



A novel smart grid architecture that facilitates high-RES penetration through innovative markets towards efficient interaction between advanced electricity grid management and intelligent stakeholders

Final e-Demo Day Event

Concluding Remarks

Dr. Prodromos Makris (ICCS/NTUA)

Senior Researcher

Institute of Communications & Computer Systems / National Technical University of Athens



This project has received funding from the **European Union's Horizon 2020 Research and Innovation programme** under Grant Agreements No **863876**.

The information and views set out in this presentation are those of the author(s) and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein.

September 26, 2022, Halden, Norway

FLEXGRID recommendations (technical level)

- **Coordinated decision making** (e.g. combination of game theory with optimization tools) models to take into consideration all stakeholders' business interests towards **finding optimal equilibrium points that maximize social welfare**.
- **Combine AI/ML-based decision making with classic optimization theory** to deal with complex problems, many types of uncertainties, inherently ambiguous/unknown models and big data supporting thus an **efficient interaction between the aggregator and vast number of end users**.
- Exploit the **cloud-edge computing continuum for many SG applications** → need for deep inter-disciplinary research between power engineers and ICT engineers
- **Combine game theory with AI models** towards dealing with competitive interests of multiple agents and many sources of uncertainty.

FLEXGRID recommendations (policy level)

- ▶ Need for well-designed **regulatory sandboxes at EU level** to simulate the conflicting business interests of multiple stakeholders in energy markets
- ▶ Need for **minimum interoperability and standardization** towards scaling up and replicating already existing solutions (cf. too many types of end devices, communication protocols, data formats, H/W technologies, etc.)
- ▶ Regulation updates are required in several EU countries for the:
 - ▶ **coordination between the energy supplier/retailer and the aggregator**
 - ▶ **integration of local (DN-level) flexibility markets with existing TN-level markets**
- ▶ Incentives should be given to aggregators in order to **provide novel personalized services to the end users** → need for inter-disciplinary research between power engineers and social/behavioral scientists
- ▶ **Communication protocols should be privacy-preserving and incentivize truthful bidding** in order to avoid market manipulation phenomena and support market uptake in both B2B and B2C contexts.



Thank you!

Prodromos Makris (ICCS)
prodromosmakris@mail.ntua.gr

Visit our website!

<https://flexgrid-project.eu/>

YouTube channel:

https://www.youtube.com/channel/UCEpd_rFhiltkGTi7dmNL--yg

GitHub area:

<https://github.com/FlexGrid>



This project has received funding from the **European Union's Horizon 2020 Research and Innovation programme** under Grant Agreements No **863876**.

The information and views set out in this presentation are those of the author(s) and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein.