

Implementation NC: modernisation

vision for Requirements for Generators and Transmission Connected
Demand Facilities

Belgian Grid 07/11/2017

Agenda

- 1) Recap
 - 1) Legal context – link to existing process

- 2) Requirements for Generators
 - 1) Adapted slides
 - 2) High level examples

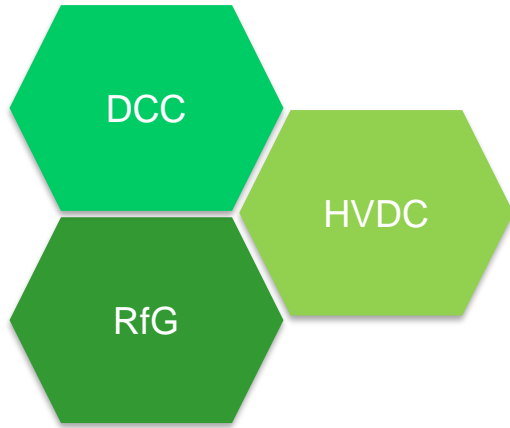
- 3) Demand Connection – transmission connected demand facility
 - 1) New proposal

- 4) Federal Grid Code

Recap

1.1 - Legal context and link to the existing proces

Legal context

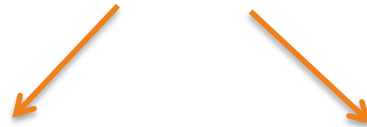


3 Connection Codes

- Requirements for generators
- Demand Connection Code
- HVDC

Apply only for new ‘systems’

**Not apply to existing ‘systems’
Except in case of:**



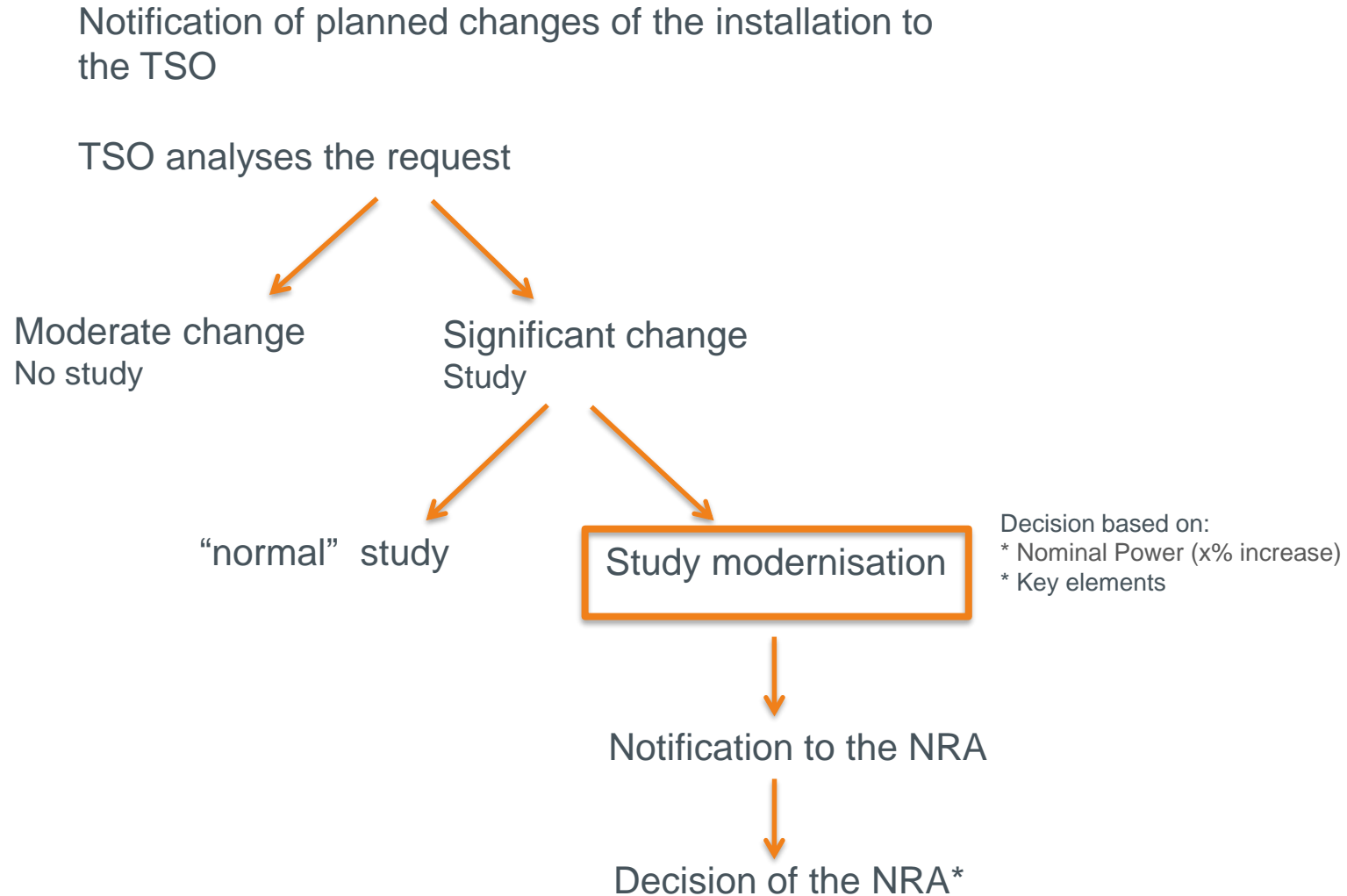
**Retro-active effect
with CBA (Cost-
Benefit Analysis)**

**Or in case of substantial
modernisation or
replacement of equipment
impacting the technical
capabilities of the systems**

Extract of Article 4 – DCC:

- (i) demand facility owners, DSOs, or CDSOs who intend to undertake the modernisation of a plant or replacement of equipment impacting the technical capabilities of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit shall notify their plans to the relevant system operator in advance;
- (ii) if the relevant system operator considers that the extent of the modernisation or replacement of equipment is such that a new connection agreement is required, the system operator shall notify the relevant regulatory authority or, where applicable, the Member State; and
- (iii) the relevant regulatory authority or, where applicable, the Member State shall decide if the existing connection agreement needs to be revised or a new connection agreement is required and which requirements of this Regulation shall apply; or

link to the existing process



* Clarification ongoing

Requirements for Generators

2.1 - Adapted slides

2) RfG - Triggers of the principle of modernisation

(1/2)

General principles (type A/B/C/D):

If the replacement/extension does not fit into one of the hereunder mentioned cases I, II or III:

- a) The new elements or the additional unit in the facility have to be able to comply with the new regulations
- b) The entire facility has to comply with the current regulation (unless otherwise agreed in the past)

Check based on simulations and, if judged necessary, tests

Case I) Increase in power resulting in a type shift

Full compliance

Case II) Increase* in nominal power of a unit

if increase is $\geq 50\%$:

Full compliance

if increase is between 20 en 50%:

Partial compliance**

* power decrease: case III

List will be presented in Belgian Grid

2) RfG - Triggers of the principle of modernisation

(2/2)

Case III) Renewal of a key element of the installation:

example:

rotor/generator

Invertor

Fuel type

Transformer

Control system

Protections

Means of communication

....

Key Principles:

- * RSO needs to be informed prior to execution
- * The new elements in the facility has to be able to comply with the new regulations. See General principles.
- * Compliance at CP - based on a study

2) RfG - Partial compliance achieving the list

(1/2)

The need to be compliant with a limited set of requirements. These will be listed and public available.

Comparison of the set of the requirements in RfG with the current requirements

- If already existant and RfG is less or equally stringent

→ compliance mandatory

- If a) already existant and RfG is more stringent
or

b) existing requirements don't exist and we will adopt the requirements set in RfG (some are optional)

→ Priority analysis of the need for the stability, safety and exploitation of the grid to be compliant to the new requirement

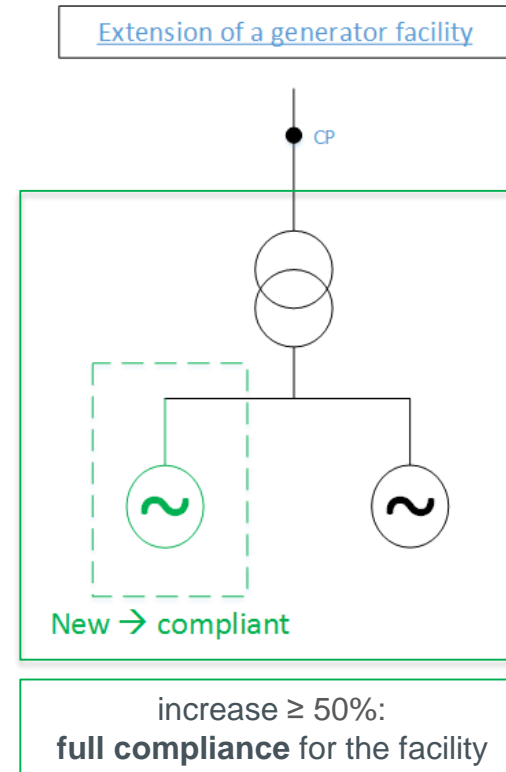
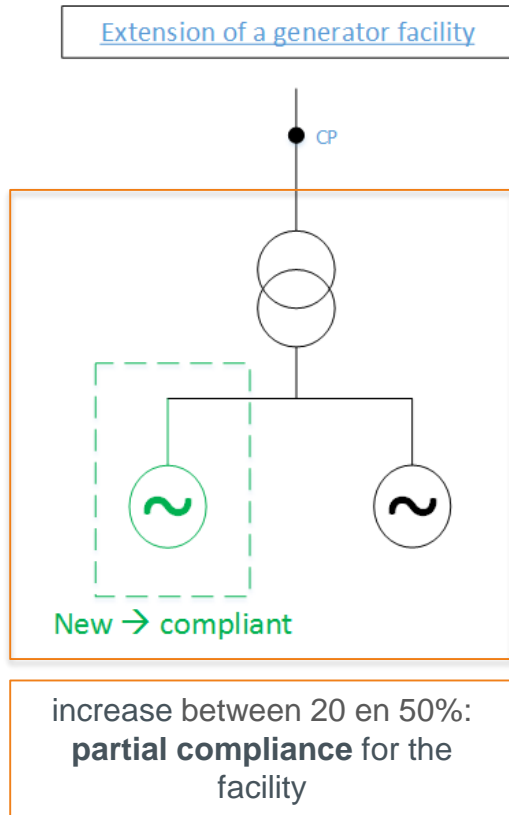
→ Yes: the requirement will be part of the partial compliance list

→ No: -

Requirements for Generators

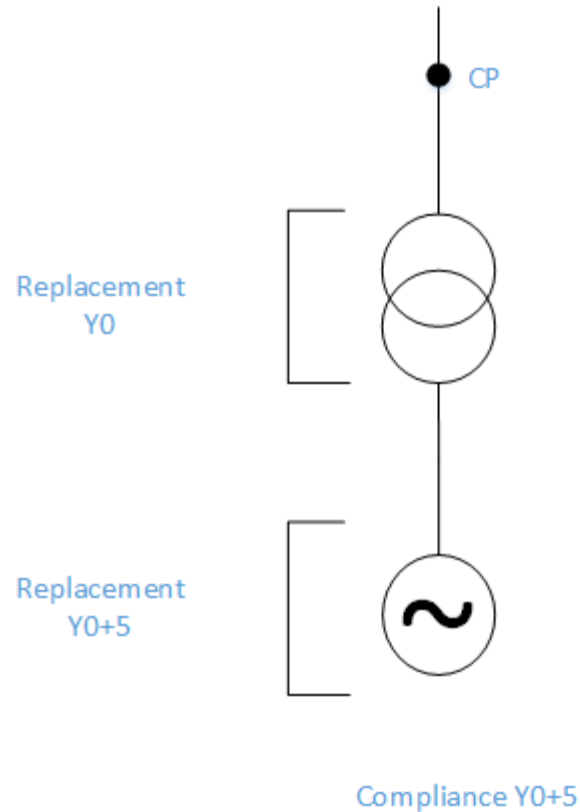
2.2 - High level examples

High level examples – case II – increase in nominal power



High level examples – case III – key elements

Replacement of equipments



| Timeline | Before replacement Equip 1 | After replacement Equip 1 | After replacement Equip 2 |
|--|--|--|---|
| Equipment's contributing to the functional list of requirement A | Existing Equip 1 limiting application of requirement A | Opt1: Spare part of Equip 1 limiting application of requirement A Opt2: New Equip 1 not limiting the application of requirement A | New Equip 1 not limiting the application of requirement A |
| | Existing Equip 2 limiting application of requirement A | Existing Equip 2 limiting application of requirement A | New Equip 1 not limiting the application of requirement A |
| Conclusions | => Requirement A does not apply | => Requirement A does not apply | => Requirement A applies |

Demand Connection – transmission connected demand facility

3.1 – new proposal

3) DCC – transmission connected demand facility

Triggers of the principle of modernisation

(1/2)

In general:

If the replacement/extension does not fit into one of the 2 hereunder mentioned cases I or II:

- a) The new elements or the additional unit in the facility have to be able to comply with the new regulations
- b) The entire facility has to comply with the current regulation (unless otherwise agreed in the past)

Check based on simulations and, if judged necessary, tests

Case I) Increase in Power Put at Dispostal (PPAD) of the demand facility

if increase is $\geq 50\%$:

full compliance

if increase is between 20 en 50%:

at least partial compliance

Remark BG 04/09: focus on technical capabilities/functional blocks in stead of PPAD

3) DCC – transmission connected demand facility

Triggers of the principle of modernisation

(1/2)

Principles:

In case of EXTENSION:

- * RSO needs to be informed prior to execution
- * The new unit in the facility has to be able to comply with the new regulations
- * The entire facility has to comply with the current regulation (unless otherwise agreed in the past)
Check based on simulations and, if judged necessary, tests
- * **Compliance at CP – based on a study**

In case of REPLACEMENT

- * RSO needs to be informed prior to execution
- * The new elements in the facility has to be able to comply with the new regulations.
- * The entire facility has to comply with the current regulation (unless otherwise agreed in the past)
Check based on simulations and, if judged necessary, tests
- * **Compliance at CP –based on a study**

5) Federal Grid Code

4) Federal Grid Code

Proposal:

- * Insert modernisation in the current existing process for connection
- * Incorporate the general philosophy and cases (including the thresholds)
- * Define full/partial compliance

Questions or remarks?

Many thanks for your attention!

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