

esbnetworks.ie

FORM NC5 EMBEDDED GENERATION FACILITIES

ESB Networks DAC requires the information requested on this application form to enable us to set up and manage your electricity supply connection. As the Distribution System Operator, this information is also required to enable ESB Networks DAC to manage the electricity network. The data controller is ESB Networks DAC. Please refer to our privacy policy at https://esbnetworks.ie/privacy

Application for a New Connection

FOR OFFICIAL USE ONLY
B.P. No:
MPRN:

Introduction

This application form outlines the information ESB Networks DAC requires to progress an application for connection to the Electricity Distribution System. All applications must comply with the Distribution Code and ESB Networks DAC Conditions Governing Connection to the Distribution System. These can be found on our website: <u>esbnetworks.ie</u>.

Please note that this application form only deals with LV (230/400V), 10kV, 20kV, 38kV and in some cases, 110kV connections. If a higher connection voltage is required the applicant should contact the Customer Relations Team in EirGrid: +353 1 237 0472 or info@eirgrid.com.

ESB Networks DAC 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 ESB Networks DAC responsibility to determine distribution connection method. If the applicant has a specific request this will be considered and examined in this process. The selected method will be based on the overall least cost technically acceptable solution unless the Applicant requests otherwise or ESB Networks DAC requires an alternative method for system reasons.

This application form must be submitted in **electronic format.** Electronic files must be submitted via email (all electronic files should be a cumulative maximum of 5MB or less).

Definitions of terms used in this form can be found in the glossary of the Distribution Code.

When the application form is fully completed email the form and all relevant documentation to: **DSOGenerators@esb.ie**

If any queries arise ESB Networks DAC can be contacted at 1850 372 757 or DSOgenerators@esb.ie

Please note that in accordance with the Commission for Regulation of Utilities, some information from your completed application form will be published on the ESB Networks website: <u>esbnetworks.ie</u>. Please also see CRU's website for more detail: <u>cru.ie</u>.

Please Note: Information contained within this application form may need to be shared with the Transmission System Operator in order to sufficiently assess your application.

The Form NC5 should be used where an applicant has identified their specific generator manufacturer detail and would like their technical study processed using the specified data provided by the applicant. Form NC5A is a shortened version of this form and may be used where the specific generator manufacturer detail is unknown at time of application. Therefore the technical study is completed using assumed data and the applicant is required to provide their specific data a year in advance of energisation. For more detail on which is the most suitable, please refer to our website esbnetworks.ie

Please note: Incomplete applications will not be accepted.



Please fill in ALL sections in BLOCK CAPITALS

PART 1 - ALL APPLICANTS

1. APPLICANT DETAILS:
Full name of the applicant: (if a company or a partnership give full company or trading name)
Full address of legal applicant required (in the case of a body corporate, the registered or principal office)
Company registration number required
Telephone Number:
Email:
Contact details as per above. Company's registered address will be used as the contact address.
Contact Person:

2. SITE DETAILS:
Project Name: (Please note the Project Name must be geographically reflective of the location of the generator and must not match any existing
generator name or substation. The Project Name will be published on esbnetworks.ie)
Site Name & Address:
Site Substation Co-ordinates of Connection Point: EASTINGS:
(For a project with the Maximum Export Capacity greater than 0.2 MW the connection point will be at the customer's substation site. For all other projects please use the co-ordinates of the generator unit itself. The co-ordinates to be supplied are the Irish Grid Co-ordinates, e.g. E243,566 N050,334)
3. GENERAL DETAILS:
Projected Start-Up Date: (month and year)
Target Connection Date: (month and year)
This Project is applying to export energy Yes No
Maximum Export Capacity (MEC) Required (MW): (if extension then only the additional capacity)
(For generators which operate in parrallel with the network and do not require a MEC, please include 0 MWs here and and ensure to
include the associated MPRN below.)
This project is an extension to an existing installation (MPRN) Yes 🔽 No 🗍
This project is an extension to a planned generator Yes No
If 'yes' please provide the existing project name and the Meter Point Reference Number (MPRN):

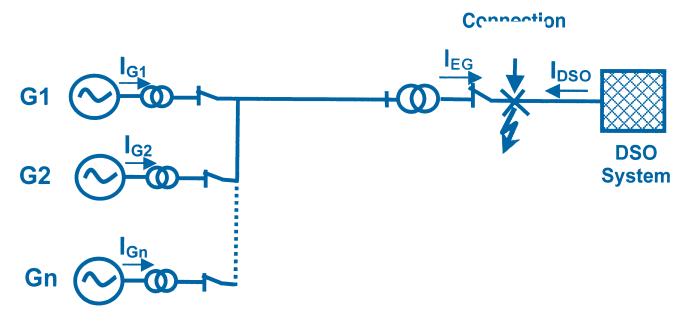
4. GENERATOR APPLICATION FEES												
Please note that a deposit of €2,000 (incl VAT) which is part of the application fee or the full application fee if the total application ee amount is less (both non-refundable) must accompany the application. Please visit the Generator New Connections section of pur website <u>esbnetworks.ie</u> for more information on application and modification fees. Please refer to our website <u>esbnetworks.ie</u> on payment methods available. <u>Please use your Project Name as the reference if paying by electronic fund transfer (EFT)</u> . Applications submitted without this fee will be returned.												
Noted * Date of EFT Payment												
5. MAPS AND DIAGRAMS: Please provide electronic copies of the following:												
A 1:50,000 "Discovery Series" Ordnance Survey map, with the location of the facility clearly marked with an "X" and indicating the site boundary. A plan of the site (in an appropriate scale) of the proposed facility, indicating the site boundary, the proposed location of the connection point, generators, transformers, site buildings etc. A draft electrical single line diagram of the proposed facility detailing all significant items of plant and their values including: • Relevant Voltage Levels • Interlocking • Earthing and Synchronising Arrangements • Power Factor Correction • Pease note: we will not be able to process your application without these maps/diagrams												
6. SITE LOAD DATA:												
Maximum Import Capacity (MIC) Required:	(kVA) torage facility:	(kVA)										
7. TECHNICAL DETAILS: Unit and Plant capability data	L											
Number of Generation Units (for solar projects this is the number of solar invertors): For thermal plant only: please provide a functional block diagram of the main plant components, showing boilers, turbines, heat recovery boilers, alternators, any heat or steam supplies to other processes etc. indicating e.g. whether single shaft or separate shaft Please note: we will not be able to process your application without this.												
boilers, alternators, any heat or steam supplies to other proces	ses etc. indicating e.g. whether the set of	nether single shaft or sep	arate shaft									
boilers, alternators, any heat or steam supplies to other proces	ses etc. indicating e.g. wh											
boilers, alternators, any heat or steam supplies to other proces	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other proces Please note: we will not be able to process your application wi Type of Generation Plant:	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other proces Please note: we will not be able to process your application wi Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other proces Please note: we will not be able to process your application wi Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant:	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application wi Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator:	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application wi Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.]	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type:	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW): Minimum Continuous Generating Capacity (MW): Minimum Continuous Generating Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW): Minimum Continuous Generating Capacity (MW): Minimum Continuous Export Capacity (MW): Minimum Continuous Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW): Minimum Continuous Generating Capacity (MW): Minimum Continuous Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application will Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW): Minimum Continuous Generating Capacity (MW): Minimum Continuous Export Capacity (MW): Minimum Continuous Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									
boilers, alternators, any heat or steam supplies to other process Please note: we will not be able to process your application wi Type of Generation Plant: [combined cycle combustion turbine, steam turbine, wind generator, etc] If two or more technology types are to be constructed under this MEC, please state what portion of the MEC (as set out in General Details Section) is attributed to each type of generation plant: Make/Version of Generator: Type of Generator: [synchronous, asynchronous, converter connected, etc.] Number of generators of type: Normal Maximum Continuous Generation Capacity (MW): Normal Maximum Continuous Export Capacity (MW): Maximum (Peaking) Generating Capacity (MW): Maximum (Peaking) Export Capacity (MW): Minimum Continuous Export Capacity (MW):	ses etc. indicating e.g. wh thout this. Unit 1	nether single shaft or sep Unit 2	arate shaft Unit 3									

Please provide a <u>calculation sheet</u> (in addition to the fault current figures requested in Table 1) showing the fault current available (r.m.s. value of the a.c. symmetrical component) from the Embedded Generation Facility due to a fault at the Connection Point when all generating sets are operating in parallel with the Electricity Distribution System.

	Fault ty	tion Point	
hort Circuit Current Contribution from Embedded eneration Facility IEG [kA] [RMS]	Three- Phase	Phase-to Phase	Single-Line to-Ground (*)
t=0.00s			
t=0.02s			
t = 0.04s			
t=0.06s			
t=0.08s			
t = 0.10s			
t=0.12s			
t=0.14s			
t=0.16s			
t=0.18s			
t=0.20s			
t=0.30s			
t = 0.40s			
t=0.60s			
t = 0.90s			
t = 1.30s			
t = 1.70s			
t = 2.00s			
t = 3.00s			

(*) Not necessary for connections at 10kV or 38kV.

Table 1



Legend: **EG:** Fault Current Contribution from Embedded Generation Facility **IDSO:** Fault Current Contribution from DSO System **IGn:** Fault Current Contribution from Individual Generation Unit

Figure 1 Embedded Generation Facility and Fault Current Contributions

8. NETWORK CONNECTION TRANSFORMER DATA (if	applicable):		
There are many types of transformers. This application specifies transformer rated MVA and kV. Please note that the connection voltage is determined by ESB Distribution Code, taking into account the particulars of each a application, ESB Networks DAC will request new data corresp until such reasonable data is obtained.	Networks DAC in accorc	dance with normal standar ion voltage is different to t	ds, as outlined in the hat assumed in the
Please note that a full manufacturers test report may be require	d at a later stage. Noted		
State number of transformers proposed at the network connect (at the connection voltage level i.e. not transformers associated with ind			
Transformer Rated MVA:			
Transformer Voltage Ratio HV/LV [kV]:			
Transformer Winding Configuration:			
Transformer positive sequence resistance (R ₁ %):			
Transformer positive sequence reactance (X ₁ %):			
Transformer zero sequence resistance (R ₀ %):			
Transformer zero sequence reactance (X ₀ %):			
Please provide details of Tap Changer. Nature of tap changer (off load/on load/ off circu	iit)	
Tapped Voltage Winding: kV + +	Steps -	Steps	% Step Size
			% Step Size
Tapped Voltage Winding: kV +	rs associated with inc Unit 1	lividual generators):	With 3 (or Type 3)
Tapped Voltage Winding: kV +	rs associated with inc	lividual generators):	Unit 3
Tapped Voltage Winding:	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding: kV + 9. GENERATOR TRANSFORMER DATA (i.e. transforme Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV:	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding:	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding: kV 9. GENERATOR TRANSFORMER DATA (i.e. transformer Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Winding Configuration: Generator Transformer positive sequence resistance (R ₁ %)	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding: kV 9. GENERATOR TRANSFORMER DATA (i.e. transforme Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Winding Configuration: Generator Transformer positive sequence resistance (R ₁ %) Generator Transformer positive sequence reactance (X ₁ %)	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding: kV 9. GENERATOR TRANSFORMER DATA (i.e. transforme Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Winding Configuration: Generator Transformer positive sequence resistance (R ₁ %) Generator Transformer zero sequence resistance (R ₀ %)	rs associated with inc Unit 1	lividual generators):	Unit 3
Tapped Voltage Winding: kV 9. GENERATOR TRANSFORMER DATA (i.e. transforme Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Winding Configuration: Generator Transformer positive sequence resistance (R ₁ %) Generator Transformer positive sequence reactance (X ₁ %)	rs associated with inc Unit 1 (or Type 1)	dividual generators):	Unit 3
Tapped Voltage Winding: kV 9. GENERATOR TRANSFORMER DATA (i.e. transforme) Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer positive sequence resistance (R1%) Generator Transformer positive sequence resistance (R1%) Generator Transformer zero sequence resistance (R0%) Generator Transformer zero sequence reactance (X0%)	rs associated with inc Unit 1 (or Type 1)	dividual generators):	Unit 3
Tapped Voltage Winding: kV + 9. GENERATOR TRANSFORMER DATA (i.e. transforme Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Winding Configuration: Generator Transformer positive sequence resistance (R_1 %) Generator Transformer positive sequence reactance (X_1 %) Generator Transformer zero sequence reactance (X_0 %) Please provide details of Tap Changer. Nature of tap changer (α	rs associated with inc Unit 1 (or Type 1)	it)	Unit 3 (or Type 3)
Tapped Voltage Winding: kV + 9. GENERATOR TRANSFORMER DATA (i.e. transformer Generator Transformer Rated MVA: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer Voltage Ratio HV/LV kV: Generator Transformer positive sequence resistance (R1%) Generator Transformer positive sequence resistance (R1%) Generator Transformer zero sequence resistance (R0%) Generator Transformer zero sequence reactance (X0%) Please provide details of Tap Changer. Nature of tap changer (d) Tapped Voltage Winding: kV +	rs associated with inc Unit 1 (or Type 1)	it)	Unit 3 (or Type 3)

A Generator Power Station will be deemed to be unrelated to and independent of the other Generator Power Stations already present in a Contiguous Generator Site ("Independent Generator Power Station") if:

- the Applicant, where a body corporate, is not a related undertaking of another Generator Power Station already present in the Contiguous Generator Site or in respect of which an application for a Connection Agreement has been made to the DSO or the TSO;
- no person or body corporate holding 50% or more of the equity or voting rights in the Applicant is a person connected with any other person or body corporate holding 50% or more of the equity or voting rights in another Generator Power Station present in the Contiguous Generator Site ("Connected Person").

The Generator Power Station is/will be independent from contiguous Generators Yes 🗌 No 📃

PART 2 - ALL SYNCHRONOUS GENERATORS ONLY

12. GENERATOR DATA FOR FAULT STUDIES

QUESTIONS APPLY TO SYNCHRONOUS GENERATOR APPLICANTS ONLY	Unit 1 (or Type 1)	Unit 2 (or Type 2)	Unit 3 (or Type 3)
X ¹ _d - Generator Direct Axis Transient Reactance (saturated): (pu on machine MVA base)			
X ¹¹ _d - Generator Sub-transient Reactance (saturated): (pu on machine MVA base)			
X ₂ - Generator Negative Phase Sequence Synchronous Reactance: (pu on machine MVA base)			
X _o - Generator Zero Phase Sequence Reactance: (pu on machine MVA base)			
X ¹ _d - Generator Direct Axis Transient Reactance (unsaturated): (pu on machine MVA base)			
X ¹¹ _d - Generator Sub-transient Reactance (unsaturated): (pu on machine MVA base)			
Generator Direct Axis Positive Phase Sequence Synchronous Reactance: (pu on machine MVA base)			
Generator Quadrature Axis Positive Phase Sequence Synchronous Reactance: (pu on machine MVA base)			

13. GENERATOR DATA FOR DYNAMIC SOLUTION

QUESTIONS APPLY TO SYNCHRONOUS GENERATOR APPLICANTS ONLY	Unit 1 (or Type 1)	Unit 2 (or Type 2)	Unit 3 (or Type 3)
Generator Quadrature Axis Transient Reactance (unsaturated): (pu on machine MVA base)			
Generator Sub-transient Reactance (unsaturated): (pu on machine MVA base)			
Armature Leakage Reactance			
Generator Direct Axis Transient open circuit Time Constant: (pu on machine MVA base)			
Generator Direct Axis Subtransient open circuit Time Constant: (pu on machine MVA base)			
Generator Quadrature Axis Transient open circuit Time Constant: (pu on machine MVA base)			
Generator Quadrature Axis Subtransient open-circuit Time Constant: (pu on machine MVA base)			
Inertia of complete turbogenerator (MWsecs/MVA) (pu on machine MVA base)			

PART 3 - ALL NON-SYNCHRONOUS GENERATORS ONLY

14. MAINS EXCITED NON-SYNCHRONOUS GENERATORS ONLY:
State how the generator is run up to synchronous speed (prime mover, separate motor, generator operated as a motor).
Magnitude and duration of inrush/starting current: Amps at kV for ms
Starting/ paralleling frequency (i.e. times per hour):
Power Factor on starting:
Reactive power demand at zero output ('no load') : kVAr and maximum output : kVAr
Details of reactive power compensation to be installed & the charging current available from cable circuits within the Embedded Generation Facility:

15. GENERATOR DATA FOR FAULT STUDIES (Short Circuit)												
Please provide the below specified currents or submit a short circuit current decrement curve (current vs time) representing your generators:	Unit 1 (or Type 1)	Unit 2 (or Type 2)	Unit 3 (or Type 3)									
I," - Initial symmetrical short circuit current												
I _p - Peak short circuit current												
I_k - Steady state short circuit current												

PART 4 - NON-SYNCHRONOUS GENERATORS WITH AN MEC LESS THAN OR EQUAL TO 5MW

16. NON-SYNCHRONOUS GENERATORS:

State the Generator type:

(fixed speed stall regulated; fixed speed pitch regulated; fixed speed pitch regulated with variable rotor resistance; variable speed with doublyfed induction generator; variable speed with synchronous generator and fully-rated converter or other specified type)

Unit 1 (or Type 1) Unit 2 (or Type 2) Unit 3 (or Type 3)

Please attach the approved power curve

Please note: we will not be able to process your application without this

17. DYNAMIC SIMULATION DATA:

In the connection offer process the dynamic impact of the generator on the transmission and distribution systems is examined. To be able to carry out dynamic simulation the applicant needs to submit the electrical data in questions below. If the requirements in questions below are being met by the provision of a dynamic model, then the applicant does not need to answer questions below. All necessary parameters and data must accompany the model. The dynamic model should be available from the manufacturer and should be suitable for software program PSS/E and specific to the type of generator unit to be installed. Further, if the appropriate model has already been provided to EirGrid by the manufacturer then the same model does not need to be provided again as long as the applicant explicitly advises the following for the model in question:

The version number of the model

The sender (i.	e. name	& co	mpan	y) o	f the	e mo	del	:																										
The (EirGrid)	recipier	nt of th	ie mo	del																														
Specify by wh	nat meth	nod th	e moc	del v	was	sent	t (e	.g. (ema	ail,	CD) et	c):																					
The date the r	nodel w	/as se	nt to	EirG	arid																													
	The re	maini	ng qu	esti	ions	in p	art	4 a	re	only	y to	be	e fill	ed	in i	if tł	ne a	ιpp	lica	ant	is r	not	sub	omi	ttin	g a	dy	'na	mic	; m	ode	əl		

17. DYNAMIC SIMULATION DATA: Cont'd

	Туре 1	Туре 2	Туре 3
Generator			
Base voltage (kV)			
Base MVA			
Maximum power (MW)			
Minimum power (MW)			
Stator Resistance (pu)*			
Stator Inductance (pu)*			
Magnetising Reactance (pu)*			
Frequency Protection Scheme (if it exists)			
Rotor Resistance (pu)*			
Rotor Inductance (pu)*			
Inertia constant H of the entire drivetrain [MW.s/MVA]			
Voltage protection scheme (if it exists)			
Under voltage limit (pu)			
Under voltage pick up time (seconds)			
Under voltage breaker time (seconds)			
Over voltage limit (pu)			
Over voltage pick up time (seconds)			
Over voltage breaker time (seconds)			
Under frequency limit (pu)			
Under frequency pick up time (seconds)			
Under frequency breaker time (seconds)			
Over frequency limit (pu)			
Over frequency pick up time (seconds)			
Over frequency breaker time (seconds)			

PART 5 - NON-SYNCHRONOUS GENERATORS WITH AN MEC GREATER THAN 5MW

18. NON-SYNCHRONOUS GENERATORS

State the generator type: (fixed speed stall regulated; fixed speed pitch regulated; fixed speed pitch regulated with variable rotor resistance; variable speed with doubly-fed induction generator; variable speed with synchronous generator and fully-rated converter or other specified type)

Unit 1 (or Type 1)	
Unit 2 (or Type 2)	
Unit 3 (or Type 3)	

Please attach the approved power curve

Please note: we will not be able to process your application without this

19. INTERNAL NON-SYNCHRONOUS GENERATOR NETWORK STRUCTURE AND CORRESPONDING DATA:

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

Name of internal network structure attachment					

19. INTERNAL NON-SYNCHRONOUS GENERATOR NETWORK STRUCTURE AND CORRESPONDING DATA: Cont'd

	Тур	e 1	Тур	e 2	Тур	e 3
Generator						
Conductor cross section area per core (mm2)						
Type of insulation						
Charging current (Ampere/km)						
Positive sequence reactance (X ₁ Ohm/km)						
Zero sequence reactance (X _o Ohm/km)						
Please state the power factor ranges of the generators at the specified active power percentages and then specify the						
equivalent MVAr capability	Ind	Cap	Ind	Cap	Ind	Cap
Equivalent MVAr						
Please provide reactive power capability curve for the generator site as measured at the LV side of the grid connected transformer. The capability curve should specify MVAr vs MW for the entire range of MW output. The curve should be consistent with the answers given in the following questions. Please note that the generator site must comply with the Distribution Code. Number of inductive devices Indicate for each device the inductive MVAr. 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 MVAr in Steps						
Number of capacitive devices Indicate for each device the Capacitative MVAr. 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	Step)S		MVAr in	Steps	
Please indicate the inductive MVAr contribution of the internal non-synchronous generator structure (i.e. 20kV cable) Provide details of start-up regime. (Number of simultaneous starts, use of control system etc.) TECHNICAL DETAILS REQUIRED						

20. DYNAMIC SIMULATION DATA:

In the connection offer process the dynamic impact of the generator on the transmission and distribution systems is examined. To be able to carry out dynamic simulation the applicant needs to submit a dynamic model of their generator. This dynamic model should be available from the manufacturer.

Please submit a dynamic model and all data and parameter values required for the dynamic model. The dynamic model should be suitable for software program PSS/E and specific to the type of generator unit to be installed. This should be submitted in electronic version.

Please note: we will not be able to process your application without this. However, if the appropriate model has already been provided to EirGrid by the manufacturer then the same model <u>does not</u> need to be provided again as long as the applicant explicitly advises the following for the model in question:

The version number of the model			
The sender (i.e. name & company) of the model:			
The (EirGrid) recipient of the model			
Specify by what method the model was sent (e.g. email, CD etc):			
The date the model was sent to EirGrid			

Please submit a written statement, preferably from your manufacturer, detailing confirmation of commitment to "meaningful engagement" to progress the level of modelling to an appropriate validated model. "Meaningful engagement" shall be interpreted as:

a. commitment on the part of the applicant to deal with and respond to issues raised by EirGrid with regard to the generator and generator modelling in a timely manner and

b. the applicant providing details of a specific contact(s) to deal with issues and queries relating to the performance and modelling of the generator, the overall performance and modelling of the generator and the operation of the PSS/E dynamic model.

Please note: we will not be able to process your application without this.

PART 6 - DS3 APPLICANTS ONLY

21. DS3 TECHNICAL DETAILS REQUIRED ¹ :
Please indicate which services can be provided
FFR POR
Fast Frequency Response
What level of FFR can be provided? (MW)
For how many hours per year can the service be provided?Hrs
Service at low MW outputs
Can the service be provided at 0MW output levels? Yes No
Can the service be provided while operating below 20% of MEC? Yes 🗌 No 📃
Primary Operating Reserve
What level of POR can be provided? (MW)
For how many hours per year can the service be provided?Hrs
Service at low MW outputs
Can the service be provided at 0MW output levels? Yes No
Can the service be provided while operating below 20% of MEC? Yes 🗌 No 📃

'If an applicant makes a false, misleading or inaccurate declaration in respect of DS3 eligibility requirements, this will be deemed to be an "event of default" under any resulting connection agreement.

PART 7 - ALL APPLICANTS

22. PLANNING PERMISSION CONFIRMATION ¹ : (This section applies to all applicants)				
I, (Name in Block Capitals):				
Position:				
on Behalf of (Company Name in Block Capi	itals as specified in Applic	ant Details of this application forr	n)	
confirm that Planning Permission for the ger	nerator units as specified i	n this application form is in place	as follows:	
Planning Reference No:				
Planning Permission Grant Date:	/ / Planni	ng Permission Expiry Date:		
Extension applied for? Yes No				
If the generator unit(s) as specified in this ap	pplication are exempt from	Planning Permission, please pro	vide reason for exemption below:	
Applicant Signature:			Date:	
Confirmation of above Planning Permis	ssion details by Solicit	or / Planning Consultant		
Profession:				
on Behalf of (Company Name in Block Capi	itals as specified in Applic	ant Details of this application form	n)	
warrant that I have conducted all necessary	checks and am satisfied t	hat the aforementioned planning	permission is in place.	
Signed:			Date:	
Solicitors ² / Planning Consultant Number ³				
Solicitors / Planning Consultant Address				
	Solicitor / Planning Consultar	nt Stamp (where possible):		
¹ Planning permission is the responsibility of the applican false, misleading or inaccurate declaration in respect of				
² As per the Law Society of Ireland (www.lawsociety.ie) ³ As per the Irish Planning Institute (www.ipi.ie) or Royal	Town Planning Institute (www.rtpi	consultants.co.uk)		

23. LANDOWNER CONSENT CONFIRMATION ¹ :			
, (Name in Block Capitals):			
Position:			
on Behalf of (Company Name in Block Capitals as specified in Applicant Details of this application form)			
confirm that all necessary landowner consents are in place for the substation at the coordinates as specified in Site Details of this			
application form and the generation site.			
Applicant Signature: Date: Date:			
and witnessed by Solicitor (Name in Block Capitals)			
Signed: Date: Date:			
Solicitors Address			
Please note the application will be returned to the applicant if submitted without a solicitors stamp and / or solicitor number.			
Solicitors stamp:			

¹Landowner consent is the responsibility of the applicant. ESB Networks DAC accepts no responsibility for checking details of landowner consent. If an applicant made a false, misleading or inaccurate declaration in respect of landowner consent, this will be deemed to be an "event of default" under the connection agreement.

24. SIGNATURE OF APPLICANTS:

I/We accept ESB Networks DAC General Conditions relating to the connection and all amendments, which ESB Networks DAC may make from time to time. I/We agree to grant ESB Networks DAC all necessary access to bring the network to the premises. I/We acknowledge that ESB Networks DAC shall be entitled to connect other customers to the network.

Signature of Applicant:	Date: Agent.				
Full Name in Block Capitals:					
Title:					
[ESB Networks DAC may require the signatory to produce evidence of authority to bind the applicant by his/her signature].					
Signature of Witness:Date:					
Full Name in Block Capitals:					
Address of Witness:					

DATA PROTECTION

ESB Networks DAC may use your personal data to the extent necessary (a) to set up and manage your connection agreement (b) for compliance with its licence and other legal obligations; and/or (c) for its legitimate interests (provided those interests do not confict with your fundamental rights and freedoms) Personal data provided by you in this application form may be disclosed to other parties in the following circumstances:

- In performing its functions, ESB Networks DAC may utilise the services of contractors or other suppliers. ESB Networks DAC may disclose your data to these parties to the extent necessary to perform their functions and provided they are only permitted to use your data as instructed by ESB Networks DAC. They are also required to keep your data safe and secure.
- ESB Networks DAC may make available the existence, location and/or technical aspects of your connection to licensed electricity supply companies and other parties involved in your electricity supply. In the case of new connections, ESB Networks DAC will make available your telephone contact number to licensed electricity supply companies in order to facilitate energisation of the connection.
- ESB Networks DAC may be required by law, or our license obligations, to provide data that ESB Networks DAC holds about you, your electricity supply or connection, to government agencies or departments, the Commission for Regulation of Utilities or other third parties.
- Contact details may also be provided to a professional third party market research company for the purposes of researching your satisfaction with the services provided by ESB Networks DAC. This information may also be used to enhance our services as the Distribution System Operator.

Note: ESB Networks DAC reserves the right to request additional data if necessary and the applicant agrees to provide such information promptly. The connecting party will be required at the relevant time to comply with Connection Agreement and the Distribution Code and provide information in accordance with these documents. ESB Networks DAC regrets it cannot accept responsibility for delays or mistakes if this application is completed incorrectly. If this application is incomplete the form will be returned to you.