

# NC HVDC User Group 4<sup>th</sup> meeting

Date: 15 January 2014

Time: 11h00 – 16h00

Place: ENTSO-E offices, Brussels

## MINUTES

| Participants        | Affiliation                                     | Present | Excused |
|---------------------|---|---------|---------|
| <b>Stakeholders</b> |   |         |         |
| Magnus CALLAVIK     | ABB   |         | X       |
| Peter LUNDBERG      | ABB / CENELEC WG06                              | X       |         |
| Marcelo FERRAZ      | ALSTOM Grid UK                                  |         | X       |
| Andrew McINTOSH     | BritNed   |         | X       |
| Alan CROES          | BritNed   | X       |         |
| Torsten HAASE       | Dong Energy                                     | X       |         |
| Muhammad JAFAR      | DNV KEMA  | X       |         |
| Dania CRISTOFARO    | ECOS  | X       |         |
| Thomas WILLSON      | ECOS  | X       |         |
| Simon LUDLAM        | Eleclink  | X       |         |
| Angus NORMAN        | Eleclink  |         | X       |
| Ton GERAERDS        | Eurelectric (Essent)                            | X       |         |
| Herman BAYEM        | Eurelectric (EdF)                               | X       |         |
| Paul WILCZEK        | EWEA  |         | X       |
| Ivan PINEDA         | EWEA  | X       |         |
| Frans van HULLE     | EWEA  |         | X       |
| Joe CORBETT         | Friends of the Supergrid (Mainstream Renewable) | X       |         |
| Norman MacLEOD      | Friends of the Supergrid (PB World)             |         | X       |
| Peter CLAES         | IFIEC   | X       |         |
| Jan SUCKOW          | FNN/VDE   |         | X       |
| Stijn COLE          | GDF Suez  |         | X       |
| Ara PANOSYAN        | GE Global Research                              |         | X       |
| Emad AHMED          | GE Global Research                              |         | X       |
| Stephen MILLAR      | Iberdrola Engineering                           |         | X       |
| Mukund BHAGWAT      | IFIEC   |         | X       |

|                     |                            |     |   |
|---------------------|----------------------------|-----|---|
| Petter LONGVA       | IFIEC                      |     | X |
| Michelle MANNING    | Mitsubishi Electric        | X   |   |
| Steve LANGDON       | Mitsubishi Electric        | X   |   |
| Mike WILKS          | Pöyry                      |     | X |
| Eckhart LINDWEDEL   | Pöyry                      |     | X |
| Kim WEYRICH         | REpower                    |     | X |
| Michael ALDERS      | Eurelectric (RWE)          |     | X |
| Daniel EICHHOFF     | RWTH Aachen / CENELEC WG06 | X   |   |
| Gavin GREENE        | Scottish Power             |     | X |
| Frank SCHETTLER     | Siemens / CENELEC WG06     | X   |   |
| Manfred POHL        | Siemens                    |     | X |
| Fabio SPINATO       | Statkraft                  | X   |   |
| Kamran SHARIFABADI  | Statoil                    | X   |   |
| Ifigenia STEFANIDOU | Swisselectric              | X   |   |
| Chuan ZHANG         | The Crowne Estate          | X   |   |
| Peter Wibæk         | Vestas Wind Systems A/S    | WEB |   |
| Eric DEKINDEREN     | VGB PowerTech (GDF Suez)   | X   |   |
| Helge REGBER        | VGB PowerTech (EON)        | X   |   |
| Claudio GIANOTTI    | World Energy SA            |     | X |
| Mario GENOVESI      | World Energy SA            |     | X |
|                     |                            |     |   |
| Philippe ADAM       | CIGRÉ B4-56                |     | X |
| James EARL          | OFGEM                      | X   |   |
| Uroš GABRIJEL       | ACER                       | Web |   |
| Anne de GEETER      | ACER                       | Web |   |
| Tadhg O'BRIAIN      | EC                         |     | X |
|                     |                            |     |   |
| Wilhelm WINTER      | TenneT GmbH                | X   |   |
| Helge URDAL         | ENTSO-E                    | X   |   |
| Edwin HAESSEN       | ENTSO-E Secretariat        | X   |   |
| Ádám SZÉKELY        | ENTSO-E Secretariat        | X   |   |

## 1. Introduction

ENTSO-E welcomed all participants and proposed the agenda of the meeting, which was accepted with the following additions:

- Statkraft asked how cover letters with general viewpoints provided in the written consultation are taken on board and wished to discuss these in the user group meeting.
- VGB asked for clarification on grid quality target requirements in the NC HVDC context.

Public consultation of the draft code was open during the period from 7 November 2013 through 7 January 2014. Various organisations from the industry, investors as well as academia submitted a total of nearly 2500 individual comments, which are being assessed by ENTSO-E. The aim of present meeting is to have a general discussion across all impacted parties on key suggestions given in the consultation.

## 2. User Group Member presentations

Besides the brief summary of key issues outlined below, the full presentations are available for download from the ENTSO-E website.

### Views of Siemens

The network behind the onshore connection point to the public network should not be subject to additional NC requirements, as it narrows down the optimisation options and development possibilities for offshore networks.

The concept of Relevant Transmission System should be defined, with requirements either applying to this connection point, or alternatively, the requirements of Chapter 3 of the current draft shall be delayed and included in a later amendment or separate code, when technology is more mature.

Requirements applicable to Power Park Modules should entirely be decoupled from those applying to HVDC transmission assets.

Remarks:

- Eurelectric: Impression that two philosophies of ownership were in mind when drafting the code. ENTSO-E clarifies that the technical requirements for DC systems apply regardless of ownership structure.
- Statoil: CIGRE document on DC side requirements is being prepared (expected by August 2014) and can address some of these aspects.
- Siemens: Chapter 3 on DC-connected PPM requirements is needed. The question is when and in what form is most appropriate

### Views of Statkraft /Statoil

Standards and codes are needed, if they help new technologies to develop. There is a need to clearly demonstrate benefits of the requirements with regards to new and developing technologies.

High level sample calculations raise concern on margin of profitability of new offshore projects. The cost associated with certain proposed requirements of the code might diminish or even annulate the margin.

Interconnectors should be regulated by this code, not the development of RES, especially connected via HVDC.

## Views of EWEA

Improved stakeholder engagement during the code development process acknowledged, EWEA remains open for further bilateral discussions.

Frequency range for remote end converters should at least allow nominal frequency other than 50Hz

No cost-based justification of proposed voltage ranges and Q/Pmax ranges in supporting documents – even if such quantitative information is not received from manufacturers, TSOs (acting often as investors in HVDC system projects) should have all the necessary information to be able to perform the CBA.

Remarks:

- Statoil: asked to share info with ENTSO-E, not allowed by manufacturers (NDA), still working on how to make it partly available
- Siemens: understand that we talk about a new field – expect that cost will not take discussions to a new level – the discussion should be based on which requirements are needed (or have clear major benefits) as a technical minimum for the system, rather than based on costs

## 3. Detailed discussion of key topics

### Scope

- Applicability to new/existing connections
  - o General principle clarified that all connection codes focus on new connections.
  - o Britned, Eurelectric: modernization and minor works using identical spare parts should be clearly distinguished. ENTSO-E takes comment on board and will seek to clarify the text
- Applicability to “embedded systems”
  - o Participants ask whether this covers links to PPMs? ENTSO-E will clarify this, e.g. by clear definition.
- Special loads (e.g. railway connections)
  - o should be excluded, are covered in DCC
- Distribution-connected DC links
  - o With view on distribution-level connections, there is a need to review each requirement whether the “Relevant TSO” or the “Relevant Network Operator” shall be referred to. ENTSO-E will clarify this per requirement.
- DC connected PPMs: see general comments on applicability.

### Interaction studies

- Swisselectric: Article 27: The Relevant Network Operator (DSO or TSO) is responsible for the security of its system and, therefore, also for conducting the required studies to assure that no adverse interaction may occur. All connected Network Users should fulfil the requirements at the connection point and contribute to the studies by providing the necessary data and models. In order to avoid discrimination, the National Regulatory Authorities should assess the scope, the timeframe and the results of the required studies.
- Statoil: concern that it will be difficult if not impossible to receive sufficiently detailed models of equipment from manufacturers for the studies. The resulting risk of denying connection if studies are not performed constitutes a case of discrimination against the “latest coming” connectee
- EWEA: in line with Statoil’s comment, TSOs should perform the studies, receiving the necessary details under confidentiality agreements.
- ENTSO-E argues that the study is best performed by the party who has the detailed model, and who can always delegate this task. The Relevant Network Operator has a role in defining the scope of the study, and assessing the results.

### Frequency withstand capability

- All agree that frequency/time should at least as cover generation and demand requirements as given in RfG/DCC
- Some claim the proposed requirements have an unreasonably high cost impact (no actual figures given)
- ENTSO-E requests clarification on exactly which articles seem most problematic
  - o Statoil: receiving detailed information per requirement from vendors is difficult, as actual cost is not the only factor in final price – in general wider frequency range means larger filter
  - o Siemens: apart from filter specification, a major cost driver is also the requirement to maintain full active power exchange capability across the frequency range – ref. Art 41(7)
  - o ABB: need to take into account entire converter station design, other components may be affected
  - o ENTSO-E: does it take into account harmonization? ABB: harmonization helps drive costs down, but if functionalities are specified differently per country, the advantage is lost
  - o Statoil: similar requirements on TSO owned Statcoms would be justifiable
  - o EWEA requests ENTSO-E to publish cost-based justification of the requirements
- Conclusion:
  - o interaction with other requirements to be checked
  - o possibility for shorter time durations and the option for active power reduction for underfrequency shall be examined by ENTSO-E. This still requires more info on cost implications

### **Reactive power capabilities (LCC/VSC)**

- Statoil:
  - o Blocking thyristors and provide services at the same time is not possible
  - o Additional equipment is needed to meet the requirements if LCC technology is used, which is a case of discrimination of technology –ENTSO-E does not share this view: requirements are deemed to be functional and based on system needs
- ENTSO-E will review the article based on detailed comments provided in the written consultation.

### **Offshore developments**

- Statkraft:
  - o Ready to contribute to cost impact calculations as far as practicable
  - o questions the need for parallel AC lines to first projects
  - o Code is needed, but not now. ENTSO-E refers to offshore grid development plans (both TSO and independent), indicating a rapid growth of DC in next 5-10 years, justifying defining the first set of requirements already
  - o Fault Ride Through for DC connected offshore is not needed. ENTSO-E does not share this view. DC connected Offshore installations usually have high ratings, e.g. several 1000 MW. Such offshore cluster shall not completely disconnect in case of short circuits or other incidents in the offshore part.
- Development of 16.7Hz grids, variable frequency collection networks, etc. should not be precluded by the requirements in the code – ENTSO-E agrees to open the wording of relevant articles as to not block these developments.
- Siemens indicates the need to publish some more studies on multi-terminal connections
- Models of responsibility for offshore networks (and TSO's role) differ across countries and are not even fully defined everywhere, such differences should be born in mind
- FOSG: connection point needs to be clearly defined: requirements could be defined onshore only if one link & one PPM is constructed by the same owner
- Statoil: costs offshore are higher than onshore by a factor of 10, the requirements impose too high costs, endangering financial viability of projects and development of technology. ENTSO-E refers to the options in the NC HVDC for not having reactive power capability installed if not justified for day 1 and no long term development is foreseen, when such an agreement can be obtained. The inherent

---

capabilities on both sides (remote end HVDC and DC connected PPMs) should be available in order to reduce risks in case of incidents inside the DC connected AC collection grid.

- ENTSO-E will review the article based on detailed comments provided in the written consultation.

#### **4. Next steps**

The next User Group meeting is to be held in early March, ahead of which an amended working draft of the code (based on the review of all comments) will be made available to the members of the group.

ENTSO-E remains open for further discussions on remaining issues, also on a bilateral basis, if requested.

Everybody's active input and constructive feedback in this meeting is much appreciated.

---