Report from the Expert Group 'Mixed Customer Sites with generation, demand and storage and definition of system users' (EG MCS)

Robert Wilson, Chair of EG MCS

14th Grid Connection European Stakeholder Committee Meeting

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EG MCS structure

ACER Agency for the Cooperation of Energy Regulators

entsoe

Expert group: Mixed customer sites with generation, demand and storage, and definition of system users (EG MCS)

Approved by the GC ESC on September 14, 2018
Subject to possible updates on the list of members

Chair: ENTSO-E, Robert Wilson

Vice-Chair: Paul de Wit, CEDEC on behalf of DSO Associations

Problem Statement

On 11 June 2018, the Grid Connection European Stakeholder Committee (GC ESC) decided to establish an Expert Group (EG) to clarify the requirements on mixed customer sites (MCS), where these could be a combination of generation, demand and/or storage facilities. The creation of this EG was proposed by ENTSO-E to elaborate on connection network code (CNC) issues which had been raised by stakeholders during CNC implementation. The ENTSO-E proposal was based on the findings of a stakeholder survey to identify priority topics.

Target (objectives)

The objectives of the EG MCS are:

- to provide clarification regarding the application of the Network Code on Requirements for Generators (NC RfG) Demand Connection Code (NC DC) and HVDC (NC HVDC) to MCS with generation, demand and storage (to the extent that storage might in future be classed as separate from generation or demand);
- identify differences and similarities of mixed customer sites which are CDSOs and non-CDSOs;
- in the context of MCS:
  - assess types of MCSs to be considered;
  - to assess the MCS case against the current definition of system users, found in the Directive 2009/72/EC;
  - to review the definitions of Synchronous Power Generating Module (SPGM)/Power Park Module (PPM); and
  - to provide clarification in terms of the type A-D categorisation or applicability of RfG for mixed or novel sites addressing cases such as:
    - mixed generation only sites where a small PGM (e.g. PV) is installed within the connection site of a larger generator;
    - small PGMs connected to a ≥110kV network due to unavailability of lower voltage connection points
    - combined heat and power generating facilities connected at ≥110kV (where type A-C would be excluded from certain RfG requirements)
    - clarification on arrangements for point of connection to TSO, DSO or CDSO if that will determine the voltage of connection and therefore 'type' *(point added after the*

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Public space

EG MCS

Mixed customer sites with generation, demand and storage, and definition of system users.

Annex

EG MSC Reporting 13th GC ESC

EG MSC Reporting 12th GC ESC

Internal EG space

EG MCS

new document or drag files here

All Documents ··· Find a file

Name

- archive (non-exhaustive)
- Examples and Additional references
- Final report
- Kick-off meeting_181019
- meeting_190319_Brussels
- RfG classification
- Specific equipment types_combinations
- ToR and Annex
- webinar_181119
- webinar_181217
- webinar_190121
- webinar_190221
- 180914_GC ESC_EG MCS_notes from preparatory call
- EG MCS reporting_12th GC ESC
- EG MCS_contact list
- READ ME

Final EG meetings since last GC ESC meeting

- 9 April 2019, webinar

Examples of ‘Mixed Customer Site’ issue

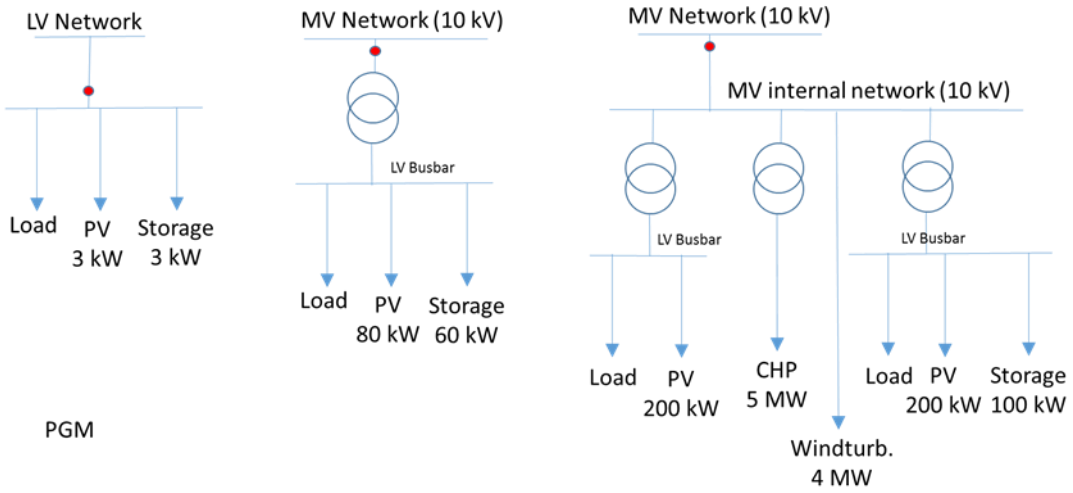
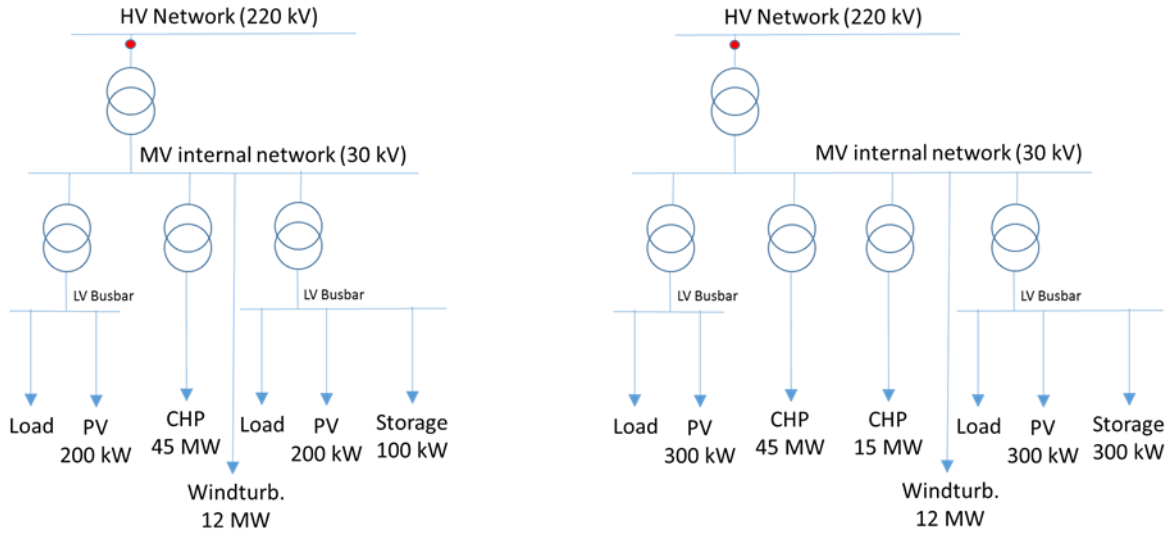


Fig 1(a) & (b) & (c) Mixed site connections to LV and MV networks .

Each of these generators is assessed as type A-D on the basis of their size



Figs 2 (a) & (b) Mixed sites connecting to HV networks via internal (= private) MV

Each of these generators is assessed as type D since their connection point to the system is at > 110kV

● Connection point at the network of DSO or CDSO

Possible solutions discussed in the EG

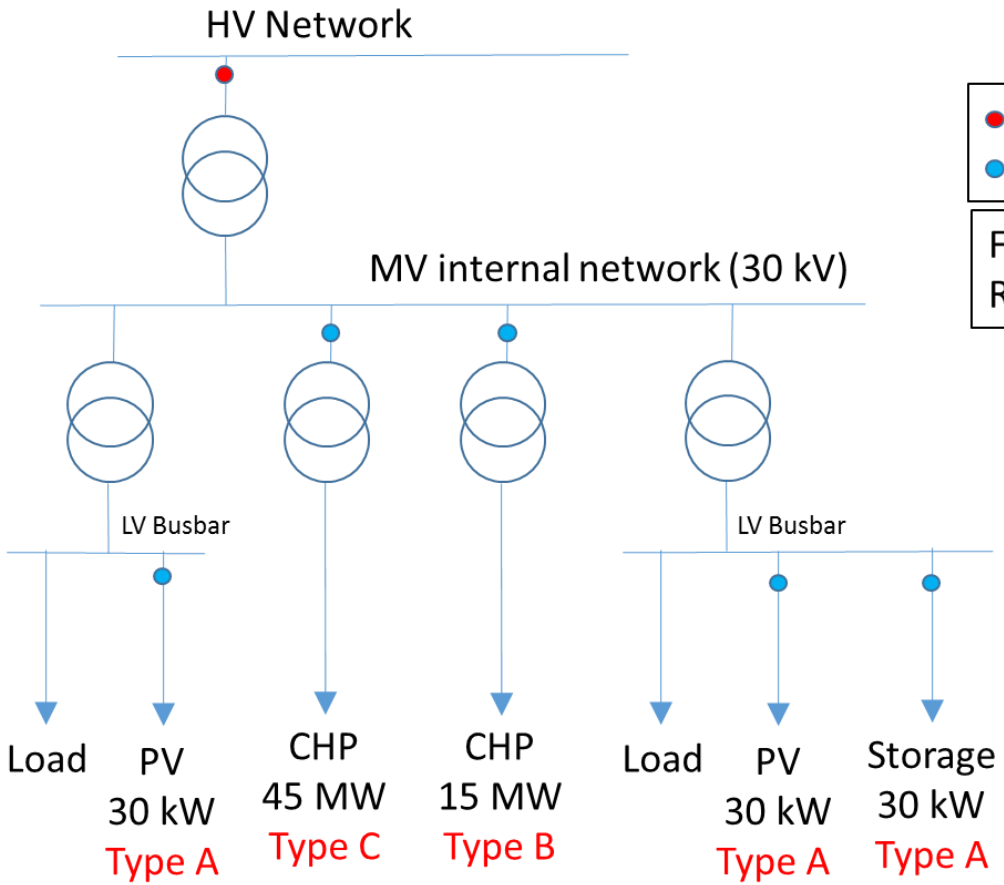
- Acknowledgement that RfG ‘type D’ voltage default was not perfect but during the drafting of RfG had been the best option available.
- In line with the ACER FWGL to take account of the connection voltage - on page 8:
  ‘The minimum standards and requirements shall be defined for each type of significant grid user and shall take into account the voltage level at the grid user’s connection point.’

Options considered:

- Define additional ‘interface point’ to determine all connection requirements (except fault ride through); or
- Define additional ‘interface point’ just to determine the connection voltage and therefore type
- Increase voltage criteria to be >220kV; or
- Remove voltage criteria from type A generators (so determined by capacity only); or
- Remove voltage criteria from type A & B generators; or
- Remove voltage criteria completely so for all of types A-B-C; or
- Removal of voltage criteria from type A, partial removal of increased RfG requirements for type B generators (on capacity) where defaulted up to type D on connection voltage

Extending the exclusions for CHP plant were also suggested by TSOs. This could be a partial solution although goes against a guiding principle of seeking to apply a level playing field of harmonised requirements across technologies

Interface Point illustration



- Connection point at TSO
- Interface point

FRT Requirements at Connection Point
Reactive Power Req. at Interface point

Each of these generators is assessed as type A-D on the basis of their size if against their interface point but type D if against their connection point

Advantages and Disadvantages

Voltage Criteria Solution	Pro	Con
Use interface point for all	• Treats public/private networks identically • Solves issues with supply of reactive power across connection point	• Visibility of performance within a network to TSO/DSO • Establishes an additional legal boundary • Doesn't solve geographic availability of LV/MV issue • Reverses established legal arguments around requirements applying at the connection point to the system • Encourages connection at lower voltages and independent operation (no collective control)
Use interface point – for type selection only	• Maintains visibility of performance to TSO/DSO • By generally leading to reclassification, reduces technical requirements for smaller generators	• As above (except visibility within a network to TSO/DSO) • Doesn't solve reactive range issue
Change the default criteria to >220kV	• Simple – minimum change to RfG	• Doesn't resolve issues with transmission connections constrained for geographic reasons • Doesn't solve case where a major industrial site is connected at 220kV+. (Examples of this in Germany and in Belgium for CHP plant)
Remove voltage criteria from type A generators (so type A determined by capacity only)	• Resolves all type A scenarios • Solves obligations in the SOGL imposed for type A PGMs connected at >110 kV	• Some reduction in network support • Will incentivise connections to keep within capacity for type A • Discrimination between types A & B
Remove voltage criteria from type A & B generators	• Resolves all type A/B scenarios	• Some reduction in network support • Will incentivise connections to keep within capacity for type B • Discrimination between types B & C
Remove voltage criteria from type A, partially remove from type B (some type D requirements retained where defaulted up to type D by connection voltage)	• Seeks a compromise in reducing impact for smaller generators and retaining more network support from type B by size	• Complicated solution • Possible discrimination between types A, B and C • Feels similar to a derogation for type B
Remove voltage criteria completely so for all of types A-B-C)	• Simple in principle • Resolves all cases	• May be viewed as significant change to RfG – loses link to ACER framework guidelines in no longer considering voltage • Reduction in network support would lead some TSOs to reassess 'type' thresholds

Acceptability…red lines

- Generators:
  - Would like to see voltage criteria removed completely
  - Want to at least address type A & B issues
  - Support interface point in concept
- TSOs:
  - A reduction in support will lead to increased operational costs. Needs to be balanced.
  - Removal of voltage criteria completely would lead some TSOs to revise ‘type’ thresholds
  - Don’t support adding another legally complex boundary (interface point)
  - Highlight ‘independent controllability’ as a requirement for a number of generators sharing a connection point to qualify under a lower ‘type’ threshold
- DSOs:
  - Don’t support adding another legally complex boundary (interface point)
- Industrial sites/CDSOs/CHP parties:
  - Would like to see voltage criteria removed completely - increasing threshold to 220kV doesn’t work
- Manufacturers:
  - Want as simple a solution as possible
  - Prefer greater harmonisation and removal of national specificities
  - In some cases can’t comply with type D requirements for smaller plant

Preferred Solutions

- Removal of voltage criteria (for all of types A-C)
- Removal of voltage criteria for A & B
- Interface point

Particular issues requiring consideration in code drafting

- ‘Independent controllability’ as a requirement for a number of generators sharing a connection point to qualify under a lower ‘type’ threshold was highlighted as a guiding principle of RfG
- If the ‘interface point’ solution were considered this would need legal clarification
- Removal of the voltage criteria would lead to substantial changes in generator volumes by type in some member states. Two drafting solutions could help as an alternative to a full reassessment of type thresholds:
  - Add to RfG type B fault ride through requirements a 2nd voltage profile to use where connected to the transmission system (similar to type D)
  - Specify in the code that the type B/C threshold should be set through an independent assessment reporting to the NRA determining the size at which generator connections would normally be made at 110kV or above.