

**FSR Policy Workshop**

# Renewables Penetration and System Flexibility

**29 November 2024**

Theatre - Badia Fiesolana, Via dei Roccettini 9 - San Domenico di Fiesole (Fiesole, Florence)

*Scientific Director:***Alberto Pototschnig** | Florence School of Regulation / Robert Schuman Centre for Advanced Studies / European University Institute*Organiser:***Elena Iorio** | Florence School of Regulation / Robert Schuman Centre for Advanced Studies / European University InstituteJoin Zoom Meeting: <https://eui-eu.zoom.us/j/99757199592?pwd=yimXDSYoZAYUAzwquTAcf2NcJbX0KW.1>

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## Introduction

The European Union has committed to ambitious renewable-penetration targets. They entail a share of renewable-based generation in final electricity consumption of around 70% by 2030. Most of the new renewable-based generation capacity will be provided by wind-farms and solar PV plants. The production of these plants is highly variable, depending on meteorological conditions (wind speed and solar irradiation), less predictable than the production of conventional plants and cannot be relied upon to be available when most needed.

The penetration of larger shares of wind and solar PV generation therefore requires the system to become more flexible, i.e. ready to absorb greater variations in electricity injections in the grid, even at short notice.

This is a challenge that has been identified already years ago and policies and measures have been put in place to promote the development of flexibility resources and their availability for the system. At the same time, technological development and digitalization are allowing a greater range of flexibility resources to be offered in the market. An efficient short-term market will provide the correct price signals to activate flexibility resources to balance the variation in residual demand, i.e. the difference between total demand and the part which can be met by non-dispatchable renewable-based generation.

This is recognized by the Regulation reforming the electricity market, when it acknowledges that “*well-functioning and efficient short-term markets are a key tool for the integration of renewable energy and flexibility sources in the market and facilitate energy system integration in a cost-effective manner*”<sup>[1]</sup>.



This Regulation also defines, for the first time in EU legislation, ‘flexibility’ as “*the ability of an electricity system to adjust to the variability of generation and consumption patterns and grid availability, across relevant market timeframes*”[\[2\]](#). Moreover, it introduces a periodic assessment of the flexibility needs of the system, to be conducted by the National Regulatory Authority (NRA) of each Member State at national level and by the EU Agency for the Cooperation of Energy Regulators (ACER) at Union level. In this context, ACER shall assess the introduction of shorter-term products for flexibility, flexible network assets and connections, and better prequalification requirements for participation in the balancing markets[\[3\]](#).

Based on NRAs’ reports, each Member State shall define indicative separate quantifiable national objectives for demand-side response and energy storage based on available capacity and develop a plan for delivering these objectives considering all non-fossil flexibility sources with the most cost-efficient solutions, all time frames, and the availability of cross-border capacity.

The focus is therefore on promoting non-fossil flexibility sources, with demand response and energy storage attracting much of the attention, to the extent that the new market design provisions encourage Member States which apply capacity mechanisms to consider enabling the development of demand response and energy storage by introducing additional criteria or features in the design of those mechanisms, ensuring that the product design, including participation requirements, are market-based and do not impose any undue barriers on such resources. When such measures are insufficient or where capacity mechanisms are not applied, Member States may apply flexibility support schemes consisting of payments for the availability of capacity of non-fossil flexible resources, including charging services for electric vehicles or hydro with reservoir and/or pumping[\[4\]](#). The new provisions also include detailed criteria for such support schemes[\[5\]](#).

The participation of demand response in providing flexibility requires smart meters to be installed.

Already the Clean Energy Package recognised the importance of demand response for the future electricity system and envisaged that a network code could be developed on demand response, including rules of aggregation, energy storage and demand curtailment[\[6\]](#).

In May 2024, ENTSO-E and the EU DSO Entity submitted to ACER the joint proposal for the Network Code on Demand Response, on the basis of the Framework Guideline published by ACER in December 2022. The Network Code aims at facilitating the integration of demand-side flexibility into the transmission and distribution system services. It covers not only demand response, but also energy storage, distributed generation and demand curtailment, it also provides rules on aggregation.

At the same time, and more generally, network tariffs should incentivise transmission and distribution system operators to use flexibility services through further developing innovative solutions to optimise the existing grid and to procure flexibility services, in particular demand response or storage.

Finally, the use of electrolysers to absorb excess (renewable) electricity to produce (renewable) hydrogen has been referred to as a form of energy storage and flexibility[\[7\]](#), even though not the most obvious form of demand response. In any case, no mention to it is made in the Framework Guideline developed by ACER, or in the proposed Network Code submitted by ENTSO-E and the EU DSO Entity.

In this context, this Workshop will discuss a vision for the role of flexibility resources in the future electricity sector, in terms of how they will be attracted to and remunerated in the market, and the relationship between flexibility resources procured and used at distribution and transmission levels, the role of aggregation to enable distributed flexibility resources to participate in flexibility markets, and the role of electrolysers for the use of surplus (renewable) electricity to produce (renewable) hydrogen to provide flexibility to the electricity sector.

For this purpose, the Workshop will be structured in three sessions:

- **Session I**, in the morning, will focus on how flexibility resources will be attracted and remunerated, through the existing electricity markets or through the use of specific market based mechanisms (e.g. capacity mechanisms), and the relationship between TSOs and DSOs in procuring and managing flexibility resources;

- **Session II**, also in the morning, will explore the role of aggregation, and in particular the relationship between the aggregators, the flexibility resource providers, their electricity suppliers and, possibly, other entities operating in the electricity markets;
- **Session III**, in the afternoon, will look at the contribution that power-to-X facilities, and, in particular electrolysers, could make in providing flexibility to the electricity system.

### **Sustainability assessment**

*The FSR assesses the sustainability and carbon footprint of all its Workshops of the Regulatory Policy Workshop Series. This Workshop is run 'in presence' to promote more effective interaction and discussion. Participants travelling to Florence by car or by air will be encouraged to offset any carbon emissions related to their travel. It is considered that, in this way, a suitable balance is achieved between the effectiveness of the policy dialogue and the net carbon footprint of the event.*

[1] Recital (13) of Regulation (EU) 2024/1747 of the European Parliament and of the Council of 13 June 2024 amending Regulations (EU) 2019/942 and (EU) 2019/943 as regards improving the Union's electricity market design

[2] Article 2(79) of Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast), as modified by Article 2(2)(b) of Regulation (EU) 2024/1747 of the European Parliament and of the Council of 13 June 2024 amending Regulations (EU) 2019/942 and (EU) 2019/943 as regards improving the Union's electricity market design.

[3] Article 19c of Regulation (EU) 2019/943, as modified by Article 2(9) of Regulation (EU) 2024/1747.

[4] Article 19e of Regulation (EU) 2019/943, as modified by Article 2(9) of Regulation (EU) 2024/1747.

[5] Article 19f of Regulation (EU) 2019/943, as modified by Article 2(9) of Regulation (EU) 2024/1747.

[6] Article 58(1)(e) of Regulation (EU) 2019/943.

[7] For example, Article 1(5) of Directive (EU) 2024/1788, refers to the "*establishment of a Union-wide interconnected hydrogen system contributing to the long-term flexibility of the electricity system*".

## Draft Programme

- 09.00 – 09.15 *Welcome and introductory remarks*  
**Leonardo Meeus** | Florence School of Regulation
- Introduction to the Workshop*  
**Alberto Pototschnig** | Florence School of Regulation
- 09.15 – 09.30 *Flexibility in the future electricity market: the policy perspective*  
**Mathilde Lallemand** | DG ENER

### **SESSION I – HOW FLEXIBILITY IS AND WILL BE ATTRACTED AND TRADED IN THE ELECTRICITY MARKET**

Moderator: **Catharina Sikow-Magny** | Florence School of Regulation

- 09.30 – 09.40 *Opening presentation*  
**Ellen Beckstedde** | Florence School of Regulation
- 09.40 – 10.25 *The market for flexibility*  
**Olivia Alonso** | ENTSO-E  
**Yvonne Ruwaida** | EU-DSO Entity  
**Mathieu Fransen** | ACER
- 10.25 – 10.45 *Roundtable of representatives of FSR Donors*  
**Torsten Knop** | EOn  
**Rafael Gomez Elvira** | Omie  
**Christian Baer** | Europex
- 10.45 – 11.15 Coffee Break

### **SESSION II – THE ROLE OF AGGREGATION IN PROMOTING DECENTRALISED FLEXIBILITY IN THE ELECTRICITY MARKET**

Moderator: **Alberto Pototschnig** | Florence School of Regulation

- 11.15 – 11.25 *Opening presentation*  
**Nicolò Rossetto** | Florence School of Regulation
- 11.25 – 12.10 *Aggregators, decentralised flexibility providers and suppliers*  
**Mathilde Chareyron** | smartEn  
**Rita Mota** | Eurelectric  
**Hélder Milheiras** | ERSE
- 12.10 – 12.30 *Roundtable of representatives of FSR Donors*  
**Alain Taccoen** | EDF  
**Sabrina Ried** | Transnet BW
- 12.30 – 13.45 Lunch Break

## SESSION III – POWER-TO-X AS A SOURCE OF FLEXIBILITY FOR THE ELECTRICITY SECTOR

Moderator: **TBC** | Florence School of Regulation

- 13.45 – 13.55 *Opening presentation*  
**James Kneebone** | Florence School of Regulation
- 13.55 – 14.25 *The future of power-to-X and its role in providing flexibility to the electricity sector*  
**Daniel Fraile** | Hydrogen Europe  
**Piotr Kuś** | ENTSOG
- 14.25 – 14.45 *Roundtable of representatives of FSR Donors*  
**Giulia Branzi** | Snam  
**Scarlett Mertin** | GIE  
**Alain Taccoen** | EDF
- 14.45 – 15.00 *Concluding remarks*  
**Leonardo Meeus** | Florence School of Regulation  
**Alberto Pototschnig** | Florence School of Regulation

### Participants

<b>Freek Akkermans</b>	Netbeheer Nederland, Netherlands
<b>Olivia Alonso Garcia</b>	Red Electrica España, Spain
<b>Nicola Bacigalupi</b>	Shell, Italy
<b>Christian Baer</b>	Europex, Belgium
<b>Ellen Beckstedde</b>	European University Institute, Italy
<b>Giulia Branzi</b>	SNAM, Italy
<b>Astrid Brunt</b>	Statnett, Norway
<b>Martin Carbonez</b>	TotalEnergies, Belgium
<b>Mathilde Chareyron</b>	Sympower, Netherlands
<b>Marco Foresti</b>	ENTSO-E, Belgium
<b>Daniel Fraile</b>	Hydrogen Europe, Belgium
<b>Mathieu Fransen</b>	ACER, Slovenia
<b>Rafael Gomez Elvira</b>	OMIE, Spain
<b>Leigh Hancher</b>	European University Institute, Italy
<b>Tom Howes</b>	European Commission, Belgium
<b>Daniel Kirschen</b>	European University Institute, United States of America

<b>James Thomas Kneebone</b>	European University Institute, Italy
<b>Torsten Knop</b>	E.ON, Germany
<b>Timm Krägenow</b>	Tennet Holding, Belize
<b>Piotr Kus</b>	European Network of Transmission System Operators for Gas, Belgium
<b>Lallemand Dupuy Mathilde</b>	European Commission, Belgium
<b>Emma Solène Menegtti</b>	European University Institute, Italy
<b>Scarlett Ann Mertin</b>	Gas Infrastructure Europe, Belgium
<b>Hélder Milheiras</b>	ERSE, Portugal
<b>Michael Mollner</b>	Netz Niederösterreich GmbH, Austria
<b>Rita Mota</b>	EDP, Portugal
<b>AnnMarie O'Brien</b>	EirGrid, Ireland
<b>Luis Ignacio Parada</b>	Enagas, Spain
<b>Longjian Piao</b>	TenneT, Germany
<b>Alberto Pototschnig</b>	European University Institute, Italy
<b>Massimo Ricci</b>	ARERA, Italy
<b>Sabrina Ried</b>	TransnetBW, Germany
<b>Susanne Rompel</b>	E.ON, Germany
<b>Belmans Ronnie</b>	EnergyVille, Belgium
<b>Nicoló Rossetto</b>	European University Institute, Italy
<b>Yvonne Ruwaida</b>	Vattenfall Eldistribution, Sweden
<b>Isa Ryspaeva</b>	TenneT, Germany
<b>Fabio Gaetano Santeramo</b>	European University Institute, Italy
<b>Joerg Spicker</b>	Swissgrid, Switzerland
<b>Giusi Squicciarini</b>	Shell, Italy
<b>Noemi Szabo</b>	ENTSO-E, Belgium
<b>Alain Taccoen</b>	Electricity Of France - European Affairs, France
<b>Patrick van Dongen</b>	Netbeheer Nederland, Netherlands
<b>Simon Vanhove</b>	Gent University, Belgium
<b>Gérald Vignal</b>	RTE, France
<b>Andrea Villa</b>	Enel, Italy
<b>René Wollenschein</b>	TenneT, Germany