

**CEER**

**Council of European  
Energy Regulators**



Fostering energy markets, empowering **consumers**.

---

**CEER Memo on**

**Development and Regulation of  
Electricity Storage Applications**

**Ref: C14-EQS-54-04  
21 July 2014**



## 1 Introduction

Due to the increased penetration of unpredictable renewable energy source (RES) generation units, power systems are currently subject to major changes. More flexibility is needed on both the supply and demand sides to cope with new challenges, especially intermittency and low schedulability.

For this reason, CEER has begun looking at the different regulatory arrangements around electricity storage applications across Member States, in the context of their possible function as flexibility tools.

As a first step, we have carried out some preliminary research aimed to understand how storage applications are regulated and managed in a liberalised energy market. Information was provided for this exercise by 17 CEER members. When undertaking our analysis, we have considered both conventional storage (i.e. hydro-pumping) and electrochemical storage (e.g. batteries). This has allowed us to understand the viability ranges of different storage technologies' depending on the type of application (e.g. centralised storage vs. distributed storage).

This short memo on “Development and Regulation of Storage Applications” summarises our initial work on this issue and our key findings on:

- the most prominent storage technologies by installed capacity;
- which market actors own the storage facility and what it is used for; and
- the legal framework for storage facilities and the main drivers of storage in the future.

## 2 Key findings

### Storage overview

When assessing the different storage technologies in operation in Europe at the end of 2012 and the expected increase in storage in the next 5 years, we conclude that hydro-pumping storage is, currently, the predominantly used technology. Furthermore, this is not expected to change significantly in the coming years in terms of power and energy capacity. Other technologies will still be utilised (e.g. flywheels, compressed air electricity storage –CAES– and electrochemical storage) but even if they increase in number, they will constitute less than 3% of power installation and the increase in energy capacity will be negligible. For example, electrochemical storage will increase by up to 100 MW with new demonstration



projects, while hydro-pump represents about 37 GW in storage capacity in the countries covered by the analysis.

Of course, the picture drawn above for the future can change, even sharply, in presence of breakthrough technologies or strong decrease of cost of electrochemical storage, thanks also to the development of other sectors that may improve weight, size and performance of batteries as well as their costs (mainly batteries for electric vehicles and for ICT mobile devices).

### **Ownership**

Regarding the ownership of storage facilities, we can conclude that in the majority of cases, storage is owned by generators, although network operators can to some extent own storage facilities in some Member States.

In the majority of countries, storage can provide services to network operators and generators. The main users of storage are the facility owners themselves. NRAs noted that the major drivers of storage in the next five years will be RES penetration and time shift, frequency regulation and maximisation of profits (for generators).

### **Legal framework**

The legal framework for governing storage is identified at European level in the 3<sup>rd</sup> Package Electricity Directive<sup>1</sup> but there are, at national level, other laws under development which will regulate electricity storage application.

Where it is regulated, the regulation is done within the services market. In some cases (demonstration projects for electrochemical storage technology application), storage systems are regulated as infrastructure, but regulators set disclosure obligations on network operators in order to disseminate knowledge among market players on this new technology.

---

<sup>1</sup> [Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009](#) concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC



### **Drivers for the next five years**

Although there may be different reasons for the development of electricity storage in different Member States (according to national situations e.g. level of installed renewable energy sources and generation portfolio), two main drivers have been identified:

1. RES penetration, in order to stabilise the grid and avoid congestions; and
2. Time shift, for the most part to maximise generators' profits from price arbitrage across time, or to reduce electricity costs on the end-use side or peak shaving.

### **Conclusions**

CEER plans to continue to examine this issue, in particular as it relates to flexibility. In addition, the expected increase in distributed generation and so-called “prosumers” being able to inject energy into the systems means that a deepened understanding and assessment of these tools is important.

We will therefore continue to consider these questions across our work, including on the role of DSOs, demand response, generation adequacy and commercial and regulatory arrangements for markets going forward (rf. “[ACER Public Consultation on European Energy Regulation: A Bridge to 2025](#)”).



## **Annex – CEER**

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. Through CEER, a not-for-profit association, the national regulators cooperate and exchange best practice within and beyond Europe's borders. CEER includes national regulatory authorities from 33 European countries (the EU-28, Iceland, Norway, Switzerland, FYROM, Montenegro and growing).

One of CEER's key objectives is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market that works in the public interest. More specifically, CEER is committed to placing consumers at the core of EU energy policy. CEER believes that a competitive and secure EU single energy market is not a goal in itself, but should deliver benefits for energy consumers.

CEER works closely with (and supports) the Agency for the Cooperation of Energy Regulators (ACER). ACER, which has its seat in Ljubljana, is an EU Agency with its own staff and resources. CEER, based in Brussels, deals with many complementary (and not overlapping) issues to ACER's work such as international issues, smart grids, sustainability and customer issues. European energy regulators are committed to a complementary approach to energy regulation in Europe, with the Agency primarily focusing on its statutory tasks related to EU cross-border market development and oversight, with CEER pursuing several broader issues, including international and customer policies.

The work of CEER is structured according to a number of working groups and task forces, composed of staff members of the national energy regulatory authorities, and supported by the CEER Secretariat.

This report was prepared by the EQS Task Force of CEER's DSO Working Group.