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# ENWL ICE DG HV / EHV Workshop

5 March 2019

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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
- mark.williamson@enwl.co.uk
- ice@enwl.co.uk

# Domestic Arrangements

- Don’t  forget to sign in!
- No Fire Alarms planned
- Emergency Assembly Point
- WCs – Fob on registration desk – Please return
- Mobile Phones



# Agenda

**Welcome & Introduction**

ICE Workplan 2018-19 Update

ICE Workplan 2019-20 Development

Flexible Services

A&D Fees

Heat Map Tool

**Coffee Break**

Engineering Recommendation G99

Panel Question & Answer Session

**Wrap Up & Close**

# ICE Update:
# DG HV EHV 2018-19 Workplan

Hannah Sharratt, ICE Manager

# How are we performing against our commitments?

| Commitment | How we'll achieve it | Delivery Date | Status |
|---|---|---|---|
| Improve connection charging approach to make charging fair for our customers | Engage with our stakeholders regarding our proposals | Q4 | Complete |
| We will share our vision for the transition of Distribution Network Operators (DNO) to Distribution System Operators (DSO) | Hold an engagement session with our stakeholders | Q4 | Complete |
| We will review our EHV connection offers | We will review our connection offers and introduce a new offer pack in line with ours and stakeholder needs. | Q2 | Complete |
| We will improve visibility of remaining available capacity. | We will publish improved information on available thermal capacity and fault level. | Q2 | Complete |
| Improve speed of response where transmission works required for a distribution connection | We will communicate the new process to customers, transition to the new process and publish the process | Q4 | On Target |

# How are we performing against our commitments?

| Commitment | How we'll achieve it | Delivery Date | Status |
|---|---|---|---|
| Develop and continue DG owner / operators panel | Hold 1 DG owner/operator forum session for generators at 33 /132kV | Q3 | **Complete** |
| Target improved Time to Quote timescales for EHV quotations. | We will continue to work towards a 58 day average Time to Quote | Q4 | **On Target (YTD 57d)** |
| Target improved Time to Quote timescales for HV quotations | We will continue to work towards a 58 day average Time to Quote | Q4 | **On Target (YTD 39d)** |
| We will continue to offer opportunities for stakeholders to engage with us. | Offer surgery session and webinars and a workshop covering a range of topics. | Q4 | **On Target** |
| Continue to provide quarterly updates on progress of actions | We will publish quarterly updates on our actions and outputs. | Q4 | **On Target** |

# ICE 2019-20 Proposed Workplan

Hannah Sharratt, ICE Manager

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# Proposed DG HV EHV Workplan

How we created the proposed plan...


Draft 2019/20 ICE Workplan

# 2019-20 DG HV / EHV ICE Workplan Development

| Gather Ideas & Options: | Assessment & Benefits Review: | Assessment & Benefits Review: | Confirm: | Finalise |
|---|---|---|---|---|
| Draft ICE commitments & actions (Dec / Jan) | Test draft ICE actions with stakeholders (Jan / Feb) | Review & respond to feedback (Feb / Mar) | Test updated ICE actions & KPIs / outputs with stakeholders (Mar) | Publish Workplan (Apr) |
| Internal engagement | External engagement | Act on feedback | External engagement | Finalise & Issue |

# ICE Commitments League – Ranking exercise

- Using the sheets provided, please categorise each proposed ICE commitment.
  - Very important – Into Europe
  - Important – Mid table
  - Not very important – Relegation zone

| # | Team | MP | W | D | L | G | Pts |
|---|---|---|---|---|---|---|---|
| 1. | Liverpool | 22 | 18 | 3 | 1 | 50:10 | 57 |
| 2. | Man City | 22 | 17 | 2 | 3 | 59:17 | 53 |
| 3. | Tottenham | | | | 0 | 6 | 46:22 | 48 |
| 4. | Chelsea | 22 | 14 | 5 | 3 | 40:17 | 47 |
| 5. | Arsenal | 22 | 12 | 5 | 5 | 46:32 | 41 |
| 6. | Man Utd | 22 | 12 | 5 | 5 | 44:32 | 41 |
| 7. | Watford | 22 | 9 | 5 | 8 | 32:32 | 32 |
| 8. | Leicester | 22 | 9 | 4 | 9 | 26:25 | 31 |
| 9. | West Ham | 22 | 9 | 4 | 9 | 30:32 | 31 |
| 10. | Everton | 22 | 8 | 6 | 8 | 33:31 | 30 |
| 11. | Wolves | | | | 5 | 9 | 23:28 | 29 |
| 12. | Bournemouth | 22 | 8 | 3 | 11 | 31:42 | 27 |
| 13. | Brighton | 22 | 7 | 5 | 10 | 24:30 | 26 |
| 14. | Crystal Palace | 22 | 6 | 4 | 12 | 20:28 | 22 |
| 15. | Burnley | 22 | 6 | 3 | 13 | 23:43 | 21 |
| 16. | Southampton | 22 | 4 | 7 | 11 | 23:39 | 19 |
| 17. | Cardiff | 22 | 5 | 4 | 13 | 19:41 | 19 |
| 18. | Newcastle | 22 | 4 | 6 | 12 | 16:31 | 18 |
| 19. | Fulham | | | | 5 | 14 | 20:49 | 14 |
| 20. | Huddersfield | 22 | 2 | 5 | 15 | 13:37 | 11 |

Into Europe

Mid Table

Relegation Zone

# Topics

- List of Topics in proposed DG HV / EHV plan:

| | | |
|---|---|---|
| Network Capacity | Access to Geographical Information Systems | Engineering Recommendation G99 |
| Flexible Services | Time To Quote | Outage communication |
| Flexible Connections | Time To Connect | Ofgem Charging Changes |
| DSO Transition | NMS – Pre Builts | Post acceptance process |
| Interactivity processes | Website | A&D Fees |
| Engagement | Regular updates | |

*Thank you !*

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# Flexible Services

Could you reduce demand or increase generation when instructed in return for payment?

Keith Evans

Smart Grid Engineer

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# Flexible Services

As the region's distribution network operator, it's our responsibility to plan for the future and seek out smarter, more flexible solutions to meet future demand for electricity. We are utilising a number of innovative techniques to ensure we can continue to deliver an affordable, reliable and sustainable electricity supply for all our customers.

**Flexible services is one such technique**

Distributed Energy Resources (DERs) are companies or individual customers capable of adjusting how much they consume or generate electricity. These adjustments can support the local distribution network due to high electricity demand or when the network is operating abnormally, and DERs receive payment from Electricity North West in return. These DERs can be generators, consumers, and electricity storage connected to our networks that can increase exports (generate more) or reduce imports (consume less) when instructed and receive payment in return.

We are looking to use this flexibility to support how we operate our local networks, as an alternative to traditional approaches. The aim is to reduce the cost for electricity distribution networks in customer energy bills while ensuring that our network remains resilient, reliable and meets our customers' needs.

# Types of Flexible Service

RESTORE - Provide an immediate response following an unplanned network event

SUSTAIN - Flex your supply up or down at peak times to help manage network constraints

CONTINUOUS - Fulfil a continuous capacity requirement

| Service Characteristics | RESTORE | SUSTAIN | CONTINUOUS |
|---|---|---|---|
| **When to Act** | Post fault | Pre fault | Pre fault |
| **Trigger** | Network abnormality | Asset loading | Constant |
| **Certainty of Utilisation** | Uncertain | Uncertain | Certain |
| **Risk to network assets** | High | Med | Low |
| **Frequency of use** | Low | Med | High |

# Current requirements

We are now regularly publishing our requirements for flexible services via Requests for Proposals (RfP's), and are looking for companies, customers or community groups who are capable of adjusting how much electricity they consume or generate.

There are three regions that we are actively seeking flexible services for currently.

The full RfP document for the three sites located in Cumbria will be published on our e-procurement portal WAX digital on 1st April.

For more information, or to register your interest for this RfP please visit our website at

www.enwl.co.uk/flexible-services

# Forecast requirements


We have recently begun to publish our forecasted flexibility requirements on our website.

These are sites that we have identified as being constrained within the next five years, and that may be addressed by flexible services.

Please note that these are not guaranteed and are subject to future capacity reviews.

To receive notifications of new flexible service requirements, please sign up to our distribution list at www.enwl.co.uk/flexible-services.

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# Upcoming DFES Webinar

Keith Evans

Smart Grid Engineer

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# Distribution Future Electricity Scenario's Webinar

Sign up to our webinar and find out how we're preparing for the future of electricity in the North West

11.00am – 12.00 noon, Thursday 28 March 2019


www.enwl.co.uk/dfes

# Connections Offer Expenses - Update

Brian Hoy, Head of Market Regulation and Compliance

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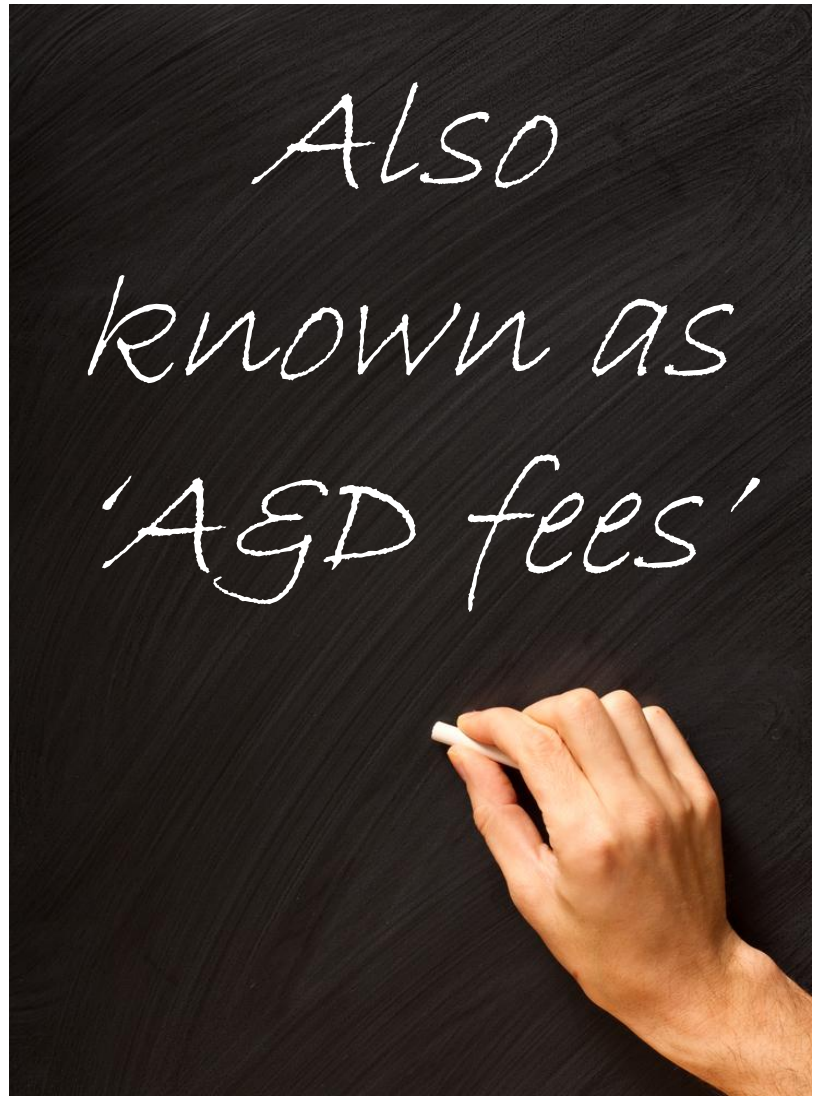
# Connection Offer Expenses

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 | What we will be charging for |
| --- | --- |
| Budget Estimates | EHV offers (demand and generation) from May 2018 |
| Minor connections (1-4) | HV generation offers over 1MVA from January 2019 |
| Cancellations within cooling off period | LV and other HV offers (demand and generation) but from a later date |
| Offers for diversions | 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

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

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

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

# Network Information Heat Map Tool

Gill Williamson

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# New Heat Map Tool launched 28 January 2019

Identifies nearest substations

Indicates the ability to make connection there

Accompanied by maps of substation locations

Download here: https:/www.enwl.co.uk/get-connected/network-information/heatmap-tool/

- Does not replace detailed assessments
- Indication of constraints doesn't mean that we can't connect you

# Heat Map Tool

**Excel Workbook**

**Tools**

**Background Data**

User Guide and Network Maps

11kV & 6.6kV Connections

33kV Connections

Primary Headroom Data

BSP Headroom Data

Transmission Capacity

Workbook Tabs

# Heat Map Tool – Tab 1) User Guide and Network Maps

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## User Guide

With this tool we aim to provide our customers with information on where there is spare capacity for new developments to connect to our network without triggering reinforcement work. To aid our customers in interpreting the information contained within this tool we have produced a user guide which can be found below. Please note that the data presented in this tool is based on high level analysis and as such may differ from the results of a formal connection application.

If your proposed development falls within an area with limited network capacity please contact us to discuss a possible solution.

We will always to work with customers to overcome network constraints whether this is through traditional reinforcement or smart network solutions.

Heatmap Tool - User Guide.pdf

## Map Data

The maps below provide the customer with an overview of the location of key assets:

Cumbria Supply Region.pdf

Lancashire Supply Region.pdf

Manchester & Peak Supply Region.pdf

| Last Updated: | 25.01.2019 |
|---|---|

User Guide

Maps of BSP & Primary substation locations and roads

# Heat Map Tool –Tabs 2 & 3) 11kV & 6.6kV & 33kV Connections

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## 11 kV & 6.6 kV Connections

The results given by this tool are based on high level approximations only. It should also be noted that the network ... since the last time the data was updated. As such, the outcome of a formal application may differ from the results given by this tool. For further information on how to inter... ...ined within this workbook please refer to the user guide embedded within the first tab.

| Inputs | |
|---|---|
| Easting | Enter Data |
| Northing | Enter Data |
| Scheme Capacity (MW) | Enter Data |
| Connection Type | Enter Data |

... the controls to the left to find the nearest primary substations to your site. The results will be displayed in the table below. When the desired site capacity and connection type are entered an estimate of available headroom and connection feasibility will be displayed. The results are based on both local constraints and constraints at the associated BSP.

**Results**

| No | Distance (km) | Primary Substation | BSP Group | GSP Group | Primary Substation Location | | Headroom (MW) | Can be accommodated? (RAG) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Easting | Northing | | |
| 1 | 0.34 | TRINITY | FREDERICK RD | KEARSLEY | 382649 | 398230 | 0.0 | |
| 2 | 0.63 | BLACKFRIARS | FREDERICK RD | WHITEGATE | 383030 | 399104 | 4.1 | |
| 3 | 0.66 | CHAPEL WHARF | FREDERICK RD | KEARSLEY | 383499 | 398634 | 8.3 | |
| 4 | 0.71 | DEANSGATE | BLOOM ST | SOUTH MANCHESTER | 383463 | 398149 | 6.6 | |
| 5 | 0.83 | KNOTT MILL | BLOOM ST | SOUTH MANCHESTER | 383136 | 397725 | | |
| 6 | 1.12 | BRIDGEWATER | BLOOM ST | SOUTH MANCHESTER | | | | |
| 7 | 1.22 | CANNON ST | RED BANK | | | | 5.1 | |
| 8 | 1.43 | FREDERICK RD | FREDERICK RD | | 381697 | 399348 | 10.2 | |
| 9 | 1.48 | DICKINSON ST | BLOOM ST | SOUTH MANCHESTER | 384109 | 397722 | 0.0 | |
| 10 | 1.55 | STRANGEWAYS | RED BANK | WHITEGATE | 383780 | 399743 | 5.1 | |

**Connection Types**

| | |
|---|---|
| Demand Firm | The connection of load which is secure for a first circuit outage. |
| Demand N-0 | The connection of load which can be actively constrained off under outage conditions |
| Generation Synchronous (LV) | Generation such as diesel or gas turbines connected to the HV network through step up transformers. |
| Generation Synchronous (HV) | Generation such as diesel or gas turbines connected to the HV network directly i.e. without step up transformers. |
| Generation Inverter Based | Generation technologies connected by inverters this typically includes solar and wind generators |
| Battery Energy Storage | Inverter connected battery energy storage schemes |

**User enters connection requirements:**

- Grid co-ordinates
- Required capacity
- Connection type

i.e. Demand or generation

**Results**

- Nearest **Primaries/BSPs**
- Headroom
- Can be accommodated? (RAG)

# Heat Map Tool – Tabs 4 & 5) Primary & BSP Headroom Data

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**Primary Substation Headroom**

| Primary Substation | Voltage (kV) | BSP Group | GSP Group | Primary Substation Location | | Demand Headroom (MW) | | Generation Headroom N-0 -(MW) | | | Battery Storage Headroom N-0 -(MW) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Easting | Northing | Firm | N-0 | Inverter Based | Synchronous - LV | Synchronous - HV | |
| ALBION ST | 6.6 | LOWER DARWEN | ROCHDALE | 367434 | 426087 | 0.0 | 13.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| ALDERLEY | 11 | MOSS NOOK | SOUTH MANCHESTER | 385044 | 379026 | 7.8 | 14.8 | 11.2 | 2.0 | 1.4 | 11.2 |
| ALSTON | 11 | PENRITH & SHAP | HARKER / HUTTON | 372125 | 546499 | 0.0 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 |
| AMBLESIDE | 11 | KENDAL (PARKSIDE RD) | HARKER / HUTTON | 337602 | 503506 | 7.5 | 16.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| ANCOATS NORTH T11 & T12 | 6.6 | RED BANK | WHITEGATE | 385022 | 398830 | 0.0 | 1.2 | 32.2 | 6.9 | 5.0 | 1.2 |
| ANCOATS NORTH T14 | 6.6 | RED BANK | WHITEGATE | 385032 | 398840 | 0.0 | 5.1 | 20.0 | 20.0 | 16.0 | 5.1 |
| ANNIE PIT | 11 | STAINBURN & SIDDICK | HARKER / HUTTON | 300011 | 527810 | 2.4 | 6.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| ANSDELL | 6.6 | LYTHAM | PENWORTHAM WEST / STANAH | 334416 | 428229 | 7.1 | 10.1 | 21.6 | 10.2 | 7.4 | 10.1 |
| ARDWICK | 6.6 | STUART ST | STALYBRIDGE | 384753 | 397415 | 0.0 | 1.3 | 24.2 | 14.1 | 10.3 | 1.3 |
| ARNSIDE | 11 | KENDAL (PARKSIDE RD) | HARKER / HUTTON | 346495 | 478180 | 9.7 | 13.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| ASHTON (GOLBORNE) | 6.6 | GOLBORNE | BOLD | 357056 | 400663 | 0.3 | 7.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| ASHTON (RIBBLE) | 6.6 | RIBBLE | PENWORTHAM EAST / ROCHDALE | 350275 | 430526 | 3.1 | 3.1 | 10.5 | 2.0 | 1.4 | 3.1 |
| ASHTON ON MERSEY | 6.6 | SALE | CARRINGTON | 377188 | 392252 | 9.9 | 14.0 | 28.8 | 9.2 | 6.7 | 14.0 |
| ASHTON UNDER LYNE T11 & T12 | 6.6 | HARTSHEAD-HEYROD | STALYBRIDGE | 393275 | 399319 | 4.4 | 8.5 | 7.0 | 2.0 | 1.4 | 7.0 |
| ASHTON UNDER LYNE T13 | 6.6 | | | | | | | | | | |
| ASHWOOD DALE | 6.6 | | | | | | | | | | |
| ASKAM | 11 | | | | | | | | | | |
| ASKERTON CASTLE | 11 | | | | | | | | | | |
| ASPATRIA | 11 | | | | | | | | | | |
| ATHERTON TOWN CENTRE | 11 | | | | | | | | | | |
| ATHLETIC ST | 6.6 | | | | | | | | | | |
| AVENHAM | 6.6 | | | | | | | | | | |
| BAGULEY | 11 | | | | | | | | | | |
| BAMBER BRIDGE | 11 | | | | | | | | | | |
| BARBARA ST | 6.6 | | | | | | | | | | |
| BARROW | 11 | | | | | | | | | | |
| BARTON DOCK RD | 6.6 | | | | | | | | | | |
| BEDFORD | 11 | | | | | | | | | | |
| BELGRAVE | 6.6 | | | | | | | | | | |
| BENCHILL | 11 | | | | | | | | | | |
| BENTHAM | 11 | | | | | | | | | | |
| BISPHAM | 6.6 | | | | | | | | | | |

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**BSP Headroom**

| BSP | Voltage (kV) | GSP Group | BSP Coordinates | | Demand Headroom (MW) | | Generation Headroom - N-0 -(MW) | | Battery Storage Headroom N-0 -(MW) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Easting | Northing | Firm | Non Firm | Inverter Based | Synchronous | |
| ADSWOOD | 33 | BREDBURY | 389188 | 388310 | 55.6 | 73.6 | 150.1 | 54.1 | 73.6 |
| AGECROFT | 33 | KEARSLEY | 380345 | 401831 | 14.5 | 26.5 | 90.4 | 25.4 | 26.5 |
| ALTRINCHAM | 33 | CARRINGTON | 376380 | 389012 | 47.5 | 65.5 | 151.5 | 46.4 | 65.5 |
| ATHERTON | 33 | KEARSLEY | 366150 | 402088 | 19.2 | 37.2 | 94.5 | 17.1 | 37.2 |
| BARROW | 33 | HARKER / HUTTON | 319709 | 470489 | 39.4 | 79.4 | 80.2 | 14.5 | 79.4 |
| BARTON | 33 | CARRINGTON | 376758 | 397174 | 46.7 | 76.7 | 6.7 | 1.9 | 6.7 |
| BELFIELD | 33 | ROCHDALE | 391033 | 413945 | 55.3 | 74.9 | 54.7 | 12.9 | 54.7 |
| BISPHAM | 33 | PENWORTHAM WEST / STANAH | 332328 | 439711 | 33.9 | 51.9 | 40.6 | 7.4 | 40.6 |
| BLACKBURN | 33 | PENWORTHAM EAST / ROCHDALE | 370584 | 429294 | 60.0 | 77.6 | 84.4 | 36.6 | 77.6 |
| BLACKPOOL | 33 | PENWORTHAM WEST / STANAH | 330835 | 435308 | 28.6 | 46.6 | 36.9 | 6.7 | 36.9 |
| BLOOM ST | 33 | SOUTH MANCHESTER | 384221 | 397717 | 0.0 | 10.4 | 160.0 | 45.8 | 10.4 |
| BOLTON | 33 | KEARSLEY | 372255 | 410566 | 18.3 | 37.3 | 10.7 | 1.9 | 10.7 |
| BURNLEY | 33 | ROCHDALE | 385569 | 434469 | 58.1 | 76.1 | 10.7 | 1.9 | 10.7 |
| BURY | 33 | KEARSLEY | 380272 | 411184 | 23.9 | 23.9 | 10.7 | 1.9 | 10.7 |
| BUXTON | 33 | STALYBRIDGE | 407769 | 375476 | 0.0 | 48.3 | 10.7 | 1.9 | 10.7 |
| CARLISLE | 33 | HARKER / HUTTON | 338655 | 556583 | 7.6 | 28.6 | 6.7 | 1.9 | 6.7 |
| CARRINGTON BSP | 33 | CARRINGTON | 373110 | 393020 | 21.6 | 51.6 | 0.0 | 0.0 | 0.0 |
| CASTLETON | 33 | ROCHDALE | 388461 | 411290 | 19.9 | 58.9 | 122.6 | 23.0 | 58.9 |
| CHADDERTON | 33 | WHITEGATE | 389137 | 403821 | 10.5 | 10.5 | 98.3 | 17.8 | 10.5 |
| DROYLSDEN | 33 | STALYBRIDGE | 390140 | 398146 | 42.1 | 60.1 | 10.7 | 1.9 | 10.7 |
| EGREMONT | 33 | HARKER / HUTTON | 301070 | 513074 | 68.1 | 76.1 | 97.5 | 58.7 | 76.1 |
| FREDERICK RD | 33 | KEARSLEY | 381795 | 399250 | 0.0 | 10.2 | 6.7 | 1.9 | 6.7 |
| GOLBORNE | 33 | BOLD | 360607 | 397690 | 3.7 | 18.7 | 0.0 | 0.0 | 0.0 |
| GREENHILL | 33 | WHITEGATE | 393262 | 404755 | 31.3 | 31.3 | 38.5 | 7.0 | 31.3 |
| HAZEL GROVE | 33 | BREDBURY | 391313 | 386877 | 37.7 | 55.7 | 100.3 | 18.2 | 55.7 |
| HARTSHEAD-HEYROD | 33 | STALYBRIDGE | 397322 | 399942 | 27.4 | 84.4 | 6.7 | 1.9 | 6.7 |
| HUNCOAT | 33 | PADIHAM | 377997 | 431083 | 37.1 | 55.1 | 31.5 | 5.7 | 31.5 |
| HYDE | 33 | STALYBRIDGE | 395522 | 395647 | 53.8 | 71.8 | 10.7 | 1.9 | 10.7 |
| KEARSLEY LOCAL | 33 | KEARSLEY | 376355 | 404783 | 9.4 | 52.4 | 6.7 | 1.9 | 6.7 |
| KENDAL (PARKSIDE RD) | 33 | HARKER / HUTTON | 351915 | 491858 | 9.7 | 27.7 | 0.0 | 0.0 | 0.0 |
| LANCASTER | 33 | HEYSHAM | 348644 | 463628 | 25.7 | 25.7 | 10.7 | 1.9 | 10.7 |
| LEYLAND | 33 | PENWORTHAM WEST / STANAH | 354121 | 423373 | 25.1 | 43.1 | 0.4 | 0.1 | 0.4 |

## Background Primary & BSP Headroom Data

- Basis of the previous tools

- Considers:
  - Network thermal capacity
  - Fault levels
  - Existing demand and generation
  - Accepted demand and generation

# Heat Map Tool – Tab 6) Transmission Capacity

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**Appendix G Summary**

| GSP / Site | Capacity of Connected & Contracted Connections (MW) | | | | Materiality Headroom (Part 5) (MW) | Materiality Status | Capacity in Project Progression / Modification Application | Total Capacity of Connections (MW) | Transmission FL Headroom (kA) |
|---|---|---|---|---|---|---|---|---|---|
| | Part 1 | Part 2 | Part 3 | Part 4 | | | | | |
| Rainhill / Bold (Golborne)* | 25.1 | 50.0 | 0.0 | 0.0 | 0 | B | N/A | 75.1 | 0 |
| Bredbury | 10.1 | 86.3 | 0.0 | 0.0 | 50 | A | N/A | 146.4 | 3 |
| Carrington | 105.0 | 233.0 | 0.0 | 0.0 | 0 | B | N/A | 338.0 | 3 |
| Harker | 671.0 | 123.7 | 0.0 | 143.9 | 0 | C | 143.9 | 938.6 | 0 |
| Hutton | 49.0 | 10.4 | 0.0 | 104.5 | 0 | C | 104.5 | 163.9 | 0 |
| Heysham | 302.0 | 0.0 | 0.0 | 133.6 | 0 | C | 133.6 | 435.6 | 0 |
| Kearsley & Kearsley local | 57.4 | 237.5 | 0.0 | 0.0 | 0 | B | N/A | 294.9 | 0 |
| Kirkby | 6.0 | 115.9 | 0.0 | 0.0 | 0 | B | N/A | 121.9 | 3 |
| Macclesfield | 27.9 | 20.0 | 0.0 | 0.0 | 50 | A | N/A | 97.9 | 3 |
| Padiham | 35.5 | 139.9 | 0.0 | 0.0 | 50 | A | N/A | 225.4 | 0.98 |
| Pen East Roch / Pen West | 189.6 | 709.1 | 0.0 | 0.0 | 0 | B | N/A | 898.7 | 3 |
| Rochdale Main Part | 204.7 | 158.2 | 0.0 | 0.0 | 50 | A | N/A | 362.9 | 3 |
| South Manchester | 22.2 | 109.9 | 0.0 | 0.0 | 50 | A | N/A | 182.1 | 0.5 |
| Stalybridge | 58.0 | 293.0 | 0.0 | 0.0 | 50 | A | N/A | 401.0 | 0.78 |
| Stannah | 195.9 | 59.5 | 0.0 | 0.0 | 0 | B | N/A | 255.4 | 0.64 |
| Washway Farm | 14.2 | 131.2 | 0.0 | 0.0 | 0 | B | N/A | 145.4 | 3 |
| Whitegate | 32.0 | 187.0 | 0.0 | 0.0 | 0 | B | N/A | 236.9 | 0 |

## Appendix G Summary

- Lists all ENWL GSPs

- Indicates:-
  - Existing generation connections
  - Constrained generation connections
  - Future generation connections
  - **Thermal headroom**
  - **Fault level headroom**

# Heat Map Tool – Summary

## The new heat map tool provides:-

Better quality information

Improved accuracy

Monthly refresh rate

# Coffee break

# EREC G99

Steffan Jones / Gill Williamson

electricity north west

Bringing energy to your door

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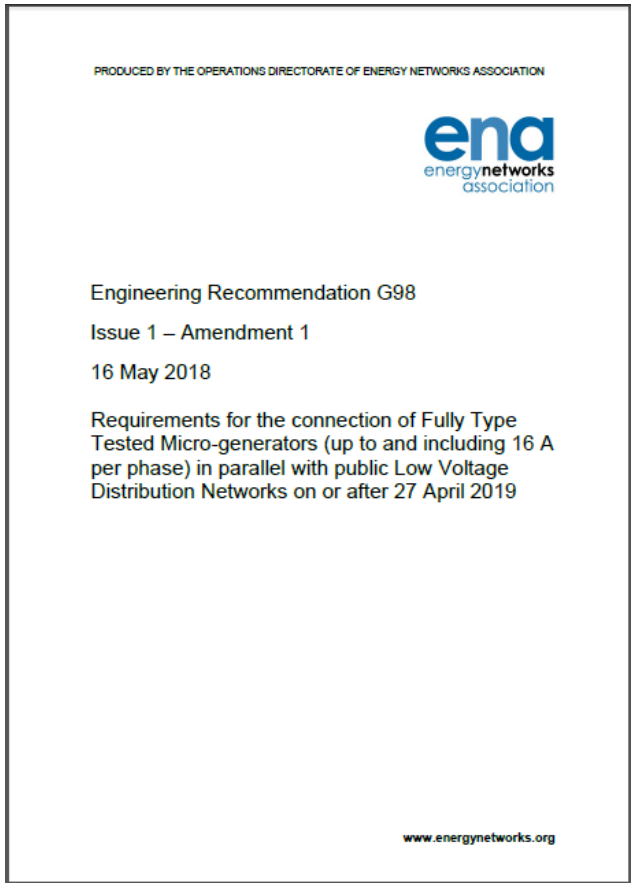
# EREC G98 & EREC G99

## 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


PRODUCED BY THE OPERATIONS DIRECTORATE OF ENERGY NETWORKS ASSOCIATION

ena energynetworks association

Engineering Recommendation G98

Issue 1 – Amendment 1

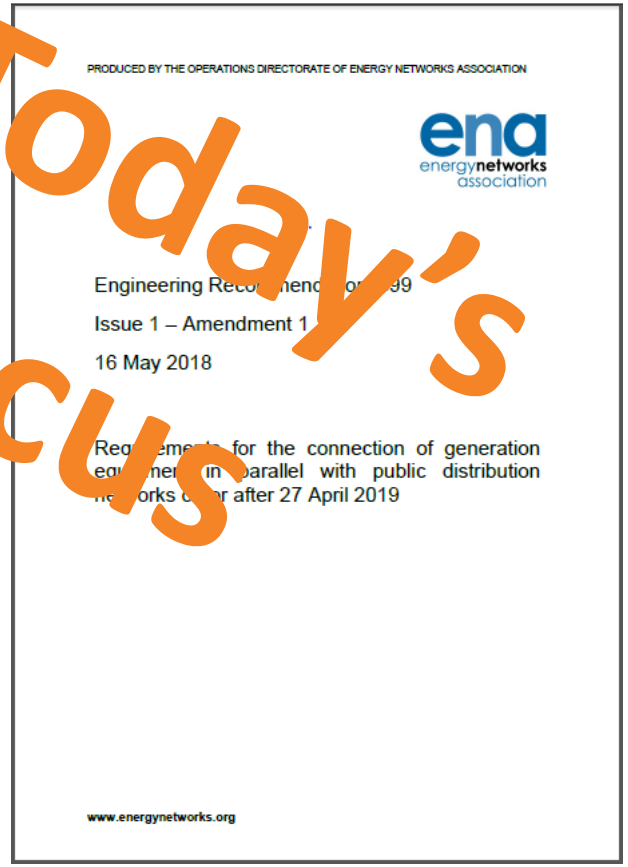
16 May 2018

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

## G99:

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



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Issue 1 – Amendment 1

16 May 2018

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# EREC G99 – Today's Objectives

Present summary of EREC G99

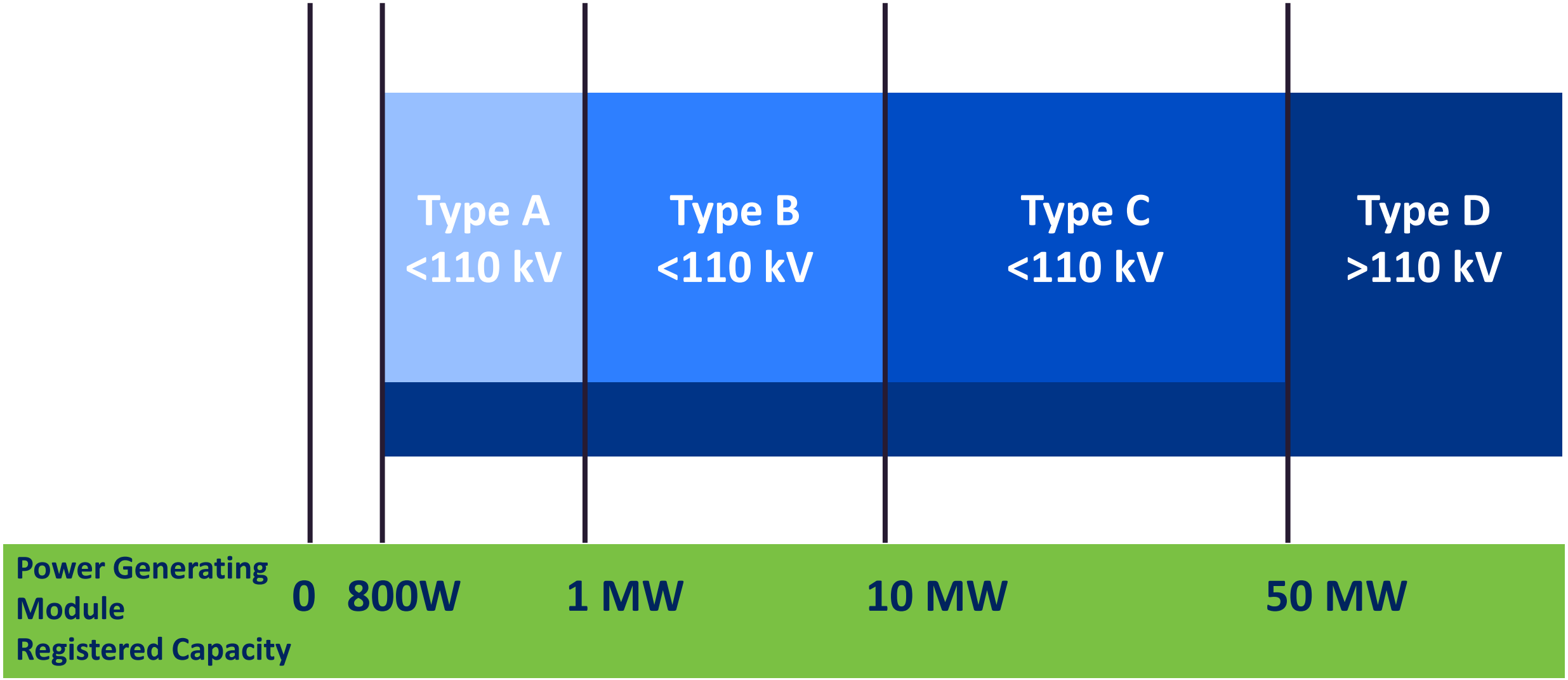
Explain your and our responsibilities under EREC G99

Discuss the connection timeline under EREC G99

# EREC G99 Terminology

# EREC G99 - Types (GB)

- Types affect technical requirements and which forms you use

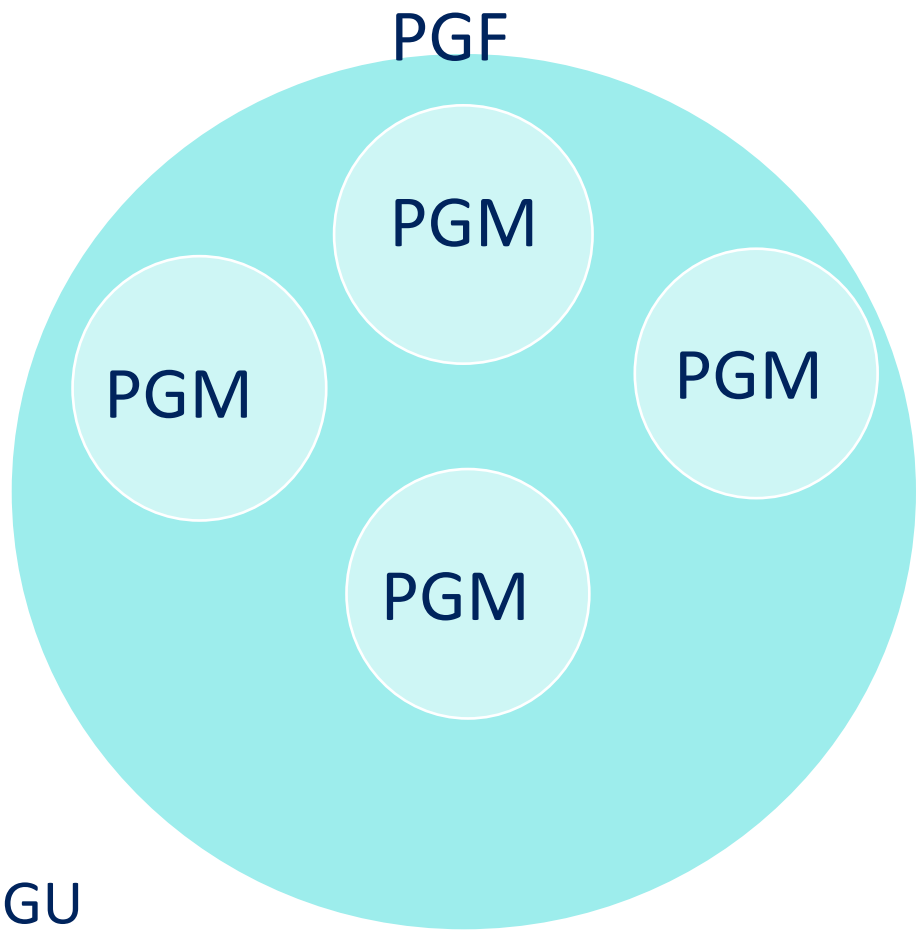


# EREC G99 - Power Generating Units & Power Generating Modules

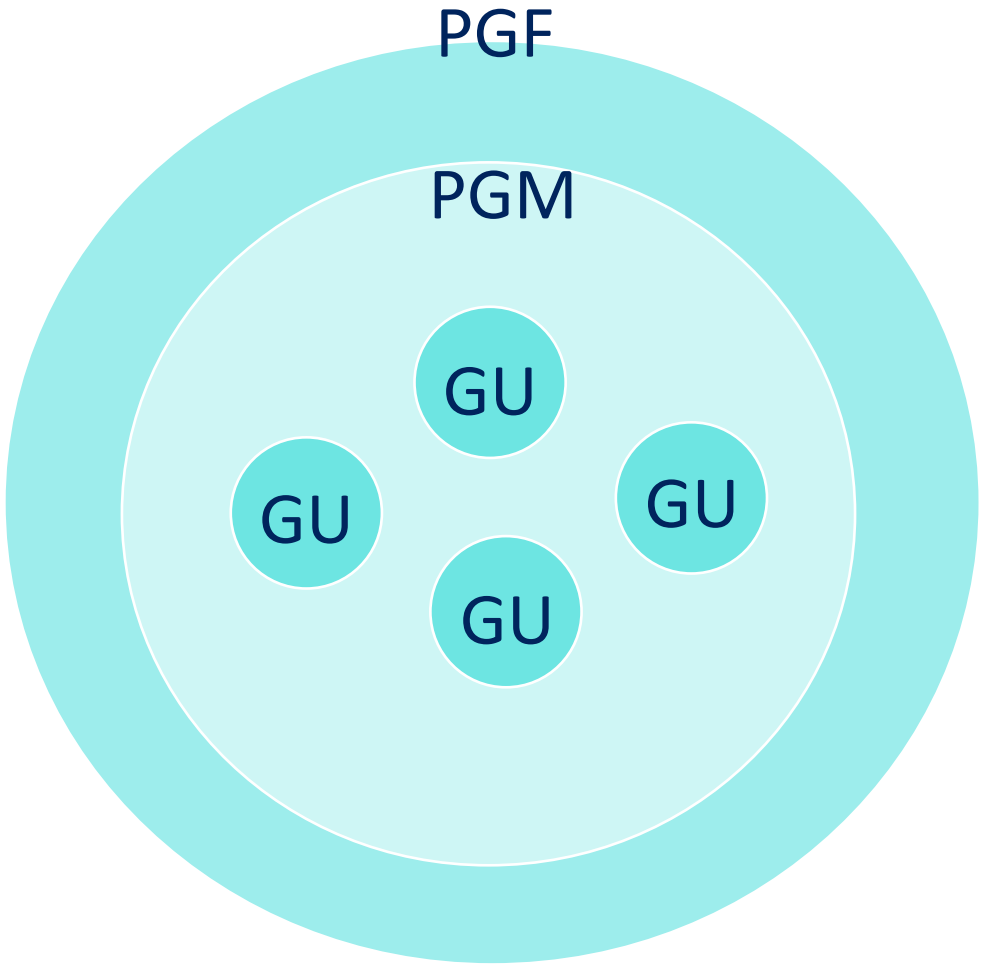
Types depend on PGM capacity

PGM definition depends on whether the technology is synchronous / asynchronous

## SYNCHRONOUS SCHEME



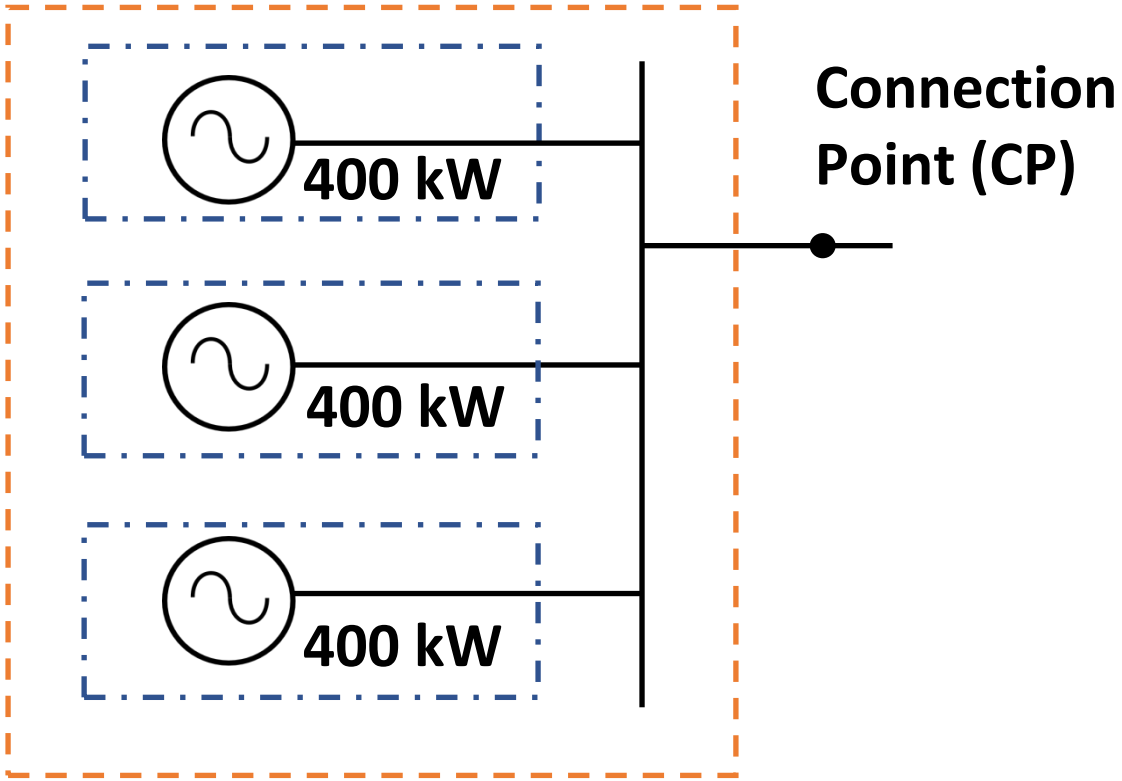

## ASYNCHRONOUS SCHEME




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

# EREC G99 – Type A synchronous machine example

3 x 400 kW Type A Synchronous PGMs = 1.2 MW PGF

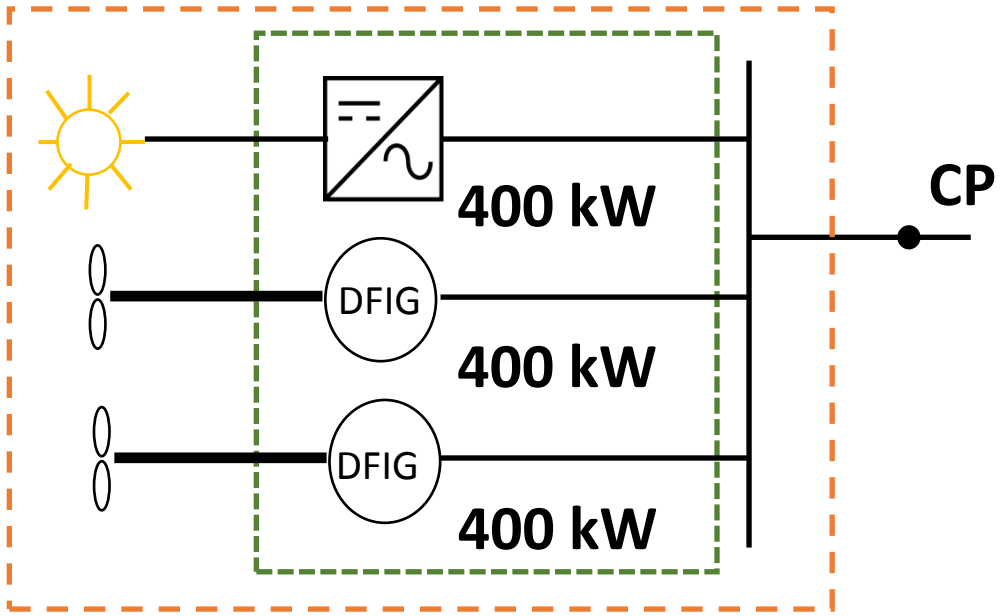



Power Generating Module (PGM) / Synchronous Power Generating Module

Power Generating Facility (PGF)

# EREC G99 – Type B asynchronous example

1 x 400 kW Inverter connected plus 2 x 400 kW Asynchronous GU
= 1.2 MW Type B PPM = 1.2 MW PGF

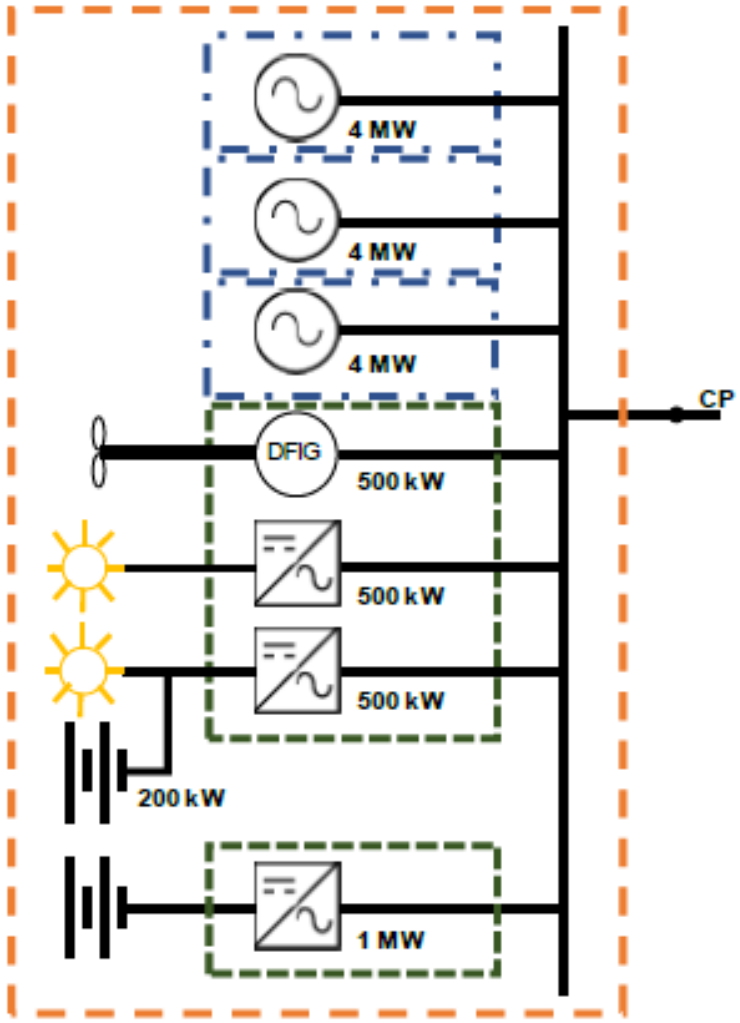



Power Generating Module (PGM) / Power Park Module (PPM)

Power Generating Facility (PGF)

# EREC G99 – Type A and Type B Power Generating Modules in same Power Generating Facility

3 x 4MW Type B synchronous PGMs
2 x 500 kW Inverter connected plus 1 x 500 kW Asynchronous GU = 1.5 MW Type B PPM
1 x 1MW Energy Storage = 1MW Type B PGM
= 14.5MW PGF

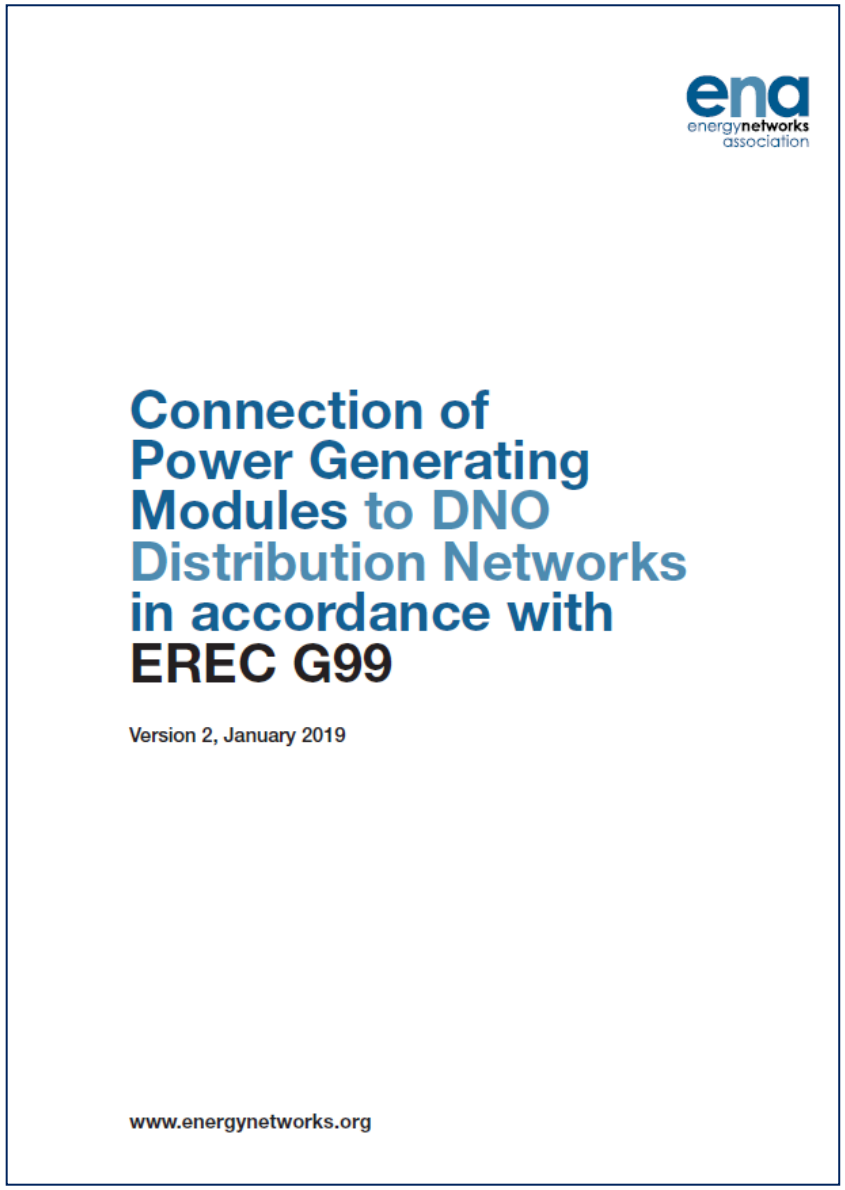



Power Generating Module (PGM) / Synchronous Power Generating Module

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

Power Generating Facility (PGF)

# EREC G99 – Standard Application Form, SAF




Used when wanting to connect a Power Generating Module greater than 16 Amps per phase.

Changes include:-

- Alignment of terminology with G99 (PGM, GU etc)
- Inclusion of storage data
- New technical data
  - Voltage control data
  - Frequency response droop settings
  - Type C & D only:
  - Governor and prime mover model
  - AVR and excitation model
  - Short circuit ratio

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

# EREC G99 – Power Generating Module Document, PGMD



B.2 Power Generating Module Document Type B

**Form B2-1 Power Generating Module Document for Type B Power Generating Modules**

**Compliance Statement**

This document shall be completed by the **Generator**

| **Power Generating Module (PGM)** | **Distribution Network Operator (DNO)**: |
|---|---|
| **PGM Name:** | **DNO Name**: ABC electricity distribution |
| **Compliance Contact** (name/tel/email): | **Compliance Contact** (name/tel/email): |

**Key to Submission Stage**

**A – Application:** Submission of the Standard Application Form.

**IS – Initial Submission:** The programme of initial compliance document submission to be agreed between the **Generator** and the **DNO** as soon as possible after acceptance of a Connection Offer. Initial Submission of this **Power Generating Module Document** to be completed at least 28 days before the **Generator** wishes to synchronise its **Power Generating Module** for the first time.

**FONS – Final Operational Notification Submission:** The **Generator** shall submit post energisation verification test documents to obtain **Final Operational Notification** from the **DNO**.

| **Key to evidence requested** | **Key to Compliance** |
|---|---|
| S - Indicates that **DNO** would expect to see the results of a simulation study | Y = Yes (Compliant), |
| P - **Generating Unit** or **Power Generating Module** design data | O = Outstanding (outstanding submission) |
| MI - **Manufacturers' Information**, generic data or test results as appropriate | UR= Unresolved issue |
| D - Copies of correspondence or other documents confirming that a requirement has been met | N = No (Non-Compliant) |
| T - Indicates that the **DNO** would expect to see results of, and/or witness, tests or monitoring which demonstrates compliance | |
| TV - Indicates Type Test reports (if **Generator** pursues this compliance option) | |

= Compliance Statement

Type B – form B2-1 (appendix B of EREC G99)

Type C & D – form C2-1 (appendix C of EREC G99)

# EREC G99 – Operational Notifications, ION, EON, FON

Notifications issued by the DNO to a Generator

**Final Operational Notification (FON)**
Issued when the relevant requirements of EREC G99 are complied with allowing operation of the PGM in parallel with the distribution network.

Type D only:
**Energisation Operational Notification (EON)**
Issued prior to energisation of a generator's internal network.

**Interim Operational Notification (ION)**
Issued to permit time limited synchronisation when there are outstanding compliance issues.

# EREC G99 – Manufactures Information

Manufacturers' Information is the generic term for information that the Generator needs, which needs to be sourced from the manufacturer. It can include type testing information, but also other relevant information that does not necessarily come from type tests, e.g. simulation studies etc.

The information is supplied by the manufacturer to the customer, who should send it to the DNO. The suitability of the information is agreed between the generator and the DNO – although a three way discussion involving the manufacturer might well be appropriate in some cases.

A manufacturer might have posted this information on the ENA database, in which case it will have an ID reference. The generator can use the ID reference in compliance forms.

# Changes to the connection process

# EREC G99 - Who is EREC G99 applicable to?

Applies to:-

New generator connections >800kW,

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 - What part of the connection process is changing?

## Now

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning

From Generator Concept to Connection

## After 27 April 2019

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning
- Final Compliance Check
- Operational Notifications

Changing

# EREC G99 - Connection Process

*Looking at the connection new process in terms of....*

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning
- Final Compliance Check
- Operational Notifications

**Timeline**

**Modified / New Activities**

**G99 Documents**

# EREC G99 Connection Process - Design Phase

## Connection Process

- Information Phase
- **Design Phase**
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning
- Final Compliance Check
- Operational Notifications

## Timeline

Offer issued after submission in accordance with GSOP timescales

## Design Phase Modified Activities

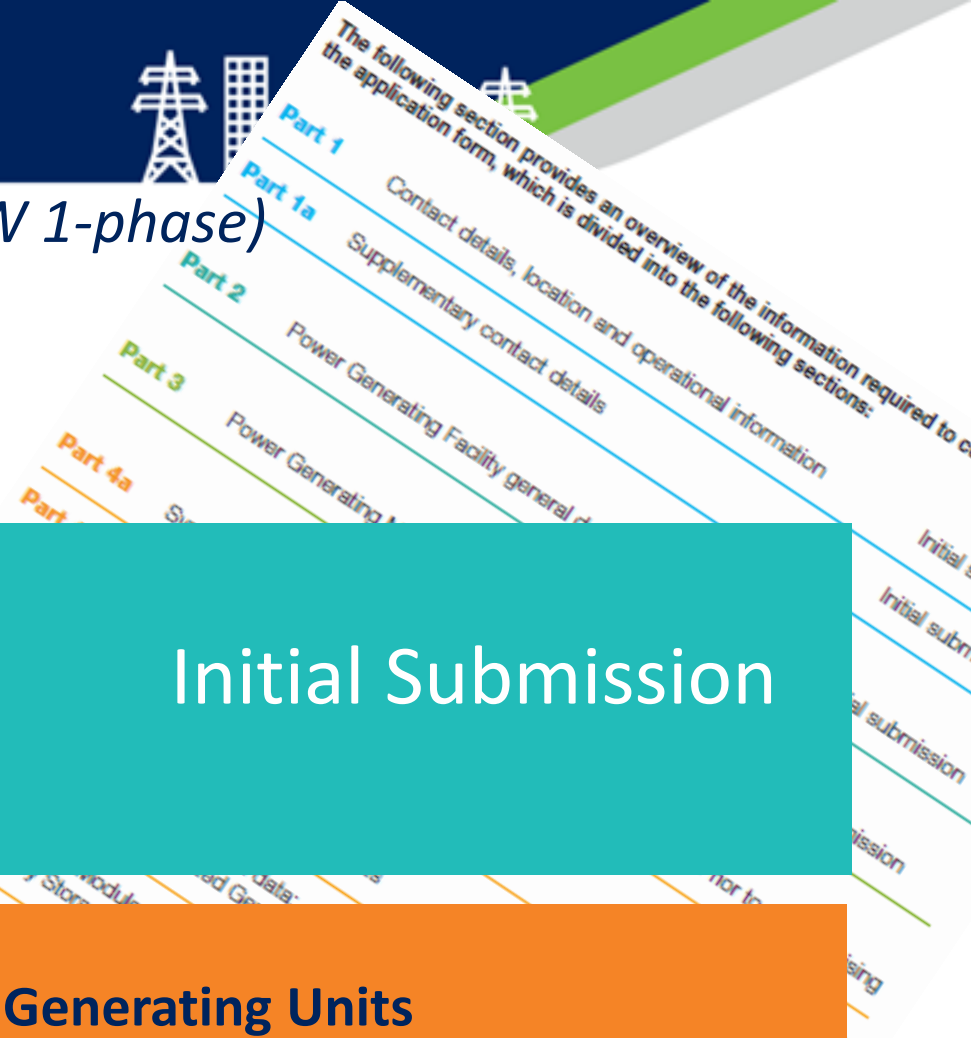
- Generator submits SAF

## Design Phase G99 Documents

- Standard Application Form

# EREC G99 Connection Process
# Design Phase – Submission of SAF

- *Form A1-1 for Type A fully type tested <50kW 3-phase (17kW 1-phase)*
- ***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 Connection Process - Compliance Checking

## Connection Process

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- **Compliance Checking**
- Construction Phase
- Energisation/Commissioning
- Final Compliance Check
- Operational Notifications

## Timeline

From time of acceptance to prior to energisation

## Compliance Checking Activities

- Generator & DNO agree compliance submission programme
- Generator iteratively submits their PGMD & associated evidence
- DNO reviews & responds / repeat

## Compliance Checking Documents

- Power Generating Module Document
- Generator's compliance evidence

(Simulation reports, Manufacturers Information, Type Testing reports)

# EREC G99 Connection Process - Compliance Checking

Technical requirements vary with Type

Generators can choose how they demonstrate compliance

Compliance is tracked in the PGMD

Incl. manufacturer info, type testing, simulation and site commissioning

DNO approval is required

# EREC G99 Connection Process - New / Modified Technical Requirements

- Interface Protection Settings (Types A, B, C & D)
- DNO logic interface by which generator will reduce active power (Type A)
- DNO communication interface for reducing active power (Types B, C & D)
- 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 Connection Process - New / Modified Technical Requirements

Fault ride through (Types B, C & D)

Voltage / power factor control capability (Type B, C & D)

Reactive Power Capability (Types B, C & D)

Fast fault current injection (Types B, C & D Power Park Modules)

Low frequency sensitive mode – under frequency (Types C & D)

Frequency sensitive mode (Types C & D)

Operational Monitoring (Types C & D)

# EREC G99 Connection Process - Energisation/Commissioning

## Connection Process

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- **Energisation/Commissioning**
- Final Compliance Check
- Operational Notifications

## Timeline

Immediately before operation

## Energisation / Commissioning Activities

- Generator undertakes site commissioning tests for remaining compliance requirements
- DNO witnesses tests

## Energisation / Commissioning Documents

- Commissioning forms (B2-2 & C2-2)
- Installation forms (B3 & C3)

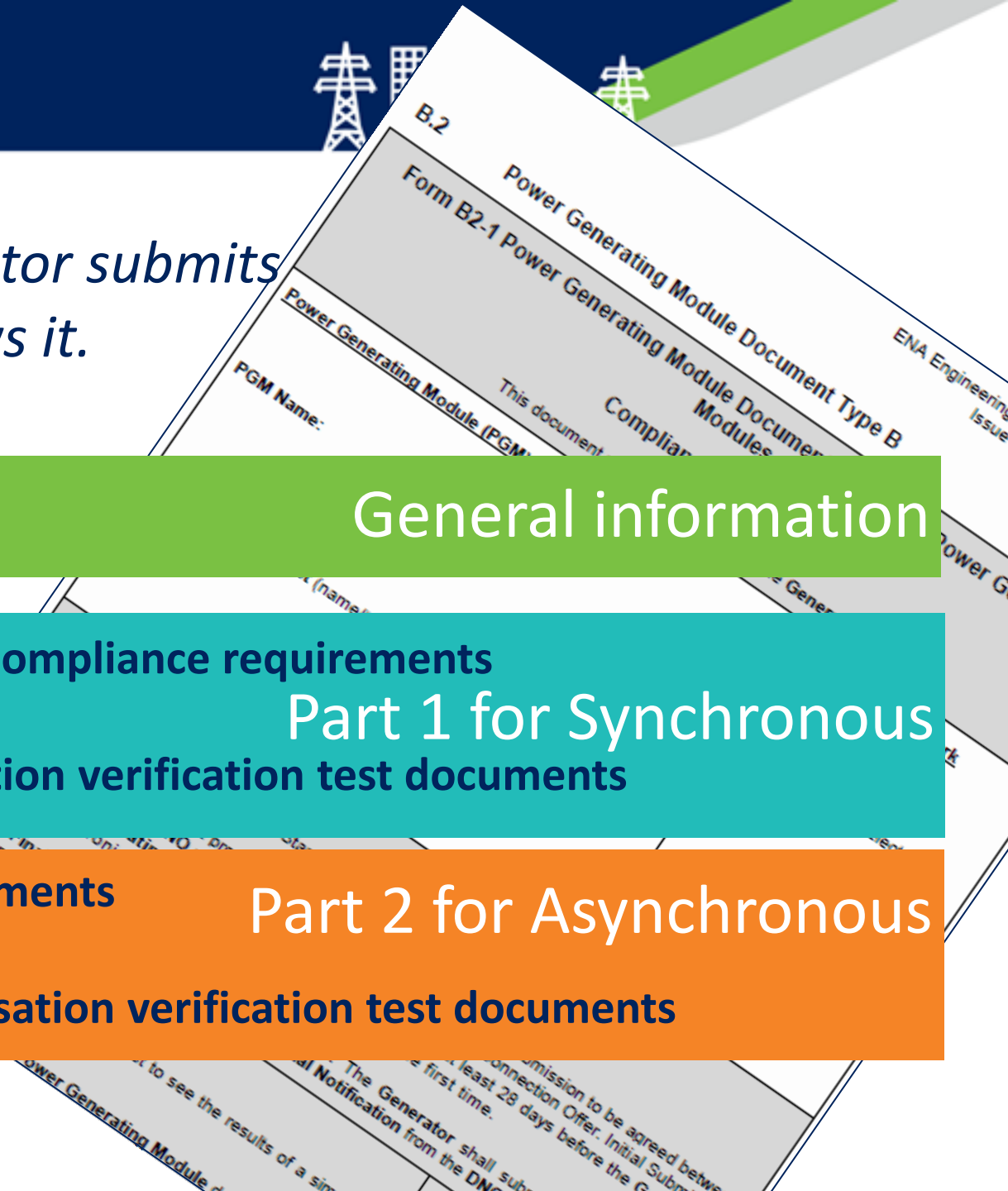
# EREC G99 Connection Process
# Compliance forms – Type A

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

| Type A | Manufacturer's Information | Site Tests |
|---|---|---|
| **Fully Type Tested** | No specific form<br><br>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<br><br>Installation forms:<br>**Form A3-1** Type A PGMs<br>**From A3-2** Integrated micro generation and storage |
| **Partially Type Tested** | **Form A2-1** Synchronous PGM ≤50kW<br>**Form A2-2** Synchronous PGM >50kW<br>**Form A2-3** Inverter connected PGMs | |

# EREC G99 Connection Process
# Compliance Checking– use of the PGMD

- *Record of compliance evidence*
- *PGMD is likely to be iterative as the generator submits evidence of compliance and the DNO reviews it.*




**Page 1 PGM and DNO basic information**
**Page 2 PGMD version control / PGM details**

General information

**Pages 3 – 7 Synchronous Power Generating Module compliance requirements**
**Pages 3-4 submitted at Initial Submission**
**Pages 5-7 submitted at FONs – post energisation verification test documents**

Part 1 for Synchronous

**Pages 8 – 12 Power Park Module compliance requirements**
**Pages 8-10 submitted at Initial Submission**
**Pages 11-12 submitted at FONs – post energisation verification test documents**

Part 2 for Asynchronous

# EREC G99 Connection Process
# Compliance check – Commissioning form

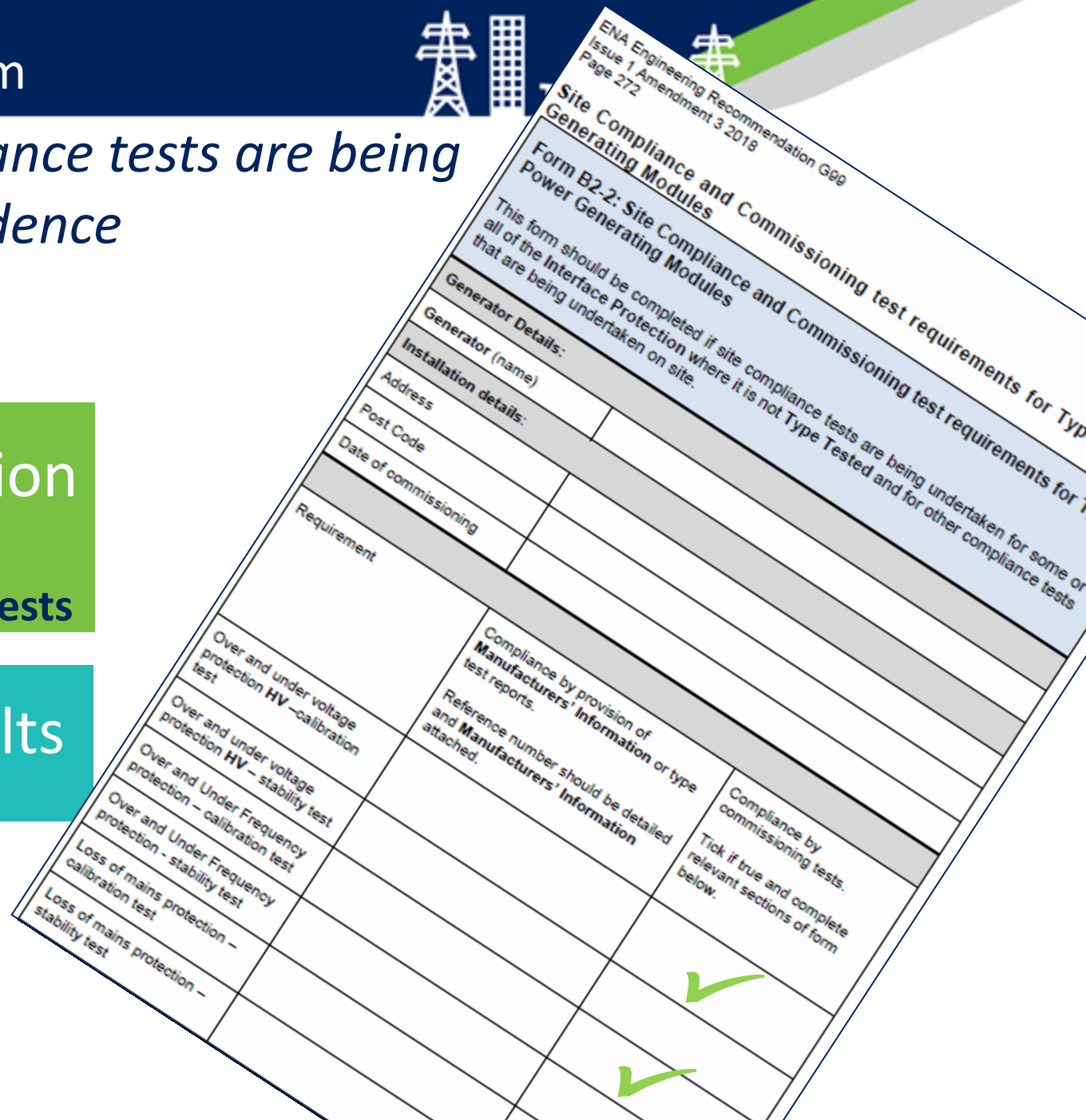
- *B2-2 & C2-2 : completed if site compliance tests are being undertaken in the absence of other evidence for Types B, (C&D) respectively.*

**Page 1**
**PGM basic information**
**Summary table indicating compliance by Manufacturers Information or commissioning tests**

Information

**Pages 2 – 5**
**Results tables for each type of test**

Results


ENA Engineering Recommendation G99
Issue 1 Amendment 3 2018
Page 272

**Site Compliance and Commissioning test requirements for Typ**
**Generating Modules**

**Form B2-2: Site Compliance and Commissioning test requirements for Typ**
**Power Generating Modules**

This form should be completed if site compliance tests are being undertaken for some or all of the Interface Protection where it is not Type Tested and for other compliance tests that are being undertaken on site.

**Generator Details:**

Generator (name)

**Installation details:**

Address

Post Code

Date of commissioning

| Requirement | Compliance by provision of **Manufacturers' Information** or type test reports. Reference number should be detailed and **Manufacturers' Information** attached. | Compliance by commissioning tests. Tick if true and complete relevant sections of form below. |
|---|---|---|
| Over and under voltage protection **HV** –calibration test | | |
| Over and under voltage protection **HV** – stability test | | ✓ |
| Over and Under Frequency protection – calibration test | | |
| Over and Under Frequency protection - stability test | | ✓ |
| Loss of mains protection – calibration test | | |
| Loss of mains protection – stability test | | |

# EREC G99 Connection Process
# Compliance check – Installation form

- *B3 & C3 : completed as a record of commissioning and installation for Types B, (C&D) respectively.*

**Part 1**
**Installer**
**Installation details**
**PGF commissioning information**

Per PGF

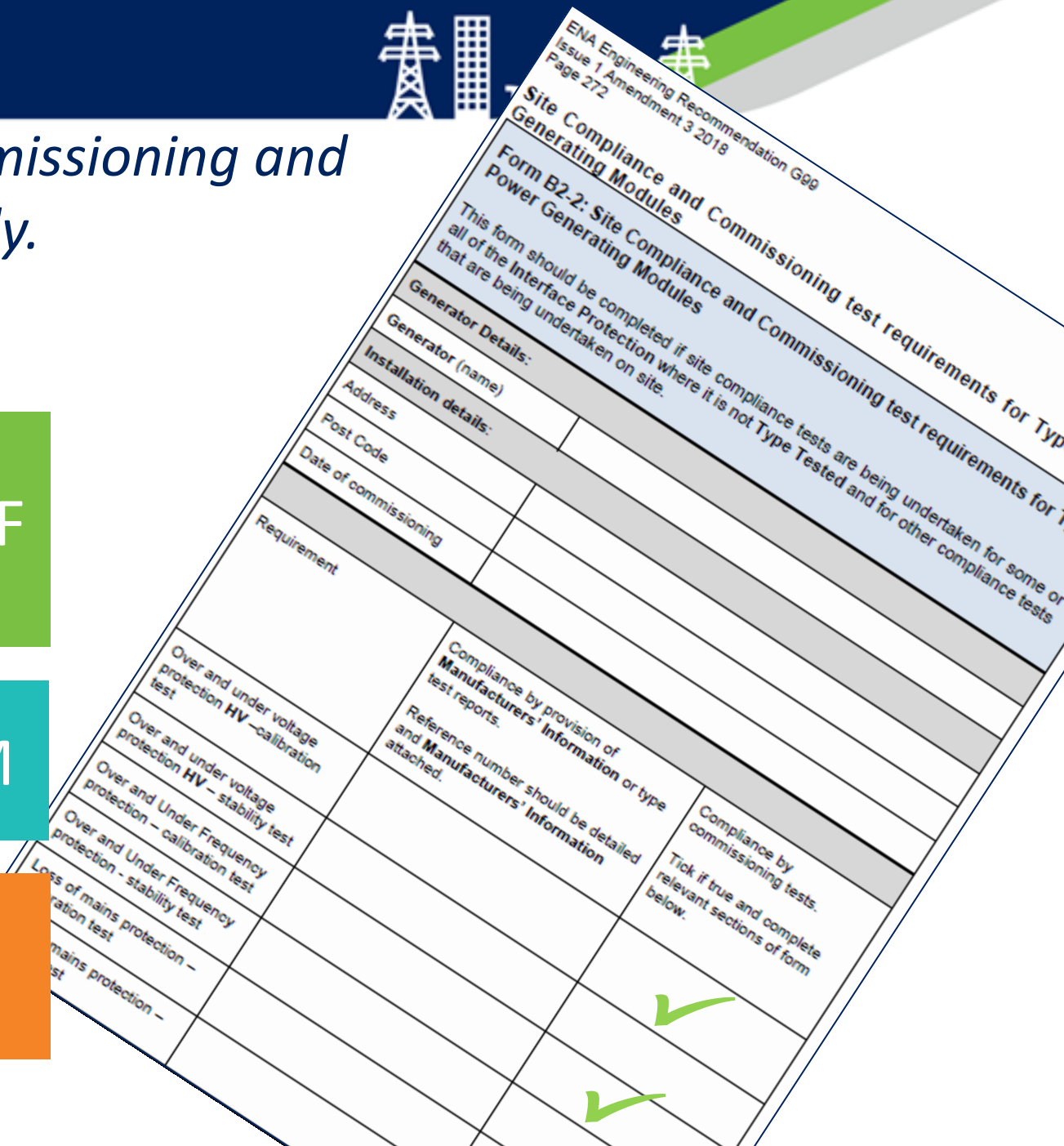
**Part 2**
**PGM commissioning information**

Per PGM

**Generator Declaration**

**DNO Declaration**

Declarations



# EREC G99 Connection Process - Final Compliance Check

## Connection Process

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning
- **Final Compliance Check**
- Operational Notifications

## Timeline

Immediately before operation

## Final Compliance Check Activities

- Generator submits final PGMD, Installation & Commissioning forms

## Energisation / Commissioning Documents

- PGMD
- Commissioning forms (B2-2 & C2-2)
- Installation forms (B3 & C3)

# EREC G99 Connection Process - Operational Notifications

## Connection Process

- Information Phase
- Design Phase
- Connection Offer
- Connection Acceptance
- Compliance Checking
- Construction Phase
- Energisation/Commissioning
- Final Compliance Check
- **Operational Notifications**

## Timeline

At time of operation

## Operational Notification Activities

- DNO confirms all commissioning tests completed and data submitted
- DNO issues FON
- PGM is allowed to operate using the distribution network

## Operational Notification Documents

- FON

# EREC G99 Discussion

# EREC G99 – Electricity North West's Next Steps

FAQs on website

EREC G99 Webinars

Individual bespoke sessions

# 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/

# EREC G99 - Over to you...

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

2) Is there anything that is still unclear for you?

3) Have you thought about how you are going to submit your evidence?

4) Is there anything more that you think we can do to help?

# Panel Q & A

# Wrap up and Close

Mark Williamson

Energy Solutions Director

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

- Thank you for your attendance and have a safe journey home.