



**SONI LTD**

**TRANSMISSION CONNECTION CHARGING METHODOLOGY  
STATEMENT**

**DECEMBER 2009**

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## 1 Introduction

- 1.1 SONI Ltd is the Transmission System Operator for Northern Ireland. It is authorised to participate in the transmission of electricity by means of a licence issued by The Department of Enterprise, Trade and Investment (the “**Department**”), under Article 10(1)(b) of the Electricity (Northern Ireland) Order 1992 (the “**Order**”). It is regulated by the Northern Ireland Authority for Utility Regulation (the “**Authority**”).
- 1.2 Under the **Transmission Licence** SONI is responsible for operating the **Transmission System** in Northern Ireland, a system consisting of some 2,000 circuit kilometres of 110kV and 275kV overhead line and cable with a maximum demand of about 1,850MW.
- 1.3 It is the only party in Northern Ireland entitled to offer terms to enter into a **Connection Agreement** (or to amend an existing **Connection Agreement**) for connection (or modification of an existing connection) to the **All Island Transmission Networks** at entry and exit points on the **Transmission System**. Such terms are offered following receipt by SONI of an application containing all such information as SONI may reasonably require for the purpose of formulating the terms of the offer.
- 1.4 SONI is required by Condition 30 of the **Transmission Licence** to, in co-operation with the **Republic of Ireland Transmission System Operator**, prepare (and obtain the **Authority’s** approval to) a statement setting out the basis upon which charges will be made for connection to the **All-Island Transmission Networks** and this statement is published to meet that obligation.
- 1.5 This statement is required to include:
- 1.5.1 a schedule listing those items (including the carrying out of works and the provision and installation of electric lines or electrical plant or meters) of significant cost liable to be required for the purpose of connection to the **All-Island Transmission Networks** for which connection charges may be made or levied and including (where practicable) indicative charges for each such item and (in other cases) an explanation of the methods by which and the principles on which such charges will be calculated;
  - 1.5.2 the methods by which and the principles on which any charges will be made in respect of extension or reinforcement of the **All-Island Transmission Networks** rendered necessary or appropriate by virtue of providing such connection to the **All-Island Transmission Networks**;
  - 1.5.3 the methods by which and the principles on which connection charges will be made in circumstances where the electric lines or electrical plant to be installed are of greater size or capacity than that required for use of system by the person seeking connection;
  - 1.5.4 the methods by which and the principles on which any charges (including any capitalised charge) will be made for maintenance and repair required of electric lines, electrical plant or meters provided and installed for making a connection to the **All Island Transmission Networks**;
  - 1.5.5 the methods by which and the principles on which any charges will be made for the provision of special metering or telemetry or data processing equipment by
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SONI for the purposes of enabling any person which is bound to comply with the **Grid Code** to comply with its obligations in respect of metering thereunder, or for the performance by SONI of any service in relation thereto;

- 1.5.6 the methods by which and principles on which any charges will be made for disconnection from the **All Island Transmission Networks** and the removal of electrical plant, electric lines and ancillary meters following disconnection; and
- 1.5.7 such other matters as shall be specified in directions issued by the **Authority** from time to time.
- 1.6 This statement is reviewed, in co-operation with the **Republic of Ireland Transmission System Operator**, at least once in every year in order that the information set out shall continue to be accurate in all material respects.
- 1.7 Any revisions will be made with the approval of the **Authority**.
- 1.8 A copy of this statement can be obtained from SONI's website at [www.soni.ltd.uk](http://www.soni.ltd.uk).
- 1.9 Details on the processes to be followed in applying for a connection to the **All Island Transmission Networks** can also be found at this website.
- 1.10 Expressions used in this statement have the definitions given to them in the **Order** unless otherwise defined herein and shall be construed accordingly. Terms which are capitalised and in bold type are defined in section 12 of this document.
- 1.11 Persons being connected to the system will be required to enter into an agreement(s) with SONI setting down the terms and conditions which will apply in providing a connection. In the event of any inconsistency with this statement the agreement(s) will take precedence.
- 1.12 Where the person seeking a connection to the **All Island Transmission Networks** is not satisfied with the terms offered and agreement with SONI cannot be reached within a reasonable time, either party may request a determination of any of the terms and conditions of connection by the **Authority**.

## **2 Charging Methodology Objectives**

- 2.1 The connection charging methodology is designed to ensure:
- 2.1.1 the recovery of the appropriate proportion of the costs directly or indirectly incurred (or to be incurred) in carrying out the works, extension or reinforcement in question and in providing, installing, maintaining and repairing (and, following disconnection, removing) the electrical lines, electrical plant, meters, special metering, telemetry, data processing equipment or other items in question;
  - 2.1.2 the recovery of a reasonable rate of return on the capital represented by such costs;
  - 2.1.3 that charges are based on clear and transparent rules: and
  - 2.1.4 that SONI does not unduly discriminate between any persons or class or classes of persons.

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### 3 Connection Charging Methodology

- 3.1 In order to calculate transmission charges, SONI categorises assets as either “**Connection Assets**” or “**System Assets**”.
- 3.2 In connecting to the **All-Island Transmission Networks** a new **User** may connect to either **Connection Assets** or to **System Assets**, and the connection charge payable will vary in each circumstance.
- 3.3 Any person wishing to enter into a **Connection Agreement** (or to amend an existing **Connection Agreement**) for connection (or modification of an existing connection) to the **All Island Transmission Networks** at entry or exit points on the **Transmission System** will be required to pay for:
- 3.3.1 either the estimated or the outturn cost of the new or modified **Connection Assets**, as defined in section 4;
  - 3.3.2 a proportion of the estimated or outturn cost of any new **Connection Assets** which are to be shared with others who are connecting simultaneously, if any;
  - 3.3.3 a proportion of the cost of any existing **Connection Assets** to be shared with other **Users** who are already connected, if any;
  - 3.3.4 the estimated or outturn cost of decommissioning transmission assets resulting from the new or modified connection, if any; and
  - 3.3.5 certain pass-through costs which will be set out in the offer of connection. For example, any environmental planning costs, any costs incurred in acquiring planning consents, any costs incurred in complying with any conditions of planning consents, any external legal costs, any costs incurred in seeking, obtaining and paying for wayleaves or easements and any costs relating to exceptional land conditions or exceptional civil works.
- 3.4 Where the **Applicant** advises SONI that he wishes to pay the estimated cost of the connection, SONI will provide as part of the connection offer an estimate of the connection charge, identifying the costs of the main items of expenditure in a manner consistent with the level of detail provided in Table 2. The **Applicant** will pay this amount irrespective of the outturn cost, subject to any price adjustment mechanism(s) set out in the offer.
- 3.5 Where the **Applicant** advises SONI that he wishes to pay the outturn cost of the connection, SONI will provide as part of the connection offer an estimate of the connection charge, identifying the costs of the main items of expenditure in a manner consistent with the level of detail provided in Table 2. In this case the **Applicant** will pay a connection charge based on the actual outturn cost, including any additional administrative costs associated with this payment option. The detail of the actual outturn costs provided to the **User** will be consistent with the level of detail provided in Table 2.
- 3.6 The estimate provided to an **Applicant**, as set out in sub-paragraphs 3.4 or 3.5, will contain elements covering engineering costs and a reasonable rate of return on any capital outlay in excess of sums received.
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- 3.7 For firm price offers where the connection works are completed over a significant period of time after the acceptance of the connection offer the actual connection charge may be adjusted in line with the **Retail Price Index** or in line with another appropriate index, such as a London Metal Exchange price index. Any price adjustment mechanism will be set out in the connection offer.
- 3.8 The work to be done and the connection charge payable will inevitably depend on the requirements of the person seeking the connection, on the condition of the assets at the point of connection, on the planning and security standards applicable and on any other relevant matters.
- 3.9 Notwithstanding sub-paragraph 3.3, all assets which were installed on the Northern Ireland **Transmission System** at April 1992 are funded through use of system charges. New or existing **Users** will not therefore be charged through a connection charge for pre-April 1992 plant, equipment or cabling which is utilised as part of the local connection arrangements, even if they require to be refurbished, modified or replaced due to asset condition or for wider system needs. However, where a new or existing **User** requests that any pre-April 1992 plant, equipment or cabling is refurbished, modified or replaced to meet the requirements of that **User** then the new or modified assets will be defined as **Connection Assets** and a connection charge will be levied in accordance with this section 3.
- 3.10 Where an **Applicant's** connection requires that works which are planned to be constructed and which are set out in the **Transmission System Capacity Statement** be advanced or altered, the **Applicant** will be liable to pay for any incremental costs incurred by deviating from the original plan, whether for **Connection Assets** or **System Assets**, including any advancement costs.
- 3.11 The connection charge will include an element to provide for the operation and maintenance (O&M) costs over the lifetime of the connection. The O&M charge shall be paid prior to commissioning the connection. It is set at 2% of the **Connection Asset** value, increasing in real terms over the lifetime of the **Connection Agreement**, discounted back to a present value using the regulated rate of return. In certain cases, SONI may agree to annual O&M charges. Where this is the case the annual charge shall be set at 2% of the **Connection Asset** value, increasing in real terms over the lifetime of the **Connection Agreement**.
- 3.12 The connection charge is normally payable in full in advance of energising the connection. Where a connection is to be commissioned or constructed in phases, payments will be reflective of those phases, with payment details set out in the connection offer. Where the **Applicant** has elected to pay the outturn cost of the connection the full estimated cost will be payable in advance of energising the connection with any reconciliation carried out after a determination of the final costs.

## 4 Connection Assets

### 4.1 Connection Assets are:

4.1.1 those assets which are installed to enable the transfer of the **Maximum Export Capacity (MEC)** or the **Maximum Import Capacity (MIC)** of the **User(s)** located at the **Connection Point**, to or from, as appropriate, the **All-Island Transmission Networks**, subject to sub-paragraph 4.2; and

4.1.2 those assets which are installed as a result of the **User's** effect on fault current levels on the **Transmission System**, but does not include any assets installed at any location other than the transmission node to which the **User** connects.

4.2 In deciding which assets are required to enable the transfers referred to in sub-paragraph 4.1.1, power flows other than those to or from the **User(s)**, shall be disregarded.

4.3 Assets which are not **Connection Assets** are **System Assets** and the costs of these assets are recovered through use of system charges.

### 4.4 Connection Assets include, as appropriate:

4.4.1 the circuit(s), or those parts of the circuit(s), required to connect the **User** to the existing **All-Island Transmission Networks**;

4.4.2 in addition to assets required under sub-paragraph 4.4.1, any new circuit(s) or enhanced circuit(s) required pursuant to sub-paragraph 4.1.1;

4.4.3 the circuit bay(s) required by the **User**;

4.4.4 any upgraded existing protection or communication equipment required as a direct result of the connection but not changes or additions to protection systems at remote substations (including the provision of communication channels); and

4.4.5 metering, telemetry or data processing equipment supplied by SONI.

4.5 Figures 1 and 2 illustrate the standard boundary for asset ownership and the standard boundary for **Connection Asset - System Asset**.



## **5 Least Cost Technically Acceptable Connection Design**

- 5.1 It is likely that SONI will evaluate a number of design options before deciding on the preferred design for a new or modified connection to the **All-Island Transmission Networks**. In doing so, there may be occasions where the preferred design is not the **Least Cost Technically Acceptable (“LCTA”)** connection.
- 5.2 Where SONI does not proceed with the **LCTA** connection, whether new or modified, to accommodate a **User**, or a group of **Users**, then that **User**, or group of **Users**, will only be required to pay for the estimated cost of the **LCTA** connection.
- 5.3 Where an **Applicant** requests a connection offer which is more expensive than the **LCTA** connection then the **Applicant** will be required to pay either the estimated or outturn cost of providing both the **Connection Assets** and additional **System Assets**, if any, required by the **Applicant’s** preference.

## **6 Cost Allocation Rules for Shared Assets**

- 6.1 Where a new **User** connects to the **All-Island Transmission Networks** by making use of existing **Connection Assets** which have been funded by an existing **User(s)** who connected within the preceding ten years the new **User** will be charged a proportion of the value of the shared **Connection Assets**, calculated in accordance with sub-paragraph 6.3.
- 6.2 If the existing **User(s)** connected within the preceding ten years then the **User(s)** will be entitled to receive a partial rebate of the original connection charge from SONI, calculated in accordance with sub-paragraph 6.3.
- 6.3 The charge to the new **User** and the rebate to the existing **User** will be derived using:
- 6.3.1 the historic cost of the assets, including any decommissioning costs;
  - 6.3.2 the current cost accounting valuation of the assets, using **RPI**;
  - 6.3.3 any advanced contributions towards O&M charges in respect of the **Connection Assets**; and
  - 6.3.4 the per MW share of the utilisation of the shared assets.
- 6.4 In addition to the charges for use of the shared **Connection Assets** the new **User** will be required to make a payment to SONI in respect of reasonable administrative expenses.
- 6.5 Where a number of **Users** connect simultaneously at a new **Connection Point** and jointly make use of **Connection Assets** each **User** will be charged a proportion of the estimated cost of the shared **Connection Assets**, calculated on a per MW share of the utilisation of the shared **Connection Assets**.

## 7 Application Fees and Feasibility Studies

- 7.1 An **Applicant** seeking a connection offer will be required to pay to SONI a fee to enable SONI to recover the costs of producing the connection offer. The fee shall be either:
- 7.1.1 A fixed fee derived from Table 1; or
  - 7.1.2 A fee based on the outturn cost of carrying out the relevant detailed studies, preparing a connection design and issuing a connection offer.
- 7.2 The **Applicant** shall advise SONI of his preferred payment method.
- 7.3 Where the **Applicant** advises SONI that he wishes to pay the outturn cost of carrying out the relevant detailed studies, preparing a connection design and issuing a connection offer, SONI shall levy the appropriate application fee in Table 1 and a reconciliation of the actual charge will be carried out after a determination of the final costs.
- 7.4 If SONI or NIE has carried out relevant feasibility studies in relation to the connection in advance of the submission of the application then a reasonable credit will be allowed in respect of these studies.
- 7.5 The fee will be paid in two instalments. A first instalment of £5,000 (exclusive of VAT) must accompany the connection application form. The second instalment, the balance of the fee, will be invoiced when SONI deems the application to be effective, which means that all information necessary to enable SONI to prepare a connection offer has been received and it is clear in all material respects.
- 7.6 Delays in production of the connection offer may occur if the application fee instalment payments are not received in a timely manner.
- 7.7 Any **User** applying for an offer to modify an existing connection will be required to pay an application fee to enable SONI to recover the costs of producing the connection modification offer. The fee for a connection modification offer is calculated on a case by case basis.
- 7.8 Where an **Applicant** wishes to change any aspect of the connection application, or in the case of a **User**, change a modification application, then the **Applicant** or **User** may be obliged to pay a second application fee. The decision on whether or not to levy a charge will depend on the materiality of the change to the application.

## 8 Bonds and Credit Cover

8.1 An **Applicant** seeking to connect to the **All-Island Transmission Networks** must provide security in the form of a number of bonds which are designed to protect other **Users** of the system. Detailed requirements are set out in sub-paragraphs 8.2 - 8.4.

### 8.2 Connection charges bond

8.2.1 A **User** must post a connection charges bond upon acceptance of their connection offer. This bond will cover any costs incurred during construction of the connection which are not covered under the payments made by the **User**. The bond will be drawn down should the **User** decide not to proceed to completion. The connection charges bond must be provided prior to execution of the **Connection Agreement**. This requirement is a condition precedent to offer acceptance.

### 8.3 Maximum Export Capacity and Maximum Import Capacity bond

8.3.1 Because of limited capacity on the **Transmission System Applicants** should request offers for their **MIC** or **MEC** and should not attempt to reserve additional capacity on the network for later development of their facilities.

8.3.2 A generation **User** will require an **MEC** bond and a load **User** will require an **MIC** bond.

8.3.3 Once a generator has demonstrated to the satisfaction of SONI that it has passed the **Capacity Test** then the capacity bond is returned. However, if the generator has not passed the **Capacity Test** by the date specified in the **Connection Agreement**, or where the **User** terminates the **Connection Agreement**, then SONI is entitled to draw down the **MEC** bond.

8.3.4 The value of the **MEC** capacity bond is set at £7,000 per MW.

8.3.5 SONI shall be entitled to draw down the **MIC** capacity bond under the terms of the **Connection Agreement** including where the **User** terminates the **Connection Agreement** and/or fails to pay for the appropriate loss in TUoS revenue.

8.3.6 The **User** is required to maintain an **MIC** bond for two years.

### 8.4 Decommissioning and reinstatement bond

8.4.1 A **User** must maintain a decommissioning and reinstatement bond for the duration of its **Connection Agreement** to cover costs arising out of the decommissioning of **Connection Assets** and reinstatement of the connection site.

## **9 Disconnection, De-energisation and Decommissioning Charges**

- 9.1 Where a **User** wishes a connection to be de-energised then, on request, SONI will arrange to de-energise the **Connection Point**. No charge will be made for this service if carried out during normal working hours and following reasonable notice, except as provided by agreement.
- 9.2 On termination of the **Connection Agreement** the **User** shall be liable for the reasonable outturn cost of decommissioning the **Connection Assets**, removing the **Connection Assets** from the connection site and making good the condition of the connection site. In the event that the assets are not decommissioned or the site is not reinstated no decommissioning or reinstatement charges, as appropriate, will be payable by the **User**.

## 10 Indicative Charges

10.1 Factors which influence costs and charges are:

10.1.1 statutory and other standards governing the system;

10.1.2 the length of cable or overhead line required to connect to the existing system;

10.1.3 the **User's MEC** or **MIC** in relation to the available capacity of the existing system;

10.1.4 whether the connection is by underground cable or overhead lines;

10.1.5 the type of ground requiring excavation;

10.1.6 the type and extent of reinstatement necessary;

10.1.7 the need for river, railway, telecommunication, other electric circuit and road crossings;

10.1.8 the availability of wayleaves or easements for cables or lines, including any planning consents;

10.1.9 the availability of a suitable substation site, including any necessary planning consents; and

10.1.10 the connection programme.

10.2 These items should not be regarded as a comprehensive list.

10.3 Significant cost items for connection to the **All-Island Transmission Networks** are provided in Table 2.

## 11 Contact Details

- 11.1 Should you require any further details about the information contained in this document or if you have any comments on how this document might be improved please contact our charging representative at the address below.
- 11.2 As stated previously in the document, additional information on the connection process can be obtained at SONI's website - [www.soni.ltd.uk](http://www.soni.ltd.uk).

Contact details:

SONI Ltd  
12 Manse Road  
Belfast  
BT6 9RT

Tel +44 28 907 94336

## 12 Definitions

“All-Island Transmission Networks”	means the <b>Transmission System</b> and the <b>RoI Transmission System</b> taken together;
“Applicant”	means a person who has applied for an offer of terms to enter into an agreement with SONI in respect of connection to the <b>All-Island Transmission Networks</b> at entry or exit points on the <b>Transmission System</b> but has not yet signed that agreement;
“Authority”	means the Northern Ireland Authority for Utility Regulation, as established under the <b>Energy Order</b> ;
“Capacity Test”	means the tests to be undertaken by the <b>User</b> to satisfy SONI that the facility has met the tests required to allow the <b>MEC</b> capacity bond to be released by SONI;
“Connection Agreement”	an agreement between SONI and a <b>User</b> setting out the terms relating to a connection to the <b>All Island Transmission Networks</b> ;
“Connection Assets”	as defined in sub-paragraph 4.1;
“Connection Point”	means the point at which a <b>User’s</b> plant connects to the <b>All Island Transmission Networks</b> , normally the busbar clamp on the busbar side of the busbar isolators on <b>User</b> circuits;
“Department”	means the Department of Enterprise, Trade and Investment;
“Energy Order”	means the Energy (Northern Ireland) Order 2003;
“Grid Code”	means the code of that name drawn up pursuant to Condition 16 of the <b>Transmission Licence</b> ;
“Least Cost Technically Acceptable” or “LCTA”	<p>The <b>Least Cost Technically Acceptable</b> connection is the connection which:</p> <ul style="list-style-type: none"><li>• complies with the <b>Transmission and Distribution System Security and Planning Standards</b>; and</li><li>• complies with any other applicable standard, regulation and code; and</li><li>• takes into account committed developments on the <b>Transmission System</b>; and</li><li>• is the least overall cost;</li></ul>
“Maximum Export Capacity” or “MEC”	means the maximum permissible amount of electricity to be exported to the <b>All Island Transmission Networks</b> at the <b>Connection Point</b> as set out in the <b>Connection Agreement</b> ;



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“ <b>Maximum Import Capacity</b> ” or “ <b>MIC</b> ”	means the maximum permissible amount of electricity to be imported from the <b>All Island Transmission Networks</b> at the <b>Connection Point</b> as set out in the <b>Connection Agreement</b> ;
“ <b>Order</b> ”	means The Electricity (Northern Ireland) Order 1992;
“ <b>Retail Price Index</b> ” or “ <b>RPI</b> ”	means the index of prices compiled by the Office for National Statistics and published as Table RP02 at <a href="http://www.statistics.gov.uk">www.statistics.gov.uk</a> ;
“ <b>RoI Transmission System</b> ”	means the system of electric lines operated by the <b>Republic of Ireland Transmission System Operator</b> and comprising high voltage lines and electrical plant and meters used for conveying electricity from a generating station to a substation, from one generating station to another, and from one substation to another within the Republic of Ireland;
“ <b>Republic of Ireland Transmission System Operator</b> ” or “ <b>RoI TSO</b> ”	means EirGrid plc, the company formed under Regulation 34 of SI 445 of 2000 of the Republic of Ireland legislation and licensed under Section 14 (1) (e) of the Republic of Ireland Electricity Act, 1999;
“ <b>System Assets</b> ”	as defined in sub-paragraph 4.3;
“ <b>Transmission and Distribution System Security and Planning Standards</b> ”	the standards referred to in Condition 20 of the <b>Transmission Licence</b> ;
“ <b>Transmission Licence</b> ”	a licence to participate in transmission granted under section 10 of the <b>Order</b> ;
“ <b>Transmission System</b> ”	means the system of electric lines owned by NIE and comprising high voltage lines and electrical plant and meters used for conveying electricity from a generating station to a substation, from one generating station to another, and from one substation to another within the Authorised Area (including such part of the North/South Circuits as is owned by the Licensee) (except any such lines which the Authority may approve as being part of the <b>Licensee’s</b> distribution system) and any other electric lines which the <b>Authority</b> may specify as forming part of the <b>Transmission System</b> , but shall not include any Interconnector;
“ <b>Transmission System Capacity Statement</b> ”	means the statement of that name prepared pursuant to Condition 33 of the <b>Transmission Licence</b> ;
“ <b>User</b> ”	means a person who has entered into an agreement with SONI in respect of connection to the <b>All-Island Transmission Networks</b> at entry or exit points on the <b>Transmission System</b> .

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**Table 1 – Connection Offer Application Fee**

The following table sets out the application fee payable to SONI by **Applicants** seeking a connection offer.

<i>MIC and MEC ranges</i>	<i>Demand - Assessment of system works</i>	<i>Generation - Assessment of system works, including distribution connected generation</i>	<i>G or D - Assessment of Shallow Works</i>	<i>Total fee for demand with shallow works</i>	<i>Total fee for generation with shallow works</i>	<i>Maximum charge for an assessment by the RoI TSO (generation connections only)</i>
<20 MW	£15,000	£23,000	£24,000	£39,000	£47,000	£23,000
> 20 MW ≤ 100 MW	£24,750	£33,000	£27,500	£52,250	£60,500	£33,000
>100 MW	£33,750	£35,250	£31,250	£65,000	£66,500	£35,250

## Notes:

1. For the payment of this fee an applicant shall receive a connection offer within the period defined in Condition 25 of the **Transmission Licence** and the offer shall set out any connection and/or reinforcement works required, the dates by when these works are planned to be completed and the connection charges payable. The works specified in the offer will not normally be fully engineered and specified. In particular, any overhead line routes or cable routes will not have been identified and any environmental aspects of the works will not have been fully evaluated. These tasks will not be undertaken until after the acceptance of any offer.
2. Fees are subject to Value Added Tax at the appropriate rate.
3. Where the RoI TSO is required to assess the impact on its system caused by a proposed generation development in Northern Ireland then a fee no more than the figure in the column headed “Maximum charge for an assessment by the RoI TSO (generation connections only)” will be levied to enable SONI to recover the RoI TSO’s costs.
4. Where two or more transmission connection applications are processed together as a group of applications SONI may, in its sole discretion, reduce the application fees for each applicant if the costs incurred in preparing the offers are reduced.

**Table 2 – Indicative Costs**

This table gives typical costs for the main items of expenditure, excluding VAT, for a new or modified connection to the Northern Ireland **Transmission System**. These costs are based on current market information, budgetary quotes received from manufacturers and recent tenders. While SONI believes these costs are reasonable at the time of publication actual costs can vary significantly, depending on, for example, movements in labour and raw material costs, site conditions and planning requirements.

Description	£k		
	275kV	110kV	33kV
<b>Bay of switchgear</b>			
Single busbar bay	-	775	70
Double busbar bay	1,550		-
<b>Overhead Lines (10 km)</b>			
110 kV Double Circuit Steel Tower (661A/circuit @ 75°C)	-	6,000	-
110 kV Single Circuit Wood Pole (661A @ 75°C)	-	3,100	-
<b>Transformer Cables (100 m)</b>			
240MVA	940	330	-
120MVA	900	275	-
<b>Transformers</b>			
240MVA 275/110kV	3,600	-	-
90MVA 110/33kV	-	2,500	-

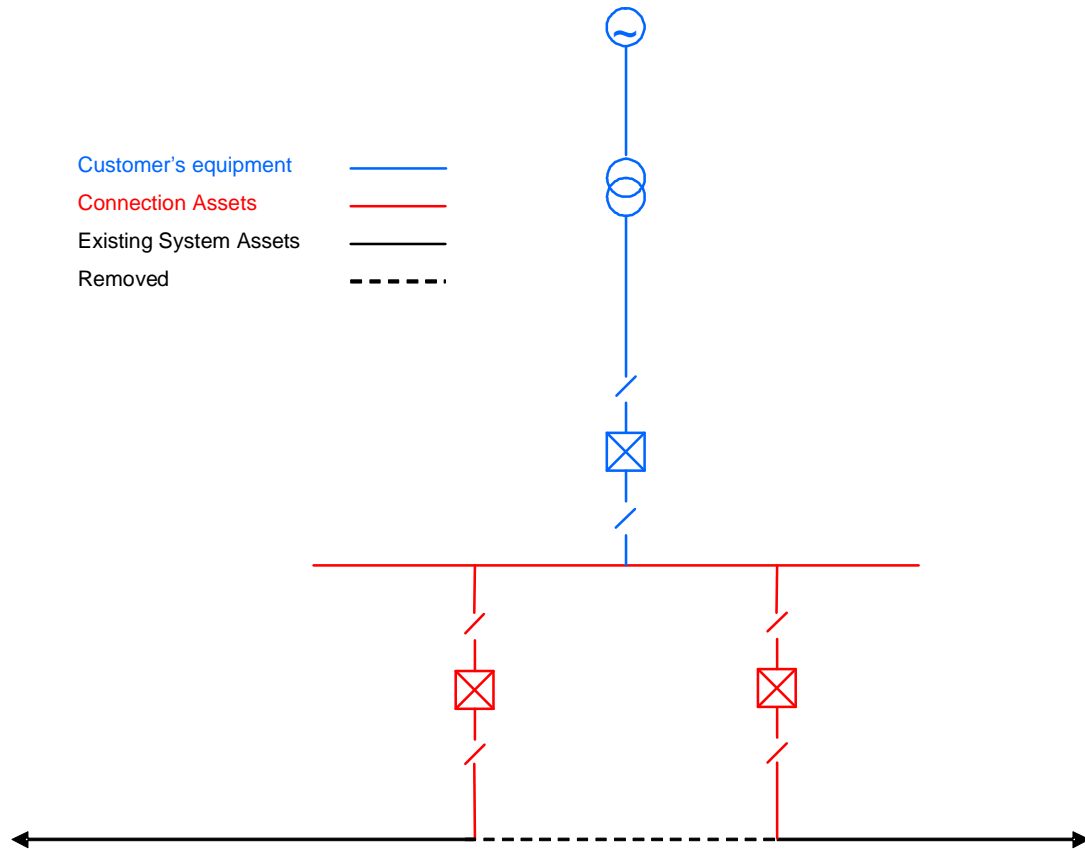
## Notes:

1. The switchgear costs are inclusive of all civil, electrical, protection and control items and are based on a minimum of three switching bays per substation.
2. The overhead line tables give the estimated cost per 10 km of overhead line assuming a normal route of 10 km or more in length with 80% of steel towers of the suspension type. These costs will increase for lines located in particularly difficult areas, e.g. urban or inaccessible areas. They do not include costs for scaffold protection or skycradles at, for example, road or railway crossings.
3. Costs do not include land purchase, wayleaves, legal fees, environmental impact assessments, communications equipment, metering equipment, SCADA equipment, applications for planning permission or compliance with any conditions of planning permission as these costs vary considerably for each individual project.
4. It has been assumed that the cables are installed in the substation which is located in a rural environment.
5. All costs are inclusive of manufacture, supply, delivery, erection, commissioning and any SONI project oncosts.
6. It is assumed that all sites are accessible by means of routes that are suitable for heavy loads, such as the transformers, and there are no road infrastructure or bridge reinforcement costs.

**Transformer costs include civil works, such as plinths and oil containment bunds, but do not include noise enclosures.**

**Figure 1 – Generator Connection**

Illustration of asset ownership and system/connection boundaries



## Figure 2 – Load Connection

Illustration of asset ownership and system/connection boundaries

- Customer's equipment ——— (blue line)
- Connection Assets ——— (red line)
- System Assets ——— (black line)
- Removed - - - - - (dashed black line)

