



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

An Coimisiún um Rialáil Fóntas

ESB Networks 2020 proposals for changes to Generator Standard Charges

Decision Paper

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CRU Mission Statement

The CRU's 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
- Foster and maintain a high-performance culture and organisation to achieve our vision

Executive Summary

Generator Standard Charges (GSCs) are applied to equipment in generator connection offers that are issued by the Distribution System Operator (DSO), ESB Networks. ESB Networks publish these annually as the “Standard Prices for Generator Connections”. The present set of GSCs that are used by ESB Networks were established in 2007 and have been indexed in line with inflation on an annual basis. This has led to the GSCs being out of line with cost appropriate ESB Networks expenditure on generator connections and an under-recovery of this expenditure from the generators.

Following review and assessment from 2018 to 2020, ESB Networks submitted revised proposals for changes to the GSCs in July 2020 for CRU approval:

- The revision of pricing for 37 GSCs and the addition of two new GSCs.
- The discontinuation of 17 infrequently used GSCs.
- The removal of the remaining embedded civils estimates where possible in the relevant GSCs (which will instead be passed through to the generator as final actual cost).

The CRU published a consultation on the proposals in December 2020 ([CRU/20/144](#)) following a detailed review in line with Price Review 5 (PR5) unit cost benchmark assessments.

Following review of the consultation responses and further information provided by ESB Networks, the CRU has decided to accept the ESB Networks proposals but with the following changes:

- Disallowing 10% contingency that was proposed to be added to the component prices.
- Discarding one of the two new GSCs proposed and rolling it back into its existing GSC¹.
- Reinstating two of the 17 GSCs proposed to be discontinued, with new pricing².
- Accepting joint industry association recommendations for the four “civils estimate only” GSCs, but only for the purposes of refund.

¹ GSC 9a (Arc Suppression Coil) has been removed and pro-rated back into GSC 9 (38kV cable). Proposed new GSC 55 (110kV NVD protection) has been added.

² GSC 33 (Uprate 2*5MVA station to 2*10MVA) and GSC 45 (MV Metering and Power Quality >= 10 MVA) have been reinstated with update charges in line with similar GSCs for LCTA and rebate purposes, respectively

The new 2021 list of approved GSCs is detailed in Appendix 1 of this decision. The new ESB Networks “Standard Prices for Generator Connections 2021” document is published alongside this decision (CRU/21/035a).

The CRU accepts that the existing GSCs were contributing to the under recovery of generation connection expenditure from generators, thereby resulting in a subsidy from Distribution Use of System (DUoS) network charges in Price Review 4 (PR4). This decision therefore reinforces the expectation of increased recovery of appropriate costs from generators as reflected in the PR5 decision on DSO revenue 2021-2025 ([CRU/20/153](#)).

The PR5 DSO revenue decision and the PR5 decision on Regulatory Framework, Incentives and Reporting ([CRU/20/154](#)) provide strong direction for increased design and construction efficiency, improvements through innovation and enhanced customer engagement from ESB Networks in generator connections, including pass through costs estimation and optimisation.

Whilst this decision ensures that efficiently incurred costs are recovered appropriately from generators for standard equipment, the CRU would like to emphasise the need for ESB Networks to employ truly Least Cost Technically Acceptable solutions in all connections, thereby delivering lower cost outcomes for both generators and consumers.

This delivery should incorporate both the efficient design and selection of current equipment in connection methods as well as the fast development and implementation of new equipment through ESB Networks innovation work and other programmes.

The CRU encourages ESB Networks to bring new standard equipment to the CRU for review, consultation where necessary, and incorporation into the GSCs as quickly as possible so that they can be efficiently deployed in new generator connections earlier than they might otherwise be. The CRU notes the development of the MV EGIP Modular Connection (referenced in section 2.2.8 of this decision) as one of the first examples of such development.

The next comprehensive review by ESB Networks of the GSCs approved by this decision will not be earlier than 2023 (2024 implementation) i.e., these approved GSCs, allowing for inflation, will apply until at least after ECP-2.3 offers. This provides a level of cost certainty for generators with regards to current standard equipment.

Public Impact Statement

Generator Standard Charges (GSCs) apply where generators connect to the Distribution System and the Distribution System Operator (ESB Networks) builds the associated connection works, e.g., the substations, overhead lines, cables. GSCs are designed to ensure that the costs associated with the provision of the distribution connection works are recovered from generators in a way that limits potential subsidy from Distribution Use of System (DUoS) networks charges (that apply to all customers).

However, the charges should also be a reasonable estimate of the likely average cost of the networks item in question when account is taken of all the known cost factors and variables. They should not be set at a level that would guarantee no DUoS subsidy that would risk discouraging potential developers of projects required to meet national climate action targets.

Since the GSCs were originally compiled in 2007 connection costs have changed significantly. In 2020, ESB Networks proposed changes to GSCs to make them more reflective of the actual connection costs and methodologies.

With this decision, the CRU has now accepted ESB Networks pricing proposals for 34 GSCs (though without the proposed 10% contingency on the component prices as this is not appropriate for a standard charge). This decision also: accepts one new charge; discontinues 15 infrequently used GSCs; removes civils estimates from the charges where they still existed (which will now be pass through to the generator as final actual cost); accepts the joint association recommendation for the four GSCs with civil charges that are used for refund purposes only.

This decision by the CRU ensures:

- The GSCs are cost appropriate based on efficient delivery of works.
- The recovery of appropriate costs of connection works from generators.
- The potential risk to the DUoS customer is minimised.

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Glossary of Terms and Abbreviations

Abbreviation or Term	Definition or Meaning
1999 Act	Electricity Regulation Act, 1999
CER	Commission for Energy Regulation (now, Commission for Regulation of Utilities)
Contestable works	Were a generator can choose to undertake the work themselves with a suitably qualified contractor. Some of the Generator Standard Charges are contestable and some are non-contestable (i.e., the DSO must undertake the work on that item).
CRU	Commission for Regulation of Utilities
DSO	Distribution System Operator (ESB Networks)
DUoS	Distribution Use of System (network charges)
ECP	Enduring Connection Policy
ECP-1	First stage of the Enduring Connection Policy; includes the 2018 batch and non-batch processes.
ECP-2	Second stage of the Enduring Connection Policy – Batches 2.1, 2.2, 2.3 and non-batch processes.
Electricity system	Transmission and distribution electricity systems
ESBN	ESB Networks DAC
GPA	Group Processing Approach
GSC	Generator Standard Charges
LCTA	Least Cost Technically Available
kV	Kilo Volt
kW	Kilo Watt
MEC	Maximum Export Capacity
MV	Medium Voltage

Abbreviation or Term	Definition or Meaning
MW	Mega Watt
Pass Through Costs	Costs that are incurred by the DSO that are passed through to the generator who is then responsible for their payment in full.
PR4	Price Review 4 of the DSO's revenue for the period 2016-2020
PR5	Price Review 5 of the DSO's revenue for the period 2021-2025
SOs	System Operators (i.e., TSO and DSO)
TSO	Transmission System Operator (EirGrid)

1. Introduction

This section summarises the relevant context and background for this decision on ESB Networks Standard Prices for Generator Connections, commonly known as Generator Standard Charges (GSCs).

As part of the generator connection application process, a generator includes essential information such as the generation technology, project size (in Maximum Export Capacity) and site location in their application. ESB Networks then undertakes a power system study to determine the most appropriate connection method and the high-level electrical connection requirements. From this, a scope of work is produced that forms the basis for estimating the project costings.

The project costings are prepared using the GSCs as charging building blocks, as well as an estimate of any pass-through costs or other known costs such as project management costs for contestable build projects, TSO costs, non-standard items and refunds due to existing generators. These form the project charges included in a generation connection offer.

1.1 Legal context

Under section 35 of the Electricity Regulation Act 1999, as amended, (the 1999 Act), the CRU may give directions to the Transmission System Operator (TSO) and Distribution System Operator (DSO), collectively the “system operators” (SOs) in respect of the basis of charges for use of and connection to the transmission or distribution system. Sub-sections (4) and (5) are particularly relevant for this consultation and are detailed here.

Section 35 (4) A charge for connection to or for the use of the transmission or distribution system of the Board shall be calculated in accordance with directions given by the Commission under this section so as to enable the Board to recover—

(a) the appropriate proportion of the costs directly or indirectly incurred in carrying out any necessary works, and

(b) a reasonable rate of return on the capital represented by such costs.

Section 35 (5) The Commission, solely, will determine what constitutes an “appropriate proportion” referred to in subsection (4)(a) and a “reasonable rate of return” referred to in subsection (4)(b).

The CRU policy for Standard Prices for Generators set out in [CER/05/090³](#) requires the GSCs to recover the costs incurred by the DSO for those items in the connection offer and limit any potential subsidy covered by ESB Networks (and ultimately, depending on the outcome of ESB Networks price reviews, impacting on the UoS customer).

However, that decision outlined that “the Commission considers that the risk that the sum of all actual connection costs may exceed the sum of all standard charges for a given volume, or period, of connection offers, should not fall exclusively, or even largely, on the applicants in question. In other words, the standard charges should not be pitched at levels to virtually guarantee full cost recovery to ESB Networks from the applicants. A standard charge should be what it implies: a reasonable estimate of the likely average cost of the networks item in question when account is taken of all the known cost factors and variables.”

The CRU is not moving away from the principles in legislation and the CER/05/090 policy decision in determining the appropriate proportion of costs for connection to the distribution system. In the time since the 2005 policy decision was published the actual costs incurred by ESB Networks have demonstrably moved away from the approved standard prices for generators established in 2007.

1.2. Background

1.2.1 Background to previously approved GSCs

In 2005, the CRU approved proposals by the DSO (ESB Networks) to introduce a standard pricing approach which would apply to all connections offers issued to renewable generators under the Group Processing Regime ([CER/05/090](#)).

That decision described the advantage of the standard pricing approach as offering greater financial certainty to applicant generators while allowing group offers to be drawn up, costed and issued more readily. Under any standard pricing approach, the actual costs of any particular project may be above or below the standard charges since these are developed as averages of typical projects.

Following this decision, in 2007, standard prices were developed and approved for the main items that are included in the connection offers to generators⁴. The combined standard prices are known commonly as Generator Standard Charges (GSCs) and these are applied to all generator

³ <https://www.cru.ie/wp-content/uploads/2005/07/cer05090.pdf>

⁴The 2007 Standard Prices for Generators had 21 Generator Standard Charges. The current 2020 Standard Prices has 54 Generators Standard Charges, with the additional charges added over time as deemed appropriate at that time.

connection offers that are issued by ESB Networks. The present set of GSCs that are used by ESB Networks have been indexed in line with inflation on an annual basis since 2007. ESB Networks publish these annually as the “Standard Prices for Generator Connections”.

The GSCs have been used for all connections processed under the gate processing approach in Gate 3, all non-GPA connections, and all ECP-1 connections. GSCs have been indexed (using the Harmonised Index of Consumer Prices) in line with inflation on an annual basis since 2007.

In March 2018, ESB Networks proposed a detailed review of the GSCs and submitted its recommendations to the CRU. The CRU conducted a review of the proposed GSCs at that time supported by independent economic and technical advisors, which led to CRU consultation paper [CRU/18/227](#)⁵. Following a review of consultation responses, further submissions by ESB Networks and further review from independent advisors, CRU issued an information paper stating that no decision was being made on the proposed changes and that the upcoming ECP-1 offers should be based on the existing approved charges at that time.

That review process suggested that the existing approved GSCs could be too low and if so should be increased. However, the CRU considered that further assessment was needed to satisfactorily demonstrate that the project delivery costs for the proposed GSCs are reasonably and efficiently incurred. This further assessment was to be concluded in time to allow offers in ECP-2 to incorporate new GSCs (if approved). This led to an updated ESB Network’s submission for proposed changes to GSCs in July 2020.

1.2.2 ESB Networks review process for 2020 proposals

The process of review by ESB Networks and CRU following the 2018 proposals that led to the 2020 proposals is detailed in GSCs proposal consultation CRU/20/144 and is summarised here.

In 2019 WSP undertook a review of eight of the 2018 proposed GSCs (with updated 2019 Construction Units) for ESB Networks. They recommended that ESB Networks redefine the GSCs with actual time and material cost of Construction Supervision Element of Project Management, Telecommunications and Commissioning, rather than using a percentage multiplier on construction as previously applied.

In 2019 ESB Networks also submitted Unit Costs for assessment to the CRU for the Price Review 5 assessment. This included a benchmark analysis by WSP for ESB Networks. GHD then performed a benchmark and appropriateness assessment of the Unit Costs for the CRU

⁵ <https://www.cru.ie/wp-content/uploads/2018/10/CRU18227-Consultation-Paper-on-the-ESB-Networks-proposals-for-changes-to-Generator-Standard-Charges.pdf>

and found that all Unit Costs submitted were reasonable with no material deviations that justify a challenge.

ESB Networks revised the methodology for the 2020 proposed GSCs based on WSP's recommendations. There were also some scope improvements developed through the review process. ESB Networks also updated the Construction Units that make up the GSCs with 2020 materials costs prior to submitting the 2020 proposed GSCs.

1.3. Purpose of this paper

This paper provides the decision from the CRU on the request made by ESB Networks in 2020 to approve:

- The revision of 37 GSCs and the addition of two new GSCs
- The discontinuation of 17 GSCs; and
- The removal of the remaining embedded civil construction charges where possible in the relevant GSCs.

1.4. Related documents

- [CER/05/090](#)⁶: Standard Pricing Approach for Connecting Renewable Generators to the Distribution Networks – Decision paper
- [CER/07/092](#)⁷: Standard Prices for Generators 2007 (the first approved GSCs)
- [CER/10/085](#)⁸: System Operator Pricing Principles – Decision paper approving the [“Joint TSO/DSO Group Processing Approach Charging and Rebating Principles”](#)⁹
- [ESB Networks Standard Prices for Generators 2020](#)¹⁰ (the 2020 approved GSCs)
- [CRU/20/144](#)¹¹ ESB Networks 2020 proposals for changes to Generator Standard Charges
- [CRU/20/148](#)¹² Consultancy Support for Electricity Transmission Revenue Controls (2016-2025)

⁶ <https://www.cru.ie/wp-content/uploads/2005/07/cer05090.pdf>

⁷ <https://www.cru.ie/wp-content/uploads/2007/07/cer07092.pdf>

⁸ <https://www.cru.ie/wp-content/uploads/2010/07/cer10085.pdf>

⁹ https://www.esbnetworks.ie/docs/default-source/publications/joint-tso_dso-group-processing-approach-charging-and-rebating-principles.pdf?sfvrsn=f34433f0_4

¹⁰ https://www.esbnetworks.ie/docs/default-source/default-document-library/standard-prices-for-generator-connections-2020-revision-9.pdf?sfvrsn=336707f0_0

¹¹ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20144-ESB-Networks-2020-proposals-for-changes-to-Generator-Standard-Charges.pdf>

¹² <https://www.cru.ie/wp-content/uploads/2020/12/CRU20148-Consultancy-Support-for-Electricity-Transmission-Revenue.pdf>

- [CRU/20/149](#)¹³ Consultancy Support for Electricity Distribution Revenue Controls 2016-2025.
- [CRU/20/153](#)¹⁴ PR5 - DSO Revenue for 2021- 2025
- [CRU/20/154](#)¹⁵ PR5 Regulatory Framework, Incentives and Reporting

1.5. Structure of this paper

This decision paper is structured as follows:

- Section 1** Introduction; context and background of GSCs.
- Section 2** CRU's decision on ESB Networks 2020 proposals for changes to GSCs.
- Section 3** Next steps.
- Section 4** Summary of responses to the GSC consultation (CRU/20/144).

¹³ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20149-Consultancy-Support-for-Electricity-Distribution-Revenue2.pdf>

¹⁴ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20153-Distribution-System-Operator-DSO-Revenue-for-2021-2025.pdf>

¹⁵ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf>

2. CRU decisions on ESB Networks 2020 proposals for changes to GSCs

In July 2020, ESB Networks submitted proposals for changes to the GSCs. Following consultation on these changes ([CRU/20/144](#)) and further response from ESB Networks, the CRU have made the following decisions:

- Based primarily on the benchmarking assessment on Price Review 5 (PR5) Distribution Unit Costs, the CRU has accepted ESB Networks proposed component prices for the 34 GSCs that are being continued out of the existing 54 charges.
- The CRU has decided to disallow the 10% contingency included by ESB Networks on the component prices in its proposals. The new GSCs are also indexed for 2021 resulting in a further 1.4% decrease on the 2020 proposals.
- For the two new charges proposed in the consultation, GSC 9a (Arc Suppression Coil) has been removed and pro-rated back into GSC 9 (38kV cable) whilst the GSC 55 proposal (110kV NVD protection) has been accepted without contingency.
- GSCs 13, 14, 24, 34 are civil construction charge GSCs that are only used for refund purposes. The CRU has decided to use the joint association recommended values for these GSCs, for the purpose of refund only. GSC 13 has been split into 13a for 110kV cables and 13b for 38kV cable as recommended.
- On the basis that the GSCs that were proposed to be discontinued will not likely occur with much frequency (and where they do, they will likely be built contestably) the CRU accepts the discontinuation of 15 of the 17 charges as proposed.
 - GSC 33 (Uprate 2*5MVA to 2*10MVA) and GSC 45 (MV Metering and Power Quality ≥ 10 MVA) have been reinstated with update charges in line with similar GSCs for LCTA and rebate purposes, respectively.
- The embedded civils construction charges will be removed from GSCs where possible, thereby removing an inconsistency with civils charges associated with other GSCs that are not included. These removed charges must be estimated by ESB Networks at offer stage as pass through costs.

- The CRU accepts the list of pass through costs as proposed and notes that pass through cost is a necessary component of the charging policy.

2.1. General decisions regarding the proposals

2.1.1 Application of contingency on proposed GSCs

- The CRU has decided to disallow the 10% contingency included by ESB Networks on the component prices in its proposals.

The development of proposed GSCs by ESB Networks includes 10% contingency on the four main cost components described in section 2.2.1. In the consultation paper [CRU/20/144](#) the CRU was minded to accept the logic of this addition on the basis of the amount expended by ESB Networks for connection projects, and due to the way the GSCs are built up as components equivalent to an early stage design estimate.

The joint association response to the consultation considered that the GSCs were not estimates and were based on a standard scope. After further discussions with ESB Networks the CRU understands the scope for each GSC to be an average scope which can change in the detail resulting in the necessity of contingency.

Based on the responses to the consultation and these further discussions ESB Networks, the CRU has considered this issue further.

As described by ESB Networks, the 10% contingency is to cover the risk associated with the unknowable non-standard elements of the design which are likely to arise out of development in a brownfield site. These risks include a wide range of scenarios which cannot be determined at offer stage and include things such as: more complex/extensive wiring requirements due to changes in design standards; bespoke solutions to accommodate different equipment to that of the original station design; sourcing of equipment which is no longer standard and hence not available on framework agreements.

The CRU accepts that these factors are relevant, and that the risk of scope change is real for some (but not all) projects. The CRU notes that these risks are primarily associated with brownfield works and non-contestable GSCs. Therefore, in considering whether to add contingency to all GSCs, the CRU must consider if the risk of this scope change should be borne by all projects on an averaged basis across all GSCs or if this risk should be attributed to ESB Networks (and ultimately, depending on the outcome of price reviews, the UoS customer). The

CRU notes this is similar to the argument for removing embedded civils charges from the GSCs described in section 2.1.4

As described in the original decision to allow generator standard charges (CER/05/090) the actual costs of any particular project may be above or below the standard charges, since these are developed as averages of typical projects. ESB Networks do use cost units which are averages but also assume standard designs to produce the GSCs.

The decision also states that the standard charges “should not be pitched at levels to virtually guarantee full cost recovery to ESB Networks from the applicants. A standard charge should be what it implies: a reasonable estimate of the likely average cost of the networks item in question when account is taken of all the known cost factors and variables.” For the CRU, this means the estimate of the average cost based on the average reasonable design at the time of offer, taking into account all available and appropriate information. Contingency by definition covers unknown cost factors and variables and as described by ESB Networks covers unknowable non-standard elements of the design.

Based on the existing policy philosophy and further consideration following the recent consultation, the CRU has decided that 10% contingency should not be included in the GSCs and this is reflected in the newly approved costs in this decision shown in section 2.2 and Appendix 1.

The CRU notes that removing the 10% contingency across all GSCs increases the incentive on ESB Networks to drive efficiency across standard elements of all connection projects and most notably in cases where the scope does not change, and the contingency is not ultimately necessary.

The CRU also notes that whilst the removal of contingency will result in a decrease in cost recovery of connections from generators relative to ESB Network’s 2020 proposals, there will still be a significant increase in cost recovery with the newly approved GSCs versus the previously approved GSCs (as the increase in most proposed GSCs was at least 10%).

2.1.2 New Charges proposed

- For the two new charges proposed in the consultation, GSC 9a (Arc Suppression Coil) has been removed and pro-rated back into GSC 9 (38kV cable) whilst the GSC 55 proposal (110kV NVD protection) has been accepted without contingency.

GSC No.9a - Arc Suppression Coil Requirement on 38kV Cable Installation > 1km

ESB Networks initially proposed the development of a new charge GSC 9a for the installation of an Arc Suppression Coil (ASC) rather than trying to pro-rata the cost in the per km cable charge of GSC 9.

The consultation responses and subsequent discussion with industry associations raised concern over the large cost impact such a proposal would have on smaller generators.

Following consideration of this point and further discussion with the CRU, ESB Networks have reviewed and revised costs and charging methodology accordingly in order to minimise the impact it may have had to smaller generation projects. ESB Networks have reverted to including the ASC cost as part of the GSC 9 on the per km of cable charge.

The cost will be spread between customers who connect via 38kV cable and this will avoid the project which triggers the requirement for an ASC having to pay the full cost and potentially making the project unviable. Further detail on the reasoning is included in ESB Networks response paper (CRU/21/035b) published alongside this decision.

As there are a number of ASC projects that have been developed for RESS-1 projects, ESB Networks has been able to drive efficiencies and have reduced the design and project management costs based on the pipeline of ASC projects (which was not evident when the initial GSC 9a proposal was created).

The costs per km portion of the ASC costs have therefore been re-calculated and apportioned back into the per km 38kV cable charge on a pro-rata basis resulting in an addition of €19,570 per km for GSC 9 38kV cable onto the proposed GSC of €105,310 resulting in a new GSC 9 proposal of €124,880. Without contingency and indexed for 2021 this equates to €111,940 resulting in a 13% decrease on the 2020 approved GSC 9. The CRU accepts this new proposal for GSC 9 without contingency is cost and indexed for 2021 is appropriate.

GSC No. 55 - Installation of 110kV NVD (Neutral Voltage Displacement) Protection (on both Transformers)

This a new proposed charge by ESB Networks based on its frequent use in recent connection offers and the application of current standards that make this equipment necessary.

The need for this equipment was questioned by industry. ESB Networks state that Neutral Voltage Displacement (NVD) protection is needed to deal with Earth Faults on the network because when a line it disconnected from the main ESB Networks grid, an earth fault will create a high voltage rather than a high current. This means the overcurrent relays or fuses will not work

and ESB Networks need to have the additional NVD protection to detect this dangerous high earth fault voltage. This protection is required and standard with UK DNOs. The CRU notes that this protection is also included in ESB Networks Protection Policy NPP05 and is included in standard drawings.

The CRU noted in the GSC consultation that the Design and Project Management component for this new proposed GSC is large relative to the overall charge. ESB Networks has confirmed informed then that the equipment requires a bespoke local network analysis review of protection resulting in a bespoke design.

Following further industry concerns in response to the consultation on this point, ESB Networks have commented further that the designs involved in these charges are bespoke in that every connection and substation is different. ESB Networks stated that while elements of design can be similar, the challenge is integrating the design into a unique brownfield site where connecting into older stations can be very complex. The design and project management costs relative to the material costs can therefore vary significantly.

Industry response to the consultation also questioned the cost appropriateness of this new charge given that it had been charged previously at €29k per transformer. In response, ESB Networks stated that the Non-standard protection had previously been charged at €29k, based on a PR4 Unit cost developed in 2014-15 for use during the PR4 Period (2016-2020). For purposes of consistency across the PR4 period this non-standard protection charge remained constant over that period, even though it was considerably under-recovering the costs that were actually incurred in delivery. Since then, this Unit Cost has undergone a review in 2019 to provide a more accurate up to date cost of D&PM, installation, and commissioning, applying the same approach as PR5 Units costs & proposed GSCs.

It should be noted that the Unit Cost is based on 110kV NVD on one transformer whereas the new GSC is based on installation of two (on both sides of the transformer).

ESB Networks have provided the following instances where one or two 110kV NVD and its relationship to the GSC (and refunding):

- For a 2x63MVA station (110kV/38KV) there would be two 110kV NVDs required.
- All of the 110kV/38KV transformers require 110kV NVD protection relay per transformer where the connected generation is 2MW or above at the node.
- For 110kV/MV, the 110kV NVD is either required or not required depending on the earthing arrangements (required on both transformers, or if it is a single transformer only)

one is required). Where only one is required, or the second is required as part of the normal networks operation policy, a refund will be established and paid back to the customer.

Based on ESB Networks response to the consultation responses and clarification of the equipment use and refund policy, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate (at €172,840) as shown in section 2.2.6.

2.1.3 GSCs with civils charge only - for refund purposes

- GSCs 13, 14, 24, 34 are civil construction charge GSCs that are only used for refund purposes. The CRU has decided to use the joint association recommended values for these GSCs only for the purpose of refund. GSC 13 has been split into 13a for 110kV cables and 13b for 38kV cable as recommended.

In the GSCs consultation CRU/20/144, the CRU detailed the ESB Networks proposals for the GSCs with civil construction charges only that are used for refund purposes (GSCs 13, 14, 24 and 34). There is no DUoS exposure associated with these costs and the CRU stated it was open to a combined industry response to the consultation with one recommendation for each of these GSCs (Nos. 13, 14, 24 and 34).

The industry associations that responded jointly to the consultation recommended charges for these GSCs as detailed here in Table 1. On review, ESB Networks have stated that without further detail on the assumptions behind the recommendations, it cannot comment on their appropriateness. As these GSCs are only for the purpose of refunding generators, and have no implication for DUoS charges, the CRU has decided to accept the joint association recommendations. However, this acceptance does not reflect the CRU's opinion or ESB Networks opinion on the cost appropriateness of these recommendations and they should not be used for any purpose other than for refunds (e.g., for comparing similar civils charges going forward).

Note, the industry associations recommended the split of original GSC 13 (110kV and 38kV cable civils – roadway day) into 13a (110kV cable civils – roadway day) and 13b (38kV cable civils – roadway day) due to the experience of different costs for each.

Table 1 GSCs with civils charges only – for refund purposes

GSC	Charge Description	2020 approved GSCs	ESBN 2020 Proposed GSCs	Industry recommendations (CRU accepted)
13a	110kV Cable civils – roadway day	€152,910	€379,210	€314,500
13b	38kV Cable civils – roadway day	€152,910	€379,210	€205,000
14	MV Cable civils – roadway day	€53,090	€210,850	€144,740
24	Civil works for a Typical Outdoor 110kV Station	€1,097,790	€1,531,120	€1,000,000
34	Civil Works for a Typical Outdoor 38kV Station	€439,120	€904,160	€563,620

2.1.4 Discontinued charges

- On the basis that the GSCs that were proposed to be discontinued will not likely occur with much frequency (and where they do, they will likely be built contestably) the CRU accepts the discontinuation of 15 of the 17 charges as proposed.
 - GSC 33 (Uprate 2*5MVA to 2*10MVA) and GSC 45 (MV Metering and Power Quality \geq 10 MVA) have been reinstated with update charges in line with similar GSCs for LCTA and rebate purposes, respectively.

In carrying out a review of all the GSCs used in the 95 connection offers issued as part of ECP-1, ESB Networks identified 17 GSCs which were not used and are not likely to be in use in the next number of years. ESB Network's experience has shown that where such charges do occur, they tend to be built contestably e.g., 110kV and 38kV works on greenfield sites. ESB Networks recommended that these GSCs be discontinued. These GSCs will be shown as "discontinued" in grey boxes within ESB Networks Standard Pricing for Generators document (Schedule 1). These GSCs will continue to be shown in this way for reference.

The CRU is conscious that these items, if occurring in future and not built contestably, would then be charged as non-standard items to the generator. This should improve the overall customer cost recovery of generator connections. Non-standard charges are described by the decision that established the DSO GSCs (CER/05/090) as items that may from time to time be required for particular connections and be costed on an individual basis.

On the basis that ESB Networks experience shows that these charges will not likely occur with much frequency, and where they do, they will likely be built contestably, the CRU has decided to accept ESB Networks proposal to discontinue 15 of the 17 charges.

There were two charges, GSC 33 and GSC 45, that the joint association response questioned the removal of in the consultation responses. ESB Networks accept that these should be reinstated and the detail of the new cost and approval for these charges is described in section 2.2 along with the other remaining GSCs.

- GSC 33 – Uprate 2 * 5 MVA to 2 * 10 MVA. The industry associations were concerned that removing this GSC would remove the option for renewable generators to be offered the Least Cost Technically Acceptable (LCTA) connection method. ESB Networks responded that this GSC has not been used over the past number of years and the more likely connection would be the installation of a third transformer. However, based on the consultation feedback, ESB Networks proposed to reinstate this GSC for this purpose and the CRU accept this proposal on this basis. The detail of the GSC 33 revised cost approval is described in section 2.2.5.
- GSC 45 – MV Metering and Power Quality ≥ 10 MVA (where CB is being charged as part of EGIP installation, no need for KKK). The industry associations asked for clarity on the rebate generators will receive if MV connections are being completely contestably and based on System Operator Preferred Connection method with MV CBs. Based on this consultation feedback, ESB Networks proposed to reinstate this GSC to make it clear what rebate generators will receive where MV connection are completed on a contestable basis and the CRU accept this proposal on this basis. The detail of the GSC 45 revised cost approval is described in section 2.2.7.

The joint association response also requested the maintenance of GSC 4 for uprating. ESB Networks state that this GSC has not been used over the past number of years and would not be considered in an LCTA calculation, as well as providing an alternative method of assessment should this charge be needed again. The CRU accepts ESB Networks recommendation to discontinue GSC 4 on this basis.

2.1.5 Removal of embedded civil construction charges

- The embedded civils construction charges will be removed from GSCs where possible, thereby removing an inconsistency with civils charges associated with other GSCs that are not included. These removed charges must be estimated by ESB Networks at offer stage as pass through costs.

ESB Networks proposed that civil construction charges embedded in 15 of the current GSCs be removed (where they have been included up to now) and charged on a transparent pass-through basis as other civil construction costs have been up to now. This would be the case for all except three GSCs where the civil works element of a charge is truly standard in nature in the standard civil or ground works associated with erecting a wood pole (GSCs 5, 7 and 12).

In the consultation, the CRU was minded to accept this proposal based on the following reasons. The CRU accepted that based on ESB Network's experience, the civil element of works associated with a connection and thus the costs, is subject to often major variation from site to site based on actual conditions. This leads to developers underpaying and overpaying to varying degrees for the actual work carried out.

As civils costs are often difficult to design for in advance of the detailed design phase, ESB Networks will estimate the civils components for the relevant charges in each offer based on the desktop study and preliminary site visit. These civils estimates will then be charged on a pass-through basis and thus the project developer will only pay in the end the actual cost of the work. This means that developers with benign sites will only pay the civils charges incurred, a particular advantage to smaller projects in this situation.

The proposal also removed some inconsistency in that a number of the current GSCs already have civil works excluded from the charge and estimated on a pass through basis i.e., station extension works. Providing an estimate for civils in this manner gives greater accuracy in the initial estimation whilst more efficiently recovering the actual costs incurred at the project conclusion.

The assessment of project level customer cost recovery described in CRU/20/144 demonstrates an average recovery improvement of 4% with the civils treated in the manner proposed. The CER/05/090 decision that established the DSO GSCs stated that a standard charge should be a reasonable estimate of the likely average cost of the networks item in question when account is taken of all the known cost factors and variables. Based on experience and this assessment, the civils cost of GSCs cannot be given a standard reasonable estimate as there is a wide variation in the cost factors. The CRU also now notes in that decision (in relation to station uprates), that

Commission accepts that civil works of their nature do not lend themselves to a standard pricing approach because of the inevitable wide differences in terrain etc.

The industry response to consultation called for the civils charges to remain embedded on the basis of increased cost certainty for generators and benefit to the overall network where costs are higher than the average.

On balance, the benefits detailed above for removing the remaining embedded civils outweighs the benefits for keeping them. Therefore, the CRU has decided to accept ESB Networks proposal to remove the remaining embedded civils charges (except for GSCs 5,7 and 12). The CRU does understand the desire for project developers to have as much cost certainty as possible from an early stage and is therefore directing ESB Networks to ensure that the estimations for pass through costs of the civils that are removed by this decision are included at the offer stage in the manner adopted for other civils pass through costs.

2.1.6 Pass through costs

- The CRU accepts the list of pass through costs as proposed and notes that pass through cost is a necessary component of the charging policy.

The 2020 approved GSCs Standard Pricing document lists a number of costs that are passed through from the DSO to the generator who will be responsible for their payment in full (“Pass Through Costs”).

Most of these costs will be determined at the scoping, detailed design and construction phases of the DSO’s connection works and will be advised to the generator at those points. However, where feasible, an estimate of these costs, or information which may allow the generator to estimate the costs, may be provided at offer stage on the basis that such estimates or information are not an obligation by the DSO to commit to these estimates or information.

That said, the CRU would like to re-iterate here the decision in section 2.1.4, that the removal of embedded civil construction charges from GSCs is approved on the basis that ESB Networks must provide an estimate at offer stage of pass through costs associated with the specific civil construction charges being removed with this decision.

The CER/05/090 decision on DSO GSCs allowed items to be passed through to the generator where these are outside the control of the DSO. It is noted that such items are exceptional in nature and should only be incurred in the minority of cases. The CRU noted in the consultation some changes were made to the pass through costs list in the proposed Standard Pricing for

Generators connections document B for approval and asked for feedback. There was no feedback in the consultation that would cause the CRU to reconsider ESB Networks proposals and the CRU accepts the list of pass through costs as proposed.

There was feedback from the consultation on the transparency and methodology of ESB Networks estimation of pass through costs as well as a number of specific concerns around outage constraints and flexible working hours. These have been addressed in ESB Networks response document CRU/21/035b.

In general, the point was made that project developers need to be satisfied that there has been no overspend by the DSO on pass-through costs and that sufficient control of spend procedures are in place. It was noted that given that pass-through costs are not subject to impact on ESB Networks costs (and ultimately DUoS subsidy depending on price reviews) there is a risk of lack of scrutiny by ESB Networks in this regard.

The CRU notes that pass through cost is a necessary component of the charging policy. The CRU also notes from ESB Networks response that it is continuously seeking to improve engagement with generators on the pass through cost process, and that ESB Network's procurement policies are held against and governed by EU Utilities Directive to ensure openness and competitiveness in the procurement of goods and services, including those used for pass through costs.

2.2. Cost appropriateness of proposed GSCs

- Based primarily on the benchmarking assessment on Price Review 5 (PR5) Distribution Unit Costs, the CRU has accepted ESB Networks proposed component prices for the 34 GSCs that are being continued out of the existing 54 charges.
- However, the CRU has decided to disallow the 10% contingency included by ESB Networks on the component prices in its proposals. The new GSCs are also indexed for 2021 resulting in a further 1.4% decrease on the 2020 proposals.

2.2.1 Overview of assessment of cost appropriateness of proposed GSCs

In the GSCs consultation CRU/20/144, the CRU reviewed each 2020 proposed GSC to assess them for cost appropriateness and consistency of methodology. Based on this review the CRU was minded-to accept the GSCs as proposed.

The review was primarily achieved by drawing comparisons between the Price Review 5 Distribution Unit Cost benchmark assessment for Distribution ([CRU/20/149¹⁶ – section 5.5.1](#)) and GSCs, where appropriate. This comparison acknowledged the differences between the make-up of those costs as well as the changes in costs and methodologies since the 2019 WSP GSC benchmark report and the 2019 PR5 analysis outlined in section 1.2.2. It is also important to acknowledge again here that the PR5 benchmarked unit costs are based on national average budgetary costs, whereas the GSC's are specific to the requirements for generation connections.

The consultation assessment also compared the 2020 proposals with the 2018 proposed GSCs to check for consistency and appropriateness. In both cases the proposals were broken down into four main cost components that make up the generator standard charges which are:

- Design and Project Management costs¹⁷,
- Telecommunications costs¹⁸

¹⁶ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20149-Consultancy-Support-for-Electricity-Distribution-Revenue2.pdf>

¹⁷ All the costs associated with the initial and detailed design (including desk top design, project specific detailed wiring diagrams, site visits, specification of equipment etc.) and the project management including safety and on-site supervision.

¹⁸ All the costs associated with setting up equipment required for sending signals / communications from station / field equipment back to control locations.

- Construction costs¹⁹
- Commissioning costs²⁰

These components as presented in the consultation were inclusive of overheads, contingency and any remaining embedded civils estimates that could not reasonably be removed (i.e., in GSCs 5, 7 and 12).

As described in section 2.1.1. the CRU has decided to remove the 10% contingency from the 2020 proposed GSCs and this is reflected in the CRU 2021 decision GSCs shown in this section.

The GSCs are reviewed again here in the following sections in the context of the consultation responses, and further response from, and discussion with, ESB Networks.

Note in GSC consultation CRU/20/144 the “current” GSCs shown were those approved in 2020 with inflation indexation change since 2019. Since then, 2021 GSCs were approved by the CRU in February 2021 with an indexation decrease of 1.4% from the 2020 GSCs. These were used by ESB Networks for a small number of small connection projects. In this decision the use of the ESB Networks 2020 proposals (with 2020 indexation) is maintained here for review but the new GSCs approved by the CRU with this decision include the 2021 indexation decrease.

Also note, in GSC consultation CRU/20/144 Appendix 1, the GSC percentage change comparisons shown were made by subtracting the 2018 indicative civil construction estimates from the 2020 approved GSCs in order to compare with the 2020 proposed GSCs (which have the civils estimates removed). On review, it is more appropriate to compare the 2020 approved GSCs to the 2020 proposed GSCs plus the indicative civils estimate, due to the recency of the indicative civils estimate relative to the embedded civils estimates (from 2007-2010). This change is factored into the text and tables in this section 2.2 and in the overall table in Appendix 1.

¹⁹ All the costs associated with the procurement and installation of the electrical equipment including all the materials and labour costs and site / outage logistics.

²⁰ All the costs associated with testing and putting the equipment into service so as to ensure safe and correct operation and compliance with all appropriate standards etc.

2.2.2 Line Standard Charges**Table 2** Line Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs (inc. civils)	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
5	38 kV SC Woodpole 150 mm ² AAAC 80oC	€88,830	-	€98,470	€88,260	-1%
7	MV SC Woodpole 150 mm ² AAAC / 92 mm ² SCA 65°C	€52,700	-	€51,820	€46,450	-12%

GSC No.5 - 38 kV SC Woodpole 150 mm² AAAC 80oC.

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment (150 AAAC - single circuit 1km) was €102,081. The proposed GSC without contingency is well within the benchmark range and lower than the comparable unit cost. Based on this benchmark and following review of consultation responses and further discussion with ESB Networks, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed to 2021 is cost appropriate.

GSC No.7 - MV SC Woodpole 150 mm² AAAC / 92 mm² SCA 65°C

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment (Three Phase 150AAAC 1km) was €36,286. The proposed GSC without contingency falls well within GHD benchmark range of 96-154% of the unit cost and is also less than the current approved GSC.

Based on this benchmark and following review of consultation responses and further discussion with ESB Networks, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed to 2021 is cost appropriate.

2.2.3 Cable Standard Charges**Table 3** Cable Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs (inc. civils)	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
8	110kV – 630mm ² XLPE (AL) Single Circuit	€357,210	-	€379,130	€339,840	-5%
9	38kV – 630mm ² XLPE (AL) Single Circuit	€128,830	-	€124,880	€111,940	-13%
10	MV – 400mm ² XLPE (AL) Single Circuit	€58,550	-	€39,020	€34,980	-40%
12	110kV Cable End Mast	€163,960	-	€247,010	€221,410	+35%
13a*	110kV Cable Civils (for refund purposes only)	€152,910	€379,210	€379,210	€314,500	+106%
13b*	38kV Cable Civils (for refund purposes only)	€152,910	€379,210	€379,210	€205,000	+34%
14*	MV Cable Civils – (for refund purposes only)	€53,090	€210,850	€210,850 (all civils)	€144,740	+173%

*Joint association recommendations accepted by CRU.

GSC No.8 - 110 kV – 630 mm² XLPE (AL) Single Circuit

The most comparable unit cost in Appendix A – Unit Cost Benchmarking Assessment of Consultancy Support for Electricity Transmission Revenue Controls (2016-2025) - [CRU/20/148](#)²¹ was “110kV - 1000mm² AI Single Circuit” at €379,400. With the civils component added this unit cost was within the benchmark range of 78 – 109%. The difference between this and the ESB Networks 2020 proposal for GSC 8 is accounted for by the larger diameter of the cable benchmarked, the change in material cost to 2020 and the contingency added.

Following the consultation responses, the CRU also queried why the Design and Project Management percentage of this GSC is relatively higher than comparable GSCs 5, 7, 9, 10. ESB Networks explain that for GSCs 5,7,9 & 10 at distribution level (MV & 38kV), design and project management is carried out in-house and covered as an overhead by application of standard overhead rates. GSC 8 is at transmission level 110kV requiring third party consultants and thus additional professional design and project management fees apply.

The 2020 proposed GSC without contingency is now lower than the 2020 approved GSC. Based on this benchmark and following review of consultation responses and further discussion with ESB Networks, the CRU is satisfied that the 2020 GSC proposal without contingency and indexed for 2021 is cost appropriate.

²¹ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20148-Consultancy-Support-for-Electricity-Transmission-Revenue.pdf>

GSC No.9 - 38 kV – 630 mm² XLPE (AL) Single Circuit

The cables benchmarked by GHD in the PR5 Distribution Unit Cost benchmark assessment are not directly comparable to the cable GSCs however as stated in the report the “*DSO’s MV cable costs benchmark at the low end of the GHD benchmarking examples and the DSO’s 38kV cable costs at the high end, resulting in a relatively large step change between the voltages. This may be partly due to the use of 33kV cable costs for benchmarking purposes but is unlikely to be solely due to this. GHD do not consider this a material concern.*”

As described in section 2.1.2, the cost per km portion of the previously proposed Arc Suppression Coil (GSC 9a in the GSC consultation) has now been re-calculated and apportioned back into the per km 38kV cable charge on a pro-rata basis resulting in an addition of €19,570 per km for GSC 9 38kV cable. This is added onto the proposed GSC 9 of €105,310 resulting in a new GSC 9 proposal of €124,880. Without contingency this equates to €113,527 resulting in 12% decrease on the 2020 approved GSC 9. The CRU accepts this new proposal for GSC 9 without contingency is cost appropriate.

GSC No.10 - MV – 400 mm² XLPE (AL) Single Circuit

The benchmarking of cables in the PR5 Distribution Unit Cost benchmark assessment is noted above. The new proposal for GSC 10 without contingency and 2021 indexation is much lower than the 2020 approved GSC and the CRU accepts that this is cost appropriate.

GSC No. 12 – 110 kV Cable End Mast

There is no comparator in the PR5 Distribution Unit Cost benchmark assessment for this GSC. The increase in this GSC is not out of line with the average increase across the GSCs. It is noted that the non-construction costs have reduced since the 2018 submission but that there was an increase in construction costs since 2018 due primarily to increasing costs for the civils element of the mast foundation and the cable termination costs.

As per the industry response to the consultation, ESB Networks acknowledges that this is a relatively rudimentary asset, however the civils element in both civils design and physical civil works associated with the mast foundation can vary widely between sites. In ESB Networks view, its 2020 proposal provided industry with a fixed price reflecting the average civils costs associated with the installation. The CRU notes as per section 2.1.4 that the civils element in this GSC (as with GSC 5 and 7) is truly standard in nature and cannot be removed.

Based on this further explanation from ESB Networks and comparison with the average increase across the GSCs, the CRU is satisfied that the 2020 GSC proposal without contingency and indexed for 2021 is cost appropriate.

GSC No. 13 – 110 kV and 38 kV Cable Civils – roadway day (for refund purposes only)

The split of this GSC into two GSCs (13a and 13b for 110kV and 38kV cable civils respectively), and the associated costs, were recommended by industry for refund purposes and accepted by the CRU as described in section 2.1.4.

GSC No. 14 – MV Cable Civils (for refund or estimating purposes only)

The cost of this GSC was recommended by industry for refund purposes and accepted by the CRU as described in section 2.1.4.

2.2.4 - 110 kV Station Standard Charges**Table 4** 110 kV Station Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs (inc. civils)	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
18	110kV/38kV 63MVA Green Field Transformer Package	€1,582,630	€47,100	€1,737,450	€1,557,390	1%
19	110kV/38kV31.5MV A Green Field Transformer Package	€1,223,490	€47,100	€1,430,600	€1,282,340	9%
20	110kV/MV 20MVA Green Field Transformer Package	€1,060,610	€47,100	€1,143,630	€1,025,110	1%
21	110kV/MV 31.5MVA Green Field Transformer Package	€1,297,070	€47,100	€1,315,500	€1,179,170	-5%
23	Uprate 2*31.5MVA to 2*63MVA	€2,927,940	€240,300	€3,678,490	€3,297,260	21%
24*	Civil works for a Typical Outdoor 110kV Station (for refund purposes only)	€1,097,790	€1,531,120	€1,531,120	€1,000,000	-9%

*Joint association recommendations accepted by CRU.

GSC No. 18 - 110 kV/38 kV 63 MVA Green Field Transformer Package

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment was €1,516,675. The proposed GSC without contingency is marginally higher than the 2020 approved GSC (when civils estimate is accounted for) and falls well within the GHD benchmark range of 88-114% of unit cost.

There are a number of other scope factors that explain the difference between the unit cost and the marginally higher proposed GSC without contingency. The Unit Cost reflects the average installation costs of a 110kV/38kV 63MVA Transformer only. Although this does include for civils costs of the plinth & bund, it does not allow for the complete transformer package in the GSC. The GSC scope provides for a full Transformer Package which includes the construction of the Transformer Bay itself and a 2 bay 38kV busbar extension. Additional costs are included for busbar steelwork, disconnects, circuit breakers, surge arrestors CT/VT's, cabinets and cabling to

deliver the full 63MAV Transformer package in the GSC (as per the SLD in ESB Networks Part B document).

These scope differences equate to an approximately an additional €140,000 to the Unit Cost. The CRU has discussed this scope and cost difference with GHD. The scope difference is considered justified, and the cost is considered reasonable. However, the proposed GSC was then decreased by reduced overhead and other efficiencies gained on the combined scope of the transformer “package”. Also note civils is not now included in the GSC whereas it was in the Unit Cost.

In response to the consultation, industry questioned the benchmark of 132kV/33kV transformers versus 110kV/38kV transformers. ESB Networks states that benchmarking comparison by both GHD and WSP to UK equivalent 132kV/33kV transformers is considered broadly accurate and valid as purchase price supply costs are broadly in line, and design, installation and commissioning costs would be similar. Such supply costs are based on material components and manufacturing etc., as opposed to being directly proportional to the operating voltages which seems to be suggested by industry.

It would not be accurate to adjust these supply price costs on a pro-rata basis between the 132kV/33 kV when comparing benchmark costs of UK DNO's and Irish equivalent of 110kV/38 kV. The ESB Networks distribution voltage of 38 kV has Basic Insulation Level (BIL) of 250 kV. To meet this standard 52 kV and in some instances 72 kV equipment is required. This has a direct impact on the cost of equipment but also on the physical footprint costs required to install this physically larger equipment. As such care needs to be taken when making direct comparisons to adjust for not only the system voltage, but also the BIL and consequential additional installation costs.

Based on the benchmark and following review of consultation responses and further discussion with ESB Networks, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 19 - 110 kV/38 kV 31.5 MVA Green Field Transformer Package

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment was €1,217,132. The proposed GSC without contingency falls well within the GHD benchmark range of 93-115% of unit cost. This is before the additional factors as detailed for GSC 18 are taken into account as they are applicable to GSC 19 also. Based on the benchmark the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 20 - 110 kV/MV 20 MVA Green Field Transformer Package

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment was €1,144,462. The proposed GSC without contingency is lower than this unit cost and the GHD benchmark range of 99-112% of unit cost. This is before the additional factors as detailed for GSC 18 are taken into account as they are applicable to GSC 20 also. Based on the benchmark the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 21 - 110 kV/MV 31.5 MVA Green Field Transformer Package

There is no comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC. However, the cost for this GSC is proportionally in line with GSC No. 20, given the more costly equipment associated with 31.5MVA vs 20 MVA transformer for the 110kV/MV transformer package. This proposed GSC without contingency is also less than the 2020 approved GSC. Based on the benchmark the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed is cost appropriate.

GSC No. 23 - Uprate 2*31.5 MVA to 2*63 MVA

There is no comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC. However, this GSC is comparable to twice the PR5 Unit Cost of a 110kV/38kV 63MVA Transformer only. As noted in GSC 18, this PR5 Unit Cost is €1,516,675. Twice this unit cost minus the civil construction component in the unit cost of €140,000 for each transformer is equal to €2,753,350.

The difference between this amount and the proposed GSC without contingency is €591k. This difference is accounted for by:

- The cost of retirement and decommissioning of existing 31.5MVA transformers and associated obsolete equipment (CT's, VT's, CB, Disconnects and steelwork) to the value of €160k.
- 2 x 38kV Line Bays (Installation Surge Arrestors, Disconnects, CT's, VT's, Cabinets, Steelwork and associated conductor and control cabling)
- 2 x 38kV Transformer Bays (Installation of Disconnects, CT's, VT's, C&P Relays & Cabinets, Steelwork and associated conductor and control cabling)
- 1 x 38kV Sectionaliser Bay (Installation of Surge Arrestors, Disconnects, CT's, Cabinets, Steelwork and associated conductor and control cabling)

- 1 x 110kV Transformer Bay (Installation of Control & Protection Relays - Impedance, Differential, Over Current and associated Cabinets and control cabling)
- 38kV Busbar Extension (Installation of Steelwork, Conductor and insulators)

Note, where transformers are removed as part of an upgrade programme and replaced by larger capacity transformers, as per the Joint TSO/DSO GPA charging and rebate principles paper, such transformers are re-used elsewhere on the system and the generator is entitled to a refund. The refund will be paid once the removed asset has been successfully commissioned in its new location.

Based on the benchmark and ESB Networks further technical clarifications and refund detail the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 24 - Civil works for a Typical Outdoor 110 kV Station (for refund purposes only)

This GSC is based on the layout of 2020 approved GSC 15 for a “New 110 kV AIS “H-Type” Single Busbar Outdoor Station (Strung Busbar)”. GSC 15 is being discontinued as per this decision.

The cost of this GSC was recommended by industry for refund purposes and accepted by the CRU as described in section 2.1.4.

2.2.5 - 38 kV Station Standard Charges**Table 5** 38kV Station Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
26	5MVA 38kV/MV Green Field Transformer Package	€511,610	€47,100	€809,740	€725,820	51%
28	15MVA 38kV/MV Green Field Transformer Package	€586,690	€47,100	€1,017,430	€911,990	63%
29	Install 5MVA 38kV/MV Transformer into Existing Station + 38kV Busbar Extension	€525,070	€142,400	€848,460	€760,530	72%
30	Install 10MVA 38kV/MV Transformer into Existing Station + 38kV Busbar Extension	€569,900	€142,400	€929,860	€833,490	71%
31	Install 5MVA 38kV/MV Transformer into Existing Station + No 38kV Busbar Extension	€415,470	€142,400	€786,280	€704,790	104%
32	Install 10MVA 38kV/MV Transformer into Existing Station + No 38kV Busbar Extension	€459,820	€142,400	€867,680	€777,760	100%
33	Uprate 2 * 5 MVA station to 2 * 10 MVA	€1,756,770	€469,000	€1,957,880	€1,754,970	27%
34*	Civil Works for a Typical Outdoor 38kV Station (for refund purposes only)	€439,120	€904,160	€904,160	€563,620	28%

*Industry recommendations accepted by CRU

GSC No. 26 - 5 MVA 38 kV/MV Green Field Transformer Package

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment is €540,067 for a 38kV/MV 5 MVA transformer. The proposed GSC without contingency falls just outside the upper end of the GHD benchmark range of 120-132% of unit cost.

However, as with GSC 18, the PR5 Unit Cost reflects the average installation costs of a 38kV/MV

5MVA Transformer only. Although this does include for civils costs of the plinth & bund, it does not allow for the complete transformer package in the GSC. The GSC scope provides for a full Transformer Package which includes the construction of the new 38kV and MV bays. Additional costs are included for busbar steelwork, disconnects, circuit breakers, surge arrestors CT/VT's, cabinets and cabling to deliver the full Transformer package in the GSC (as per the SLD in ESB Networks Part B document).

When the differences between transformer only and transformer package are taken into account as described in GSC 18, this proposed GSC without contingency will fall within the PR5 benchmark range.

However, following responses from industry and further review the CRU also asked ESB Networks to explain the relative difference between GSC 18 and GSC 26 and their respective Unit Costs that were benchmarked.

ESB Networks states that there are two further differences between the scope of the package of works that explain this additional variance. Firstly, GSC 18 (63MVA) costs allow for one 38kV Transformer Bay, whereas GSC 26 (5MVA) includes for two Bays on both 38kV & MV side along with the associated busbar extension on both sides.

Secondly, GSC 26 includes the costs for Siemens NXPlus Switchgear at around €80k in cost. This is a standard design requirement for new transformer installations at 38kV/MV in a greenfield "new build" station scenario, in particular GSCs 26 and 28. It is noted that this was omitted in the 2018 submitted proposals as an oversight.

Based on the benchmark and following review of consultation responses and further discussion with ESB Networks, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 28 - 15 MVA 38 kV/MV Green Field Transformer Package

There is no directly comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC. However, the cost for this GSC is proportionally in line with GSC 26 for the same reasons. Based on the comparable benchmark and reasoning for GSC 26, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 29 - Install 5 MVA 38 kV/MV Transformer into Existing Station with 38 kV Busbar

Extension

Although there is no directly comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC, the reasoning for the increase in this GSC relative to the 2020 approved GSC is similar to the reasoning for GSC 26 discussed above.

For these installations into existing stations, the CRU also takes into account ESB Networks further detailing of the complexity and related cost of brownfield sites since the origin of the GSCs.

The CRU also notes that GSCs 29-32 do not increase as much relative to the 2018 proposals as the GSCs 26 and 28 for greenfield transformers. This is because Siemens NX Plus Switchgear is only required in the new greenfield packages and not for these transformers fitted into existing stations. In addition, on review of the 2018 proposals a number of material components in GSCs 29-32 were incorrectly included at 38kV and were subsequently revised to MV (CB's, VT's, CT's Disconnects, Lightning & Surge Arrestors), to account for the MV side of the transformer. Previously this equipment was taken as 38kV throughout, an oversight in the 2018 submission that is now corrected.

Based on the comparable benchmark and reasoning for GSC 26, and ESB Networks further detailing of the complexity and related cost of brownfield sites since the origin of the GSCs, the CRU is satisfied that the 2020 GSC 29 proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 30 - Install 10 MVA 38 kV/MV Transformer into Existing Station with 38 kV Busbar

Extension

Although there is no directly comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC, the reasoning for the increase in this GSC relative to the 2020 approved GSC is similar to the reasoning for GSC 26 and GSC 29 discussed above.

Based on the comparable benchmark and reasoning for GSC 26, and ESB Networks more detailed understanding of the complexity and related cost of brownfield sites since the origin of the GSCs, the CRU is satisfied that the 2020 GSC 30 proposal without 10% contingency is cost appropriate.

SC No. 31– Install 5 MVA 38 kV/MV Transformer into Existing Station without 38 kV Busbar

Extension

Although there is no directly comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC, the reasoning for the increase in this GSC relative to the 2020 approved GSC is similar to the reasoning for GSC 26 and GSC 29 discussed above.

Based on the comparable benchmark and reasoning for GSC 26, and ESB Networks further detailing of the complexity and related cost of brownfield sites since the origin of the GSCs, the CRU is satisfied that the 2020 GSC 31 proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 32 – Install 10 MVA 38 kV/MV Transformer into Existing Station without 38 kV Busbar Extension

Although there is no directly comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC, the reasoning for the increase in this GSC relative to the 2020 approved GSC is similar to the reasoning for GSC 26 and GSC 29 discussed above.

Based on the comparable benchmark and reasoning for GSC 26, and ESB Networks more detailed understanding of the complexity and related cost of brownfield sites since the origin of the GSCs, the CRU is satisfied that the 2020 GSC 32 proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 33 - Uprate 2*5 MVA station to 2*10 MVA

There is no comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment for this GSC. However, this GSC is comparable to twice the Unit Cost of a 38kV/MV 10MVA Transformer only. The PR5 Unit Cost is €688,678. Twice this unit cost minus the civil construction component in the unit cost of €120,000 for each transformer is equal to €1,137,536.

The difference between this amount and the proposed GSC without contingency is €642k. This difference is accounted for by the same reasoning described for equivalent GSC. The CRU notes that the increases for GSC 23 and GSC 33 over the current approved charges are of the same order.

Again, it worth noting here as with GSC 23, where transformers are removed as part of an upgrade programme and replaced by larger capacity transformers, as per the Joint TSO/DSO GPA charging and rebate principles paper, such transformers are re-used elsewhere on the system and the generator is entitled to a refund. The refund will be paid once the removed asset has been successfully commissioned in its new location.

The CRU notes that the indicative civil construction estimate for GSC 33 is greater than the indicative civil construction estimate for GSC 23. This is due primarily to the new control room building required for GSC 33 uprate that is not required for GSC 23 uprate. This is detailed further in ESNB response document CRU/21/035b.

Based on the benchmark and ESB Networks further technical clarifications and refund detail for GSC 23 and 33, the CRU is satisfied that the 2020 GSC proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 34 - Civil works for a Typical Outdoor 38 kV Station (for refund or estimating purposes only)

This GSC is based on the layout of 2020 approved GSC 25 for a “New 2*5MVA station”. GSC 25 is being discontinued as per this decision.

The cost of this GSC was recommended by industry for refund purposes and accepted by the CRU as described in section 2.1.4.

2.2.6 Miscellaneous Station Standard Charges

Table 6 Miscellaneous Station Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
35	New 110kV AIS Line Bay in Existing 110kV Single Busbar Outdoor station (Strung/Tabular Busbar)	€771,010	€351,000	€726,080	€650,830	30%
36	38kV Cubicle in 38kV Station	€158,110	€80,400	€267,670	€239,930	103%
37	38kV Cubicle in 110kV Station	€181,540	€80,400	€309,290	€277,240	97%
38	MV Cubicle in 110kV or 38kV station	€164,170	€40,200	€212,900	€190,840	41%
55	Installation of 110kV NVD (Neutral Voltage Displacement) Protection (on both Transformers) -	(New)	-	€192,820	€172,840	(New)

GSC No. 35 - New 110 kV AIS Line bay in existing 110 kV Single Busbar Outdoor Station

The comparable unit cost from the PR5 Distribution Unit Cost benchmark assessment is €736,772 for a “110kV Outdoor Open Terminal Bay”. The proposed GSC without contingency is lower than the comparable unit cost and the GHD benchmark range of 101-136% of the unit cost. Similar differences in scope between the PR5 Unit Cost and the GSC that apply to transformer packages detailed above also apply here.

The proposed GSC does not now include an indicative civils estimate of €351,000. However, the

new GSC without contingency, indexed for 2021 and with indicative civils estimate added is marginally lower than the upper end of GHD benchmark range. Note that as with other civils estimates the estimate shown here is only for indicative purposes and will be subject to the decision detailed in section 2.1.4.

Based on the comparable benchmark, the CRU is satisfied that the 2020 GSC 35 proposal without 10% contingency and indexed for 2021 is cost appropriate.

GSC No. 36 - 38 kV Cubicle in 38 kV Station

GSC No. 37 – 38 kV Cubicle in 110 kV Station

GSC No. 38 – MV Cubicle in 110 kV or 38 kV station

There is no comparator in the PR5 Distribution Unit Cost benchmark assessment for 38kV cubicles in stations (GSCs 36 - 38). However, the increase in cost of cubicles relative to the 2020 approved GSCs is of the same order as the brownfield 38kV station standard charges that have been benchmarked.

The CRU noted an increase in GSC 36 and GSC 37 since the 2018 proposals. ESB Networks have further explained that this is due to the following:

- Some of the material components included (disconnects, CTs, VTs & CB) were listed at MV in 2018 when 38kV is required, resulting in an increase of around €19k.
- Since the 2018 proposal there is also the inclusion of a more accurate telecoms and commissioning costing methodology increasing the cost by around €14k and €4k respectively
- Update of construction component costs in line with the same as those applied in PR5, resulting in €20-25k increase in construction costs for these particular items.

Based on the increase in cost over 2020 approved GSCs that are of the same order as 38kV station standard charges, and the reviews and corrections completed by ESB Networks after the 2018 submission, the CRU is satisfied that GSCs 36 - 38 without contingency and indexed for 2021 are appropriate.

GSC No. 55 - Installation of 110kV NVD (Neutral Voltage Displacement) Protection (on both Transformers) – new GSC

This a new proposed charge by ESB Networks based on its frequent use in recent connection

offers and the application of current standards that make this equipment necessary.

The reasoning for the decision for this new GSC 55 is detailed in section 2.1.2.

2.2.7 Metering Standard Charges**Table 7** Metering Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
41	38kV Meter and Power Quality	€58,550	-	€55,930	€50,130	-14%
42	MV Metering and Power Quality <10MVA	€29,280	-	€27,090	€24,280	-17%
43	MV Metering and Power Quality <10MVA (where MV CB is being charged as part of EGIP installation, no need for KKK)	€11,540	-	€20,770	€18,620	61%
44	MV Metering and Power Quality >=10MVA	€36,610	-	€28,760	€25,780	-30%
45	MV Metering and Power Quality >= 10 MVA (where CB is being charged as part of EGIP installation, no need for KKK)	€19,130	-	€22,400	€20,110	5%

Metering charges are not included in the PR5 Distribution Unit Cost benchmark assessment. The WSP 2019 GSC review recommendations resulted in the significant decrease of Design and Project Management costs, as well as elimination of telecoms and commissioning fees in Metering charges. This was somewhat balanced by an increase in construction scope, but the net effect is a reduction in the 2020 proposed GSCs versus the 2018 proposed GSCs in all cases and a reduction in the 2020 proposed GSCs versus the current GSCs in all cases except GSC 43. The CRU notes that the current GSC 43 was out of line with the other metering charges and has now been corrected (thus showing a large increase in percentage terms against the current GSCs but not in absolute terms).

Based on the decrease in metering costs for GSCs 41, 42 and 44, the remediation of the undervaluation of GSC 43, and the reinstatement of GSC 45 with pricing in line with the related GSCs, the CRU is satisfied that the metering standard charges without contingency and indexed for 2021 are appropriate.

2.2.8 Communication and Protection Standard Charges**Table 8** Communication and Protection Station Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
46	Protection Implementation for MV Connections with MEC <2MW	€15,730	-	€41,220	€36,950	135%
47	SCADA & Communications Implementation for MV Connections with MEC >=2MW	€17,190	-	€60,150	€53,920	214%
49	Protection & Switchgear for Standard MV Connection (Basic G10 type Connection)	€70,080	-	€53,520	€47,970	-32%
50	Switchgear and Embedded Generation Interface Protection (EGIP) for an MV Connection (Full fit-out of generator sub connection)	€124,620	-	€218,210	€195,600	57%
51	Embedded Generation Interface Protection (EGIP) for a 38kV Connection	€46,130	-	€86,530	€77,560	68%
52	Embedded Generation Interface Protection (EGIP) for a 110kV Connection	€62,450	-	€93,820	€84,100	35%

GSC No. 46 - Protection Implementation for MV Connections with MEC < 2 MW

The increase in GSC 46 over the 2020 approved GSC and the 2018 proposal is due to the update of the telecoms costs methodology to be based on actual scope required rather than as a percentage of construction. Previous assumptions were not reflective of actual telecoms works and costs for minor DSO Scada Works. The CRU is satisfied that GSC 46 without contingency and indexed for 2021 is appropriate.

GSC No. 47 - SCADA & Communications Implementation for MV Connections with MEC >= 2 MW

The increase in GSC 47 is in line with GSC 46 with the addition of a proportionally higher telecoms increase for DSO SCADA, poling radio, survey and service delivery per circuit, which is in line with current installations. The CRU is satisfied that GSC 47 without contingency and indexed for 2021 is appropriate.

GSC No. 49 - Protection & Switchgear for Standard MV Connection (Basic G10 type Connection)

This proposed GSC is lower than the 2018 proposed GSC and the 2020 approved GSC. The scope of this GSC has been appropriately redefined. The CRU is satisfied that GSC 49 without contingency and indexed for 2021 is appropriate.

GSC No. 50 - Switchgear and Embedded Generation Interface Protection (EGIP) for an MV Connection (Full fit-out of generator sub connection)

Following review, the assumptions used in the 2018 proposal for this charge were no longer valid and have been updated to reflect current EGIP solution for MV Connection in line with recent LEAN connection projects. Note the 2018 proposal was lower than the 2020 approved GSCs.

This is reflective of the latest technology currently being installed, whereas GSC 49 is the basic G10 type Nulec option (older technology). This is line with current LEAN connection design solutions and has resulted in an increase since 2018 across all cost components.

This charge reflects the full costs of installing both EGIP protection and Siemens NX Plus Switchgear up to the interface, where a developer builds a new mini-station building to house the full fit-out of both. Along with the EGIP protection relays and the switchgear, this scope also includes a new Control Panel, AAP, batteries and distribution board.

In this situation the MV EGIP is already integrated into the switchgear and can only be installed as a complete package. In the similar 38kV / 110kV GSCs 51 and 52, the EGIP can be installed as an add-on C&P panel and relays to the existing stations and does not required any additional switchgear. This is the main difference for the cost differential between MV (GSC 50) and 38 / 110kV (GSCs 51 and 52).

Based on the detailed reviews carried out by ESB Networks since the 2018 proposals and further discussion after the consultation, the CRU is satisfied that GSC 50 without contingency and indexed for 2021 is appropriate.

It should be noted here that ESB Networks is developing a modular solution for MV EGIP standard substation with self-contained housing to eliminate the need for building by project developer. ESB Networks undertook a consultation on this solution which closed in January 2021. The MV EGIP std module substation is still in the pilot phase and there are five modules planned for assembly as part of the pilot in 2021. There will be an industry showcase event for this solution, currently planned for Q2 at ESB Networks national training centre in Portlaoise. Following the completion of the pilot projects, the module costs will be built up in GSC format and presented to CRU in for approval as a new GSC in advance of issuing ECP-2.2 connection offers.

GSC No. 51 - Embedded Generation Interface Protection (EGIP) for a 38 kV Connection

GSC No. 52 - Embedded Generation Interface Protection (EGIP) for a 110 kV Connection

As with GSC 50, the 2018 proposed GSCs 51 and 52 were lower than the corresponding 2020 approved GSCs. However, the 2018 proposed GSCs incorrectly assumed a percentage estimate for in-house design, which was updated on review to reflect the specialist external design required. The telecoms and commissioning costs were previously based on a percentage of construction costs which were found to be undervalued once revised to reflect the specific scope of the works for this charge. These costs are now estimated specifically rather than on a percentage basis of construction.

Based on the detailed reviews carried out by ESB Networks since the 2018 proposals and further discussion after the consultation, the CRU is satisfied that GSCs 51 and 52 without contingency and indexed for 2021 are appropriate.

2.2.9 - 38kV Customer Compound (at generator site) Standard Charges

Table 9 38kV Customer Compound Station (at generator site) Standard Charges - GSCs

GSC	Charge Description	2020 approved GSCs	Indicative civils estimate	ESBN 2020 Proposed (exc. civils)	CRU 2021 Decision (exc. civils)	% change 2021 (inc. civils) vs 2020 approved
53	ESB Networks compound with over the fence connection to developer – overhead connection	€322,360	-	€558,780	€500,870	55%
54	ESB Networks compound with over the fence connection to developer – underground connection	€326,200	-	€595,600	€533,870	64%

GSC No. 53 - ESB Networks compound with over-the-fence connection to developer – overhead connection

GSC No. 54 - ESB Networks compound with over-the-fence connection to developer – underground connection

There is no comparator in the PR5 Distribution Unit Cost benchmark assessment for 38kV customer compound with over-the-fence connection to developer (GSCs 53 and 54). However, the increase in cost of these GSCs relative to the 2020 approved GSCs is of the same order as the greenfield 38kV station standard charges that have been benchmarked.

The primary reason for increase over 2018 proposed GSCs and 2020 approved GSCs is the definition of telecommunications. This was previously based on an incorrect assumption of 1%

estimate of total construction costs, which did not allow for the specific telecom works required for a new overhead or underground compound connection. The telecoms cost now includes specific estimates to include full SCADA RTU, Polling radio (survey & installation) including Satellite (with additional fibre elements in station, fibre link and commissioning for underground connections).

Due to this increased scope the design and project management also increased although this was somewhat offset by a reduction in construction costs following a review of electrical components and removal of additional costs no longer deemed necessary.

Based on the increase in cost that is of the same order as the greenfield 38kV station standard charges that have been benchmarked, and given the detailed reviews and corrections carried out by ESB Networks since the 2018 proposals, the CRU is satisfied that GSCs 53 and 54 without contingency and indexed for 2021 are appropriate.

2.3. Cost recovery of GSCs

The CRU policy for Standard Prices for Generators set out in [CER/05/090](#) requires the GSCs to recover the costs incurred by the DSO from the generator for those items in the connection offer and limit any potential subsidy covered by ESB Networks (and ultimately, depending on the outcome of ESB Network price reviews, impacting on the UoS customer).

However, that decision outlined that “the Commission considers that the risk that the sum of all actual connection costs may exceed the sum of all standard charges for a given volume, or period, of connection offers, should not fall exclusively, or even largely, on the applicants in question.”

ESB Networks has established through its reviews that it is not possible to entirely eliminate subsidy without being overly conservative in the estimation of likely construction costs and therefore running the risk of discouraging many potential generation developers (ESB Networks customers) required to develop projects in order to meet national climate action targets.

The reasons for customer contribution cost under recovery include the following:

- Connection offers are processed based on a desk top study (with site visit for that purpose) and are not the result of a detailed project specific scoping exercise or detailed design after a thorough site investigation.
- Delays between when an offer is issued and when works commence resulting in the quoted charges not accounting for changes in the intervening period including cost movements, changes to the distribution system configuration, work practices and new or revised standards. For example, some generators received an original connection offer in 2011 but were not in a position to proceed until up to 8 years later.
- Most renewable generation connection built to date has been wind generation sites, which have tended to be sited in remote locations in difficult terrain where the wind conditions are optimal. This offers a number of challenges resulting in higher than average costs for such developments that are not reflected in the GSCs, for example difficult site access conditions and risk of poor weather.
- Outage restrictions can drive work outside normal hours or for a project to be expedited with associated cost implications.
- Challenges on complex brownfield sites with interfacing modern generation connection equipment into older substations.

The mitigation of the above challenges by new connection and support policies for generators in part explains the increased ambition for customer connection cost recovery (and thus less revenue for ESB Networks) in the area of generation connections as detailed in the PR5 DSO revenue 2021-2025 decision paper ([CRU/20/153](#)).

In terms of the revised GSCs, to give an indication of the scale of change that would arise out of updating the GSCs as proposed, ESB Networks completed an analysis of recent ECP-1 offers with a total capacity of 800MW. The cost recovery from GSCs using ESB Networks proposed GSCs was €17.2 million more than the 2020 approved GSCs (€74 million versus €56.8 million). This gave an average reduction in subsidy of €21,500/MW.

ESB Networks forecast 2,200 MW of new generation connections in its next price review period, PR5 (2021-2025). 1,260 MW of this new generation will receive new connection offers and thus subject to the new proposed GSCs. (Note there is 940 MW of new generation connections forecast in the PR5 period with existing connection agreements/offers with current GSCs). At an approximate level, using the average reduction per MW above this equated to €27 million of subsidy over the course of PR5 due to under recovery of the 2020 approved GSCs.

This decision, by removing 10% contingency from ESB Networks 2020 proposals and indexing for 2021 (a decrease of 1.4%), decreases the average reduction in subsidy. However, as the newly approved GSCs are mostly increasing from the 2020 approved values the subsidy is still being considerably reduced. This is enhanced further by the decision to remove remaining embedded civil construction charges where possible and charge them on a pass through basis.

In summary, the price review analysis, and the project level analysis in the consultation both demonstrated significant customer cost under recovery relative to the total DSO generation connection expenditure. This will be improved by the revised GSCs approved by this decision.

3. Next Steps

The next steps to implement this decision are as follows:

- ESB Networks to publish the new version of “Standard Prices for Generator Connections 2021” (CRU/21/035a) incorporating the changes made by this decision.
- ESB Networks to use the new GSCs approved by this decision for ECP-2.1 offers and all distribution connection offers in the remainder of 2021.
- As per standard practice, ESB Networks will submit revised “Standard Prices for Generator Connections 2022” towards the end of 2021 including indexation for 2022 (using the Harmonised Index of Consumer Prices) in line with inflation for CRU approval.
- The next comprehensive review by ESB Networks of the GSCs approved by this decision will not be earlier than 2023 (2024 implementation) i.e., these approved GSCs, allowing for inflation, will apply until at least after ECP-2.3 offers.
- The CRU will review new proposed GSCs from ESB Networks resulting from innovation work or other programmes (e.g., the MV EGIP Modular Connection referenced in section 2.2.8) and consult with industry where necessary.

4. Supplementary chapter: Summary of responses to CRU/20/144

The following provides a summary of stakeholders' responses to the GSC consultation paper [CRU/20/144](#), together with a short commentary to explain how the points raised have been addressed now in this (final) decision.

The CRU received nine responses including a joint response from the following associations: WEI, ISEA, IWFA, ESI and IrBEA. Non-confidential responses are published on the CRU's consultation website, and a list of parties who submitted them is provided in Appendix 2. The CRU received no confidential responses. Following a review of the consultation responses, the CRU also discussed the responses with ESB Networks and subsequently received a response from ESB Networks on the pertinent points which is also published alongside this decision paper (CRU/21/035b).

The views and the supporting evidence from the consultation responses, and ESB Networks further response, were considered by the CRU in finalising this decision. In some areas, this is explicit in the reasoning presented in previous chapters of this decision. In the following paragraphs, some additional observations are made in response to the main points raised in the written submissions.

4.1 GSC cost recovery efficiency

In section 2.2 of the consultation, the CRU set out the policy in relation to appropriate cost recovery from generators of ESB Networks expenditure incurred by the generators connection (consultation question 1). This section then reviewed the cost recovery efficiency of the existing GSCs in PR4 and at a project level with a large sample of projects from the PR4 period.

The following were two key points raised by respondents in respect of this element of the consultation along with the response from the CRU:

- A comment about higher pass through costs affecting the cost recovery assessment. This is an incorrect assertion as the pass through costs are not included in the cost recovery assessment (other than the effect of removing embedded civil construction costs from some GSCs which leads to an improvement in recovery as the costs are then passed through).
- There was a concern that some of the cost under recovery in the project-level assessment may have been because some projects have not yet paid for shared works.

ESB Networks have confirmed the shared costs from all the projects in the project-level assessment were included in demonstrating the cost under recovery.

4.2 ESB Networks review process

In section 2.3 of the consultation, the CRU detailed the review process undertaken by ESB Networks from 2018 to final GSC proposal submission in 2020.

The following is a summary of the key points and themes raised by respondents in respect of this element of the consultation:

- The full detail of the GHD review has not been made available and more transparency on the WSP review was also requested. The scale of the cost increases proposed requires more transparency and detail for industry to consider than just a high-level comparison with some UK DNOs.
- The transparency on [the unit cost] benchmark not satisfactory. Industry has not had sufficient opportunity to review and challenge the cost review process that was outlined in the consultation paper.
- The methodology and research supporting the independent reports included alongside this consultation paper should be made public i.e., the Independent Expert Capex Unit Cost Benchmarking Report as referenced in the joint report from GHD and CEPA dated July 2020.

In addition to the reasoning and commentary presented in section 2.2 of this decision, the CRU notes the following in relation to these responses:

- The level detail of the GHD (and WSP) benchmarking assessment published for the purpose of PR5 decision is appropriate for the benchmarking of GSCs. The GHD databases are based on both UK and international experience. Relevant detail regarding this is described in the PR5 report.
- The 2019 WSP benchmark review (of 8 GSCs) was carried out for ESB Networks and although was important in establishing recommendations for further review, this report in itself was not used by the CRU for this decision as the costs have changed since then as described throughout section 2.2.
- The CRU notes the submission of high-level industry average cost information for some specific GSCs in the joint association response. After the CRU request, this was followed up with additional information around the data points used for these averages. The CRU notes ESB Networks comments on the industry values in its further response (CRU/21/035b). For such industry information to be fully incorporated into such a review

would require more extensive scope breakdown for comparison. Such future reviews could incorporate detailed industry cost information as appropriate. That said, the industry data did prompt further questioning of ESB Networks resulting in further explanations provided (as per ESB Networks further response CRU/21/035b and covered in section 2.2 where appropriate).

4.3 Cost appropriateness – general comments

In section 2.4 of the consultation, the CRU detailed the review of ESB Networks proposals for cost appropriateness of GSCs (consultation question 2).

The following is a summary of the key points and themes raised by respondents in respect of the general element of this part of the consultation:

- The impact that ESB Networks ongoing LEAN connections project should have on decreasing costs to generators as well as the scheduling of GSC review to account for this project and the incentivisation for ESB Networks efficiency on costs by the CRU in general
- Comments on analysis for the increase of costs by the CRU and the measures to be taken by ESB Networks to reduce costs
- Recommendation for a more robust and regular process of monitoring and auditing the costs
- Concerns about the cost of non-contestable works in existing ESBN stations where ESBN should understand the nature and complexity of its own network and stations.
- The GSC charges are not estimates and therefore contingency should not be included
- Costs associated with inefficiencies around working time regulations and flexible working arrangements should not be recovered as part of the GSCs.

In addition to the reasoning and commentary presented in section 2.1 and 2.2 of this decision, the CRU notes the following in relation to these responses:

- The CRU notes ESB Networks description of the purpose, projected impact, and timing of the LEAN connections project in its further response (CRU/21/035b). The delivery timelines to connect generator connections will be reported via the regulatory framework for incentives and re-reporting determined by PR5 and currently being further defined with the CRU.
- The CRU does not equate the increase in the GSCs with an increase in expenditure by ESB Networks as implied by industry responses. The increase in GSCs is to reflect the

cost appropriate amount already being expended/forecast to be expended by ESB Networks for the purpose of generator connections. This is further reflected in the expectation of increased recovery of expenditure from generators in the PR5 decision.

- The CRU understands the call for more regular and detailed review of GSCs but has to balance this against the scale of positive impact for both generators and consumers when considering the CRU's annual workplan. The CRU also wants to provide project developers with a level of certainty on GSCs over the ECP-2 period (2021-2023).
- Whilst it may seem intuitive that non-contestable costs should be better understood by ESB Networks, it has described at length in its further response the additional complexity impacting on cost of working at a brownfield site. In any case, the CRU has decided not to allow contingency on any of the GSCs and has assessed that the increase in non-contestable GSCs appropriately covers the cost to ESB Networks of a standard design.
- ESB Networks have responded on issues around working time regulations and flexible working arrangement and the CRU is satisfied that no further consideration is necessary with respect to the appropriateness of GSCs.

4.4 Cost appropriateness – comments related to specific GSCs

In section 2.4 of the consultation, the CRU detailed the review of ESB Networks proposals for cost appropriateness of GSCs (consultation question 2).

The following is a summary of the key points and themes raised by respondents in respect of specific GSCs:

- Concern on the increase of GSC 12 (110kV cable end mast) for what is relatively rudimentary apparatus.
- The comparison of 33:132kV transformers with 38:110kV transformers.
- The increasing value of GSCs for transformers and the resultant impact on connections requiring new transformers, particularly at the MV level.
- The increase of value of GSCs in 38kV cubicles outside of the ESB Networks oversight regarding MV and 38kV equipment.
- The increasing value of GSCs (in some cases) related to metering and protection versus the expectation that technology developments should lower costs in such areas
- The expectation that ESB Networks does not have significant experience in delivering customer compounds recently (due to contestability) and concerns over the scope of such assets

The reasoning underpinning the CRU's decision in relation to the appropriateness of specific GSCs is presented in section 2.2 of this decision. The above concerns were taken into account in the final questioning of ESB Networks and presented in this decision where appropriate. The CRU also notes the responses to these specific issues in the further ESB Networks response (CRU/21/035b).

4.5 New charges

In section 2.4 of the consultation, the CRU detailed the new GSCs 9a and 55 proposed by ESB Networks as part of this review (consultation question 3).

The following is a summary of the key points and themes raised by respondents in respect of specific GSCs:

- Concern on design and project management costs for the new charges as raised by the CRU in the consultation
- Questions over the need for NVD protection and its cost relative to non-standard item cost for this previously.

The reasoning underpinning the CRU's decision in relation to the technology and cost appropriateness of new GSC 55 and the pro-rata of proposed GSC 9a back into GSC 9 is presented in section 2.1.2 of this decision.

4.6 GSCs with civils charge only – for refunds purposes

In section 2.4 of the consultation, the CRU detailed the GSCs with civils charges only proposed by ESB Networks as part of this review (consultation question 4).

The following is a summary of the key points and themes raised by respondents in respect of GSCs for civils refunds:

- The joint associations committed to providing recommended charges. These have subsequently been accepted by the CRU as described in section 2.1.6
- Concern that these charges were not capped for pass through costs. (Note these charges are not passed through and are only used for refund purposes).

4.7 Discontinued charges

In section 2.5.1 of the consultation, the CRU detailed the discontinuation of 17 GSCs proposed by ESB Networks as part of this review (consultation question 5).

The following is a summary of the key points and themes raised by respondents in respect of discontinued charges:

- Support for the principle of removing items from the standard list that are no longer being used
- Maintain GSC 4 (38kV overhead lines 300 mm² ACSR) for uprating
- Maintain GSC 33 (Uprate 2 * 5 MVA to 2 * 10 MVA) for LCTA options
- Maintain GSC 45 (MV Metering and Power Quality \geq 10 MVA [where MV CB is being charged as part of EGIP installation, no need for KKK]) for rebate purposes.

The reasoning for the CRU's decision to reinstate GSC 33 and 45 is presented in section 2.1.3 of this decision. This re-instatement was proposed by ESB Networks on review on consultation responses.

For GSC 4, ESB Networks state that this GSC has not been used over the past number of years and would not be considered in an LCTA calculation, as well as providing an alternative method of assessment should this charge be needed again. The CRU accepts ESB Networks recommendation to discontinue GSC 4 on this basis.

4.8 Removal of embedded civil construction charges

In section 2.5.2 of the consultation, the CRU detailed the removal of embedded civil construction charges from 15 GSCs proposed by ESB Networks as part of this review (consultation question 6).

The following is a summary of the key points and themes raised by respondents in respect of removing remaining embedded civil construction charges where possible:

- The welcome process that determines better pass-through estimates in ECP-1 should be used as the basis for standard civil charges for GSCs. Civils for works in existing stations should be based on average costs and included in GSCs.
- Generators need certainty on costs and must be protected from major additional costs incurring after construction starts.
- If civil charges remain embedded and costs for civil works turn out higher than the embedded allowance, this will generally serve to improve the stations where the work is carried out and generally provide a future benefit for DUoS customers.

The reasoning for the CRU's decision to remove remaining embedded civils charges where possible as proposed by ESB Networks is presented in section 2.1.5 of this decision.

In addition, the CRU understands the desire for project developers to have as much cost certainty as possible from an early stage and is therefore directing ESB Networks to ensure that estimation as pass through costs of the civils that are removed by this decision are included at the offer stage in the manner adopted for other civils pass through costs. This decision regularises the consistency of treatment of civil construction charges across all GSCs.

4.9 Pass through costs

In section 2.5.3 of the consultation, the CRU highlighted the list of “Pass Through Costs” proposed by ESB Networks in its Standard Pricing document and asked for feedback on this list (consultation question 7).

The following is a summary of the key points and themes raised by respondents in respect of pass through costs:

- Support for the improvements made by ESB Networks to estimating pass through costs at the connection offer stage and the general improved communication on pass through costs by ESB Networks.
- Request for greater transparency for how pass through costs are arrived at and agreed between ESB Networks and connecting parties with recommendations on how this may be achieved
- Request for ongoing reviews of the pass through cost estimation process based on experience
- Questions on outage constraints and flexible working hours in relation to pass through costs
- Request for clarity on whether initial estimates of civil charges are fixed, or the final cost of the civils works are passed through (the CRU notes here that it is the latter as described previously)
- Request for clarity the mechanisms in place to ensure accuracy of estimate and what controls will be in place to ensure the actual civil cost incurred by the DSO is reasonable (given that there is a risk of lack of scrutiny as ESB Networks are not ultimately incurring the expenditure)

The reasoning for the CRU’s decision to accept pass through costs as proposed by ESB Networks is presented in section 2.1.6 of this decision. The points raised above are also addressed in that section and in further detail by ESB Networks response CRU/21/035b.

4.10 Other issues raised in consultation responses

The following are other key points raised by respondents in respect of ESB Networks proposals to change the GSCs and the CRU 's response to these.

- **Impact on small renewable energy generation projects.** In addition to the joint association provided specific GSC industry costs, an evaluation of impact on small projects was also provided. The CRU requested that ESB Networks detail an example of the impact of new GSCs on a small renewable energy generation project that accepted its offer in ECP-1.

This is presented in Appendix 3 and results in a 7% increase in DSO connection cost in this example and 6% increase when TSO costs are included. There is an increase of around €7,000/MW in this example. This example shows that some of the increases in GSCs for the equipment needed for small projects in some instances are somewhat offset by the decrease in GSCs also needed including overhead lines, meter and basic EGIP protection.

The CRU understands that this is straightforward connection with favourable GSCs and that other projects will need more equipment incurring higher connections costs.

However, this is the case regardless of GSC pricing and the viability of a small project is likely to more affected by its connection methodology than by the change in GSCs approved by this decision.

The CRU's decision in this paper is seeking to ensure that GSCs are cost appropriate (efficiently incurred and efficiently recovered from generators). The viability of renewable energy generation projects in relation to RESS auctions is a matter for the project developers to consider. The CRU notes that the GSCs are only one part of the total connection charge, and the connection charge is one part of the total expenditure needed for a renewable energy generation project.

- **Applicability of charges to projects on hold and projects requesting modifications.** Clarity was requested on circumstances when projects would be put on hold and how the new GSCs are applied thereafter (including with modifications). The CRU accepts the following response from ESB Networks which includes discussion on modification levels as per CRU approved Joint system operator paper on "Modification Fees for Connection Offers"²².

²² https://www.esbnetworks.ie/docs/default-source/publications/joint-dso-tso-fees-amp-process-for-connection-offer-modification.pdf?sfvrsn=fc4433f0_4

ESB Networks response: “Post connection agreement execution, ESB Networks commence the scoping of the project funded by the first stage payment. If planning permission is required, the submission will be prepared and submitted to the relevant authorities. Once scoping is complete and planning permission is in place, ESB Networks will invoice for the second stage payment, if at this stage a project is not ready to progress by paying the second stage payment, ESB Networks would put the project on hold.

When the project comes off hold and is ready to progress, the approved GSCs in place at that time should be applied as no materials will have been ordered or detailed design have commenced. In the case of minor contract modifications (Level 1 & 2) the GSCs applied in the contract at time of issue would continue to apply. It would be proposed where more a significant modification is required (Level 2.5 +) i.e., a detailed technical study is required and EirGrid SOCA, the approved charges in place at that time would apply. “

- **Contestable works.** Request for ESB Networks to make the process of contesting works easier to navigate, such as providing publicly available information on the specifications and drawings for standard layouts and connection equipment. ESB Networks have responded to this request in its response CRU/21/035b.
- **Transformer capacity calculation.** Question on ESB Networks methodology for determining allowances for transformer overload and the related consultation and communication on this point. ESB Networks have responded to this request in its response CRU/21/035b.
- **Smarter grid connections.** Concerns on the pace of development of smarter grid connections and new standards by ESB Networks which could result in more efficient solutions, thereby helping customers avoid excessive works, connection delays and charges where necessary. The CRU will monitor ESB Networks Innovation in this area as part of the PR5 decision on Regulatory Framework, Incentives and Reporting.
- **Charging policy for energy storage.** Whilst IESA were broadly supportive of ESB Networks 2020 GSC proposals, it was concerned about the applicability of the GSCs to energy storage projects. Energy storage charging policy will be covered in upcoming CRU workstreams. Currently, the GSCs will apply to all generation, storage, and system technologies greater than 6kW (single phase) and 11kW (three-phase) connecting to the network.

- **Timing of proposed changes.** There were some concerns about the timing of the proposed GSCs in relation to the ECP-2.1 and the perceived lack of warning for the scale of proposed changes. The CRU notes that industry was aware of the initial GSC review process as published in 2018 and 2019 and that this would lead to revised proposals in 2020. These revised proposals were published by ESB Networks in August 2020 (in advance of the ECP-2.1 application window) and stakeholder associations were alerted to this by the CRU. The CRU also notes that the new GSCs will be applied for Phase 2 of the early engagement process in ECP-2.1 (the conclusion of which allows the applicant to continue the offer process or exit with 75% refund of application fees).
- **Community renewable energy generation projects.** The CRU notes the proposals suggested by Community Power for community renewable energy generation projects in relation to grid connection. The CRU would welcome further discussion with community stakeholders to understand how barriers can be lowered for such projects in the area of grid connection. In particular, the CRU sees some merit in further investigating the idea of standardised grid connection costs for community renewable energy projects and would be open to discussing this matter further with Community projects and ESN.

Appendix 1 – GSCs approved by this decision

CRU	Charge Description	2020 approved GSCs	Indicative Estimate of Civils	2020 proposed GSCs (exc. Civils)	2021 CRU decision (exc. Civils)	% change 2021 (inc. civils) vs 2020 approved
5	38kV SC Woodpole 150mm2 AAAC 80oc	€88,830	-	€98,470	€88,260	-1%
7	MV SC Woodpole 150mm2 AAAC / 92mm2 SCA 65oc	€52,700	-	€51,820	€46,450	-12%
8	110kV – 630mm2 XLPE (AL) Single Circuit	€357,210	-	€379,130	€339,840	-5%
9	38kV – 630mm2 XLPE (AL) Single Circuit	€128,830	-	€124,880	€111,940	-13%
10	MV – 400mm2 XLPE (AL) Single Circuit	€58,550	-	€39,020	€34,980	-40%
12	110kV Cable End Mast	€163,960	-	€247,010	€221,410	35%
13a	110kV Cable Civils— Roadway Day	€152,910	€379,210	€379,210	€314,500	106%
13b	38kV Cable Civils – Roadway Day	€152,910	€379,210	€379,210	€205,000	34%
14	MV Cable Civils – Roadway Day	€53,090	€210,850	€210,850	€144,740	173%
18	110kV/38kV 63MVA Green Field Transformer Package	€1,582,630	€47,100	€1,737,450	€1,557,390	1%
19	110kV/38kV31.5MVA Green Field Transformer Package	€1,223,490	€47,100	€1,430,600	€1,282,340	9%
20	110kV/MV 20MVA Green Field Transformer Package	€1,060,610	€47,100	€1,143,630	€1,025,110	1%
21	110kV/MV 31.5MVA Green Field Transformer Package	€1,297,070	€47,100	€1,315,500	€1,179,170	-5%
23	Uprate 2*31.5MVA to 2*63MVA	€2,927,940	€240,300	€3,678,490	€3,297,260	21%
24	Civil works for a Typical Outdoor 110kV Station	€1,097,790	€1,531,120	€1,531,120	€1,000,000	-9%
26	5MVA 38kV/MV Green Field Transformer Package	€511,610	€47,100	€809,740	€725,820	51%
28	15MVA 38kV/MV Green Field Transformer Package	€586,690	€47,100	€1,017,430	€911,990	63%
29	Install 5MVA 38kV/MV Transformer into Existing Station + 38kV Busbar Extension	€525,070	€142,400	€848,460	€760,530	72%
30	Install 10MVA 38kV/MV Transformer into Existing Station + 38kV Busbar Extension	€569,900	€142,400	€929,860	€833,490	71%
31	Install 5MVA 38kV/MV Transformer into Existing Station + No 38kV Busbar Extension	€415,470	€142,400	€786,280	€704,790	104%

32	Install 10MVA 38kV/MV Transformer into Existing Station + No 38kV Busbar Extension	€459,820	€142,400	€867,680	€777,760	100%
33	Uprate 2 * 5 MVA station to 2 * 10 MVA	€1,756,770	€469,000	€1,957,880	€1,754,970	27%
34	Civil Works for a Typical Outdoor 38kV Station	€439,120	€904,160	€904,160	€563,620	28%
35	New 110kV AIS Line Bay in Existing 110kV Single Busbar Outdoor station (Strung/Tabular Busbar)	€771,010	€351,000	€726,080	€650,830	30%
36	38kV Cubicle in 38kV Station	€158,110	€80,400	€267,670	€239,930	103%
37	38kV Cubicle in 110kV Station	€181,540	€80,400	€309,290	€277,240	97%
38	MV Cubicle in 110kV or 38kV station	€164,170	€40,200	€212,900	€190,840	41%
55	Installation of 110kV NVD Protection (New GSC)	New	-	€192,820	€172,840	New
41	38kV Meter and Power Quality	€58,550	-	€55,930	€50,130	-14%
42	MV Metering and Power Quality <10MVA	€29,280	-	€27,090	€24,280	-17%
43	MV Metering and Power Quality <10MVA (where MV CB is being charged as part of EGIP installation, no need for KKK)	€11,540	-	€20,770	€18,620	61%
44	MV Metering and Power Quality >=10MVA	€36,610	-	€28,760	€25,780	-30%
45	MV Metering and Power Quality >= 10 MVA (where CB is being charged as part of EGIP installation, no need for KKK)	€19,130	-	€22,400	€20,110	5%
46	Protection Implementation for MV Connections with MEC <2MW	€15,730	-	€41,220	€36,950	135%
47	SCADA & Communications Implementation for MV Connections with MEC >=2MW	€17,190	-	€60,150	€53,920	214%
49	Protection & Switchgear for Standard MV Connection (G10 type Connection)	€70,080	-	€53,520	€47,970	-32%
50	Embedded Generation Interface Protection (EGIP) for an MV Connection	€124,620	-	€218,210	€195,600	57%
51	Embedded Generation Interface Protection (EGIP) for a 38kV Connection	€46,130	-	€86,530	€77,560	68%
52	Embedded Generation Interface Protection (EGIP) for a 110kV Connection	€62,450	-	€93,820	€84,100	35%
53	ESB Networks compound with over the fence connection to developer – overhead connection	€322,360	-	€558,780	€500,870	55%
54	ESB Networks compound with over the fence connection to developer – underground connection	€326,200	-	€595,600	€533,870	64%

Appendix 2 – Consultation CRU/20/144 responses

Non-confidential responses to GSC Consultation

These responses are published alongside this decision paper on the CRU website – Generator Standard Charges document group.²³

1. Community Power
2. EAI (Electricity Association Ireland)
3. EDF Renewables
4. Elgin Energy
5. Energia
6. IESA (Ireland Energy Storage Association)
7. IrBEA (Irish Bioenergy Association)
8. Joint association response - WEI (Wind Energy Ireland), ISEA (Irish Solar Energy Association), IWFA (Irish Wind Farmers Association), ESI (Energy Storage Ireland), IrBEA (Irish Bioenergy Association)
9. RES Ltd

²³ https://www.cru.ie/document_group/generator-standard-charges/

Appendix 3 – Impact of new GSCs on small renewable energy generation

	Renewable Energy Generation project (6MW) with an MV connection made up of 5.5km of 150s AAC OHL into a 38kV Station.		2020 approved GSCs	CRU 2021 decision GSCs
	DSO Costs	QTY		
GSC#7	MV 150AAC / 92 SCA	5.5	€289,850	€255,475
GSC#38	MV Cubicle in 110kV or 38kV station	1	€164,170	€190,840
GSC#42	MV Metering and Power Quality < 10MVA	1	€29,280	€24,280
GSC# 49	Embedded Generation Interface Protection (EGIP) for an MV connection. Charge assumes NULEC option is LCTA.	1	€70,080	€47,970
GSC# 47	SCADA and Protection Implementation for MV connections with MEC >=2MW	1	€17,190	€53,920
Associated with GSC#38	Pass Through Cost- Estimated Civils on MV Cubicle GSC#38			€40,200
	DSO Total		€570,570	€612,685
	Increase over current GSCs			7%
	TSO Costs (100% of the non-contestable charge associated with RTU)	1	€91,080	€91,080
	No Shared costs			
	No Refund Costs			
	TOTAL		€661,650	€703,765
	Increase over current GSCs			6%
	Cost / MW		€110,275	€117,294