Natural Resources Defense Council's DSM Activities
Final Report to the Energy Foundation
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I. Executive Summary

The Natural Resources Defense Council (NRDC) has a long history of promoting energy efficiency in China. With generous support from the Energy Foundation, NRDC established a Demand Side Management (DSM) Technical Center in Beijing at the end of 2008. The DSM Technical Center is an integral part of NRDC's and the China Sustainable Energy Program's (CSEP) goal to help China scale up its capacity to design, administer, implement, and evaluate cost effective energy efficiency programs. The DSM Technical Center is designed to serve as the go-to resource in helping China's central and provincial governments realize their energy efficiency goals. In 2009, the DSM Technical Center mainly focused on its own internal capacity building to bring staff members up to speed on DSM program best practices and U.S. implementation experiences. In 2010, the DSM Technical Center began building on the advancements of previous years to provide hands-on technical assistance, trainings, and policy implementation support in selected provinces and municipalities in China, specifically Hebei, Jiangsu, Sichuan, Beijing, Shanghai, and Chongqing. In 2011, the DSM Technical Center continued its efforts to support the selected provinces and municipalities, and, in particular, reached out to grid companies to help build technical capacity to implement utility-led DSM programs. The DSM Technical Center has also become a more accessible source of information to the Chinese audience by adopting various forms of outreach strategies in 2011. Our goal was to help scale up DSM and efficiency power plant (EPP) implementation in China. This report provides a detail of our activities under Grant 1011-13558 from March 1-December 31, 2011.

NRDC made significant progress in providing customized support to each of the local partners based on the previous and ongoing efforts to identify local needs, and continuing to strengthen relationships with them.

II. Project Progress

NRDC's DSM Technical Center has four objectives related to CSEP's strategy. In order of priority and devoted time and resources, these objectives are to:

- build the capacity of provincial level implementers of Efficiency Power Plants;
- assist China to implement the national DSM regulations and complementary policies and standards,
- support grid companies to build capacity to implement DSM programs; and
- other activities that are either lower priority to CSEP or have high priority, but the lead responsibility is with other organizations.

Our work is carried out in collaboration with CSEP grantees, the Regulatory Assistance Project (RAP), other Best Practice Networks funded by ClimateWorks, and the China-U.S. Energy Efficiency Alliance. Our progress within each of these areas is summarized below.

A. Build the capacity of provincial level implementers of Efficiency Power Plants and Grid Companies

NRDC's activities to build the capacity of provincial implementers fall into three categories: 1) training, 2) implementation support, and 3) information dissemination.

Training

NRDC actively built the capacity and expertise of its DSM Technical Center after its inception to serve as a resource to help its local partners implement DSM/EPP programs. Followed by the internal capacity building phase, the DSM Technical Center staff has been focusing on building the capacity of its local partners to scale up China's DSM/EPP implementation through a series of targeted training activities. Particularly in 2011, the Center successfully reached out to target audiences in different provinces and municipalities to encourage provincial level participation in our training activities: while the three trainings in 2010 were held either in Beijing or Shanghai, in 2011 the six trainings took place in Beijing, Chongqing, Sichuan, Shanghai, and Hainan, respectively. The details on the 2011 training activities are described below.

a. Technical Training Workshop on Energy Efficiency Program Evaluation

On June 3, 2011, the DSM Technical Center, together with the China-U.S. Energy Efficiency Alliance, organized a one-day technical seminar on energy efficiency program evaluation. The main purposes of this workshop were to introduce U.S. experiences and lessons learned in energy efficiency (EE) program evaluation to a specifically targeted group of Chinese audience to increase capacity of professionals in the field, and to assess further needs to bring in international expertise in the related topics.

The workshop provided a platform for both the participants and speakers to have a better understanding on the EE program evaluation practices in the U.S., and also to share ideas on what China could take from the U.S. experiences. The participants took full advantage of having the U.S. experts and held interactive in-depth discussion throughout the workshop.

Workshop speakers included three U.S. experts from Pacific Gas and Electric Company (PG&E) and Department of Energy (DOE). Topics covered energy efficiency evaluation, portfolio optimization and process improvement, and emerging directions in measurement and verification. Approximately 50 participants from six different cities/provinces including Beijing, Hebei, Tianjin, Shanxi, Shandong, Shanghai, Henan, and Hunan, attended the workshop. The affiliation of the participants ranged from national and provincial energy conservation centers, research institutes, and universities to ESCOs. This workshop is significant in that it specifically focuses on evaluating energy efficiency program impact and effectiveness at the portfolio level, which is a practice that has yet to be developed and

adopted in China. The success of the workshop was reflected in the high rating provided by the participants, where 40% of the survey respondents rated the training to be Excellent.

b. Training Workshop on Industrial Energy Efficiency Technology and Management

The DSM Technical Center organized two back-to-back training workshops in Chongqing and Chengdu in July 2011. These trainings have set milestones for the Center to collaborate more closely with the State Grid and provincial governments on capacity building at the local level.

From July 6-8, NRDC held a training workshop on industrial energy efficiency technology and management in Chongqing. The training was co-hosted with the Chongqing municipal government office of energy conservation and the State Grid DSM Instruction Center. The workshops invited Chinese and international experts, and covered topics on fan system optimization and assessment plus measurement and verification (M&V), compressed air system energy efficiency technology and energy savings M&V; motor system energy efficiency technology and energy savings E&V, energy performance contracting and combined heating, cooling, and power cogeneration. Participants included staffers from local industrial enterprises, utility-affiliated ESCOs, energy conservation centers, and research institutes.

This is the first training NRDC has conducted in collaboration with Chongqing since an MOU was signed between NRDC and Chongqing in December of 2010 to support local energy efficiency efforts. Also, collaboration with the State Grid DSM Instruction Center helped encourage utilities' participation from other provinces, which had an important meaning to push forward the implementation of the national DSM regulations. This training was a great start to meet the need for capacity building of the utility-affiliated ESCOs.

During the training workshop, NRDC DSM staff was also interviewed by the Chongqing municipal television. This interview provided an opportunity for NRDC to introduce energy efficiency programs in the U.S. and to discuss how to replicate international best practices in China, especially for those regions with heavy industry, such as Chongqing.

Following the training workshop in Chongqing, NRDC held a technical seminar on industrial energy efficiency technology and management in Chengdu, Sichuan province from July 11-13. The training workshop covered the same topics as in Chongqing, targeting local energy conservation centers and ESCO staff. A total of 164 participants from local energy conservation centers, government agencies, and ESCOs attended the training.

Both of the trainings received highly positive feedback: among those participants who provided feedback, 48% and 45% rated the trainings to be "Excellent" in Chongqing and Sichuan, respectively. The rest of the responses were also positive: 51% and 46% marked "Good" as their overall evaluation on the trainings. Besides the training content, participants were eager to receive further information on energy efficiency and DSM, especially international best practice and case studies regarding new energy efficient technologies, energy management, etc.

c. Training Workshop on Industrial Energy Efficiency Technology and Management

NRDC together with Shanghai Energy Efficiency Center (SEEC), RAP and the Alliance held an international forum on energy efficiency technology and energy savings verification on September 27-29 in Shanghai, which was the second training co-hosted by NRDC and SEEC. The training covered topics on iron and steel industry energy efficiency, building energy efficiency and energy auditing, as well as compressed air system efficiency improvement. On the third day of the training, the participants were given the opportunity of a site visit to a local factory, where an international expert demonstrated energy diagnosis to the participants. The main purpose of the training was to build internal capacity of SEEC and the local entities responsible for EM&V work in Shanghai. More than 60 participants from SEEC, local energy services companies, enterprises, and local universities attended the training and took full advantage of having interactive discussion with Chinese and international experts during the training. The participants were highly satisfied with the training: among the 34 participants who provided feedback, 47% rated the training "Excellent," followed by another 47% who rated it as "Good." It was also found that several participants have been continuously attending NRDC's trainings: 7 out of 34 participants who provided feedback have previously attended one or more NRDC trainings before. This suggests that the participants are benefiting from NRDC trainings and are willing to keep coming back to learn more.

d. Training Workshop on Demand Side Management and Energy Efficient Technology

NRDC has been working closely with utilities in China to help them take active roles in the DSM implementation. In line with this effort, NRDC co-organized a capacity building training workshop with the China Southern Grid in Hainan from October 28 - 29, 2011. Over 80 participants from the China Southern Grid and involved in DSM work within their service area attended the training. The topics of this workshop included a combination of energy efficiency technologies and high-level overview of China's energy efficiency policies and development trends. Mona Yew from the NRDC DSM team gave a presentation on California's energy efficiency/DSM implementation practices with a focus on program evaluation, and Yuqi Li also presented on motor system energy efficiency. The training received highly positive feedback from the participants; similar to the previous trainings, among the 50 participants who provided feedback, 42% rated the training "Excellent," followed by 26% who rated it as "Good." None of the participants had previously attended NRDC trainings, and this workshop was a good start for NRDC to collaborate with the China Southern Grid to help them meet the targets set by the national DSM regulations through capacity building trainings.

e. Training Workshop on Industrial Energy Efficiency Standard

To promote Shanghai local energy efficiency standard development, NRDC and Shanghai Energy Efficiency Center (SEEC) co-hosted a workshop on Industrial Energy Efficiency Standard in Shanghai on December 15, 2011. Experts from China National Institute of

Standardization (CNIS) and Shanghai Energy Standardization Committee (SESC) gave presentations on national energy efficiency standard development and Shanghai EE standard plan in the 12th Five-year period, respectively. The workshop was attended by 56 people from Shanghai government agency, various industry associations, research institutes and universities, energy conservation center, and manufacturers. Both SEEC and SESC expressed strong interest to further cooperate with NRDC on the development of regional energy efficiency standards.

Implementation Support

The best way to help build local capacity is to work alongside the provinces and provide customized EPP implementation support based on the specific local needs and conditions. Below is a summary of NRDC's provincial implementation activities:

a. Chongqing DSM/EPP Implementation Support

NRDC continued collaborating with the Chongqing Municipal Government Office of Energy Conservation to increase local awareness of energy efficiency technologies and to build capacity of technical staff. On March 10, Chongqing held the "Electric Energy Efficiency Technology Forum on DSM" as part of the Western China Electric Energy Efficiency and Smart Building Exhibition. The purpose of the forum was to provide the participants with the opportunity to understand international and China's experiences on energy efficiency technologies. Topics included industry energy management, electric demand side management, energy efficiency financing, electricity energy saving project application process, M&V methodologies, and new technologies and products. The forum was attended by close to 300 people including local electric utilities staff, industry energy management professionals, and ESCOs. NRDC gave a presentation on DSM and the EPP concept, and introduced utility-based DSM implementation model in the U.S. NRDC also distributed the DSM Manual to the forum attendees.

b. Hebei EPP Implementation Support

On May 20, the NRDC DSM team visited the Hebei DSM Center to find out their progress on energy efficiency programs and explore possible collaboration opportunities. Hebei DSM Center introduced their work on the ADB Loan EPP program, and mentioned establishing a measurement and verification center to carry out M&V work. Possible collaboration opportunities where NRDC is to provide corresponding support include: a) assistance to establish the M&V Center, such as qualification, formalities, necessary equipment and personnel requirements; b) policy support after the establishment of the project information management center; c) technical support on EPP project evaluation; and d) assistance to design financing mechanism for EPP projects.

The NRDC DSM team attended the kickoff meeting of Tangshan DSM pilot project on September 1, which is one of the three pilot cities together with Suzhou and Foshan. Hebei DSM Center drafted a research plan to analyze where specifically Hebei's DSM potential lies and how to achieve the potential. NRDC staff provided comments together with a group of

experts and local government officials. Highlights of the discussions include: a) further expanding the research to include implementation action plans beyond just a broad study; b) inviting the local grid company to participate in the project; c) considering incorporating smart grid elements into the work plan; and d) considering how to meet the government's requirements to ensure Hebei actually receives the allocated funding.

In November, NRDC DSM staff paid a visit to Hebei to discuss work plan for 2012 and to find out Hebei's specific needs from NRDC in terms of technical and policy support. In the meeting, Hebei Development and Reform Commission expressed their interest in continuing collaboration with NRDC in the areas of capacity building, DSM financing, new energy efficiency technologies, international communications, etc.

c. Jiangsu DSM/EPP Implementation Support

In March, the NRDC DSM team met with Jiangsu Economic and Information Commission (EIC) to discuss opportunities to support Jiangsu's EPP activities in 2011. Jiangsu (as well as other provinces throughout China) experienced severe power shortage this year and even started curtailing load. Thus, Jiangsu's main focus was load management. However, Jiangsu hopes to receive funding for a municipal DSM pilot project, in which case Jiangsu would like to collaborate with NRDC on the pilot project. Jiangsu EIC asked NRDC to help with a study that Jiangsu EIC was conducting for the NDRC regarding grid company expenditures that can reasonably be allowed in the grid companies' operating budget as per the DSM regulations. NRDC helped gather relevant information on allowable DSM expenses and accounting practices in the U.S.

Separately, the DSM team discussed the project plans of developing a case study on Jiangsu's electric monitoring platform. This project is now receiving lower priority, because, in part, the ESCO that is implementing the platform does not appear to have the in-depth expertise needed to mine the collected data for energy saving opportunities, and Jiangsu does not currently have complementary policy to incentivize the scale-up of the monitoring platform. Nevertheless, NRDC has continued to work with Suzhou EIC on the case study, including reviewing and providing input on the project plans for two potential case study participants. NRDC DSM Center staff also attended a meeting in Suzhou on the Energy Efficiency Star labeling program.

In early August, DSM Center staff visited Jiangsu Research Institute of Building Science Co., Ltd, who took part in NRDC's initiative to integrate the building sector and DSM, and carried out relevant research work throughout 2010. Due to the fact that Jiangsu EIC and Provincial Construction Bureau have their own funds for energy efficiency projects, it is very difficult for building sector energy efficiency projects to share the funds from Jiangsu EIC. Both NRDC and Jiangsu Research Institute of Building Science Co., Ltd agreed to integrate DSM and EPP awareness in building sector and develop a second phase project to use the EPP calculator to determine how much the building sector can contribute to DSM/EPP construction. The first phase project was successfully closed out in November.

On October 18, the DSM team attended the Suzhou DSM Pilot meeting in Beijing. The purpose of the meeting was to review the Suzhou DSM pilot project plans, about which NRDC provided review comments and offered suggestions to enhance the plans. Participants from NDRC, Energy Research Institute (ERI), Jiangsu Economic and Information Technology Commission (EIC), Suzhou EIC, Southeast University, and China Electric Power Research Institute (EPRI) also joined the discussion. Suzhou is one of the three DSM pilot cities—Sizhou, Tangshan, and Foshan—and has been making great efforts and achievements in DSM/EPP. The project aims to scale up the Suzhou model and gradually promote it nationwide.

In November, NRDC worked on coordination to help Jiangsu EIC organize a study tour to the U.K. and Sweden, to learn about their DSM/EE policies and implementation, including the role of policy makers and regulators, funding mechanisms, implementation framework, as well as innovative programs and technologies. The experiences learned will help further promote the DSM/EE work in Jiangsu.

d. Sichuan DSM/EPP Implementation Support

On April 27-28, the NRDC DSM team attended the Sichuan Electric Energy Saving Forum in Chengdu and made a presentation to introduce general concepts of DSM along with California's DSM/Energy Efficiency implementation model. DSM team also met with the Director of the Sichuan Energy Conservation Supervision Center (Sichuan Center) on April 28 to discuss further collaboration opportunities for 2011. The Sichuan Center indicated that it was considering establishing a DSM center and that it was interested in exploring DSM regulation implementation during the second half of the year. In particular, the Center would like to hold a DSM/EPP workshop for provincial government officials (provincial DRC, EIC, Energy Bureau and utility) and seek a DSM mechanism for Sichuan's situation or feasibility of Sichuan DSM office/center. The possibility of cementing the joint collaboration through the signing of an MOU was also discussed.

Separately, the DSM staff also met with a professor from Sichuan University to discuss potential collaboration opportunities. The professor expressed interest in conducting a study on the implementation of the DSM regulation during the second half of 2011. The Electric Power division of the Sichuan EIC was preparing for a local implementation plan, but had not made much progress. NRDC indicated willingness to support Sichuan's efforts in developing a local DSM implementation plan by providing relevant information on best practices both in China and abroad.

On October 21, a joint MOU was signed between NRDC, the China-U.S. Energy Efficiency Alliance (the Alliance), and Sichuan Energy Conservation Technical Service Center, which was aimed at providing tailor-made support to Sichuan and enhancing the collaboration. According to the MOU, NRDC and the Alliance will conduct a series of technical assistance activities to support energy conservation and emissions reduction work in Sichuan.

Following the MOU signing, a workshop on promoting Sichuan electric demand side management was held in Chengdu, Sichuan province. The NRDC DSM team invited Chinese experts to the workshop, including Zhou Zhaomao from China Electric Power Research Institute, who provided a detailed presentation on the national DSM regulations, and Ma Guangwen from Sichuan University, who shared his research on DSM in Sichuan. NRDC also presented DSM implementation model in California to the participants. The workshop provided a valuable opportunity for the local officials and experts to be introduced to the concept of DSM and its applications, thereby serving as a stepping stone for Sichuan to develop its own DSM mechanisms.

e. Shanghai DSM/EPP Implementation Support

In April, the NRDC DSM team met with the Shanghai Energy Efficiency Center (SEEC) to discuss Shanghai's targets for the 12th Five Year Plan and explore ways to support Shanghai's DSM and energy efficiency activities during 2011. Shanghai will continue to focus on motors systems as an area of high energy savings potential. In addition, Shanghai plans to develop a series of energy efficiency standards, and is seeking NRDC's participation in this effort.

On August 23, the NRDC DSM team visited SEEC to discuss possible project opportunities to carry out under the MOU signed between NRDC and SEEC in September of 2010. The meeting started with SEEC staff introducing Shanghai's achievements during the 11thFive-Year Plan: with the municipal government's continuous financial support, Shanghai has reached an energy savings of more than 6 million tce through restructuring and retrofit projects. The meeting with SEEC also included a participant from Shanghai Grid Company in order to discuss utility's recent activities and efforts to meet the targets set by the national DSM regulations. SEEC expressed their interest in working more closely with Shanghai Grid Company, and the person from the grid company agreed on the idea of strengthening collaboration with SEEC. SEEC requested NRDC's assistance in the following areas in the near term: a) internal capacity building trainings for SEEC staff and entities that are responsible for EM&V work in Shanghai; 2) promotion of Shanghai's successful stories in a form of distributing case studies on them; 3) designing new energy efficiency standards; and 4) high-level research on Shanghai's DSM implementation mechanism. NRDC agreed to fully support Shanghai, starting with organizing a capacity building training in late September (see more details on the training in the earlier section on the training activities).

In a separate meeting, DSM staff also met staff from Shanghai Energy Conservation Supervision Center (SECSC), and learned about ESCO and EPC development in Shanghai. Currently, there are 174 registered ESCOs in Shanghai, among which 104 are registered at the national level. The SECSC staff mentioned that although the number of registered ESCOs in Shanghai has been growing fast, ESCOs in Shanghai still need to build technical capacity to actually carry out projects. SECSC and NRDC will continue to explore any possible collaboration opportunities.

Following the August meeting, NRDC also continued its discussion with SEEC regarding the development of Shanghai-specific energy efficiency standards.

On December 27, upon the request of Shanghai SEEC, NRDC participated in review meetings to help draft a series of Shanghai energy savings M&V standards, specifically for compressed air systems, pump systems, and fan systems. Shanghai has been keen to develop local M&V standards to scale up its industrial energy efficiency. NRDC will continue to provide ongoing support with the standard development.

Summarize and Disseminate DSM/EPP Implementation Information

The NRDC DSM team used three methods of information dissemination, which are briefly described below.

a. Factsheets

During the grant term, the NRDC DSM team continued its efforts to bring international best practices into the Chinese audience in the form of factsheets. Followed by the first factsheet on California's DSM implementation model, three more factsheets have been completed and will be available in hardcopy. The topics of the three factsheets include: a) Introduction to DSM/EE financing mechanism in the U.S., b) Vermont's DSM implementation model, and c) New York's DSM implementation model.

The factsheets were distributed to the participants in each training activity, and the participants found them helpful. The participants also provided some topics they would like to learn more about in the form of a factsheet. More factsheets on various topics will follow, and feedback from the training participants is to be incorporated when deciding future topics.

b. Quarterly Newsletters

In June, the DSM team started issuing the "NRDC DSM Technical Center Quarterly Newsletter," with the second and third issues following in September and December. The newsletter introduces up-to-date energy efficiency and DSM policies, standards and technologies abroad to the Chinese audience, and also briefs the audience on the DSM team's recent activities. An electronic copy of the newsletter is circulated to the master contact list of the DSM team at the end of each quarter. A number of people have already sent an email to express their appreciation for the newsletter.

c. Web Strategy

NRDC launched its Chinese website in October, and the DSM project website is under construction to build in more features and contents. The goal of the NRDC DSM project website is to become a convenient online platform to provide resources to the Chinese audience including training materials, policies and standards, international and Chinese case studies, factsheets, newsletters etc. The DSM team will also add interactive features to the website for visitors to communicate with the team more easily. The DSM project website is currently undergoing final design and construction.

B. Assist China in implementation of the national DSM regulations and complementary policies

In November 2010, China's central government released the national DSM regulations, which essentially enacted national energy efficiency regulations calling for utility implementation of DSM and providing specific targets that the grid companies must achieve. Since the regulations were announced, different government bodies both at the national and provincial levels have made efforts to support the implementation of the regulations. NRDC has also actively participated in these efforts. NRDC's support to the provincial partners was described previously, and NRDC's collaboration with organizations at the national level is described below.

National DSM Capacity Building Training Framework

To support the implementation of DSM regulations, the NDRC is developing a national DSM training framework to train and expand the local capacity to implement DSM/EPP programs in China. NRDC held various meetings with the NDRC, China Electric Power Research Institute, and the State Grid DSM Instruction Center (SG DSM Center) – which was ultimately charged with leading the training curriculum development – to discuss their respective needs and expectations and provide input on the initial training proposal during the planning phase of the training framework development. After the training, a proposal was submitted to the NDRC and generally accepted. The NDRC and SG DSM identified industry experts, including NRDC, who can help develop the training materials. NRDC was requested to develop the training materials related to motor systems as well as thermal energy storage. The development of both sets of curriculum is under way.

Municipal DSM Pilots

In July, NRDC staff attended NDRC's municipal DSM pilot discussion meeting. NDRC proposed to carry out three DSM pilots in Suzhou, Tangshan, and Foshan and eventually expand to 100 cities in China. Representatives from each proposed pilot city presented its draft proposal for comment. Each city committed to conducting further study to scope out the pilot project, and the ERI is conducting an overarching study for the 100-city pilot. The Ministry of Finance will determine whether or not to fund the proposed pilots based on the studies.

As described earlier, under NRDC's support to the provincial partners, NRDC staff attended the kickoff meetings of Tangshan and Suzhou's scoping studies in September and October, respectively. NRDC will continue to work with the pilot project cities to support their efforts.

Work with State Electricity Regulatory Commission (SERC)

NRDC has been working with RAP to support the State Electricity Regulatory Commission (SERC) – the agency responsible for the overall regulation of China's power sector – in its oversight of the grid companies' implementation of China's DSM rules. An informal training and information exchange workshop was held in September, where RAP introduced U.S. and international DSM regulation, and NRDC presented California's DSM regulation framework, particularly in regard to measurement and evaluation. SERC discussed their thinking and needs regarding DSM regulations and requested assistance with drafting a set of regulatory rules for the

implementation of DSM regulations and developing a policy document on promoting DSM in China. NRDC is working with RAP to support both efforts.

C. Support grid companies to build capacity to implement DSM programs to meet the national targets

The national DSM regulations have set specific targets for grid companies to meet, and both the State Grid and China Southern Grid have identified their needs for internal capacity building to train staff with hands-on technical skills and expertise in order to implement DSM programs. The State Grid has required its provincial-level grid companies to establish an ESCO to carry out DSM programs with customers. Also, "Energy Efficiency Networking Groups" have been organized by the local grid companies to serve as an information-sharing and education platform for large customers in the region.

The SG DSM Center is a long-time partner of NRDC. In 2011, in particular, NRDC continued to work with the SG DSM Center on capacity building trainings for grid company staff to help them achieve the savings targets set by the national DSM regulations. The SG DSM Center also helped NRDC coordinate with China Southern Grid, and NRDC successfully co-organized internal capacity training with CSG for its staff. More details are described below.

Capacity building training for the State Grid affiliated ESCO staff

From July 6-8, NRDC held a training workshop on industrial energy efficiency technology and management in Chongqing, which was co-organized by NRDC, Chongqing municipal government office of energy conservation, and the SG DSM Center. The workshop targeted SG-affiliated ESCO staff in 26 provinces, and representatives from a total of 21 provinces were present at the workshop. The workshop received highly positive feedback: among the 73 participants who provided feedback, 48% and 51% rated the training as "Excellent" and "Good," respectively. This workshop opened the door for NRDC to collaborate with the grid companies to participate in their efforts to train internal staff for successful implementation of DSM programs.

Meeting with the SG DSM Center

In early August, the NRDC DSM Center staff visited SG DSM Center in Nanjing to discuss follow-up activities to the training in Chongqing in July. SG DSM Center expressed their interest in holding additional capacity building trainings, in particular, focusing more on ESCO business development and management. As for the timeframe for the next training, the SG DSM Center explained that the State Grid's top priority for the coming months lies in peak load management and would therefore have to postpone the training until after the peak season. Instead, the SG DSM Center will coordinate with China Southern Grid to organize a capacity building training for the China Southern Grid.

DSM workshop for China Southern Grid staff

With support from the SG DSM Center, NRDC developed a training workshop for China Southern Grid which was held on October 28-29. As described earlier, over 80 participants who are all from the China Southern Grid and involved in DSM work within their service area

attended the training. The topics of this workshop included a combination of energy efficiency technologies and high-level overview of China's energy efficiency policies and development trends. Two NRDC staff members gave a presentation on California's energy efficiency/DSM implementation practices with a focus on program evaluation, and a presentation on motor system energy efficiency, respectively. The training received highly positive feedback from the participants, and this workshop has become a good start for NRDC to collaborate with the China Southern Grid to help them meet the targets set by the national DSM regulations through capacity building trainings.

Other Activities

In 2011, NRDC continued its efforts to strengthen its existing partnerships with various organizations, and was also approached by new potential partners.

a. Development of a national framework of evaluation, measurement and verification (EM&V) for DSM program implementation in China

NRDC has been promoting international EM&V protocols and introducing EM&V best practices to China through a series of trainings since mid-2009, followed by collaboration with the China National Institute of Standardization (CNIS) on measurement and verification methodologies. As China pushes forward energy efficiency with the development of a robust performance contracting market, evaluation, measurement and verification of energy savings have become more important than ever in China. In 2011, NRDC continued working with CNIS and participated in the Institute's drafting of the *General Technical Rules for Measurement and Verification of Energy Saving (draft)* and *General Technical Rules for Energy Performance Contracting (draft)* at the invitation of CNIS.

In particular, NRDC participated in a series of review meetings held by CNIS on "General Technical Rules for Measurement and Verification of Energy Savings" as part of NRDC's participation in CNIS' process of developing China-specific EM&V standards and methodologies. NRDC provided various comments, such as corrections to errors and clarifications on proposed definitions in the draft standard, and participated in the detailed discussion regarding adopting comments received through the public review process. A number of NRDC's suggestions were incorporated into the final draft of the standard. CNIS has submitted the final draft for final review and expects the standard to be adopted in the spring of 2012. Based on feedback received during the review meetings that some ESCO companies found the proposed standards to be difficult to follow and implement, NRDC has launched discussion with CNIS to develop case studies on how the proposed measurement and verification methodologies differ from current industry practices. NRDC proposed carrying out some case study on how the proposed measurement and verification methodologies differed from current ESCO industry practices.

In addition, NRDC coordinated with CNIS on an energy efficiency standards seminar held on June 2, 2011, and helped CNIS invite U.S. experts to speak at the seminar. In addition, in order to take advantage of international experts traveling to Beijing for the ISO TC 257 meeting and EE standards seminar, NRDC held the technical workshop on energy efficiency

evaluation on the following day, June 3. The workshop targeted a specific group of audience who are actually involved in the relevant field. (The details of this workshop are described above in Section II. A.)

b. Meeting with North China Grid Company and North China Electric Power Research Institute

The NRDC DSM team was approached by the North China Electric Power Research Institute (NCEPRI) and North China Grid Company (NCGC) to seek collaboration opportunities. NCEPRI attended NRDC's earlier training in Chongqing, and identified NRDC as a good partner to work with on developing a framework to implement the DSM regulations at the local level, in particular, from the North China Grid Company's perspective. They expressed strong interest in playing a role in the Tangshan DSM pilot project in collaboration with the Hebei DSM Center. NEPRI also identified a few possible projects for which they would request NRDC's support. They are particularly in need for technical expertise from NRDC to push forward utility-led DSM programs. NEPRI also mentioned they would like to invite NRDC experts to their internal capacity building trainings as trainers. NEPRI's interest in working with NRDC underscores NRDC's role as a reliable go-to source for information and expertise in China, and the increased visibility of NRDC's trainings. NRDC will collaborate with NCEPRI to have a better understanding at the local level, especially on the regional grid company's work in DSM.

c. Study Tour Organization and Coordination for Local Partners

International experience and best practice in energy efficiency and DSM policies and program implementation offer valuable roadmap and lessons learned for China. In 2011, NRDC organized study tours for the Hebei DRC, the Jiangsu Economic and Information Technology Commission (EIC), and the NDRC, respectively. The Hebei delegation visited the U.S. to learn about energy efficiency and demand response programs, utility DSM programs and relevant policies, financing mechanisms for energy efficiency projects etc. Hosting organizations included Lawrence Berkeley National Laboratory, Pacific Gas and Electric Company, NRDC, and New York Power Authority. The Jiangsu delegation consisted of government officials from power divisions of major cities in Jiangsu, and they visited the United Kingdom to learn about U.K.'s experience in DSM programs and policies. The NDRC delegation consisted of staff from NDRC, Ministry of Finance, local DRCs and EICs, as well as the State Grid and China Southern Grid, who are responsible for DSM implementation. The NDRC delegation visited government agencies, utilities and NRDC offices, and had the opportunity to have a good understanding how DSM/energy efficiency programs are implemented in the U.S. The three study tours turned out to be a great success – the delegations identified the study tour as valuable experience that would help China further develop and implement DSM/energy efficiency programs both at the national and local levels.

d. Other Activities

NRDC continued to attend conferences and training workshops that are relevant to promoting DSM/EPP in China. These conferences and workshops help the NDRC DSM team stay informed of energy efficiency and DSM implementation progress in various parts of China and serve as good networking platforms to determine local needs and gaps and identify future collaboration opportunities. The conferences included training on standards and energy consumption quota for iron and steel and non-ferrous products in Sichuan, which was organized by the Sichuan Energy Conservation Supervision Center; the "Motor System Energy Efficiency Technology Seminar and Conclusion of China Motor Challenge Project" organized by CNIS; International Conference on VSD Motor system and EE & Carbon Reduction; and China Smart Grid Conference organized by China Greentech, among others.

III. Next Steps

In 2012, the successful implementation of the DSM regulations will be a key toward meeting our project goal to scale up DSM and EPP implementation nationwide. The implementation of the regulations will require concerted efforts by a broad cross section of government agencies, grid companies, energy service providers and industry experts to systematically train and develop domestic capacity to scale up DSM efforts at the national scale, as well as to develop complementary policies, measures and infrastructure to ensure the energy savings targets are met. Our specific objectives are to:

1. Promote the development of a robust supporting infrastructure to facilitate the implementation of China's DSM regulations
2. Develop and expand the energy efficiency workforce in China
3. Provide on-the-ground support to expand existing energy efficiency efforts

The work in all of these areas will be closely coordinated with the Energy Foundation, with support for and in collaboration with NRDC's international partners, including the Regulatory Assistance Project (RAP) and Climate Work's Best Practices Network, the China-US Energy Efficiency Alliance, and others. NRDC will also leverage the existing expertise in China and collaborate with domestic experts in relevant fields.

NRDC is truly grateful to the Energy Foundation/CSEP for so generously supporting our efforts to build a cleaner and more energy efficient future in China and around the world, and we are hopeful that CSEP will continue to support our project. A proposal for this work is being submitted to the Energy Foundation/CSEP for consideration.