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Distributed Generation Low Voltage Workshop

4th July 2019

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Agenda

Welcome & Introduction

Incentive on Connections Engagement (ICE) Update

Accelerated Loss of Mains Change Programme

Zero Carbon Plan

Regulatory & Government Policy Update

A& D Fees Update

Network Management System Update

Engineering Recommendation G98 & G99

Post Acceptance Process

Panel Question & Answer Session

Lunch & Networking

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Welcome and Introductions

Steffan Jones

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Meet the Team

Steffan Jones

Infrastructure Solutions Manager

Hannah Sharratt

Connections Stakeholder Engagement Manager

Keith Evans

DSO Transition Manager

Brian Hoy

Head of Market Regulation

Helen Seagrave

Community Energy Manager

Tracey Taylor

Delivery Manager Business Connections

Gavin Anderson

Connections Team Leader

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What do we want from you today?

- One word – **Feedback!**
- Use the feedback forms and give us your honest opinion
- Contact me, the ICE team or your usual contacts in ENWL at any time to give us feedback
- **Steffan.Jones@enwl.co.uk**
- **ice@enwl.co.uk**

Domestic Arrangements

- Don’t forget to sign in!
- No Fire Alarms planned
- Emergency Assembly Point
- WCs
- Mobile Phones

Incentive on Connection Engagement (ICE) Update

Hannah Sharratt

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What is ICE?

Ofgem introduced the ‘Competition Tests’ in DCPR5 to incentivise DNOs to encourage competition in connections. There were mixed results across the DNOs, and so Ofgem introduced ICE as part of RIIO ED1.

> *“The Incentive on Connections Engagement Incentive (ICE) drives Distribution Network Operators (DNOs) to provide good customer service to larger connection customers.*
>
> *Under this incentive DNO’s will need to provide evidence that they have engaged with connection stakeholders and responded to their needs.”*
>
> Ofgem

The aim of this incentive is to replicate the effects of competition and drive DNO’s to understand and meet the needs of larger connection customers. Where competition was deemed to be effective there was no need for this regulatory proxy.

Competition Tests for DNO's

		ENWL	NPg North	NPg York	UKPN EPN	UKPN LPN	UKPN SPN	WPD S West	WPD S Wales	WPD E Mid	WPD W Mid	SSE Hydro	SSE South	SP Man	SP Dist	Total
Demand Customers:	(i) LV work:	Passed Apr 2014	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not applied	Not applied	Not passed	Passed Dec 2013	2
	(ii) HV work:	Passed May 2013	Passed Oct 2012	Passed Oct 2012	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Passed Dec 2013	4
	(iii) HV and EHV work:	Passed May 2013	Not passed	Not passed	Passed Aug 2013	Passed Aug 2013	Passed Aug 2013	Not passed	Not passed	Passed Feb 2013	Passed Feb 2013	Not passed	Not passed	Not passed	Not passed	6
	(iv) EHV work and above:	Passed Nov 2011	Not passed	Not passed	Passed Aug 2013	Passed Aug 2013	Passed Aug 2013	Not passed	Not passed	Passed Feb 2013	Passed Feb 2013	Not passed	Not passed	Not passed	Not passed	6
Distributed Generation	(v) LV work:	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not applied	Not applied	Not passed	Not passed	0
	(vi) HV and EHV work:.	Passed Nov 2011	Not passed	Not passed	Passed Oct 2012	Passed Oct 2012	Passed Oct 2012	Passed Feb 2014	Not passed	Not passed	Not passed	Not passed	Passed Apr 2014	Not passed	Not passed	6
Unmetered premises:	(vii) LA work:	Passed May 2013	Not passed	Not passed	Passed Aug 2013	Not passed	Passed Aug 2013	Passed Feb 2013	Passed Feb 2013	Passed Feb 2013	Passed Feb 2013	Not applied	Not passed	Passed Dec 2013	Not passed	8
	(viii) PFI work:	Passed Nov 2011	Not passed	Not passed	Passed Oct 2012	Passed Oct 2012	Passed Oct 2012	Passed Feb 2013	Passed Feb 2013	Passed Feb 2013	Passed Feb 2013	Not applied	Passed Apr 2014	Passed Dec 2013	Not passed	10
	(ix) Other work:	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not passed	Not applied	Not passed	Not passed	Not passed	0
	Applied	9	9	9	9	9	9	9	9	9	9	4	7	9	9	
	Passed	7	1	1	5	4	5	3	2	4	4	0	2	2	2	42

- We passed seven of the nine market segments
- Our engagement activities with our Low Voltage Generation stakeholders is covered under ICE and therefore documented and reported to Ofgem.
- Ofgem Consultation - Open until 22 July

ICE 2018-19 Workplan Performance

➢ Improve our connection charging approach to make charging fair for our customers	✓ Listened to feedback on impact : **no up-front charges** introduced for LV customers.
➢ Engage with Stakeholders on our transition to Distribution System Operator (DSO) Strategy	✓ Presentation at Low Voltage Generation workshop describing our DSO Strategy.
➢ Engage with Community Energy Stakeholders on our network information.	✓ One of **4 Community Energy** workshops.
➢ Host a Low Voltage Distributed Generation workshop for our Stakeholders.	✓ Workshop hosted **specifically for our Low Voltage generation customers** in October.
➢ Offer 3 surgery sessions for our Low Voltage Distributed Generation customers.	✓ **3 surgery sessions** offered throughout 2018-19 to our LV generation customers.
➢ Provide quarterly updates on our progress.	✓ Quarterly updates and newsletters published.
➢ Outperform the regulatory standard of 45 working days, by providing quotes within an average of 28 working days.	✓ Achieved an average of **20 working days** to provide quotes for our LV generation customers.
➢ Provide a high level of customer service, with the target of an overall satisfaction score of 85%.	○ Taken out of scope due to low response rate - results not considered statistically significant.

ICE 2019-20 Workplan Progress Update

Action	Progress
Target **high levels of overall satisfaction**.	
We will seek to establish a **DG LV Expert Panel** to improve engagement, and obtain customer insights to drive overall satisfaction	
We will communicate with our stakeholders on **Engineering Recommendation G98 and G99** requirements for the connection of Generation Equipment	
We will provide updates, through stakeholder engagement sessions and meetings, on the **transition to DSO** and to gain stakeholder input.	
We will continuously improve how we provide information and publish requirements for **flexible services**, such as Community Demand Side Response.	
We will provide briefings for stakeholders on the proposed changes to charges through **Ofgem's significant code review**.	
We will lead the national engagement with stakeholders on more consistent DNO connection charging approaches to make charging fair for all of our customers. We will give stakeholders a least one month notice of any changes to our approaches	
Target improved **Time to Quote** timescales for DG LV (28 days)	
We will engage with stakeholders to review and improve the **post acceptance process**.	
We will improve 3rd party access to **Network Information** on GIS	
We will engage with our stakeholders on the impact of our **Network Management System**	

Accelerated Loss of Mains Change Programme

Keith Evans

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Background

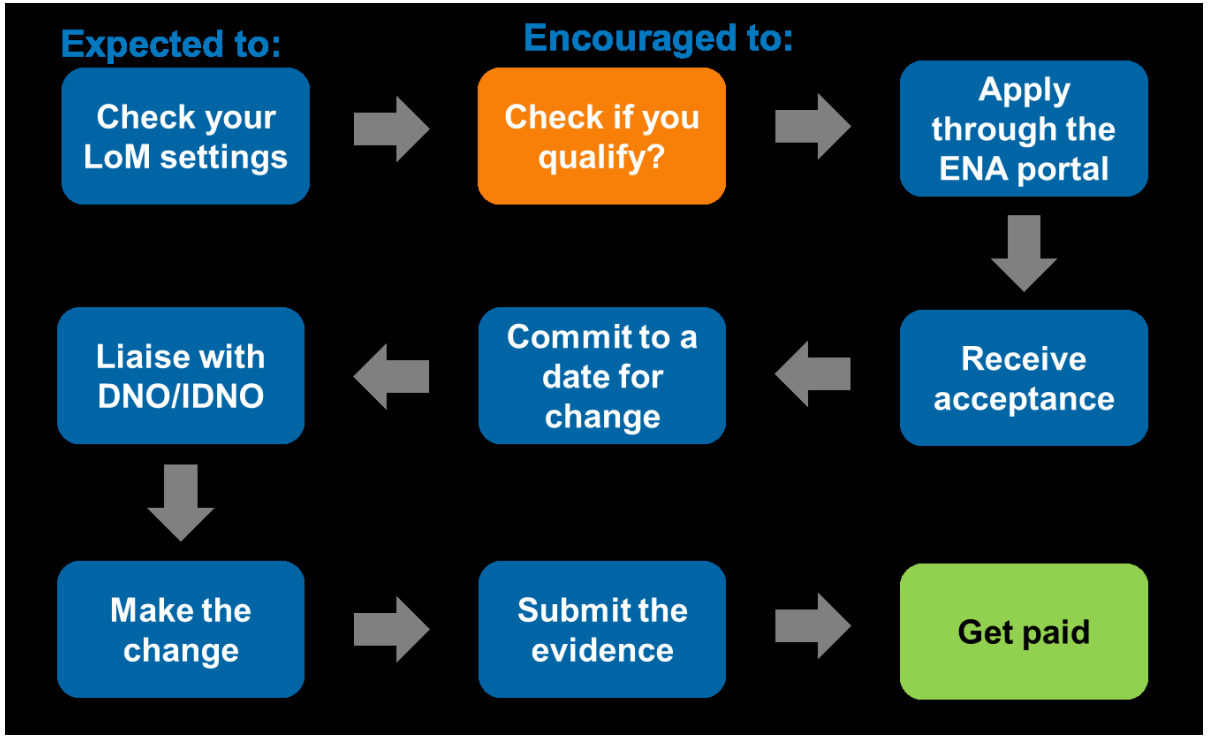
- EREC G59 requires GB generation owners to install loss of mains (LoM) protection at their generation sites.
- This is to ensure that distributed generation does not form an autonomous power island with the remaining local demand.
- Major damage could be done if isolated network re-joins the rest of the network, due to the potential for out of phase switching.
- The two most commons forms of LoM protection are:
  - rate of change of frequency (RoCoF) relays, and
  - vector shift (VS) relays.
- Older relays work on a vector shift principle, which is susceptible to nuisance tripping and new sites connected using G99 or recent sites under G59-3, are prohibited from using VS protection.
- To lower the cost of the reserve generation, National Grid and the ENA have stated that all sites will have to be converted from Vector Shift protection to Rate of Change of Frequency (RoCoF) by April 2022.

Nationwide programme

- **DC0079** is a national working group which has been established to modify historical loss of mains (LoM) protection settings to address network stability concerns.
- The first phase oversaw modified protection settings for all installations >5MW. This second phase is looking to modify the protection settings of all G59 generators fitted with LoM protection commissioned prior to February 2018.
- To comply with the latest requirements, it will be necessary to revise the LoM protection settings for all the existing non-type tested embedded generation fleet to:
  - Ensure that where rate of change of frequency (**RoCoF**) protection relays are used, as part of Loss of Mains protection, the applied setting should be **1Hz/s with a definite time delay of 500ms**,
  - Ensure that **vector shift protection** technique should be **removed** where it is in use as Loss of Mains protection,
  - **Remove LoM protection** from all generation except synchronous and DFIG where a **suitable RoCoF setting cannot be made** without additional investment.

Implementation process

- NGESO and DNO/IDNOs have devised a programme for facilitating the change to LoM protection.
- Older forms of LoM protection will need to be changed by May 2022.
- Generator owners will be offered support to help them to make the change.
- As part of the Accelerated Loss of Mains (LoM) Change Programme, generator owners are eligible to apply for a financial contribution to help them get the necessary work done by entering their details into the new online portal which is expected to be live by Summer 2019.



Impact on Electricity North West

Within ENWL there are about 1000 distribution generators that are required to make the changes.

Scope of works	Baseline approach	Revised approach where works are to be completed by a 'recognised contractor'	Potential Funding
Replacing an existing relay by a new relay	ENWL witness testing	Self certification	£4000 (plus VAT)
Disabling an existing relay	ENWL witness testing	Self certification	£1500 (plus VAT)*
Change the settings of an existing relay	Self certification with % of sites subject to a post event sample site visit	Self certification	£1500 (plus VAT)*

*£500 (plus VAT) for each additional protection device on site that requires either settings change or protection function deactivation up to a maximum of £2500 (plus VAT) per site.

The amount of sites that will require witnessed testing is currently unknown, as this is dependant on the work needed to make the changes, and the contractor chosen by the DG to carry out the works.

Stakeholder Engagement

So far:

- A series of stakeholder events were held by ENA (Energy Networks Association) during April 2019 and a set of slides have been published on their website.
- Details published on ENWL website here
- Information in newsletters.
- Email address: ALoMCP@enwl.co.uk
- **To follow on confirmation of 'go live' date:**
- National press release.
- ENWL press release.
- Social media.

Zero Carbon Plan

Brian Hoy

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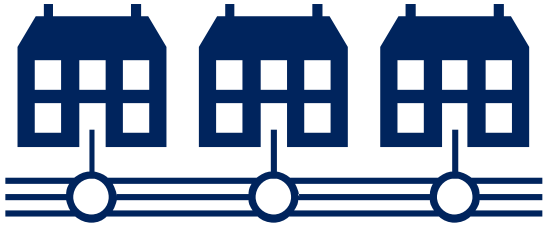
Electricity North West and decarbonisation

- £12bn of electricity infrastructure in the region
- Focused on delivering an affordable, environmentally sustainable and reliable network
- We invest more than £1m per day in the region's electricity infrastructure
- Uniquely placed to lead decarbonisation



Drivers for change

Paris Agreement on Climate Change 2015

Regional Decarbonisation

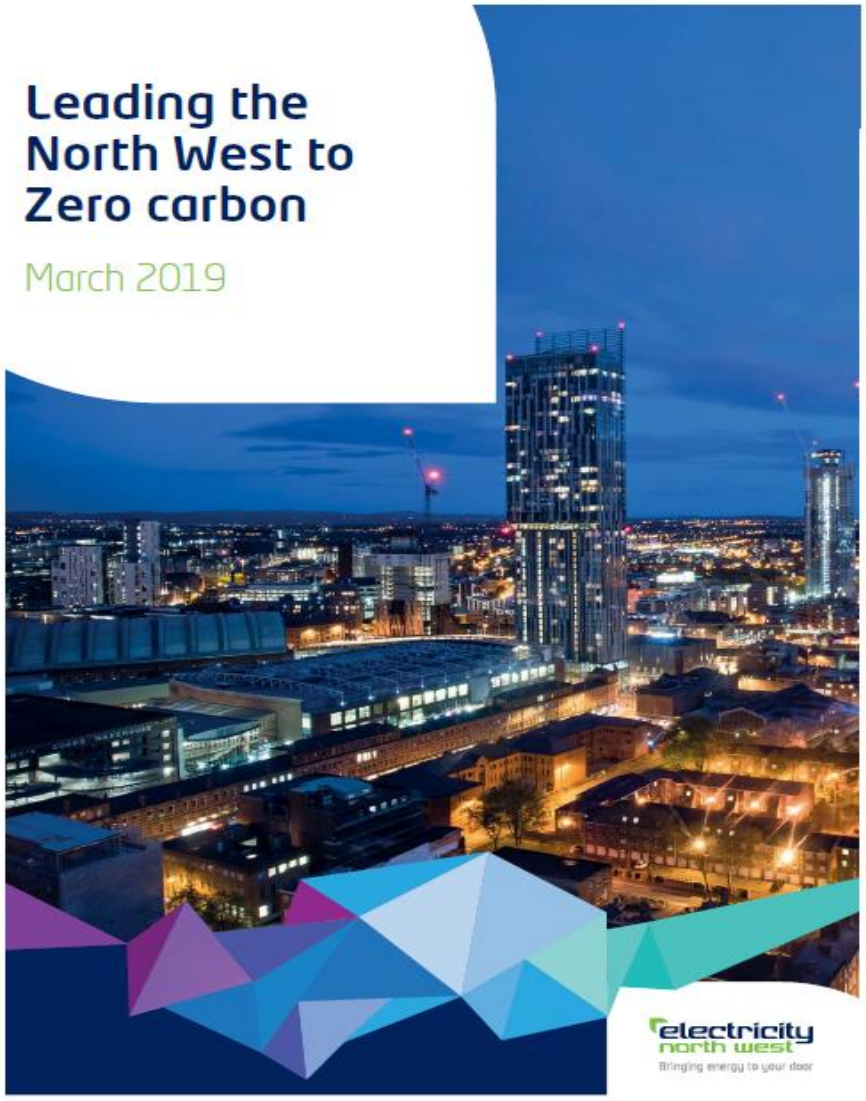
2 X grid capacity and 3 X energy at same cost and reliability

- **Partnerships**
- **Forecasting**
- **Capacity trading**
- **Strategic infrastructure**
- **Smart city**

Electricity distribution has changed

- Electricity - historically a centralised model that changed little
- Now more complicated and multi-directional
- Encouraging and enabling low carbon technologies to connect
- Electricity demand set to double by 2050
- All customers need cleaner, greener energy to enable and enhance 21st century living

Leading the North West to zero carbon



- ✓ Electricity North West plays a crucial part in leading and enabling decarbonisation across the North West
- ✓ Supports the region's ambitions
- ✓ Launched at:
  - ✓ Climate Change Emergency Event in Lancaster
  - ✓ Sustainability panel
  - ✓ Greater Manchester Green Summit
  - ✓ Cumbria Stakeholder Advisory Workshop in Kendal

What are we doing?

Carbon neutral sub-stations

Carbon training

Community Fund

Smart Street

EV charging points at depots

Carbon neutral exemplar depots

Engagement

Cross-sector collaboration
Best practice sharing
Influencing policy
Creating cultural change

Electricity North West's Sustainability and CEO Panels

Talk to us

helen.boyle@enwl.co.uk
www.enwl.co.uk/zero-carbon

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Regulatory & Government Policy Update

Helen Seagrave

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What is community and local energy?

To us community energy means community-led projects or initiatives to reduce, manage, generate or purchase energy. Community energy projects focus on engagement and benefits to their local area and communities.

Local energy encompasses community energy projects and also includes activities by a wider set of local partners such as local authorities, housing associations, intermediary or advisory organisations and local businesses. Local energy projects may have a commercial aspect to their delivery but are also likely to benefit their local area and community.

Where should we take action?

Access to ENWL

Early engagement
More face-to-face time; Dedicated point of contact
Collaboration
Help with understanding where connections could be easier

Finance

Financial support
Help to develop viable business models

Regulation

Regulatory regime doesn't suit community and local energy
Current solutions such as virtual private wires are a "work around" and not a long-term solution

91% of responses agreed or strongly agreed we have understood the main challenges faced by community and local energy groups

Recent announcements

Zero Carbon target by 2050

Smart export guarantee

Energy data task force

Customer vulnerability strategy consultation

Climate Change Act target changed -passed into Law 27th June 2019

Mandates suppliers over a certain size from 31st Dec 2019

Report and Ofgem response published June 2019

Ofgem strategy updated and out for consultation to 8th August

Ongoing consultations / work streams

Name	What is it	How / why to engage
Open Networks	Industry wide project overseeing to identify the and implement the changes required to enable energy systems transition	ENA flexible services consultation
Meter splitting proposal	Proposed code modification to enable consumers to have more than one supplier	Elexon Website
Forward looking and access charging review	Review of current practices for transmission, distribution and connection charges	Charging futures forum
Code reviews	Review of working practices for switching and operation of the energy markets	Gov.uk – Energy Codes Review

A&D Fees Update

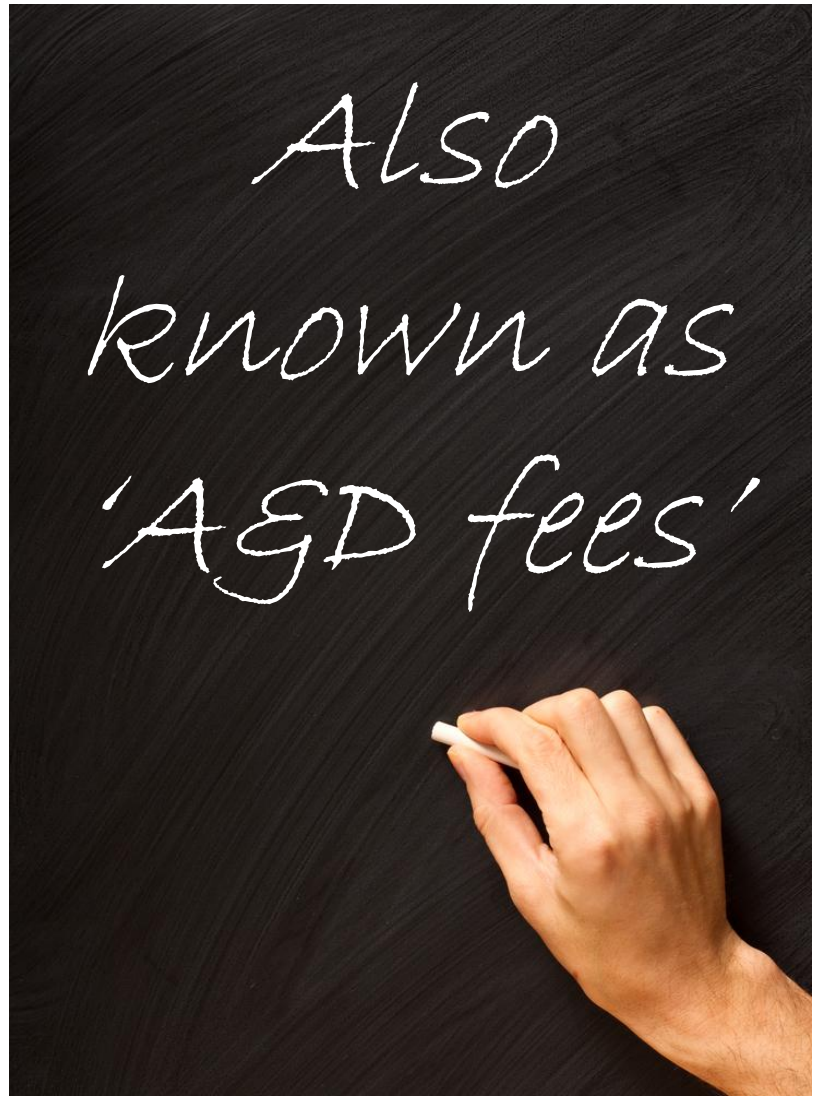
Brian Hoy

Connection Offer Expenses

BEIS introduced new regulations from April 2018

These allow DNOs to charge customers for their connection offer whether it is accepted or not

BEIS intention is to allow a fairer allocation of costs to customers



What do we propose to charge for?

What we won't be charging for
Budget Estimates
Minor connections (1-4)
Cancellations within cooling off period
Offers for diversions

What we will be charging for
EHV offers (demand and gen) from May 18
HV generation offers over 1MVA from Jan 2019
LV and other HV offers (demand and generation) possibly in future but no immediate plans to
Requotes including interactivity requotes
Cancellations (after cooling off period)
Gen+ initial assessments

These charges will be due whether the connection offer is accepted or not

The basic process

Customer Application	Connection Offer issued	Connection Offer validity period	Acceptance
Email informing customer is liable for payment for quote but with 10 working day cooling off period	Connection offer issued together with invoice for £1,000 with 30 day payment terms	Quote validity period normally 180 days but will end after 30 days if invoice not paid	Customer pays balance of Connection Offer Expenses if they accept as part of Acceptance Fee

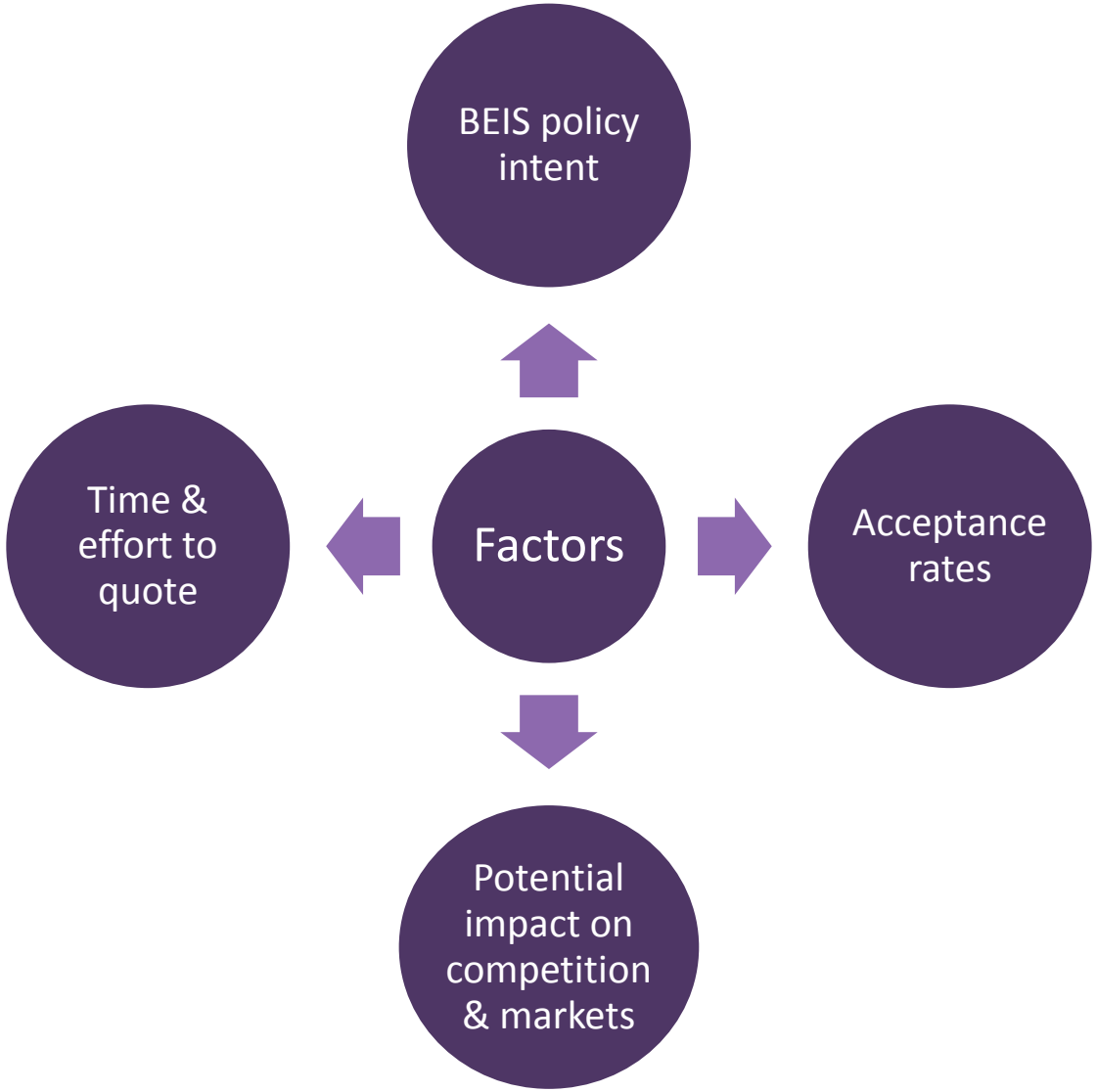
Summary of available options

Four different options available to you for EHV offers and HV generation over 1MVA offers

Budget Estimate	Gen +	Full Works Offer	POC Only Offer
•No charge •Can't accept •No queue position	•Initial charge of £500 payable in advance •Further charge of £1,000 for full offer •Queue position retained	•Initial charge of £1,000 for Dual Offer •Balance based on type of acceptance: • £20,200 for EHV full works •£15,800 for EHV POC only •£5,870 for HV gen full works •£4,500 for HV gen POC only	•Initial charge of £1,000 for connection Offer •Balance based on type of acceptance: •£15,800 for EHV POC only •£4,500 for HV gen POC only

EHV applicable from 4 May 2018
HV Generation greater 1MVA applicable from 1 January 2019

Factors that have influenced the different DNO approaches



- There are a number of different factors that DNOs have taken into account in considering their approach to A&D fees
- Each has evaluated these differently in developing their initial approaches
- This has resulted in different approaches applied to different market segments:
  - No charge
  - Some charge
  - Full charge

Current status of DNO A&D charges

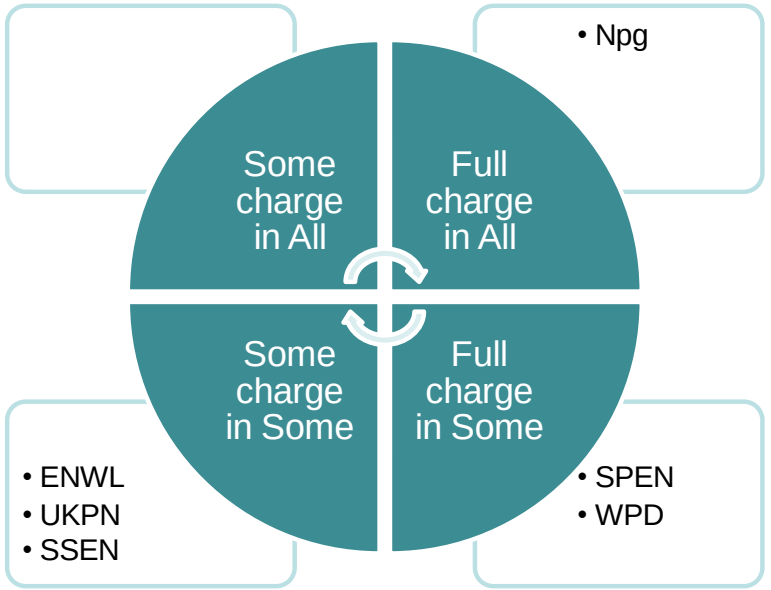
DEMAND	ENWL	NPg	SPEN	SSEN	UKPN	WPD
Demand LV work	No charge	Full charge	No charge	No charge	No charge	No charge
Demand HV work	No charge	Full charge	No charge	Some charge *	No charge	No charge
Demand EHV work	Some charge	Full charge	Full charge *	Some charge	No charge	Full charge

DG	ENWL	NPg	SPEN	SSEN	UKPN	WPD
DG LV work	No charge	Full charge	No charge	No charge	No charge	No charge
DG HV work	Some charge *	Full charge	Full charge	Some charge	Some charge	No charge
DG EHV work	Some charge	Full charge	Full charge	Some charge	Some charge	Full charge

* Denotes not all categories charged for

The tables above show where DNOs currently have implemented charges associated with the issue of Connection Offers

- ‘Full charge’ indicates that the estimated cost of the connection offer is charged to all applicants that receive an offer
- ‘Some charge’ indicates that there is a partial charge to all applicants that receive an offer; applicants that accept then pay an additional charge on acceptance
  - Note the proportion recovered varies between DNOs
- ‘No charge’ indicates all the A&D costs are recovered from accepted projects, typically through on-cost recovery



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Network Management System Update

Hannah Sharratt

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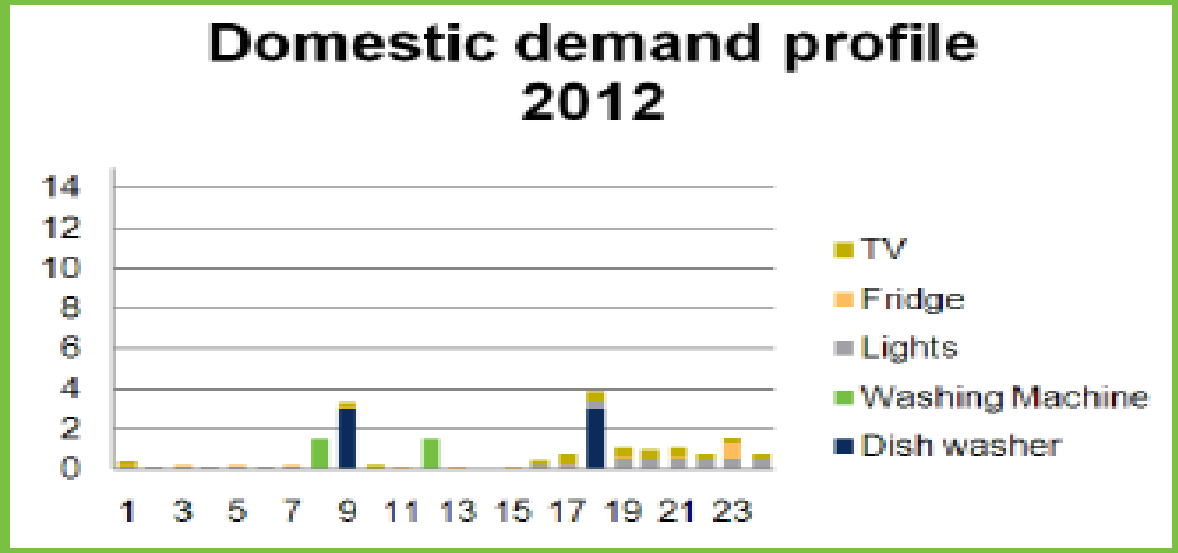
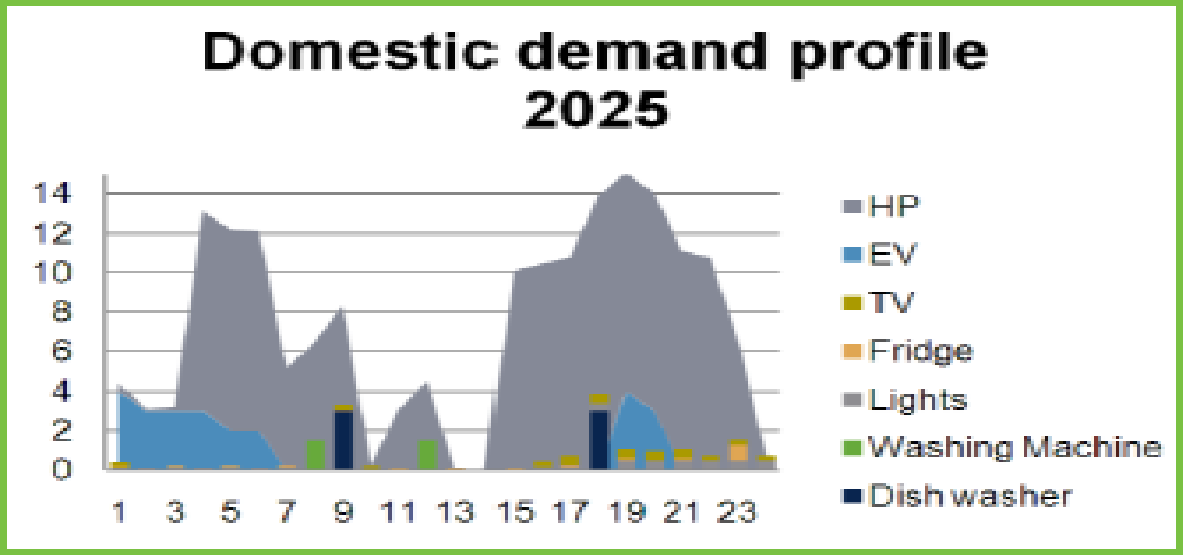
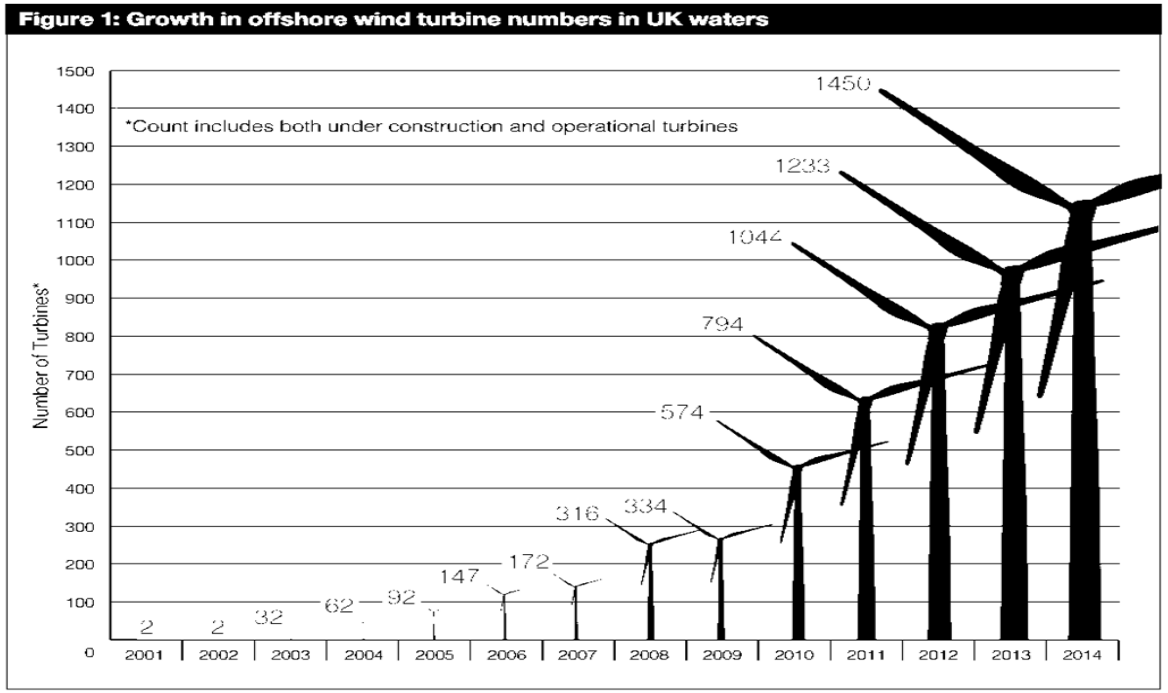
What is changing in the industry?







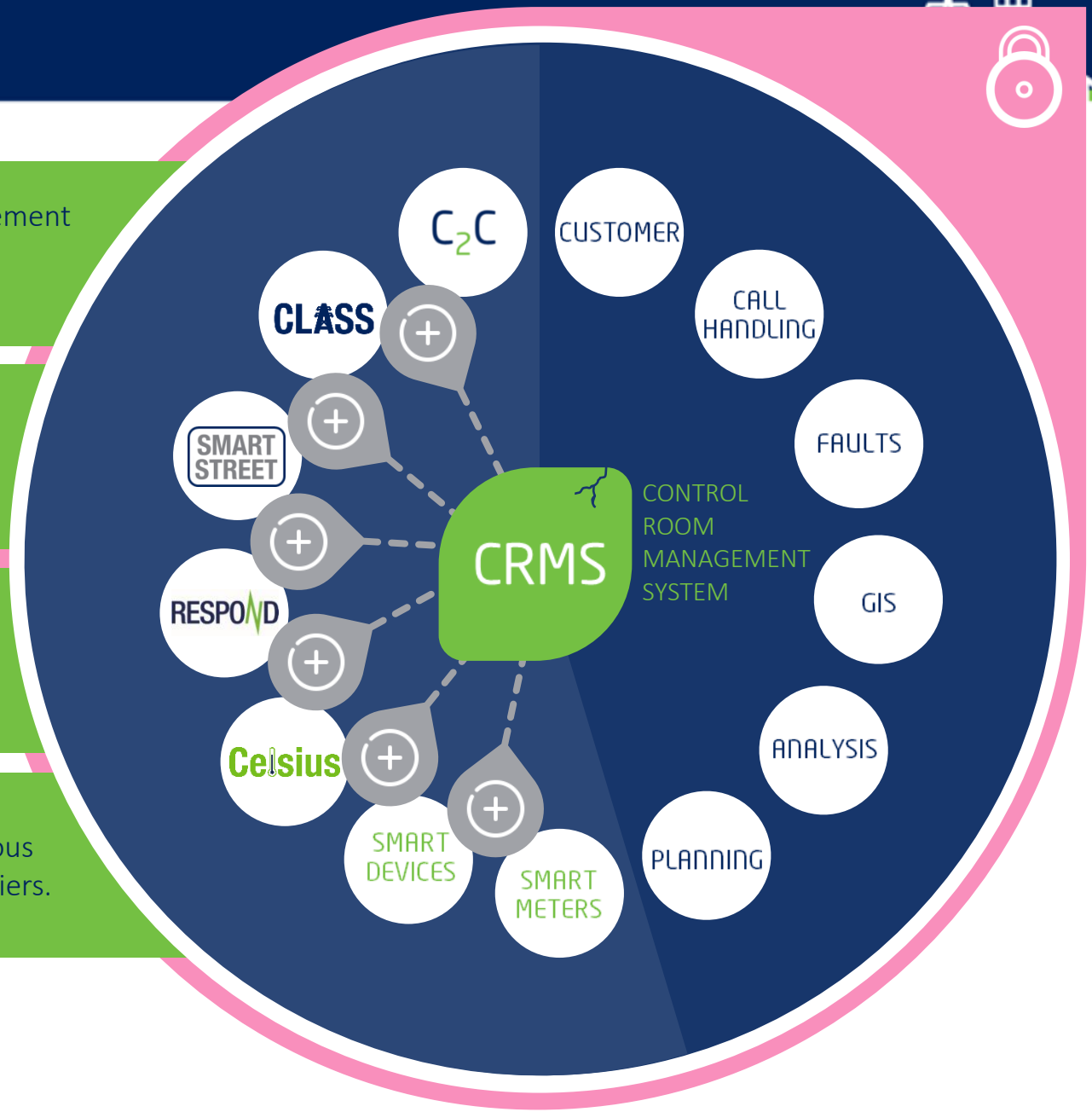
- In less than ten years time the level of domestic consumption is predicted to soar
- Traditional demand profiles will change significantly

CRMS, Our Control Room Management System, purpose built, very proud of what its helped us achieve

Nearing obsolescence, ageing, reaching its capability limits

Costly bolt-ons, funded by innovation projects, unfeasible to be continually funded as is

Higher security risk, using numerous third party connections and suppliers.



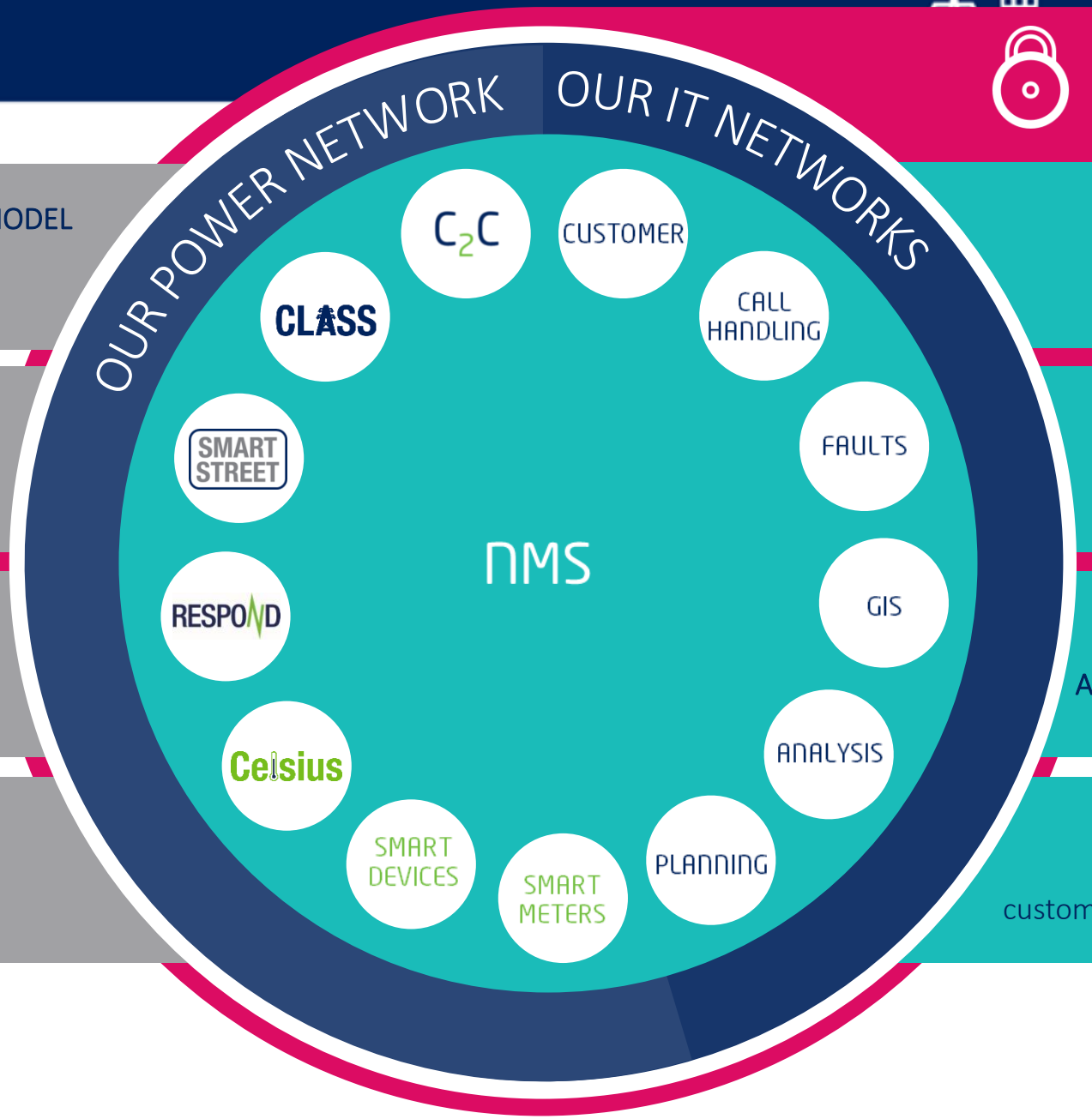
Passive & static diagram with some elements network intelligence

FULLY INTERACTIVE ELECTRICAL MODEL GIVING REAL-TIME CONTROL & FEEDBACK

Reduce investment in reinforcing our electricity network, and in fault level investment

Integrates our low carbon tech and 2.5m smart meters, to enable our Smart Grid

Enables us to continually innovate



Operation process performance improvements

Will support 13,000 switching devices and 35,000 measurement points

BRINGS DATA TOGETHER FOR ADVANCEMENT IN GIS PLATFORMS

Will deliver improvements in customer service, by reducing customer interruptions and minutes lost

What this means for you?

- Our new Network Management System will incorporate greater control and visibility of our LV network
  - Will require improved visibility of planned works, for all voltage levels, with “pre-built” drawings embedded into NMS to improve visibility of future works
- Support growth in the use of low carbon technology
- More info to follow over the next few months.....

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Engineering Recommendation (EREC G98 & G99)

Gavin Anderson

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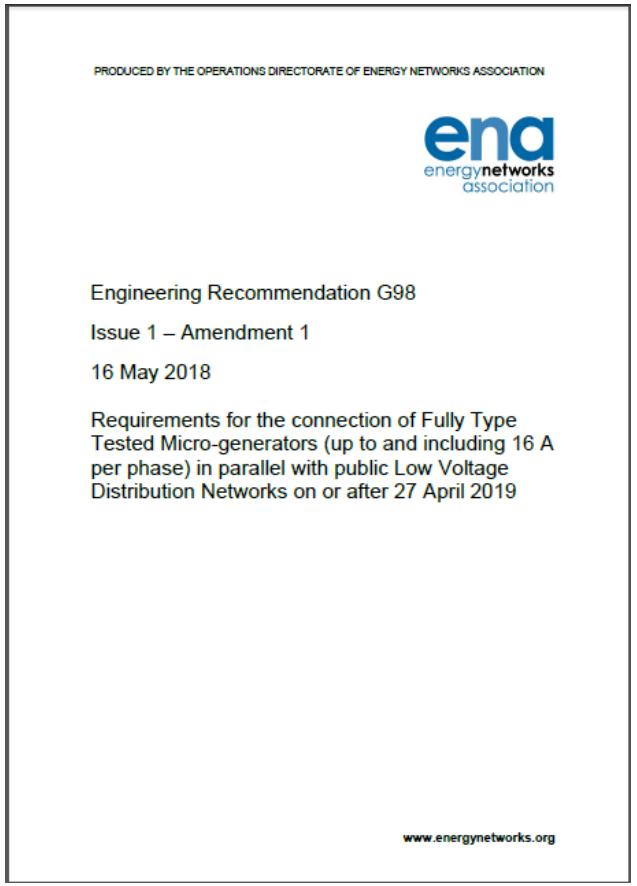
G98:

Requirements for the connection of Fully Type Tested **Micro-generators** (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after 27 April 2019



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ena energynetworks association

Engineering Recommendation G98

Issue 1 – Amendment 1

16 May 2018

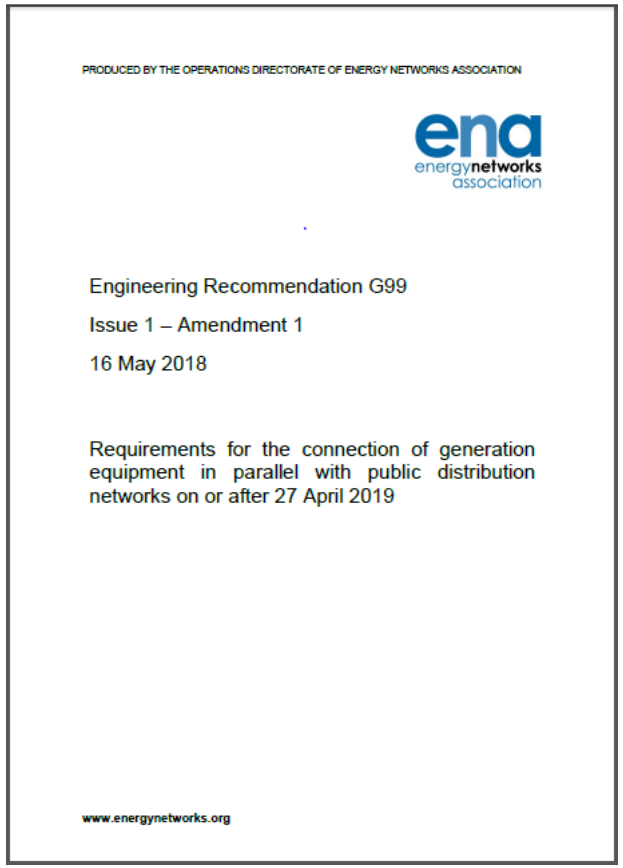
Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after 27 April 2019

www.energynetworks.org

- **Low voltage**
- **Fully Type Tested**
- **16 Amps per phase**

G99:

Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019



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ena energynetworks association

Engineering Recommendation G99

Issue 1 – Amendment 1

16 May 2018

Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019

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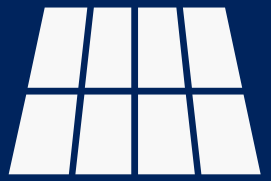
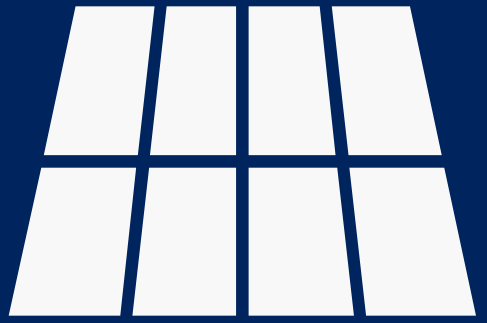
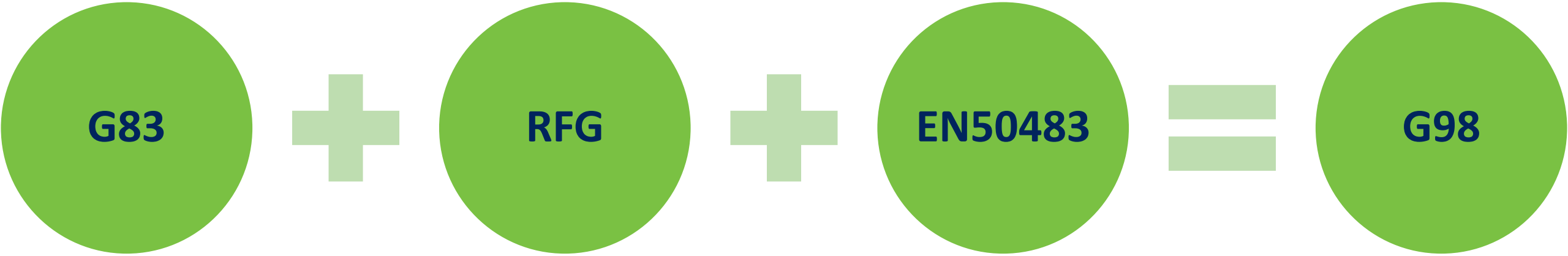
- **Greater than 800W**
- **Inclusive of Type Testing**

EREC G98 & EREC G99 - Agenda

		
EREC G98 Process & Forms	EREC G99 Terminology	Type A <50kW
		
Storage Fast Track	Type A >50kW	Questions & Answers

EREC G98

EREC G98 – Background and Terminology



Micro generator

A source of electrical energy and all associated interface equipment able to be connected to an electric circuit in a Low Voltage electrical installation and designed to operate in parallel with a public Low Voltage Distribution Network with nominal currents up to and including 16 A per phase.

Fully Type Tested

A Micro-generator which has been tested to ensure that the design meets the relevant technical and compliance requirements of this EREC G98, and for which the Manufacturer has declared that all similar Micro-generators supplied will be constructed to the same standards and will have the same performance.

In the case where Interface Protection functionality is included in the tested equipment, all similar products will be manufactured with the same protection settings as the tested product.

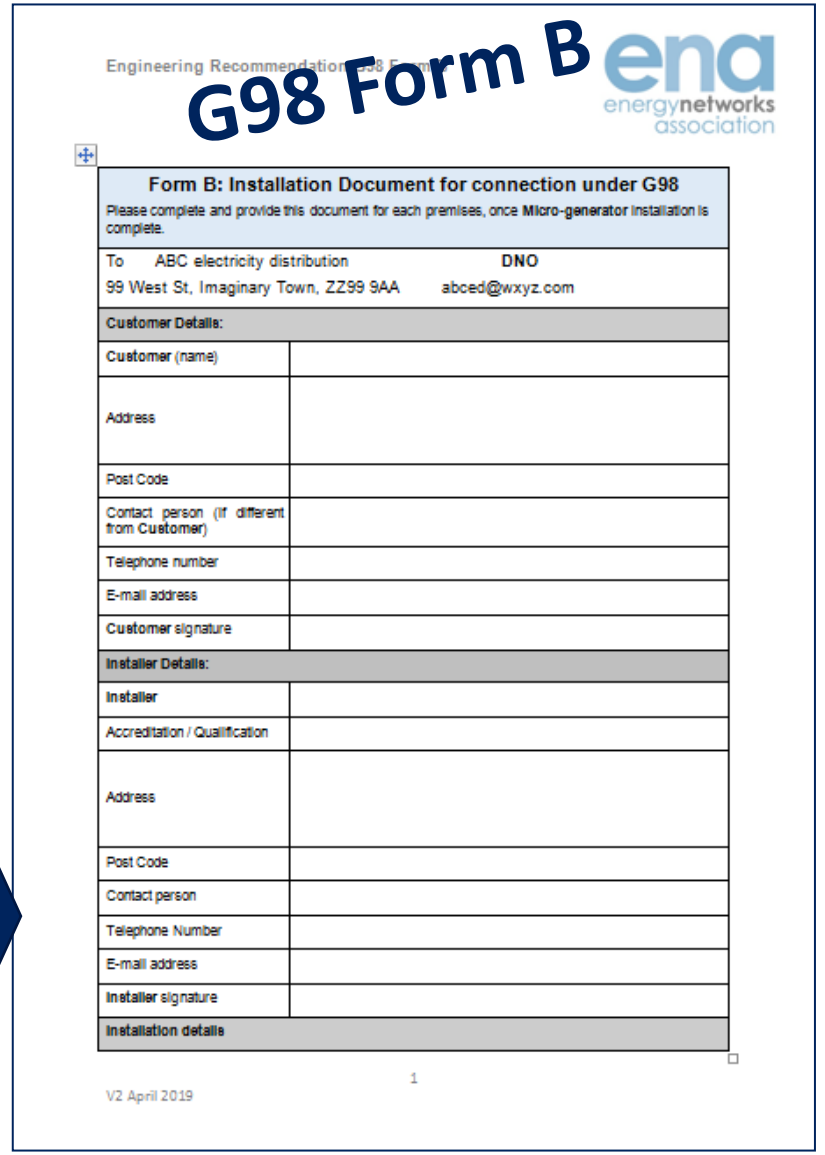
EREC G98 – Single Premises Connection Process

For single premises the G98 connection procedure is the same as the G83 process, **connect and notify**, except the forms have different names

Single:

- Notify the DNO (us) within 28 days of commissioning the generating unit (*legal requirement)*
- Installer must submit the **"Installation Commissioning Confirmation" G98 Form B** *(Appendix 3)*

- **Site details**
- **Contact details**
- **Technical information**
- **Installer details**
- **Supporting information e.g. circuit diagrams**
- **Signed declaration of compliant installation**
- **Manufacturer's Reference Number**



Engineering Recommendation G98 Form

G98 Form B

ena energynetworks association

Form B: Installation Document for connection under G98 Please complete and provide this document for each premises, once Micro-generator installation is complete.	
To ABC electricity distribution 99 West St, Imaginary Town, ZZ99 9AA	DNO abced@wxyz.com
Customer Details:	
Customer (name)	
Address	
Post Code	
Contact person (if different from Customer)	
Telephone number	
E-mail address	
Customer signature	
Installer Details:	
Installer	
Accreditation / Qualification	
Address	
Post Code	
Contact person	
Telephone Number	
E-mail address	
Installer signature	
Installation details	

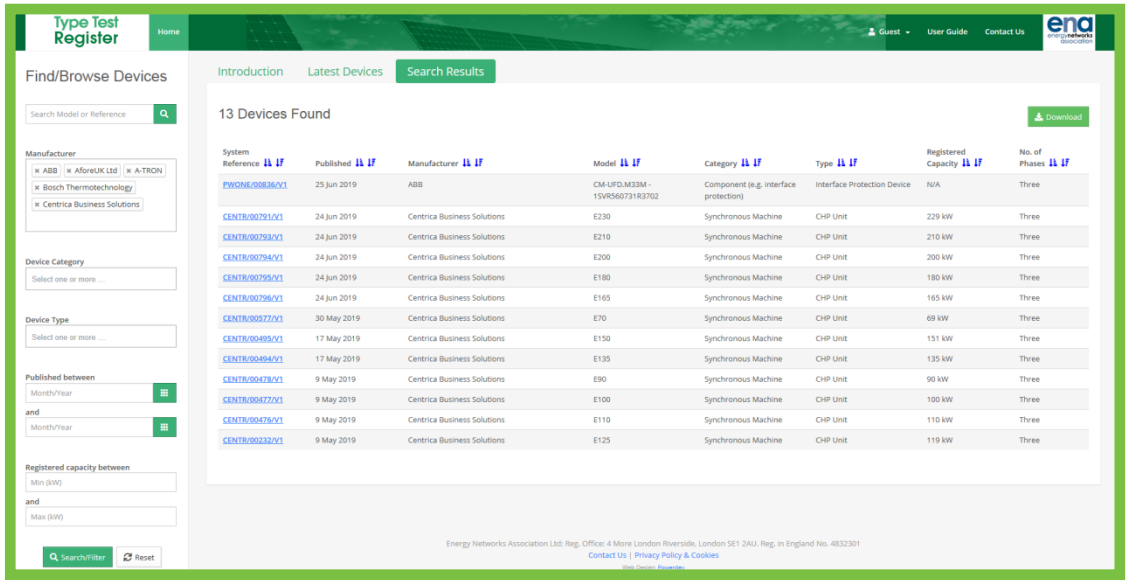
1

V2 April 2019

EREC G98 – Manufacturer's Reference Number

➢Manufacturer's Reference Number ✓

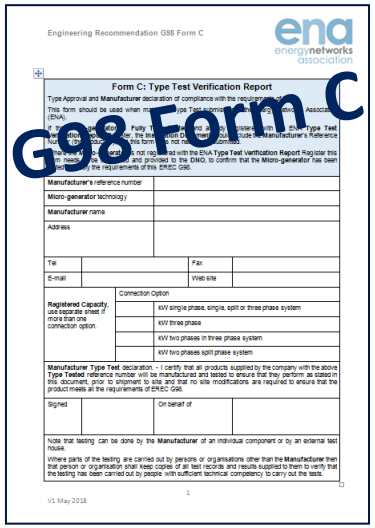
Number registered on the ENA Type Test Verification Report Register



➢Manufacturer's Reference Number ✗

NOT on ENA Type Test Register

Submit Form C – Type Test Verification Report



G98 Form C

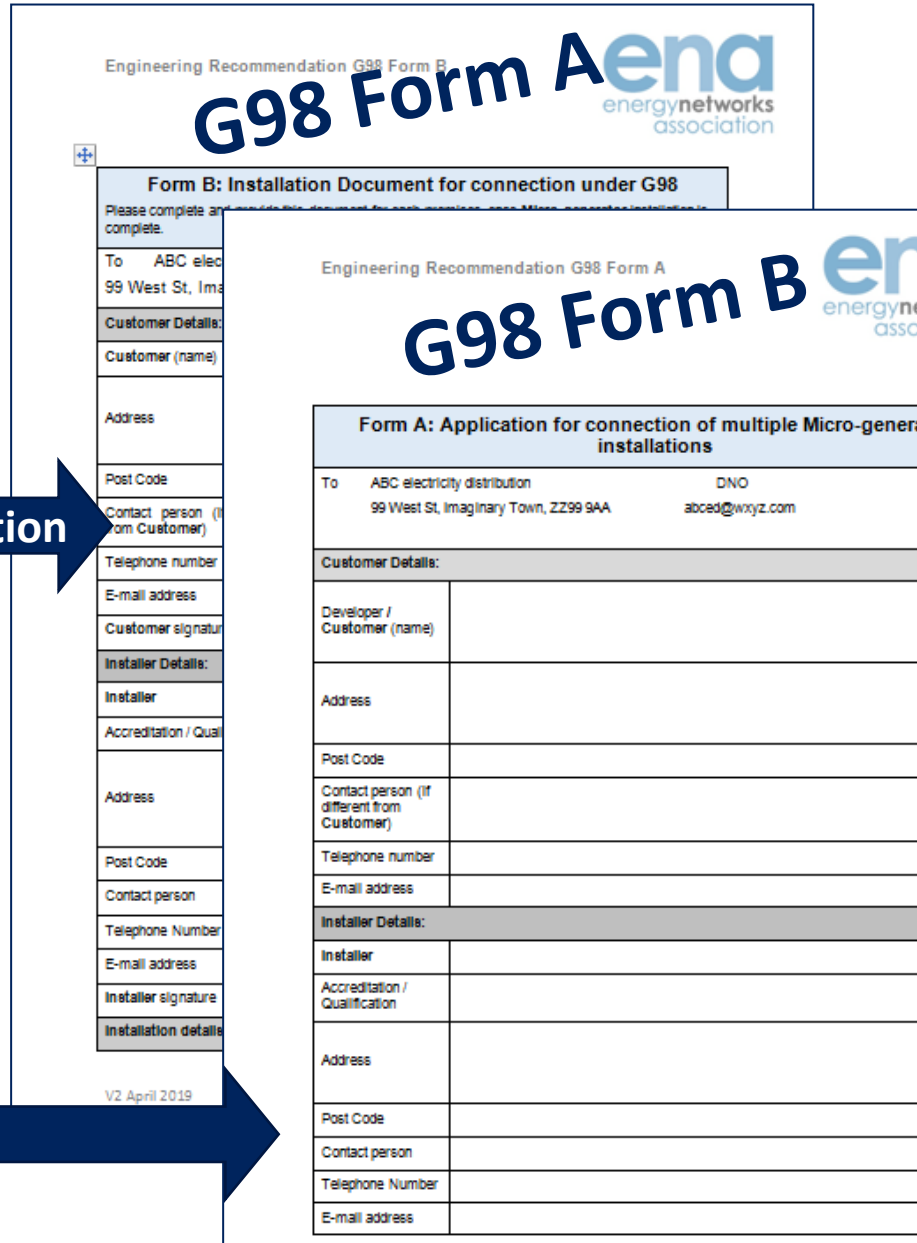
Generators will be requested to disconnect if the generator is found to be non-compliant

EREC G98 – Multiple Premises Connection Process

For multiple premises the G98 connection procedure is also the same as the G83 process, **apply, connect and notify,** except the forms have different names

Multiple:

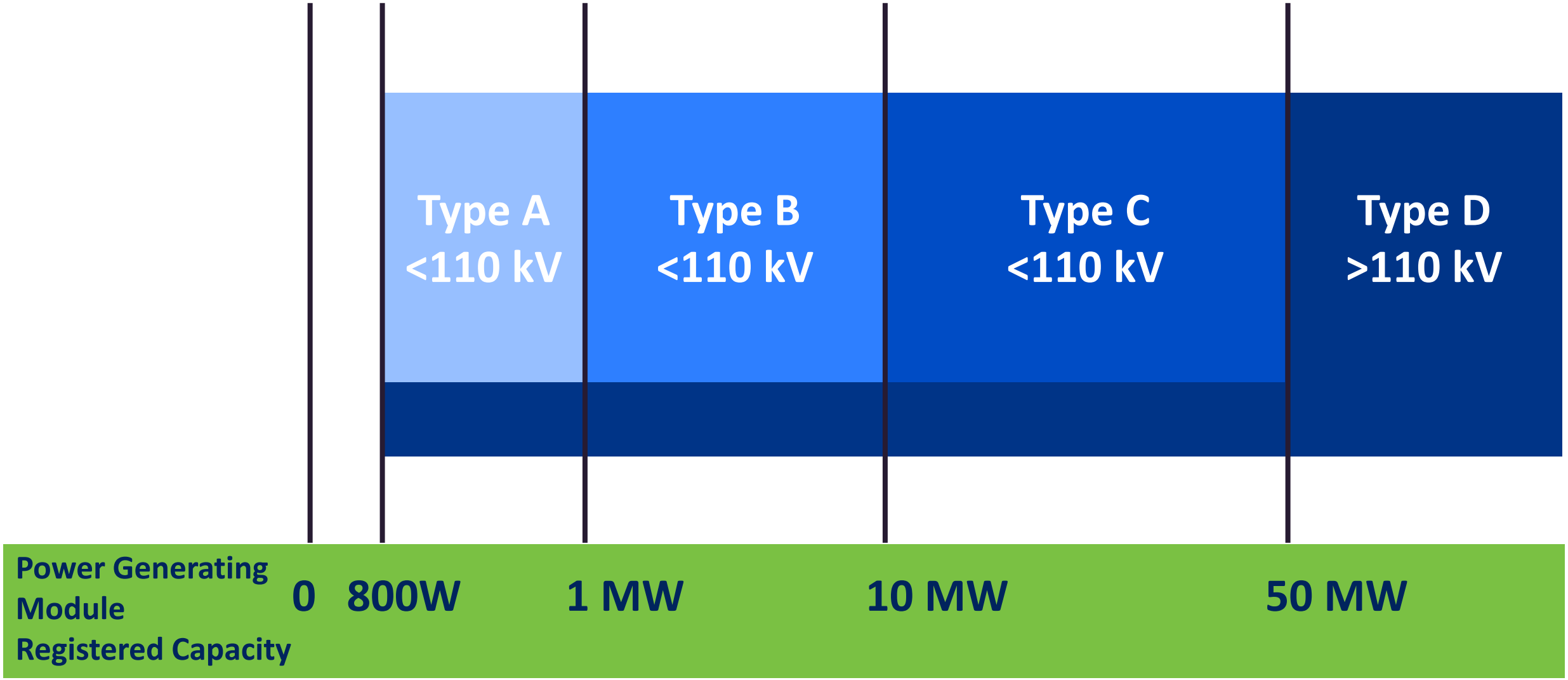
- Submit **"Application for Connection of Multiple Micro-Generator Installations" G98 Form A** *(Appendix 3)*
- Receive and accept connection offer
- Notify the DNO (us) within 28 days of commissioning the generating unit (*legal requirement)*
- Installer must submit the **"Installation Commissioning Confirmation" G98 Form B** *(Appendix 3)*



EREC G99

EREC G99 - Types (GB)

- Types affect technical requirements and which forms you use



EREC G99 - Who is EREC G99 applicable to?

Applies to:-

New generator connections >800W,

Electricity Storage, but some technical requirements do not apply

All types of electrical conversion machines and equipment

Generators significantly revised or replaced after 27 April 2019

Exempt:-

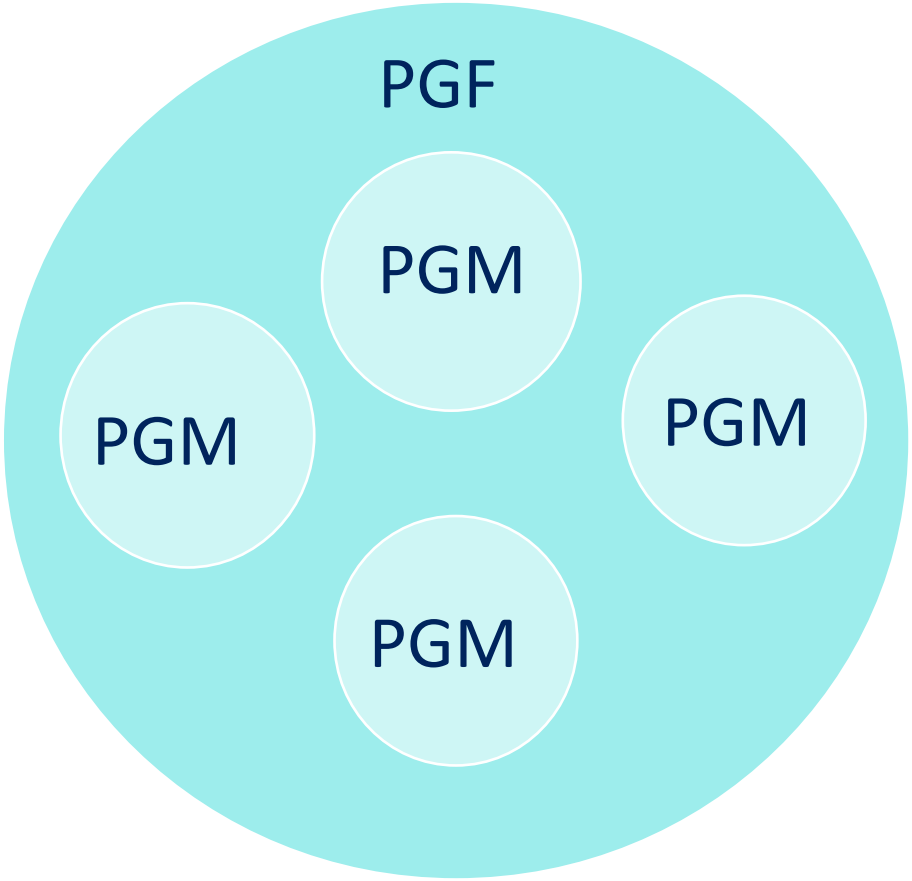
Generators connected before 27 April 2019

EREC G99 - Power Generating Units & Power Generating Modules

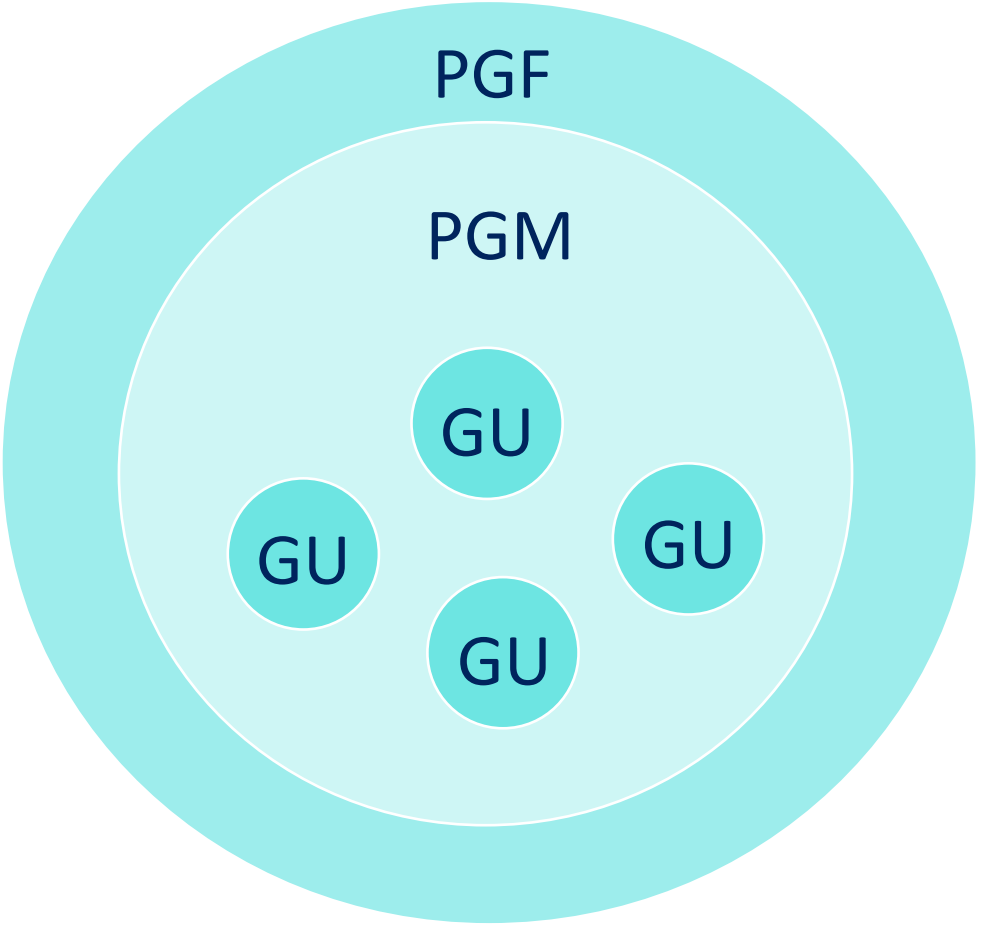
Types depend on PGM capacity

PGM definition depends on whether the technology is synchronous / asynchronous

SYNCHRONOUS SCHEME



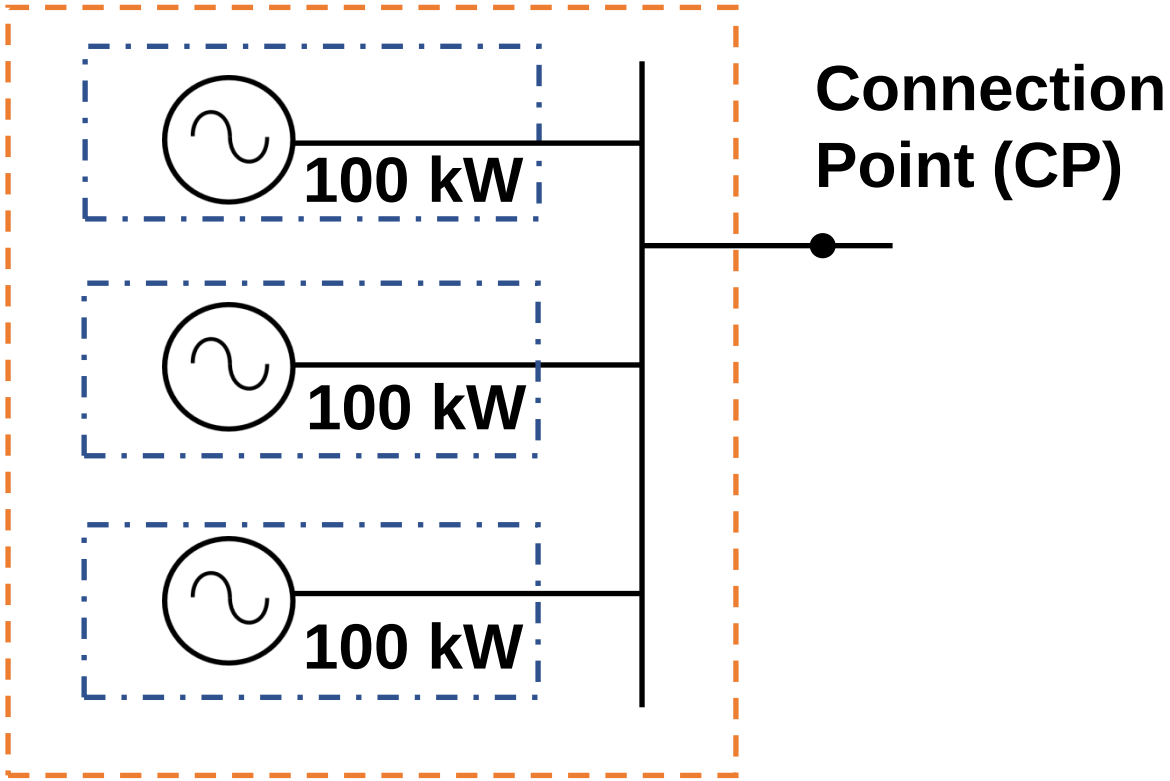
ASYNCHRONOUS SCHEME



Generating Unit, GU
Power Generating Module, PGM
Power Generating Facility, PGF

EREC G99 – Type A synchronous machine example

3 x **100 kW Type A Synchronous PGMs** = 0.3 MW PGF

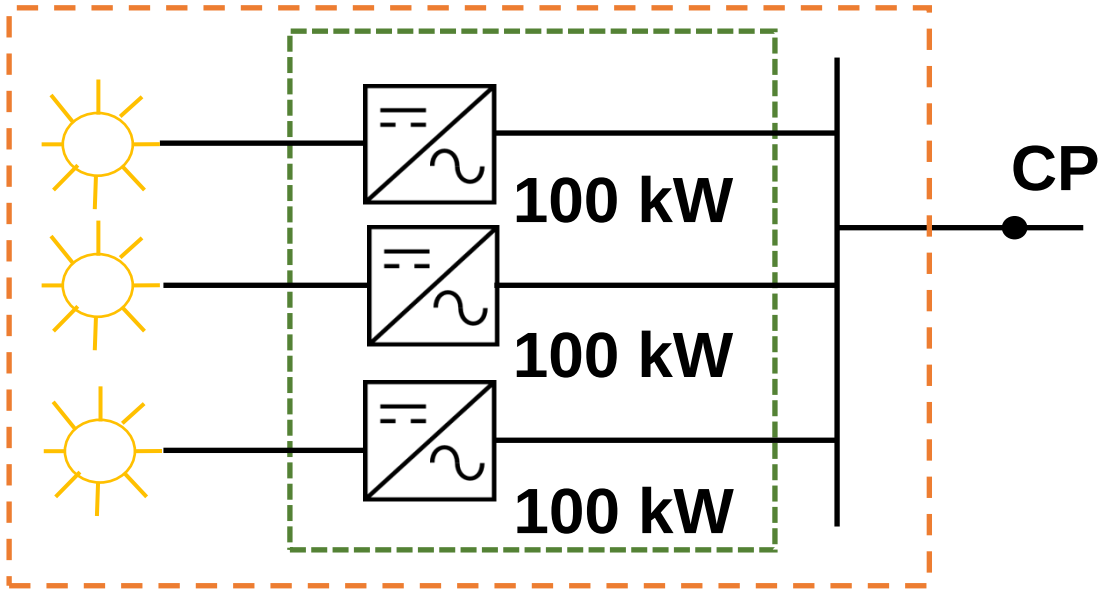


Power Generating Module (PGM) / Synchronous Power Generating Module

Power Generating Facility (PGF)

EREC G99 – Type A asynchronous example

3 x 100 kW Inverter connected GUs = **0.3 MW Type A PPM** = 0.3 MW PGF



Power Generating Module (PGM) / Power Park Module (PPM)

Power Generating Facility (PGF)

EREC G99 – Type A connection processes

Simpler connection processes available for smaller PGMs:-

PGM less than 50kW 3-phase, 17kW single phase

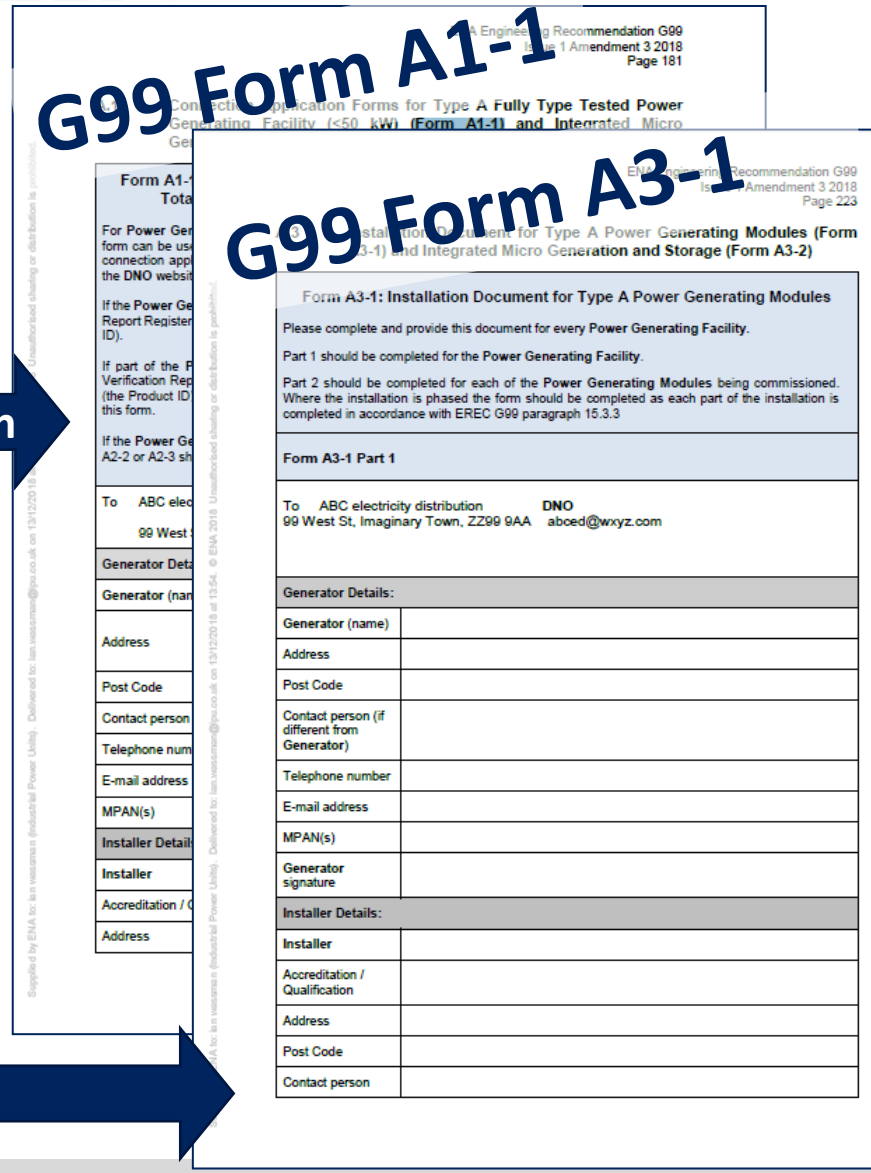
Integrated micro generation and storage installations

Type A greater than 50kW

EREC G99 – PGM <50kW connection process

A simpler process is available for Type A <50kW 3-phase (17kW 1-phase)

- Submit **"Application for Connection of Power Generator Modules with total aggregate capacity <50kW 3-phase and 17kW single phase" G99 Form A1-1** *(Annex A)* **Application**
- *Compliance test results do not need to be submitted as part of the application when data is on the ENA Database, otherwise submit Form A2-1, A2-2 or A2-3 with application*
- Receive and accept connection offer
- Notify the DNO (us) within 28 days of commissioning the generating unit (*legal requirement)*
- Submit the **"Installation Document for Type A Power Generating Modules" G99 Form A3-1** *(Annex A)* **Installation**



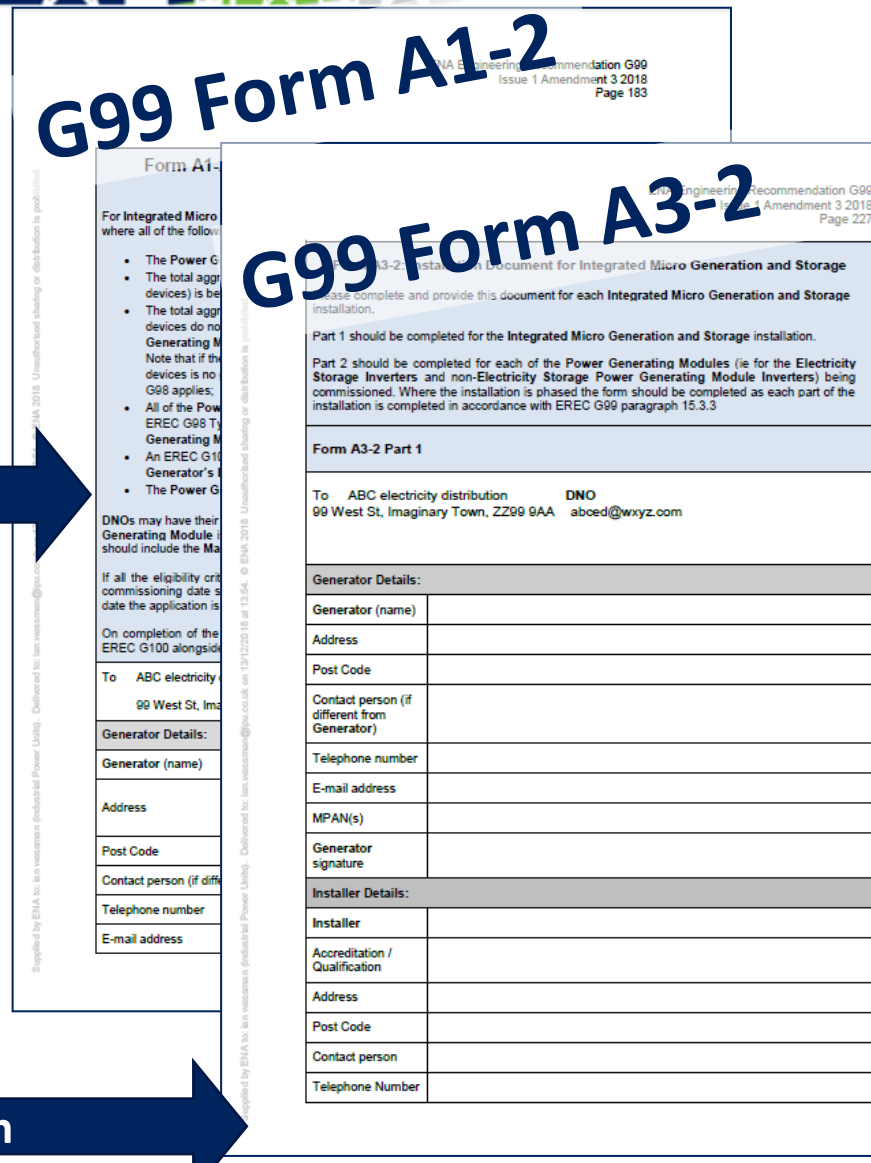
Generators will be requested to disconnect if the generator is found to be non-compliant

EREC G99 – Fast track connection process for integrated micro generation and storage

Fast track process is available for type tested integrated micro generation and storage on the same site, if;

- *16 Amps > Aggregate Capacity < 32 Amps per phase*
- *Individual Capacity < 16 Amps • G100 16 Amp export limit*

- Submit **"Application for connection of Integrated Micro Generation and Storage installations" Form A1-2** **Application**
- Receive and accept connection offer
- *Compliance test results do not need to be submitted as part of the application if data is on the ENA Database*
- Notify the DNO (us) within 28 days of commissioning the generating unit (*legal requirement)*
- Submit the **"Installation Document for Integrated Micro Generation and Storage" G99 Form A3-2** *(Annex A)* **Installation**

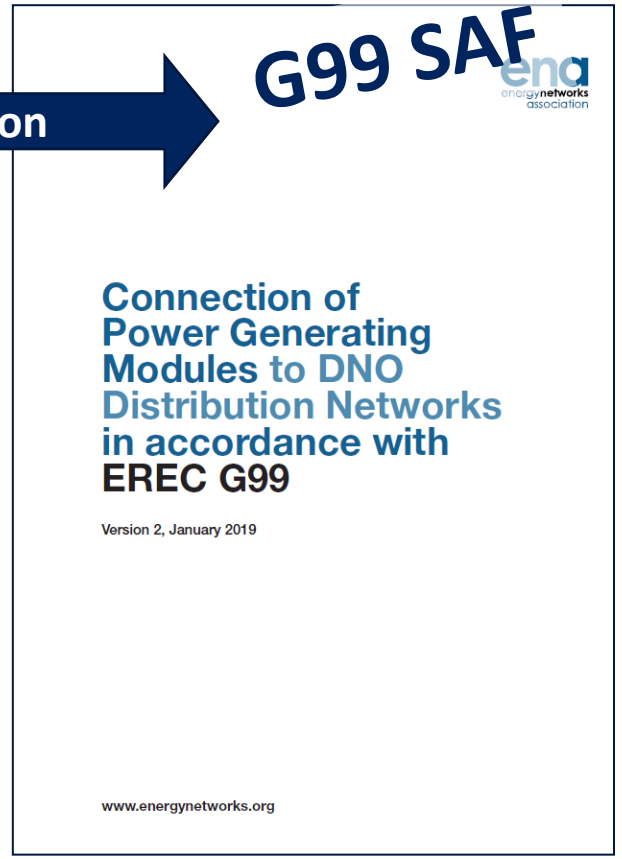


Generators will be requested to disconnect if the generator is found to be non-compliant

EREC G99 – Type A >50kW 3-phase connection process

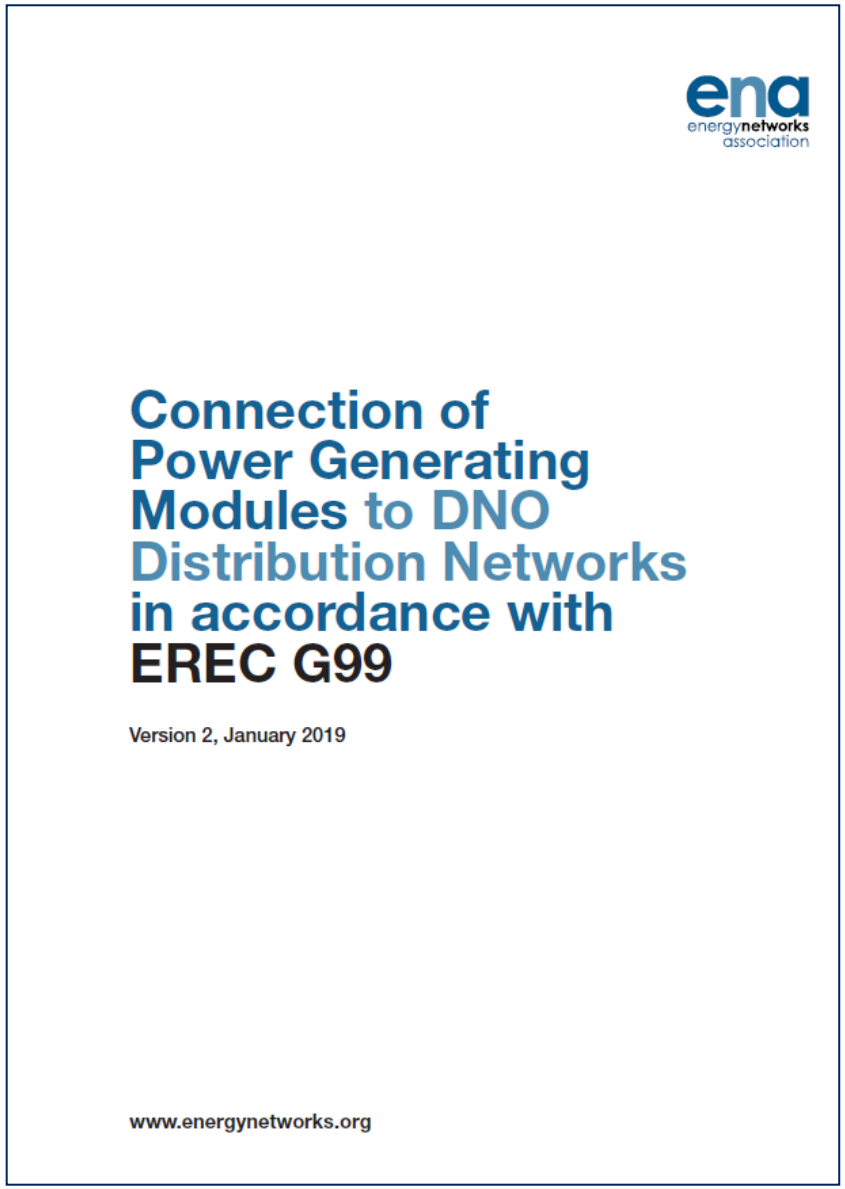
Type A >50kW 3-phase process is slightly more detailed

- Submit **Standard Application Form** (ENA or ENW website) **Application**
- Receive and accept connection offer
- *Submit evidence of compliance with application*
  - **"Compliance Verification Report for Synchronous Power Generating Modules > 50 kW" Form A2-2**
  - **"Compliance Verification Report for Inverter Connected Power Generating Modules" Form A2-3**
- Submit **"Site Compliance and Commissioning test requirements for Type A Power Generating Modules" Form A2-4** if the Interface Protection is not Type Tested or for other site compliance tests are required
- Submit **"Installation Document for Type A Power Generating Modules" G99 Form A3-1** within 28 days



Generators will be requested to disconnect if the generator is found to be non-compliant

EREC G99 – Standard Application Form, SAF



Changes include:-

- Alignment of terminology with G99 (PGM, GU etc)
- Inclusion of storage data
- New technical data

Can be accessed from our website: https://www.enwl.co.uk/get-connected/new-connection/generation-connection/over-200kw/

EREC G99 – Standard Application Form, SAF

- ***SAF >50kW 3-phase***
  - *Different parts submitted at different times*
  - *Different parts for different technologies*

Part 1 Contact details, location and operational information
Part 1a Supplementary contact details
Part 2 Power Generating Facility general data
Part 3 Power Generating Module model data

Initial Submission

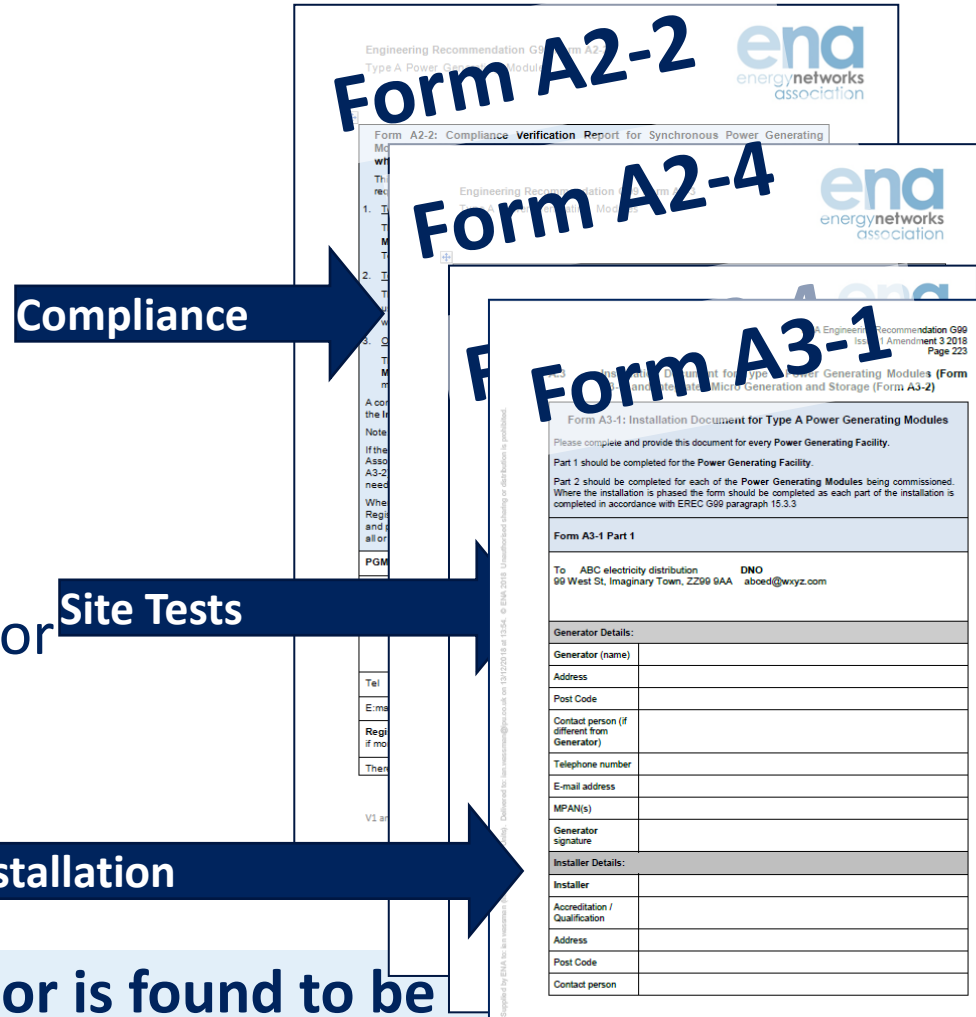
Part 4a Synchronous Power Generating Modules
Part 4b Power Park Module model data: Fixed speed induction Generating Units
Part 4c Power Park Module model data: Doubly fed induction Generating Units
Part 4d Power Park Module model data: Series inverter connected Generating Units
Part 4e Power Park Module model data: Electricity Storage plant
Part 4f Transformer information
Part 5 Additional data which may be required by the DNO

Prior to Synchronising

EREC G99 – Type A >50kW 3-phase connection process

Type A >50kW 3-phase process is slightly more detailed

- Submit **Standard Application Form** (ENA or ENW website)
- Receive and accept connection offer
- *Submit evidence of compliance with application*
  - **"Compliance Verification Report for Synchronous Power Generating Modules > 50 kW" Form A2-2**
  - **"Compliance Verification Report for Inverter Connected Power Generating Modules" Form A2-3**
- Submit **"Site Compliance and Commissioning test requirements for Type A Power Generating Modules" Form A2-4** if the Interface Protection is not Type Tested or for other site compliance tests are required
- Submit **"Installation Document for Type A Power Generating Modules" G99 Form A3-1** within 28 days



Generators will be requested to disconnect if the generator is found to be

EREC G99 - Type A >50kW 3-phase summary of forms

- *For Type A >50 kW, the form depends on the use of type testing*

Type A	Manufacturer's Information	Site Tests
Fully Type Tested	No specific form Reference is made in the installation form to the registration on ENA website	**Form A2-4** completed if site compliance tests are being undertaken for some or all of Type A generator Interface Protection where it is not Type Tested Installation forms: **Form A3-1** Type A PGMs **From A3-2** Integrated micro generation and storage
Partially Type Tested	**Form A2-1** Synchronous PGM ≤50kW **Form A2-2** Synchronous PGM >50kW **Form A2-3** Inverter connected PGMs	

EREC G99 – Type A witness testing

- We may witness LV Type A PGMs in line with EREC G99 section 16.3

- Witness testing of Type A PGMs which are not fully type tested shall only be required where the generator does not provide complete commissioning records to demonstrate compliance with the relevant parts of G99.

- Generators shall be reminded that they are legally obliged under the ESQCR Regulation 22 to have appropriate equipment to prevent danger and interference to the distribution network.

EREC G99 - New / modified technical requirements (Type A focus)

Interface Protection Settings (Types A, B, C & D)

DNO logic interface by which generator will reduce active power (Type A)

Frequency withstand (Types A, B, C & D)

Rate of change of frequency withstand (Types A, B, C & D)

Minimum active power at low frequency (Types A, B, C & D)

Limited frequency sensitive mode – over frequency (Types A, B, C & D)

EREC G99 Discussion

EREC G99 – Electricity North West's Information

FAQs on website

EREC G99 webinars on website

Meet with our experts

EREC G99 - Further information

➢ Electricity North West Website

https://www.enwl.co.uk/get-connected/new-connection/generation-connection/engineering-recommendation-g99

➢ ENA Website

http://www.energynetworks.org/electricity/engineering/distributed-generation/engineering-recommendation-g59.html

➢ DG Connection Guides

http://www.energynetworks.org/electricity/engineering/distributed-generation/dg-connection-guides.html

➢ Distribution Code DPC7

covers requirements for embedded generators including G99

http://www.dcode.org.uk/

electricity north west

Bringing energy to your door

Post Acceptance Process

Tracey Taylor

Stay connected...

www.enwl.co.uk

Objective

Enhance your Customer Journey

Improve G99 Process

Identify Guidance required

Agenda

Connections Process

Customer Journey

Information available

Table discussions & Feedback

Connections Process

Application	Connection Offer	Acceptance	Post Acceptance Studies	Installation and Commission
Receipt of your Application Triage Request further information	Assessment of Network Interaction with customer to determine Design Connection Offer	Acceptance and payment Customer contact to discuss next stages Legal consents	Receipt of **Part 4 of SAF and Forms A2-1, A2-2, A2-3 -** Compliance Test Results (if req'd) Post Acceptance Studies	**G99 Form A2-4** Site Compliance & Commissioning tests (if required) **G99 Form A3-1 –** Installation Document

Customer Journey

Application	Connection Offer	Acceptance	Post Acceptance Studies	Installation and Commission
Receipt of your Application	Assessment of Network	Acceptance and payment	Receipt of **Part 4 of SAF and Forms A2-1, A2-2, A2-3 -** Compliance Test Results (if req'd)	**G99 Form A2-4** Site Compliance & Commissioning tests (if required)
Triage & Request further information	Interaction with customer to determine Design	Customer contact to discuss next stages	Post Acceptance Studies	**G99 Form A3-1 –** Installation Document
	Connection Offer	Legal consents		

EREC G99 – Electricity North West's guidance

FAQs on website

EREC G99 webinars on website

Meet with our experts

Post Acceptance Guidance

- Post Acceptance Guidance (G59)
- What would assist you through the process?
  - Guidance – which areas/what format?
  - Process flows?
  - Communication – how?
  - Anything else???

Post Acceptance Guidance - Discussion

Table Discussions – 10 Minutes

1) Do you now know what is expected of you?

2) What information and guidance would you like?

3) How do you want us to communicate with you?

Post Acceptance Guidance - Discussion

Feedback – 5-10 Minutes

1) Do you now know what is expected of you?

2) What information and guidance would you like?

3) How do you want us to communicate with you?

Any Questions?

Panel Question & Answer Session

Wrap up and Close

Brian Hoy

Stay connected...

www.enwl.co.uk

Wrap Up & Close

- Please give us your honest feedback on the forms provided
- Presentation slides will be available via our website at the latest early next week.
- Don't forget to get in touch with us at ICE@enwl.co.uk

- Please stay for lunch and networking.
- Thank you for your attendance and have a safe journey home.

Lunch & Networking