Smart Grids and Stable Stand-Alone Electricity Systems: Practice and Implications of using it in Power Supply

Mr. Andreas Kraemer of Ecologic, Germany was the moderator for the course. He introduced the themes of the course highlighting the benefits of smart grids that induce more stability to electricity systems.

Mr. David Hirst of RLTec company in U.K. outlined his company's development of smart grid technologies. He underscored the complexity of the electricity systems in industrialized countries, alluding to the depth and width of its infrastructure which in his view has led to a structural mismatch of centralized electricity supply - prone to occasional blackouts - and decentralized demand. Mr. Hirst presented ideas to enhance both the flexibility and stability of electricity grids through grid capacity enhancement, automatic balancing services, and dynamic utility optimization. Enhanced capacities can be achieved by shifting e.g. thermal storage in households to times of low electricity demand and hence reduce peak demand. Balancing services include refrigerators fitted or retrofitted with a controller that regulates electricity consumption according to grid load/frequency. Utility optimization can be achieved by enhanced real-time pricing of electricity and incentives and rewards for well-timed consumption. Mr. Hirst was also proposing neighborhood and mini-grid electricity trading as contributions to enhanced system flexibility.

Mr Matthew Zaluto of IBM highlighted the benefits of an intelligent utility network. He underlined the trend that market forces are driving utilities to seek new business models to be able to operate with aging assets and workforces, rising energy costs, technological advancements and smart metering and demand response. These forces are increasing the need for greater network reliability. Mr. Zaluto presented the intelligent utility network under development at IBM which is based on the increased interaction between consumer and utility in real time. It will consist of transmission systems with sensors, operational insights, and enhanced switching availability, generation systems with real-time access to plant and fleet information, transparency of generation information, efficient distribution systems with established two-way communication between utilities and customers, and environmental stewardship using enhanced emissions monitoring and tracking. Mr. Zaluto concluded by highlighting the various stakeholder benefits for utilities implementing smart grid technology.

In highly interactive discussions participants raised several questions and made comments on the presentations. Several questions were raised on the applicability of smart grid technology to the electricity systems in developing countries, in particular to stand-alone, off-grid electricity production on the village level. Other questions referred to standards and intellectual property rights for smart grid systems. Mr. Hirst and Mr. Kreamer affirmed the possible adaptation of smart grid solutions for developing country conditions based on more real time demand infornation. Mr. Zaluto pleaded for open standards and mentioned the general difficulty to patent intelligent utility networks.