Digitalization and decentralization: How to unleash the full potential of this synergy?

Interactive discussion among IEA TCPs and outstanding projects
web meeting – 14/09/2021 11.00 - 14.15 Central European Time

Framework

This web meeting is organized in the frame of the Integrated Electricity System Coordination Group (IESCG) of the End-Use Working Party (EUWP) of the IEA. The Coordination Group supervises the activities of three electricity-related TCPs and aims at fostering interaction across the entire TCP community, to identify and develop synergies and collaborations around common interests. Of particular interest for the IESCG is the integration between the power system and the other energy vectors to enhance stability, efficiency, and circularity. Distributed resources and digitalization is of special concern also for the Demand-Driven Electricity Networks Initiative (3DEN)[1] aimed at developing analysis and actionable policy guidance on how to use digitalisation to access and effectively use distributed energy flexibility potentials, promoted by the Italian ministry of Ecological Transition and managed by the IEA.

Discussion background

Along the lines of the IEA net zero report[2], the increasing electrification and more decentralized deployment of renewable power generation require the development of **reinforced and smarter electricity networks**, able to accommodate both centralized and decentralized elements. The massive integration of smart meters, the availability of interfaces with the user's devices, the deployment of distributed PV, behind the meter batteries and EVs, allow the implementation of new business models and aggregation schemes (e.g. energy communities) that exploit the flexibility of the end-users. However, the multiplication of actors having different interests and skills along the electricity value chain may expose to **unexpected and yet unknown risks** when external factors (economic, social, environmental, malicious, etc.) align to create conditions that can jeopardise the system stability. Digitalization is, on the one hand, a key to unlock the **full potential of customers** having a flexible energy consumption to contribute to the effective integration of higher levels of RES, and on the other hand, a very strong element to **monitor the effects of the policies** that enable such evolution (e.g. the effects of P2P trade on the state of the system in the short and long term). Digitalization paves the way for **virtualization and digital representation** of systems and devices enabling flexible ICT architectures with increased resilience and recovery strategies. IT techniques, including semantic data models, Big Data management and Artificial Intelligence, will enable the segmentation, optimization and automation of processes for all system stakeholders. Through digitalization, it will be possible to **facilitate services** and achieve full integration throughout the energy system. Digitalization can foster **efficiency** throughout the system: system **observability and controllability** allows stable and optimal working conditions, the significant **energy storage** capacity of data centers can be used to foster system flexibility and their **waste heat** can be adequately injected into local or district heating systems. A net zero emissions energy system will strongly rely on local resources to complement the central bulk generators connected to energy highways, but their potential can be unleashed only if digital solutions are adequately developed to ensure reliability, efficiency, and resilience.

Objectives of the meeting and discussion paths:

The meeting aims at exchanging experiences among TCPs about the potential role of digitalization in the integration of distributed resources, to enhance the efficiency within the integrated energy system and to unleash the potential for variable RES integration and system decarbonisation. Starting from a scene setter by 3DEN about the recent developments of digital solutions for distributed energy systems, the discussion

[1] https://www.iea.org/programmes/digital-demand-driven-electricity-networks-initiative
[2] https://www.iea.org/reports/net-zero-by-2050

will involve 7 TCPs to debate about the different perspectives of digitalization in their respective domain of activities, identifying the main challenges and opportunities to foster the integration of distributed resources. Living experience from projects will also be discussed. A keynote speech will be delivered by the European Technology and Innovation Platform on integrated energy system (ETIP SNET).

Programme

TUESDAY 14 SEPTEMBER 2021
11.00 – 14.15 CENTRAL EUROPEAN TIME
WEB PLATFORM

<table>
<tr><td>11.00 – 11.10</td><td colspan="2">Introduction and workshop objectives
Michele de Nigris – EUWP VC</td></tr>
<tr><td>11.10 – 11.30</td><td colspan="2">Keynote speech:
Inigo Azpiri – Vice Chair ETIP SNET</td></tr>
<tr><td>11.30 - 11.45</td><td colspan="2">Scenario setting:
Pauline Henriot – IEA – 3DEN</td></tr>
<tr><td>11.45-12.15</td><td colspan="2">The experience from ongoing projects:
“A business case for managing volatile renewables in the energy system” Erwin Leeuwis
Project BEYOND - Pedro Crespo del Granado – NTNU – NO (tbc)</td></tr>
<tr><td>12.15 – 13.45</td><td colspan="2">Guided discussion among TCPs around several crosscutting topics – Moderators Vida Rozite – IEA; Michele de Nigris – RSE

Challenges and actions with unlocking flexibility potentials of distributed energy resources.
Actions to facilitate new business models and investments.
Key policy or regulatory changes needed to accelerate progress.
Needs and risks of distributed actors having different interests impacting on the system – challenges of asset coordination and signals.
Needs to enable integrated solutions, systems efficiency, better utilization of assets and resources.
Areas where TCP collaboration could bring added value
Interventions from TCPS:
PVPS: Daniel Mugnier; Roland Bründlinger; Gerd Heilscher
ISGAN: Luciano Martini; Mihai Calin
ECES: Teun Bokhoven
4E EDNA: Steve Beletich
EBC: Søren Østergaard Jensen
USERS – TCP: David Shipworth
DHC: Ralf-Roman Schmidt</td></tr>
<tr><td>13.45 – 14.15</td><td colspan="2">Key lessons learned and impact</td></tr>
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- Registrations:To participate use the following link: https://us02web.zoom.us/webinar/register/WN_FNT4lcjTTISC79BiHLcM7w