Application of non-conventional computational intelligence methodologies to highly distributed electricity networks: Balearic Islands Case Study

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The contribution of renewable energies to the power grid in EU is constantly increasing. Forecasting power plants generation (conventional and renewable) and energy demand will be of a fundamental importance to ensure the stability of the power grid and the energy trading against variability of the solar power production and energy demand at different levels of renewable energy and accumulation penetration. In this talk, an example of the Iberian electricity market will be used to introduce the Balearic Islands extra-peninsular power grid. In continuation, the studies currently being undertaken in the framework of the collaboration with the Electrical Systems Unit of IMDEA Energy Institute will be explained. The main objective is to analyze generation and demand patterns in order to develop new forecast methodologies for their application in the energy field. The proposed methodologies will then serve as a basis for the study and development of the tools necessary to estimate the state of the power grid, to evaluate stability parameters and to recommend renewable penetration levels. Finally, some preliminary forecasting results will be shown for the PV generation.