Wholesale and Local Energy Market Design for Sustainable Development

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Abstract

Over the last ten years there is confluence of environmental policies and technological advancements that have contributed to the massive penetration of renewable energy resources in the power system in many countries along with the development of other distributed energy resources, such as storage, demand response and electric vehicles.

In this presentation I address mainly the organization of the wholesale markets for energy and transmission required to support the emergence of these assets at the edge of the grid and I focus on the challenges of the next generation of energy market design structures. The new challenges energy markets are facing today are related to sustainable development, security of supply, climate change and the transition to a decarbonized economy. The examination of these issues will benefit from the history of restructuring in many jurisdictions including several states in the U.S, Canada and Europe.

I also emphasize the development of the emerging smart grids and local energy markets in the distribution system and the threats to markets arising from governmental policies favoring subsidies over market solutions based on sound economic and engineering principles.

Biography

Dr. Alex Papalexopoulos (M'80–SM'85–F'01) is an authority in energy market design and president and CEO of ECCO International, a specialized energy consulting company, which provides consulting and software services and expert advice worldwide to a wide range of clients such as Governments, Utilities, Independent System Operators and Regional Transmission Operators, Power Exchanges, Regulators, Marketers, Brokers and Software vendors. These services range from strategic planning, particularly industry restructuring and the introduction of competition into traditional utility markets, wholesale and retail electricity market design,

competitive bidding, market trading, public policy analysis, auditing utility practices, market simulation, optimization and computation techniques, renewable energy resource modeling and analysis, demand response and energy conservation, pricing negotiation and strategy to power system analysis studies, system operations and planning, generation and transmission projects, Energy Management Systems (EMS) and software system issues. Over the last twenty Dr. Alex Papalexopoulos has designed some of the most complex energy markets in the world including North and South America, Western and Eastern Europe and Asia.

Prior to forming ECCO International in 1998, Dr. Papalexopoulos was a director of the Pacific Gas & Electric Company's Electric Industry Restructuring Group in San Francisco, California. He received the Electrical and Mechanical Engineering Diploma from the National Technical University of Athens, Greece and the M.S. and Ph.D. degrees in Electrical Engineering from the Georgia Institute of Technology, Atlanta, Georgia. He has published more than 150 hundred papers in refereed scientific journals and conferences and has given numerous invited presentations in leading institutions in the U.S. and other countries. He has organized and trained various organizations in the area of energy market design and chaired numerous panels and special sessions in IEEE. He is the 1992 recipient of PG&E's Wall of Fame Award, and the 1996 recipient of IEEE's PES First Prize Paper Award. He is a Fellow of IEEE for his contributions to Optimal Power Flow and related technologies in electric power systems. In January 2016 he was awarded a honorary doctorate degree from the School of Electrical and Computer Engineering of the University of Patras. Alex is also the major investor, the CEO and the Chairman of the Board of ZOME Energy Networks, a startup company in Silicon Valley specializing in the research, development and commercialization of Demand Response technologies.