Electric Energy Systems
University Enterprise Training Partnership

Re-thinking the regulation of the power system to integrate large shares of renewables and distributed energy resources

February 15-17th, 2017

Organizer

Universidad Pontificia Comillas, Madrid, Spain

Location

Instituto de Investigación tecnológica.

Universidad Pontificia Comillas.

C/Santa Cruz de Marcenado, 26, Madrid

Seminar room.

Coordinators

Dr. Carlos Mateo Domingo

Dr. Luis Olmos Camacho

Description of the course

The power systems are evolving integrating higher shares of renewable energy sources (RES), and incorporating new distributed energy resources (DER) such as electric vehicles, storage, natural gas distributed generation and demand response solutions. This course will cover how the regulation of power systems should evolve, incorporating new innovative aspects and undergoing changes in some others, to deal with the challenges posed by the features exhibited by RES generation and DER.

Specifically, markets for the provision of certain products may need to develop, while existing ones should evolve to for example take into account large wind farms connected to the system and the observability of small photovoltaic units. In this regard, both the need for market based capacity remuneration mechanisms and their design if implemented will be analyzed to enable that, in this new scenario, the regulator can ensure that there is enough firm capacity to cover load existing in the power system in the medium and long term. Balancing services, whose provision may be compulsory or organized in markets (depending on each country regulation), also need to evolve to come up with an appropriate design of the balancing product and the pricing rules applied to it, as well as the imbalance pricing rules. Besides, balancing arrangements need to take into account that uncertainty (traditionally associated with demand) can also come from the generation side, in the case of renewables. In parallel with all this, the access of new active energy resources, namely RES generation and demand response, to these markets must be facilitated.

Mechanisms for the support of renewable generation may need to remain in place to favor the development of new technologies, and also achieve their deployment if we do not manage to make system wide decarbonization mechanisms like the ETS work properly. However, achieving an efficient support may probably call for organizing these support schemes as markets that, while fulfilling their purpose, interfere as least as possible with others.

Finally, the regulation of the distribution network and the distribution activity will be discussed, as in many cases these networks are the final location for distributed energy resources, being the Distribution System Operators responsible for connecting them to the system, and for dealing with the issues that arise during the operation of their systems.

Contents and schedule

Day 1		15 February		
8:00	9:00	Registration	Carlos Mateo	Universidad Pontificia Comillas
9:00	10:30	Introduction A power sector in transition Regulatory recommendations	Tomás Gómez	Universidad Pontificia Comillas
10:30	11:00	Break		
11:00	12:30	Market design & renewables I: Implementing market mechanisms for the support of renewable generation Consideration of the transmission grid in relevant markets	Luis Olmos	Universidad Pontificia Comillas
12:30	14:00	Lunch		
14:00	15:30	Market design & renewables II: Bidding formats, pricing and timeline of markets	Pablo Rodilla	Universidad Pontificia Comillas
Day 2		16 February		
9:00	10:30	Capacity remuneration mechanisms I: Cross-border participation and international experiences	Fulvio Fontini	University of Padua (Italy)
10:30	11:00	Break		
11:00	12:30	Capacity remuneration mechanisms II: Resource Adequacy with High Penetrations of RES-E and Distributed Energy Services	Paolo Mastropietro	Universidad Pontificia Comillas
12:30	14:00	Lunch		
14:00	15:30	Balancing I: Bringing demand flexibility as an alternative for RES integration	Pablo Frías	Universidad Pontificia Comillas
15:30	16:00	Break		
16:00	17:30	Balancing II: Participation of RES in balancing markets. Requirements and Barriers.	Plácido Ostos	Iberdrola
Day 3		17 February		
9:00	10:30	Distribution systems I: Integration of RES and DER	Rafael Cossent	Universidad Pontificia Comillas
10:30	11:00	Break		
11:00	12:30	Distribution systems II: The Italian experience	Elena Fumagalli	Politecnico di Milano (Italy)
12:30	14:00	Lunch		
14:00	15:30	Distribution systems III: The experience in U.S.	Bryan Palmintier	NREL (U.S.)