Coordinated Operation of Integrated Energy Systems - DTU Orbit (20/10/2019)

**Coordinated Operation of Integrated Energy Systems**

The project is to design the 100% renewable based Danish energy system with P2H and P2G, and develop market framework and coordinated operation strategies for the renewable based integrated energy system. The 100% renewables based Danish energy system with thermal and gas storage will be designed in order to maximize the social welfare and improve the cost efficiency. Significant energy storage technologies will be analyzed with specific focus on Danish potentials for using P2G and thermal energy storage technologies in the overall energy system. The impact of integration of electricity, heat, gas and transport sectors on the electric power system will be studied and the flexibility and ramping requirements will be quantified to ensure secure and reliable operation of the integrated system. A new market will be developed to ensure sufficient flexibility and ramping capability in the integrated energy system. Optimal short term dispatch strategies and online control will be developed to ensure the security of the whole system with the least cost. The business models for renewable generation plants coupling with energy storage will be developed. The developed energy system, market and coordination operation strategies will be demonstrated by real time co-simulation in PowerLabDK.

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