

6th Power Sector Roundtable
Seminar on deepening power demand side management in the context
of the Chinese power sector reform

The Natural Resources Defense Council (NRDC) held the 6th Power Sector Roundtable (PSR) on May 18th, 2016 with the theme of deepening power demand side management in the context of the Chinese power sector reform. The goal of the 6th PSR is to advance understanding about the opportunities and challenges faced by demand side management in China. The seminar was attended by experts from China Electric Power Research Institute (EPRI), the Energy Research Institute (ERI) of the National Development and Reform Council, China Electricity Council (CEC), Tsinghua University, Shanghai Twenty-One Energy Services Company, and China Energy Storage Alliance (CNESA). The attendees had an in-depth discussion on the market environment and technological pathways for developing demand side management in China.

Background

Chinese electricity consumption is plateauing. Since 2012 and onwards, annual growth has been below 10%. In 2015, overall consumption was up only 0.5% year on year. With growth stagnating, the competition for demand between fossil-fuel generation and renewable energy generation is intensifying. Demand side management (DSM) enhances load flexibility, enabling the electric grid to integrate higher volumes of electricity produced from renewable energy resources, thereby mitigating the deteriorating renewable energy curtailment rates in China.

In addition, the prominent feature of the emerging Energy Internet concept is the two-way communications between the supply side and the demand side of electricity. Changes in the behaviors of electricity consumption as a new grid resource help municipal power grids to tackle the ever-increasing peak loads while avoiding or deferring additional generation and transmission/distribution capacities. Therefore, managing demand side resources is central to the Energy Internet.

Summary and outlook

The main topics discussed during this Roundtable are as follows:

1. Demand-side resources market building

1) Value discovery of demand-side resources and data transparency

Uncertainty in DR pricing. CNESA points out that, provided grid companies are the buyers of demand response, the value of DR to them are the deferral/avoidance of grid asset investments and cuts to grid operating costs. However, the accounting for these benefits are yet to be fully established. Twenty-One Energy Services Company believes that future electricity markets would be able to determine the real economic values of demand response. Professor He Jijiang of Tsinghua University indicates that competitive electricity spot markets are indispensable for the purpose of expanding the deployment of demand response.

Load data. CNESA mentions that the grid companies should share customers' load data with the aggregators as the basis for DR payments. Twenty-One sees load data and the visualization of load shedding as the biggest incentive for customer participation in DR.

2) The standardization of DR products

The domestic DR market is still in the primitive stage. Regulators should focus on the standardization of the load aggregator business models, DR product specifications, DR payment and subsidies, as well as clarifying the list of DR buyers. Clear policies in those regards, or the lack thereof, matter to the long term growth prospects of the demand response market in China.

2. The benefits and technological pathways of DSM

Experts in the Roundtable posit that, in the context of the current electricity production surplus, the greatest propellant for the development of DR is not the need to lower peak loads but the need for valley-filling.

1) Electric vehicles.

EV parking lots with mass charging loads can serve as good demand side resources to feed power to the grid for it to meet peak loads and to provide ancillary services; b) Introducing a peak/off-peak structure to Beijing EV charging rates before the formation of electricity markets can incent EV drivers to charge off-peak to take advantage of the lower tariffs. To do this, retailers can contract with wind generators in Zhangjiakou for the latter to export to Beijing cheap wind power at night. The off-peak rate needs to be designed such that it stays cheap even as it includes transmission and distribution fees paid to the grid. (He Jijiang, Tsinghua University)

2) Large electric heating equipment.

Electric heating equipment, such as electric thermal storages, can not only absorb wind output that peaks at night, cutting wind curtailment, but also substitute electricity for fossil fuels, mitigating the air pollution and greenhouse gas emissions associated with burning coal for heating. (Guo Bingqing, EPRI)

3) Industrial parks.

Manufacturers in industrial parks are permitted by national policies to enter into the power retail and energy services market. (Guo Pingping, CEC)

Zhou Fuqiu, director of the Energy Research Institute of NDRC, provided conclusive remarks to the Roundtable. He believes that the introduction of market into the Chinese electricity sector is irreversible, and that electricity markets are the most critical economic condition for the expansion of demand response. Furthermore, and as has been introduced above, since the backdrop of demand side management in China is not power shortages but the vast markets for valley filling, renewable energy integration, and electricity substitution for coal, the growth potential of DSM in China is indeed considerable. Electricity retailers should double down on their efforts in locating and securing their niches in the electricity markets that are soon to enter into larger scales. In this regard, the electricity retailers are advised against confining themselves to electricity retail; and are encouraged to expand into the energy services market (load aggregators, energy efficiency, etc.). The reason for this observation is that the new retailers possess little advantages over the existing grid companies in terms of sales expertise and networks. For the new retailers, entering into the energy services market is not a mere matter of choice, but a move for survival. Meanwhile, Mr. Zhou says, regulatory agencies need to design implementation mechanisms for demand side management, including binding requirements for all market participants.