**CIGRE Study Committee C5**

## PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

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| **WG* N° C5.25** | **Name of Convenor : David GAME** (France)<br>**E-mail address**: david.game@rte-france.com |
| **Technical Issues # (8, 10)** | **Strategic Directions # (1)** |
| **The WG applies to distribution networks (4): Yes** | |
| **Title of the Group: Regulation & Market design perspectives raised by new storage technologies** | |

### Scope, deliverables and proposed time schedule of the Group :

Background :

Energy Transition requires an increase of flexible resources in power systems. This applies for hourly balancing, as fossil-fueled flexible plants are progressively pushed out of the merit order, and as the potential for more hydraulic pump storage is limited by geography but it also applies for system services, because higher rates of renewable generation increase the variability of most of the variables of the system (frequency, voltage…).

As a potential answer, new storage technologies emerge and present new disruptive features, compared to conventional storage, thus opening possibilities for new services:

- Very few restrictions in localization
- Very short response time (1 sec or less)
- Efficiency (>80% for round-trip cycle)

However, there are barriers in regulation or market design that prevent realization of the full value of these new technologies, for example:

- Short response time not valued.
- Multiple-services on a single asset difficult to implement when mixing the competitive domain (market balancing) and the regulated domain (investment deferral).

Purpose:

This workgroup is focused on electrical energy storage technologies featuring altogether few restrictions in localization, short response time and high efficiency (for example, electrochemical batteries, supercapacitors, flywheels…). We will refer to them as EES.

This workgroup aims at identifying barriers in regulation and market design that prevent realization of all the value of EES.

Deliverables:

- D1 : Identify possible services of EES taking into account their specific features (fast, localizable, efficient), and map storage technologies to services
- D2 : Map services of EES to existing value streams in current regulation & market designs, and identify services currently lacking value stream, or encountering limitations in existing value streams.

Methodology :

- Regarding D1, use not only existing material for existing services but also anticipate future system services such as fast primary reserve, synthetic inertia, parallel grid forming or opportunities related to products structuring for energy/capacity/balancing markets.
- Regarding D2, survey not only TSOs but also DSOs, market parties and the manufacturers of storage technology that have been confronted to lack of value streams or limitations in the existing value

streams. Their obvious interest in the overall objective should motivate their participation. Recommendation from positive experiences where proper incentives have been implemented to foster EES development will also be part of this survey.

Format of the deliverables:

- Publication on web site
- Publications in CIGRE conferences and in other relevant conferences
- Final report (Technical Brochure) and supporting material

**Reference Schedule** :

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| • Approval of Terms of Reference | Q4 2016 |
| • Recruit members and setup work plan | Q2 2017 |
| • Deliverable D1 | Q2 & Q3 2017 |
| • Deliverable D2 | Q4 2017 & Q1 2018 |
| • Final report | Q1 2018 |

**Comments from Chairmen of SCs concerned** :

**Approval by Technical Committee Chairman** :
**Date** : 17/01/2017

## Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

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| **1** | Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network. |
| **2** | The application of advanced metering and resulting massive need for exchange of information. |
| **3** | The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation. |
| **4** | The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation. |
| **5** | New concepts for system operation and control to take account of active customer interactions and different generation types. |
| **6** | New concepts for protection to respond to the developing grid and different characteristics of generation. |
| **7** | New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control. |
| **8** | New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics. |
| **9** | Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network. |
| **10** | An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future. |

## Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

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| **1** | The electrical power system of the future |
| **2** | Making the best use of the existing system |
| **3** | Focus on the environment and sustainability |
| **4** | Preparation of material readable for non technical audience |