for 5 years.[15] The CSNP process would provide key inputs into the OpTIC modelling. More information is provided below on what data is required from the CSNP process.
4. The network charges are calculated by comparing the unconstrained[16] ("national price") and constrained ("zonal price") outputs from OpTIC. Specifically:
   - Generation network charges are calculated for each relevant technology type and every zone as the estimated unconstrained revenue less the constrained revenue per kW. To address the fact that not all technology types may be present in all zones, charges would be calculated based on representative 1MW plants of each technology type in each zone.[17]
   - Demand network charges are calculated for each zone as the estimated constrained energy costs less unconstrained energy costs per kW. Costs would be estimated based on representative demand profiles for different customer types (incl. for customers with low carbon technologies). This methodology could imply negative charges for constrained zones e.g. Scotland. Once a £/kW demand charge is calculated there is a separate question (currently out of scope of this modification) as to how this should be levied on customers. As with today's charges, there is a case that triad charging may no longer be appropriate for demand. Therefore, reform to triad charging would also need to be considered alongside the development of OpTIC, and it is reasonable to believe that there would be significant overlaps between reforms identified as appropriate for ICRP and OpTIC.

How OpTIC methodology is linked to the expected CSNP process

As noted above, an important principle underpinning the OpTIC methodology is that it should base its inputs as much as possible on those used in the CSNP process. This would ensure that OpTIC charges are calculated using assumptions consistent with the process which determines optimal network investment.

To align the CSNP and OpTIC processes as much as possible, there are two key sets of inputs that need to be taken from the CSNP process:

- **Optimal network investment information** – the OpTIC charges are calculated in a model assuming optimal network investment. The appropriate output from the CSNP modelling which will serve as an input for OpTIC therefore needs to be identified.
- **Scenarios to be modelled in OpTIC** – OpTIC and CSNP rely on similar background assumptions for modelling. Therefore, it will be possible to ensure a high degree of consistency between the two processes and apply the same scenarios used in CSNP to OpTIC. However, the current CSNP approach models a number of different scenarios and

[13] The NOA process only considers major transmission capacity investment between a limited set of zones and does not consider possible smaller transmission investments that could affect transfer capacities between nodes within a given zone.

[14] In practice, the optimal network investment should reflect additional investment, over and above that identified as part of a CBA, providing redundancy in the event of network failures. However, the OpTIC dispatch would only reflect capacity identified by ESO as available to the market in each hour i.e. a "security constrained network capacity".

[15] It is envisaged that the optimisation would consider a range of weather years and other external factors, consistent with the modelling carried out currently for NOA.

[16] Unconstrained is used to represent current arrangements where parties are compensated for being curtailed.

[17] This would produce charges for all technology types in all zones without affecting (beyond a de minimis level) underlying assumptions on the capacity of different technologies in different zones.

then identifies optimal network investment based on LWR across each of the modelled scenarios.

Each of these issues is considered in turn below.

Network investment information

As noted above, a key step in the OpTIC process is a constrained optimisation, taking into account optimal network investments rather than actual investments, which may reflect delays relative to their efficient timing. Therefore, the OpTIC optimisation will include investment from the point in time which it is identified as being efficient. In other words, if it was identified that it would be efficient for a particular network reinforcement project to be in place for the coming year then it should be included in OpTIC even if it cannot be delivered in practice for several years.

As a result, the current primary output of the CSNP process, which reflects the realistic date of delivery for new investments identified as being beneficial to the system ("Earliest in Service Date" (EISD) investments reported by the TOs for specific projects), is not directly applicable for OpTIC. A new or adapted output from the CSNP process would be required.

In the Holistic Network Design (HND) process, the NOA has previously produced 'Required in Service Dates' (RISD), reflecting when investments were considered to be efficient without taking into account constraints associated with whether they could actually be delivered to that time (i.e. if it was identified that it would be efficient for a particular network reinforcement project to be in place for the coming year, its RISD would be for the coming year). OpTIC proposes that a version of RISD is included in the future CSNP process which will be used to determine optimal network investment in the OpTIC methodology.

While RISD would not be affected by delays in the delivery of efficient investments, it could still lead to charge volatility. However, volatility of charges from year to year is not necessarily a problem for an investment signal on the grounds that the timing of future investments for the purposes of calculating charges is more predictable, and as a result the timing of significant changes in charges is more predictable.

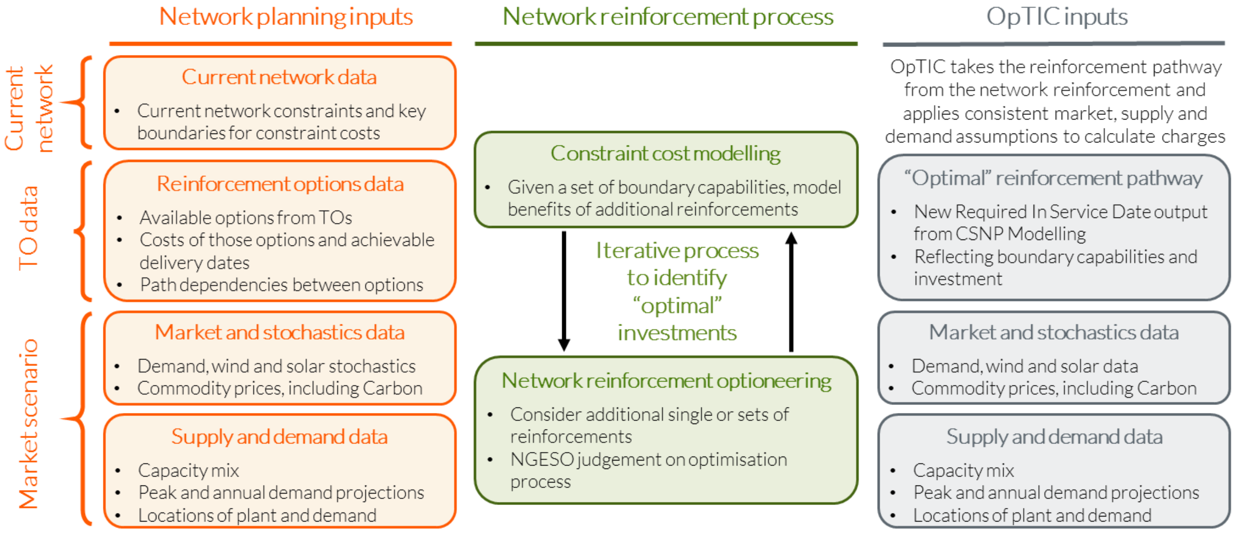
However, the intention of OpTIC is to smooth out the expected profile of future charges so they are less variable. To achieve this the OpTIC methodology will average charges over five future years to smooth out the effects of reinforcement timing and periods of over/under-investment.[18]

Scenarios to be modelled in OpTIC

The OpTIC model and the CSNP process rely on similar assumptions for the development of the GB power market. Since OpTIC is designed to send a signal based on outputs from CSNP related to optimal network investment, there is clear benefit from aligning the assumptions between the two models. Figure 4 below, outlines the main assumptions required by the CSNP process and how they would align with the inputs required by OpTIC.

[18] Figure 2 in Annex 4 illustrates the "saw tooth" SRMC signal that is created by lumpy transmission investments. Averaging calculated OpTIC charges over 5 years would transform this "saw tooth" signal into flatter profile of charges more like the LRMC signal illustrated in Figure 5 below

Figure 4: Alignment of CSNP and OpTIC assumptions



The OpTIC methodology will consider a single central scenario consistent with the NOA/CSNP process. This will reduce complexity of the OpTIC modelling process and aid transparency. However, a single *"central"* scenario is not currently identified in NOA. In future, Ofgem's intention is that the FES should switch from *"four illustrative scenarios"* to being *"more directive about the type and scale of investment needed"* through *"strategic pathways"* with a *"shared single short-term view"*.[19] It is unclear how long the *"short-term view"* period might be. However, given OpTIC will only need to model for five years ahead it is expected that in future there is a clearly identified single scenario on which OpTIC will be based.

In the absence of a single scenario being clearly identified as central, the OpTIC process will choose a single scenario on which to carry out optimisation modelling.

The choice of scenario to model will clearly matter for the final charges. It is also important to note that physical inputs, such as plants and their locations, which are crucial for determining plant revenues and hence OpTIC charges, follow those used within the CSNP process which are crucial for network planning. Within the scenarios, the CSNP assumptions are expected to be used unless there is a strong rationale not to.

Conceptual Framework

It is noted that there are many reasons why in reality SRMC and LRMC style charges would be different, for example:

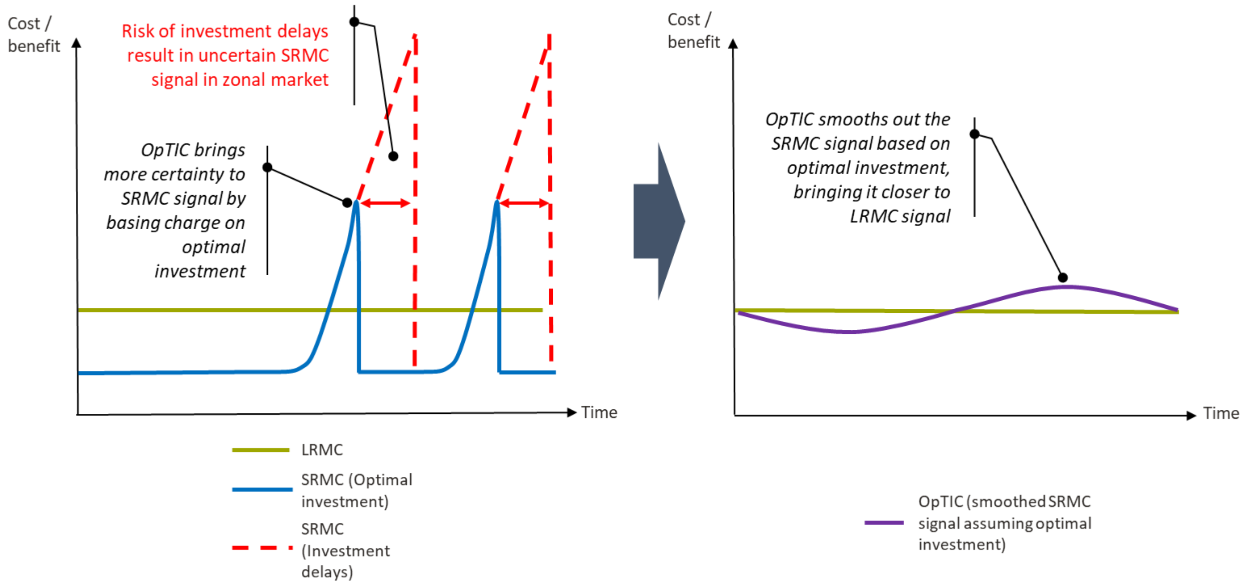
- ICRP is unlikely to be able to achieve a pure LRMC based signal given the simplifying assumptions and static relationships identified above; and
- SRMC based signals will be uncertain because of delays in network investment.

There are two important aspects of the OpTIC methodology, which are illustrated in Figure 5:

- First, by basing charges on optimal investment OpTIC brings more certainty to the volatile SRMC based investment signal that would arise in a zonal market with uncertainty about the pace of network development (this effect is illustrated on the left-hand side of Figure 5); and
- Second, OpTIC will smooth out the volatility of the SRMC based locational signal achieved through averaging of charges over 5 years resulting in OpTIC charges being smoother, i.e. closer to the LRMC line, as illustrated in the right-hand panel of Figure 5.

[19] Decision on the framework for the Future System Operator's Centralised Strategic Network Plan, Ofgem, December 2023, para 4.8

Figure 5: Comparing OpTIC to LRMC and SRMC signals



As part of the modelling work carried out to prove the concept of OpTIC, analysis was carried out to show how charges might differ between OpTIC, ICRP and LMP. Annex 5 presents an illustrative OpTIC system optimisation in PLEXOS using 8 zones and modelled against a single scenario to show possible charges given a particular set of inputs to understand how they relate and in comparing OpTIC to LMP to ICRP. The results show how charges for OpTIC vary much less significantly from north to south than under a zonal market when transmission investment is delayed relative to an optimal path.

Draft legal text

No proposed Legal text has been provided at this stage, it will be produced during the Workgroup stage.

Whilst this modification will amend Section 14, there is also the possibility that a separate non-charging CUSC modification would need to be raised in due course.

What is the impact of this change?

Proposer's assessment against CUSC Charging Objectives	
Relevant Objective	**Identified impact**
(a) That compliance with the use of system charging methodology facilitates effective competition in the generation and supply of electricity and (so far as is consistent therewith) facilitates competition in the sale, distribution and purchase of electricity;	**Positive** By achieving a better balance between cost reflectivity and predictability, locational signals will become useful and subsequently investment decisions by investors should better reflect the network implications, and therefore facilitate more efficient competition between generation, demand and storage at different locations on the network.
(b) That compliance with the use of system charging methodology results in charges which reflect, as far as is reasonably practicable, the costs (excluding any payments between transmission licensees which are made under and accordance with the STC) incurred by transmission licensees in their transmission businesses and which are compatible with standard licence condition C26 requirements of a connect and manage connection);	**Positive** OpTIC does not require the development of simplifying assumptions such as backgrounds, a sharing methodology or the need to define a reference node as is the case under ICRP. OpTIC aligns itself with the same economic model used to derive network investment proposals and relates network charges to a model which could more accurately capture SRMC based locational signals in charges, since it models the outcomes of a zonal market by modelling generation and demand behaviour across all hours of the year.
(c) That, so far as is consistent with sub-paragraphs (a) and (b), the use of system charging methodology, as far as is reasonably practicable, properly takes account of the developments in transmission licensees' transmission businesses;	**Positive** OpTIC makes an explicit link between the calculation of network charges and the optimal set of network investment targeted by network planners. To the extent optimal investment is not achieved in reality, investors are not exposed to such delays, and hence OpTIC should create a predictable signal to which investors can more readily respond. Thus, over the medium term, OpTIC would reflect developments in transmission network build as a result of evolving system conditions and reduce the need for network investment by facilitating more efficient locational decisions by investors in generation, demand and storage assets.
(d) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency *; and	**Neutral**
(e) Promoting efficiency in the implementation and administration of the system charging methodology.	**Positive** Removes the need for complex, cumbersome and proxy related modelling – modelling is already carried out by the network planning team

	of which OpTIC will mainly be an adaptation of the process that exists in that area.
**The Electricity Regulation referred to in objective (d) is Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast) as it has effect immediately before IP completion day as read with the modifications set out in the SI 2020/1006.	

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories	
Stakeholder / consumer benefit categories	**Identified impact**
Improved safety and reliability of the system	Positive Due to OpTIC linking charges and network design and build, multi-technology siting should naturally become more aligned to the system's overall optimal solution. This will positively impact the system's ability to operate efficiently, leading optimum flexibility and associated costs. In turn this leads to better balancing of the system, safer operation and therefore security enabling GB consumers to access the cheapest sources of energy.
Lower bills than would otherwise be the case	**Positive** By facilitating more efficient locational decisions by investors that better reflect the evolving system conditions, OpTIC could reduce total system costs and thus consumer bills.
Benefits for society as a whole	**Neutral**
Reduced environmental damage	**Positive** By facilitating more efficient locational decisions by investors better reflects the evolving system conditions, OpTIC could reduce the costs associated with the energy transition.
Improved quality of service	Neutral

When will this change take place?

Implementation date

01 April 2028 to ensure that developers and industry have sufficient visibility of the proposed change. This date builds in the assumption of a 6-12 month Ofgem impact assessment and that workgroups will begin between May-September 2024 and run for a period of 18-24 months.

Date decision required by

31 March 2027 to ensure developers and industry have visibility of the methodology change and to ensure implementation by the 01 April 2028.

Implementation approach

Currently, and in the absence of workgroup discussions, the following is understood by way of process:

The ICRP process and methodology, currently known as the transport element of the T&T (Transport and Tariff) model, would potentially move from the charging team to the ESO team responsible for developing the CSNP (currently the NOA). Two model runs would be required as described in the modification proposal that align with the approach used to develop the CSNP. The two 'OpTIC' model runs require: i) RISDs to be developed in addition to the current process, and ii) a central scenario that looks out Y+5 which does not current exist. With the exception of there being no requirement for ALFs in the tariff process element in the T&T model, the outputs derived from the OpTIC model runs would feed into the tariff process to derive Y+5 years' worth of charges which would be averaged to produce year Y+1 tariffs.

Through discussions, it has been noted that the ability and associated timing to carry out the 'OpTIC' model runs may not occur sufficiently in advance to interface with the tariff runs in order to meet existing licence requirements to provide notification of charges for year Y+1. While this will be for discussion at workgroup, discussions led to a preference for the CSNP process to lead the charging notification requirements as opposed to the converse.

Proposer's justification for governance route

Governance route: Standard Governance modification with assessment by a Workgroup

There are areas of detail that will require assessment by a Workgroup.

Interactions

☐Grid Code	☐BSC	☐STC	☐SQSS
☐European Network Codes	☐ EBR Article 18 T&Cs	☒Other modifications	☐Other

So far unconfirmed links with the timing of work carried out by ESO investment proposals which may impact current charge notification and publication periods.

Given the breadth of the proposal, there will be an interaction with any live CUSC charging modification throughout the lifespan of the modification. The extent of these interactions will be captured in the Workgroup Report.

Acronyms, key terms and reference material

Acronym / key term	Meaning
ALFs	Annual Load Factors
Baseline	The current CUSC
BSC	Balancing and Settlement Code
CAPEX	Capital Expenditure
CBA	Cost Benefit Analysis
CMP	CUSC Modification Proposal
CSNP	Centralised Strategic Network Plan
CUSC	Connection and Use of System Code
DCLF	Direct Current Load Flow
EBR	Electricity Balancing Regulation
EISD	Earliest In Service Date(s)
FES	Future Energy Scenarios
HND	Holistic Network Design
ICRP	Investment Cost Related Pricing
LMP	Local Marginal Pricing
LRMC	Long Run Marginal Cost
LWR	Least Worse Regrets
NGESO/ESO	(National Grid) Electricity System Operator

NOA	Network Options Assessment
OPEX	Operational Expenses
OpTIC	Optimised Transmission Investment Cost
REMA	Review of Electricity Market Arrangements
RISD	Required In Service Date(s)
SQSS	Security and Quality of Supply Standards
STC	System Operator Transmission Owner Code
T&Cs	Terms and Conditions
T&T	Transport and Tariff
TNUoS	Transmission Network Use of System
TO	Transmission Owner

Reference material

- Open letter on strategic transmission charging reform: a summary (20 March 2024)
- Decision on the framework for the Future System Operator's Centralised Strategic Network Plan (ofgem.gov.uk) (13 December 2023)
- 5 Year Projection 2029-30 to 2033-34 (nationalgrideso.com) (September 2023)
- National Grid Beyond 2030 (March 2024)

Annex	Information
Annex 1	Purpose of Locational Signals
Annex 2	Defects with the current ICRP methodology
Annex 3	Background to the current TNUoS methodology
Annex 4	Comparing LRMC and SRMC signals
Annex 5	Illustrative 2030 OpTIC and Zonal locational signals with delayed network investment