ELECTRA REX

A Researcher Exchange Programme for Smart Grids

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FUTURE ELECTRICITY MARKET STRUCTURE TO ENSURE LARGE VOLUME OF RES

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In the 2030+ power system, it is expected that generation will shift from mostly few large central generators to many smaller distributed generators. The local fluctuations will increase the activation of reserves. Flexible operation of the networks requires radically new control schemes, which enable grid operators to ensure dynamic balance and stability in a future power system with a high share of decentralized generation. Variable renewable energy sources can affect the design of ancillary services markets in the following ways: the variability and uncertainty of wind and solar energy increases requirements for various ancillary services, affecting the scheduling and pricing of those services. Their impacts vary depending on system conditions, which make the ancillary services, demands difficult to be generalized across timescales and systems [1]. Allowing variable renewable energy and demand to participate in the ancillary service markets can offer more supply to the market, but could offer challenges based on the unique characteristics of variable resources. Therefore enhanced the market design is needed to facilitate EU-wide member state centric approach to renewable deployment.

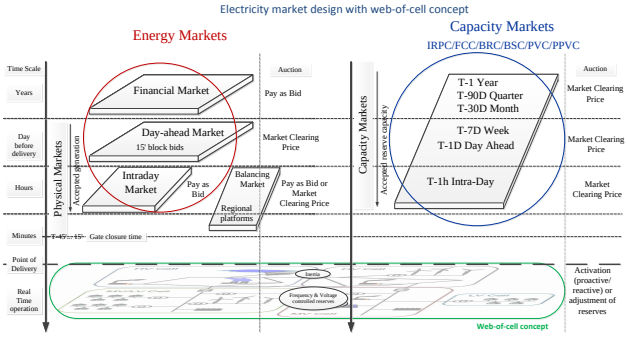

Figure 1. Electricity market design with WoC concept

During the ELECTRA Research Exchange call at the University of Strathclyde, a new market design was defined based on new way of power system operation development, namely Web-of-cell concept, with set of rules for future Electricity market structure, taking account network codes, legislation and directives to ensure RES integration targets.

Figure 2. At Power System Laboratory, University of Strathclyde, United Kingdom

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REFERENCES

[1] A. Obushevs, I. Oleinikova. Market Design for Electricity Ensuring Operational Flexibility // 5th International Conference on Power Engineering, Energy and Electrical Drives (PowerEng'2015) Riga, Latvia, 11-13 May 2015