

Application Form for Connection of

Demand Customer Connection

to the Transmission System

INTRODUCTION

This application form (version 1.1) outlines the information EirGrid requires to progress an application for connection to the Irish Transmission System. EirGrid recommends that the applicant read “Process for Connection” published on our website, www.eirgrid.com. This document describes the connection offer process and sets out the associated application processing fees. The website has links to other relevant documents such as the Grid Code. It should be noted that it is the applicants responsibility to comply with the technical, design and operational standards detailed in the Grid Code.

Please note for the purpose of this application form TSO should be interpreted as: The holder of the license to operate Ireland’s Transmission System (EirGrid).

Please note that this application form deals with HV connections only (≥ 110 kV) and that if an MV (< 110 kV) supply is required the applicant should contact ESB Networks, Tel: +353 850 372 757, www.esb.ie.

EirGrid reserves the right to request additional data if necessary and the applicant should provide such information promptly during and post the offer process.

It is EirGrid’s responsibility to determine the transmission connection method; if the applicant has a specific request this will be considered and examined in the process. The selected method will be based on the overall least cost technically acceptable solution unless the Applicant requests otherwise or EirGrid requires an alternative method for system reasons.

Definitions of terms used in this form can be found in the Glossary of the Grid Code.

When the application form is completed please send the form to:

EirGrid
New Applications, Codes and Agreements
27 Lower Fitzwilliam Street
Dublin 2
Ireland

If any queries arise please do not hesitate to contact our Customer Relations Team.

Tel: +353 1 702 6642

Fax: +353 1 661 5375

email: info@eirgrid.com

DETAILS OF APPLICANT

1. Full name of the applicant(s)

2. Address of the applicant(s) or in the case of a corporate body, the registered address and company registration number

Company ref. no. (if applicable)

3. Telephone Number

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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4. Telefax Number

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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5. Contact Person(s)

6. Email Address

7. Contact Address (if different to above)

8. Please nominate a preferred name for this facility.

The TSO will take this preferred name into consideration when determining the facilities station name but reserves the right to change it in order to avoid any potential for confusion with other projects or stations.

GENERAL DETAILS

9. It should be noted that it is the applicants responsibility to comply with the technical, design and operational standards detailed in the Grid Code

Noted

10. Has the Applicant signed a confidentiality agreement with TSO?

If no, two copies have to be submitted with application form. Confidentiality agreement templates can be found on our website, www.eirgrid.com.

Yes No

11. Has the Applicant previously had a pre-feasibility study regarding this facility completed by TSO?

If yes, please specify name and the date of issue of the pre-feasibility study(s).

Yes No

Study 1:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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(D/M/Y)

Study 2:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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(D/M/Y)

12. Please note that EirGrid has processes in place for the procurement of demand side management services from demand customers. If you wish to learn more about this and the payments involved, please contact our Customer Relations Team.

Noted

CUSTOMER TYPE

13. Please state which of the following demand types applies to this application. Then fill in the relevant sections/questions which apply to that type as specified below:

A. New transmission customer Fill in questions 15–77.

B. Existing transmission customer with transformer changes. Fill in questions 18–77.

C. Existing transmission customer (no transformer changes). Fill in questions 18–25 and 66–77.

14. State if the applicant currently has a connection at the distribution level. If yes, please continue with question 15. If no, proceed to question 18.

Yes No

TECHNICAL INFORMATION

15. What is your existing connection point? (Please specify substation/location)

16. What is your current Maximum Import Capacity (MIC)?

MVA

17. Please explain if your intentions are to transfer this demand to your new transmission connection and if this existing demand is included in your new transmission MIC.

18. New Maximum Import Capacity (MIC)

This is the amount of importing transmission capacity that will be provided in the connection offer. (New MIC to include existing contracted MIC)

MVA

19. Based on question 17 please state the following:

Active Power P MW

Reactive Power Q Mvar

Power Factor (cos Ø)

20. Please provide details of ramp schedule (power consumption over time) the facility intends to implement. Provide graph if necessary.

21. Target Connection Date (this date will be used for connection assesment)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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(D/M/Y)

22. State the number of connecting circuits to the Transmission System (eg. one, two etc.), the applicant requires for technical and/or security reasons.

CUSTOMER TYPE

TYPE OF DEMAND

The purpose of this section is to provide the TSO with a broad knowledge of the type of demand the customer will connect.

23. Please provide a graph of the facility's Load Factor over 1 year
Name of Attachment _____

24. Please indicate if there are any items of plant which can contribute significant levels of harmonic distortion i.e. Large variable speed drives, large inverters etc. If yes please provide a general outline.

Yes No

Name of Attachment _____

25. Please indicate if your facility has any equipment that can fluctuate by more than 5 MVA at the point of connection to the Transmission System.
If no skip to next section. If yes EirGrid may ask for further information. Please note that these further clarifications will not affect the completeness of your application.

Yes No

GRID CONNECTED TRANSFORMER DATA

This application form specifies two and three winding transformers – please fill in the relevant section for this application. All impedances should be stated in % on transformer MVA base.

Please note that the connection voltage is determined by EirGrid in accordance with normal standards, as detailed in the Grid Code, taking into account the particulars of each development. If the connection voltage differs from that specified in the Application, EirGrid will request new data corresponding to the new voltage level. An appropriate connection voltage will initially be examined as part of this application check.

Please note the Grid Connected Transformer specified must be compliant with sections CC.7.2.5 & CC.7.3.9 of the Grid Code.

26. Please note that a full manufacturers test report will be required at a later stage.

Noted

27. State number of transformers proposed at the electrical connection point(s).

TWO WINDING TRANSFORMERS

	Transformer 1	Transformer 2	Transformer 3
28. Transformer rated MVA	_____	_____	_____
29. Temperature above rating is based on (°C)	_____	_____	_____
30. Transformer voltage ratio HV / LV (kV)	_____	_____	_____
31. Transformer positive sequence resistance (R ₁ %)	_____	_____	_____
32. Transformer positive sequence reactance (X ₁ %)	_____	_____	_____
33. Transformer vector group	_____	_____	_____
34. Zero sequence resistance (R ₀ %)	_____	_____	_____
35. Zero sequence reactance (X ₀ %)	_____	_____	_____

NEW DEMAND CUSTOMER

GRID CONNECTED TRANSFORMER DATA – CONTINUED

	Transformer 1	Transformer 2	Transformer 3
36. Please provide details of tap changer. Nature of tap changer (off load/on load/off circuit)	_____	_____	_____
Transformer 1: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size
Transformer 2: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size
Transformer 3: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size

THREE WINDING TRANSFORMERS

Transformer 1	HV winding	LV1 winding	LV2 winding
37. Transformer rated MVA	_____	_____	_____
38. Temperature above rating is based on (°C)	_____	_____	_____
39. Transformer rated voltage (kV)	_____	_____	_____
40. Transformer vector group	_____	_____	_____
Transformer 2	HV winding	LV1 winding	LV2 winding
41. Transformer rated MVA	_____	_____	_____
42. Temperature above rating is based on (°C)	_____	_____	_____
43. Transformer rated voltage (kV)	_____	_____	_____
44. Transformer vector group	_____	_____	_____
Transformer 3	HV winding	LV1 winding	LV2 winding
45. Transformer rated MVA	_____	_____	_____
46. Temperature above rating is based on (°C)	_____	_____	_____
47. Transformer rated voltage (kV)	_____	_____	_____
48. Transformer vector group	_____	_____	_____

THREE WINDING TRANSFORMERS

Clearly specify the MVA base (in space provided between brackets) which the measured impedances below are related to.

	Transformer 1	Transformer 2	Transformer 3
49. Transformer positive sequence resistance (R _{1HL1} %) between HV/LV1:	()	()	()
50. Transformer positive sequence reactance (X _{1HL1} %) between HV/LV1:	()	()	()
51. Transformer zero sequence resistance (R _{0HL1} %) between HV/LV1:	()	()	()
52. Transformer zero sequence reactance (X _{0HL1} %) between HV/LV1:	()	()	()

NEW DEMAND CUSTOMER

GRID CONNECTED TRANSFORMER DATA – CONTINUED

53. Transformer positive sequence resistance (R_{1HL2} %) between HV/LV2: _____ () _____ () _____ ()

54. Transformer positive sequence reactance (X_{1HL2} %) between HV/LV2: _____ () _____ () _____ ()

55. Transformer zero sequence resistance (R_{0HL2} %) between HV/LV2: _____ () _____ () _____ ()

56. Transformer zero sequence reactance (X_{0HL2} %) between HV/LV2: _____ () _____ () _____ ()

57. Transformer positive sequence resistance (R_{1L1L2} %) between LV1/LV2: _____ () _____ () _____ ()

58. Transformer positive sequence reactance (X_{1L1L2} %) between LV1/LV2: _____ () _____ () _____ ()

59. Transformer zero sequence resistance (R_{0L1L2} %) between LV1/LV2: _____ () _____ () _____ ()

60. Transformer zero sequence reactance (X_{0L1L2} %) between LV1/LV2: _____ () _____ () _____ ()

61. Transformer positive sequence resistance (R_{1HL1L2} %) between HV/(LV1+LV2): _____ () _____ () _____ ()

62. Transformer positive sequence reactance (X_{1HL1L2} %) between HV/(LV1+LV2): _____ () _____ () _____ ()

63. Transformer zero sequence resistance (R_{0HL1L2} %) between HV/(LV1+LV2): _____ () _____ () _____ ()

64. Transformer zero sequence reactance (X_{0HL1L2} %) between HV/(LV1+LV2): _____ () _____ () _____ ()

65. Please provide details of tap changer.
Nature of tap changer (off load/on load/off circuit): _____

Transformer 1: Tapped voltage winding kV + Steps - Steps % Step Size

Transformer 2: Tapped voltage winding kV + Steps - Steps % Step Size

Transformer 3: Tapped voltage winding kV + Steps - Steps % Step Size

NEW DEMAND CUSTOMER

ADDITIONAL REACTIVE POWER DEVICES

66. Does the site include reactive devices or power factor correction devices on the MV side of the grid connected transformer?
If yes, please complete questions 67–71; otherwise skip to question 72. Yes No

67. Number of inductive devices.

Indicate for each device the inductive Mvar capability. If the device has more than one stage please indicate the number of stages and the Mvar capability switched in each stage.
 Mvar in steps
 Mvar in steps

68. Number of capacitive devices.

Indicate for each device the capacitive Mvar capability. If the device has more than one stage please indicate the number of stages and the Mvar capability switched in each stage.
 Mvar in steps
 Mvar in steps

69. Is it intended to utilise shunt compensation as harmonic filters? Yes No

ON-SITE GENERATORS

70. Does the site include generators? Yes No

71. Will the generator export power to the transmission system?
It should be noted here that generators expecting to export onto the transmission system will also be required to submit an application in accordance with the document 'Process for Connection' available on www.eirgrid.com Yes No

72. Will any of these generators be paralleled to the system?
If yes, please refer to and complete appendix B. Yes No

MAPS AND DIAGRAMS - New Customers or Existing Customers with Transformer Changes Only

73. Please provide a 1:50,000 “Discovery Series” Ordnance Survey map, with the location of the facility clearly marked. The electrical connection point must be clearly marked with an “X”.

Name of OS map attachment

Grid co-ordinates of the electrical connection point of your site (In appendix A an example is shown of how to correctly specify the grid co-ordinates):

Easting

--	--	--	--	--	--	--	--

Northing

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74. Please provide a site plan in an appropriate scale. This site plan should indicate

- the proposed location of the connection point
- generators
- transformers
- site buildings

Note that the connection point is normally at the HV bushings of the grid connected transformer. Space for the transmission compound will have to be clearly marked on the site plan. The exact size of the compound will depend on the connection method defined in the connection offer. Site plan is to be submitted in both hard and soft copy.

Name of site plan attachment (soft copy)

Name of site plan attachment (hard copy)

75. Please provide an electrical Single Line Diagram (SLD) of the proposed facility detailing all significant items of plant and their values including:

- Interlocking
- Earthing and synchronising arrangements
- Relay types
- CT/VT ratios
- Transformer(s)
- Power factor correction
- Location of alternative connection for on-site generation (if applicable)
- Grid connecting transformer(s)

The SLD is to be submitted in both hard copy and soft copy.

Name of the SLD attachment (soft copy)

Name of site plan attachment (hard copy)

APPENDIX A

HOW TO DERIVE THE GRID CO-ORDINATES FROM “DISCOVERY SERIES” ORDNANCE SURVEY MAP

Easting and Northing co-ordinates should be stated to six places. Easting co-ordinates are the numbers on the horizontal axis. Northing co-ordinates are the numbers on the vertical axis.

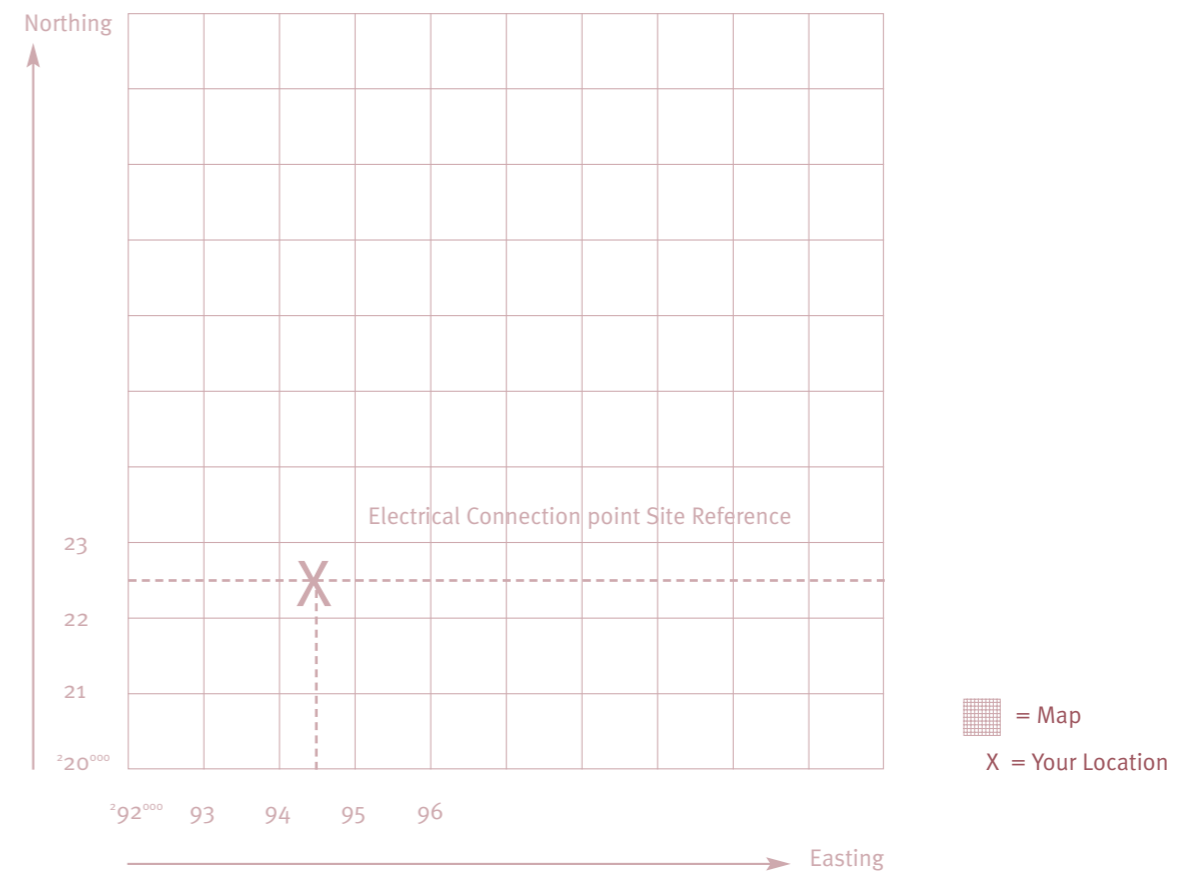


FIGURE 1. EXAMPLE OF A DISCOVERY SERIES MAP GRID

Site co-ordinates: Easting 294500, Northing 222500

EXAMPLE

The electrical connection point Easting co-ordinates are QYYZZZ.

Q refers to the first number (in superscript) of the bottom left hand corner of the map (i.e. 292000 Q=2), YY are the numbers on the horizontal axis directly below the site to the left (i.e. 94). ZZZ is the actual position in the grid expressed from 0 to 999 (e.g. if half way horizontally within the grid square, the Easting number is approximately 500).

The Northing co-ordinates are similarly identified, except that the numbers refers to the vertical axis.

APPENDIX B

GENERATORS PARALLELED TO THE SYSTEM

GENERAL DATA

B1. Maximum Export Capacity (MEC)

_____ MW

B2. Total number of generation units

B3. Please provide details of the expected running regime. (CHP, emergency, peaking)

PLANT CAPABILITY DATA

	Unit 1	Unit 2	Unit 3
B4. Type of generation plant (CHP, emergency, peaking)	_____	_____	_____
B5. Type of generator (synchronous, asynchronous, etc.)	_____	_____	_____
B6. Number of generators of type	_____	_____	_____
B7. Generator voltage (kV)	_____	_____	_____
B8. Generator rated MVA	_____	_____	_____
B9. Maximum continuous generation capacity at normal operating air conditions ¹ (MW)	_____	_____	_____
B10. Maximum continuous export capacity at normal operating air conditions ¹ (MW)	_____	_____	_____
B11. Maximum continuous generating capacity at min ambient air conditions (MW)	_____	_____	_____
B12. Maximum continuous export capacity at min ambient air conditions (MW)	_____	_____	_____
B13. Minimum ambient air conditions capacity value in question B11 and B12 is based on (°C, bar, % humidity)	_____	_____	_____
B14. Minimum continuous generating capacity (MW)	_____	_____	_____
B15. Minimum continuous export capacity (MW)	_____	_____	_____
B16. Power factor of the paralleled generator	_____	_____	_____

PARALLEL GENERATORS TRANSFORMER DATA

B17. Please indicate if the generators operating in parallel will use the same Grid Connected Transformers described in the main body of the application form.

Yes No

If yes please skip to question B57. If no please fill in questions B18 to B56, (as appropriate).

¹ Normal operating air conditions to be assumed = 10°C, 1.01bar, 70% humidity

APPENDIX B CONTINUED

B18. State number of transformers proposed at the electrical connection point(s).

TWO WINDING TRANSFORMERS

	Transformer 1	Transformer 2	Transformer 3
B19. Transformer rated MVA	_____	_____	_____
B20. Temperature above rating is based on (°C)	_____	_____	_____
B21. Transformer voltage ratio HV/LV (kV)	_____	_____	_____
B22. Transformer positive sequence resistance (R ₁ %)	_____	_____	_____
B23. Transformer positive sequence reactance (X ₁ %)	_____	_____	_____
B24. Transformer zero sequence resistance (R ₀ %)	_____	_____	_____
B25. Transformer zero sequence reactance (X ₀ %)	_____	_____	_____
B26. Transformer vector group	_____	_____	_____
B27. Please provide details of tap changer. Nature of tap changer (off load/on load/off circuit)	_____	_____	_____
Transformer 1: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size
Transformer 2: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size
Transformer 3: Tapped voltage winding	<input type="text"/> kV + <input type="text"/> Steps	- <input type="text"/> Steps	<input type="text"/> % Step Size

THREE WINDING TRANSFORMERS

Transformer 1	HV Winding	LV1 Winding	LV2 Winding
B28. Transformer rated MVA	_____	_____	_____
B29. Temperature above rating is based on (°C)	_____	_____	_____
B30. Transformer rated voltage (kV)	_____	_____	_____
B31. Transformer vector group	_____	_____	_____
Transformer 2	HV Winding	LV1 Winding	LV2 Winding
B32. Transformer rated MVA	_____	_____	_____
B33. Temperature above rating is based on (°C)	_____	_____	_____
B34. Transformer rated voltage (kV)	_____	_____	_____
B35. Transformer vector group	_____	_____	_____
Transformer 3	HV Winding	LV1 Winding	LV2 Winding
B36. Transformer rated MVA	_____	_____	_____
B37. Temperature above rating is based on (°C)	_____	_____	_____

APPENDIX B CONTINUED

B38. Transformer rated voltage (kV) _____
 B39. Transformer vector group _____

Clearly specify the MVA base (in space provided between brackets) which the measured impedances below are related

	Transformer 1	Transformer 2	Transformer 3
B40. Transformer positive sequence resistance (R_{1HL1} %) between HV/LV1:	()	()	()
B41. Transformer positive sequence reactance (X_{1HL1} %) between HV/LV1:	()	()	()
B42. Transformer zero sequence resistance (R_{0HL1} %) between HV/LV1:	()	()	()
B43. Transformer zero sequence reactance (X_{0HL1} %) between HV/LV1:	()	()	()
B44. Transformer positive sequence resistance (R_{1HL2} %) between HV/LV2:	()	()	()
B45. Transformer positive sequence reactance (X_{1HL2} %) between HV/LV2:	()	()	()
B46. Transformer zero sequence resistance (R_{0HL2} %) between HV/LV2:	()	()	()
B47. Transformer zero sequence reactance (X_{0HL2} %) between HV/LV2:	()	()	()
B48. Transformer positive sequence resistance (R_{1L1L2} %) between LV1/LV2:	()	()	()
B49. Transformer positive sequence reactance (X_{1L1L2} %) between LV1/LV2:	()	()	()
B50. Transformer zero sequence resistance (R_{0L1L2} %) between LV1/LV2:	()	()	()
B51. Transformer zero sequence reactance (X_{0L1L2} %) between LV1/LV2:	()	()	()
B52. Transformer positive sequence resistance (R_{1HL1L2} %) between HV/(LV1+LV2):	()	()	()
B53. Transformer positive sequence reactance (X_{1HL1L2} %) between HV/(LV1+LV2):	()	()	()
B54. Transformer zero sequence resistance (R_{0HL1L2} %) between HV/(LV1+LV2):	()	()	()
B55. Transformer zero sequence reactance (X_{0HL1L2} %) between HV/(LV1+LV2):	()	()	()
B56. Please provide details of tap changer: Nature of tap changer (off load/on load/off circuit):	_____	_____	_____

Transformer 1: Tapped voltage winding [] kV + [] Steps - [] Steps [] % Step Size
 Transformer 2: Tapped voltage winding [] kV + [] Steps - [] Steps [] % Step Size
 Transformer 3: Tapped voltage winding [] kV + [] Steps - [] Steps [] % Step Size

APPENDIX B CONTINUED

INTERNAL GENERATOR NETWORK STRUCTURE AND CORRESPONDING DATA

B57. Please describe how the on-site generators internal network structure (collector network) will be laid out. The description should include a breakdown of how the individual generators are connected together as well as how they are connected back to the grid connected transformers via the on-site substation. Please specify different cable sizes and individual lengths of cable.

Name of internal network structure attachment _____

	Type 1	Type 2	Type 3
B58. Conductor cross sectional area per core (mm ²)	_____	_____	_____
B59. Conductor type (Al, Cu, etc.)	_____	_____	_____
B60. Type of insulation	_____	_____	_____
B61. Charging capacitance (μF/km)	_____	_____	_____
B62. Charging current (A/km)	_____	_____	_____
B63. Positive sequence resistance (R_1 Ω/km)	_____	_____	_____
B64. Positive sequence reactance (X_1 Ω/km)	_____	_____	_____
B65. Zero sequence resistance (R_0 Ω/km)	_____	_____	_____
B66. Zero sequence reactance (X_0 Ω/km)	_____	_____	_____

GENERATOR DATA FOR FAULT (SHORT CIRCUIT) STUDIES

	Unit 1	Unit 2	Unit 3
B67. X_d' – Generator direct axis transient reactance (unsaturated): (pu on machine MVA base)	_____	_____	_____
B68. X_d' – Generator direct axis transient reactance (saturated): (pu on machine MVA base)	_____	_____	_____
B69. X_d'' – Generator sub-transient reactance (unsaturated): (pu on machine MVA base)	_____	_____	_____
B70. X_d'' – Generator sub-transient reactance (saturated): (pu on machine MVA base)	_____	_____	_____
B71. X_2 – Generator negative phase sequence Synchronous Reactance: (pu on machine MVA base)	_____	_____	_____
B72. X_0 – Generator zero phase sequence reactance (pu on machine MVA base)	_____	_____	_____

PROTECTION RELAYS & SETTINGS

B73. Please note that full details relating to generator/transformer protection relays and settings will be required at a later date.

Noted

GENERATOR DATA FOR DYNAMIC STUDIES

B74. Please note that EirGrid may require further information at a later date about the dynamic behaviour of the generators paralleled to the system.

Noted

CHECKLIST

- Application form completed in full
- Application fee
- Two signed copies of a confidentiality agreement (if applicable)
- OS map
- SLD (hard and soft copy)
- Site plan (hard and soft copy)
- Ramp schedule
- Load factor graph for 1 year
- Details provided of equipment that contributes significant levels of harmonic distortion (if applicable)
- Appendix B completed in full for paralleled generators (if applicable)