Capability Statement

Energy Efficiency & Demand Side Management

June 2013

ABPS Infrastructure Advisory Pvt. Limited

www.abpsiapl.com

Disclaimer:

Capability Statement

Climate Change Advisory Practice

1 Overview of ABPS Infra

'ABPS Infrastructure Advisory Private Limited' (ABPS Infra) is a management consultancy organization providing services in commercial, financial, and regulatory spheres of the infrastructure sector. ABPS Infra focuses on various infrastructure sectors such as Power, Renewable Energy, Oil & Gas, Water, Transportation, Urban Infrastructure, etc.

In a short span of around six and a half years since inception, ABPS Infra has completed more than 200 consultancy assignments in the infrastructure sector. ABPS Infra has advised/assisted a wide spectrum of entities in the infrastructure sector such as Corporates, Project Developers, Equity Investors, Regulatory Authorities, Utilities, Industry Associations, Governments/Government Organisations and Multi-lateral Agencies.

2 Practice Areas

ABPS Infra offers its services in five practice areas:

Financial Advisory

- Counter Party Risk Assessment
- Financial Modelling
- Risk Assessment and Mitigation Measures
- Due Diligence
- Public Private Partnership
- Contract Structuring
- Business Strategy

Regulatory and Policy Consulting

- Diagnostic Studies
- Licensing & Regulations
- Pricing Issues in Regulated Markets
- Market Development
- Monitoring and Compliance
- Rural Electrification
- Capacity Building

Renewable Energy

- Renewable Energy Resource Assessment
- Renewable Purchase Specifications
- 'Feed-in' Tariff Determination
- Grid Integration of Renewable Sources
- Market Study and Investment Strategy
- Project Development Support
- Project Structuring

Energy Efficiency and Demand Side Management

- Demand Side Management Planning
- Energy Audit
- End Use Efficiency Improvement Programmes
- Monitoring & Verification (M&V)
- Life Cycle Assessment
- Training and Capacity Building

Climate Change

- Climate Change Policy Analysis
- Carbon Foot-Print
- Carbon Neutrality
- CDM Project Development Support
- Emission Trading Advise

3 Scope of Services –Energy Efficiency and Demand Side Management

ABPS Infra is eminently placed to advice its clients on various energy efficiency and demand side management issues, which are of paramount importance to them. The areas of expertise of ABPS Infra in this regard are:

a) Demand Side Management Planning
b) Energy Audit
c) End Use Efficiency Improvement Programmes
d) Monitoring & Verification (M&V)
e) Life Cycle Assessment
f) Training and Capacity Building

3.1 Demand Side Management Planning

Demand Side Management (DSM) represents various measures undertaken by the Government/Utility on the consumer side of the meter to reduce peak demand or overall energy requirement. DSM not only provides opportunities for avoiding, reducing or postponing the need for installation of new generation, transmission and/or distribution capacity, but also provide opportunities for reducing the need for the distribution utilities to purchase costly power to meet peak demand. Most of the DSM programmes in India are at the pilot stage and DSM activity is expected to increase significantly in the medium term. Load Research, sound Demand Forecasting Techniques, and Load Profiling are pre-requisites for development of the most appropriate DSM programmes. ABPS Infra has developed the necessary expertise in development of techniques and to carry out Load Research to design, develop, implement and evaluate DSM Programmes and Projects. ABPS Infra can also assist utilities in establishment of institutional mechanism such as DSM Cells and in seeking regulatory approvals to ensure sustainable implementation of DSM Programmes.

3.2 Energy Audit

An Energy Audit is a systematic exercise to identify end-uses that consume a significant amount of energy, estimate the efficiency in each of these end-uses and devise methods for improving efficiency and curbing losses and wasteful use. Its primary objective is to determine ways to reduce the Specific Energy Consumption (SEC). Energy Audit is an effective tool in defining and pursuing a comprehensive energy management programme.

Effective management of energy-consuming systems can lead to significant cost and energy savings as well as increased comfort, lower maintenance, and extended equipment life. ABPS Infra provides advisory support in the complete chain of Energy Management starting from Preliminary Energy Audit, Detailed Energy Audit till conclusion of negotiations, and finalization of technology providers for successful implementation of the Project.

3.3 End Use Efficiency Improvement Programme

Significant potential exists for reduction in electricity demand through implementation of end use efficiency and conservation programmes in different consumer sectors such as Municipal, Agricultural, Residential, Commercial and Industrial Sectors. ABPS Infra has the necessary capability to design and implement sector specific 'End Use Energy Efficiency Programmes' that enable utilities in targeting specific set of consumers. ABPS Infra also has the necessary expertise to develop and implement 'Outreach' programmes for creation of awareness about energy efficiency issues.

3.4 Monitoring & Verification (M&V)

The long term success of energy management projects are often hampered by the inability of the project partner to agree on an accurate, successful M&V plan. M&V systems and practices are becoming increasingly important in India as the number and scale of Energy Efficiency projects and investment has been increasing. Such programmes can be implemented and scaled up only with effective tools to measure and monitor savings through a uniform yardstick or benchmark tools. Further, financial payments are linked to the performance of the project (energy savings), which require M&V capability. ABPS Infra has developed the necessary expertise to assist various stakeholders such as energy services providers, utilities, consumers and Financial Institutions in providing M&V Services such as development of M&V Protocol, Development of Milestones, Incorporation of M&V in Contracts and actual M&V.

3.5 Life Cycle Assessment

Today, markets are rapidly changing and consumers are becoming more aware of environmental issues. It is not simple to find solutions to issues such as, environmental performance of the manufacturing processes, environmental impact of products, waste management and cost reduction. Life Cycle assessment (LCA) is a tool, which helps organizations address future challenges. Life Cycle Assessment identifies the material, energy and waste flows associated with a product over its entire life-cycle to determine its environmental impact. LCA evaluates the environmental performance of processes,

products and services, and also identifies potential cost savings. ABPS Infra has expertise in Life Cycle Assessment to resolve complex decision making process by identification and understanding of environmental attributes for processes and products.

3.6 Training and Capacity Building

Indian Utilities are generally not in a position to conceive, formulate, design, implement, monitor and evaluate DSM programmes/projects. Organizationally, they have neither the infrastructure nor skill-set to undertake DSM activities. If Utilities in India are to capture the available DSM potential on a sustained basis, Utilities need to institutionalize the DSM process by setting up DSM Cells within their organisations. Such a Cell would require dedicated staff supported by dedicated infrastructure, resources and budget. Further, training and capacity building of the personnel in that Cell would be necessary. ABPS Infra stresses on knowledge transfer to Utility staff through active involvement of staff in all its assignments. ABPS Infra believes in "learning by doing" approach and has developed the necessary expertise to design and develop 'Training and Capacity Building' programmes in the area of DSM and Energy Efficiency.

4 Key Assignments in Energy Efficiency and Demand Side Management

A brief description of some of the key assignments undertaken by ABPS Infra in Energy Efficiency and Demand Side Management area is given below:

4.1 Demand Side Management Planning

Assessment of Best Practices in Demand Side Management in India

Client: Bureau of Energy Efficiency

Though DSM is a relatively new phenomenon in the country, there have been isolated implementations of DSM programmes throughout the country. It is necessary to understand the learning from these implementations and create awareness about these within all other Utilities. Also, it is necessary to create a mechanism wherein Indian Utilities benefit from the international experience in this area. To achieve this, the Government of India had signed Implementing Agreement with the International Energy Agency (IEA) to participate in its Demand Side Management Programme. The Bureau of Energy Efficiency (BEE) as a Nodal Agency for this Agreement has appointed ABPS Infra to assist it in execution of the following tasks:

- Survey of DSM implementations in India
- Identification of best practices in DSM in India
- Survey of Load Control and Smart Metering technologies
- Development of database on Load Control and Smart Metering Technologies available in India
- Identification of best practices in use of 'Load Control & Smart Metering'
- International workshop for stakeholders to create DSM Capability

Development of National DSM Policy

Client: Bureau of Energy Efficiency

India is facing an unprecedented demand-supply gap and has realized that one cannot be solely dependent on supply side solutions, such as increase in generation capacity, to bridge this gap. As a result, the Bureau of Energy Efficiency (BEE) has decided to develop a National Demand Side Management Policy, which would look at various options for implementation of DSM programmes in the country. BEE engaged ABPS Infra to assist it in stakeholder consultation and drafting of the proposed National DSM Policy. ABPS Infra assisted BEE in conducting National Workshop in October 2007 during which various facets of the proposed DSM policy were discussed.

Further, ABPS Infra prepared Theme Papers for the Workshop, which covered various issues such as concepts, benefits and objectives of DSM, barriers to implementation, regulatory framework, case studies and proposed methodology for implementation. ABPS Infra submitted the 'Draft National Demand Side Management Policy' to the Government of India.

Consultancy regarding activities in Demand Side Management, Load Study and Energy Conservation

Client: Chhattisgarh State Electricity Board

Chhattisgarh State Electricity Board (CSEB) evolved as a new vertically integrated electricity utility with a responsibility of managing growing demand in several sectors in the economy. CSEB, through the tariff setting process initiated a limited effort towards demand-side management projects with the onset of time-of-use tariff for high-tension users. CSEB with its own initiative and directives from the Chhattisgarh State Electricity Regulatory Commission (CSERC) now intends to develop a systematic demand-side management program that brings important benefits in specific sectors. CSEB appointed ABPS Infra to take up the study in demand side management, load study and energy conservation that would lead to planning and launching DSM programmes in the state bringing benefits to a cross-section of end uses in the HT, Small Industries and Agricultural sectors. The main tasks included:

- Load Research: collect and analyse the data of monthly load duration curve of CSEB, identify the contribution of consumers of different class / category / supply voltage wise of last twenty four months.
- Demand Forecast for next five years by considering previous history, pattern of use of consumers by different category, load growth, government policy, resource availability in Chhattisgarh, development prospective of area, growth of IPP & CPP and national market condition of power trading / availability.
- Identification of the measures / programme by collecting the real time data by measurement for sample cases from field unit, analyse the data and compare the same with benchmark and then suggest specific and definite measures which are technically feasible and economically viable.
- Collection of data and Preparation of Case Studies of DSM initiatives taken by different utilities in India.

Consultancy Service for Task XVIII – DSM & Climate Change of International Energy Agency Demand Side Management Programme

Client: Bureau of Energy Efficiency

Though DSM is a relatively new phenomenon in the country, there have been isolated implementations of DSM programmes throughout the country. It is necessary to understand the learning from these implementations and create awareness about these within all other Utilities. It is also known that implementation of demand side management measures helps in reduction of green house gas emission. Also, it is necessary to create a mechanism wherein Indian Utilities benefit additional benefits of clean development mechanism by implementing demand side management measures from the international experience in this area. To achieve this, the Government of India had signed Implementing Agreement with the International Energy Agency (IEA) to participate in its Task XVIII – DSM and CDM of Programme. The Bureau of Energy Efficiency (BEE) as a Nodal Agency for this Agreement appointed ABPS Infra to assist it in execution of the following tasks:

- Development of interactions between DSM and Climate Change
- Using DSM programme to mitigate GHG emissions
- Using GHG emissions mitigation programme to deliver electricity system benefits
- Fungibility of DSM and GHG emission trading
- Time of Use pricing and GHG Emission mitigation
- Communication of Information about DSM and Climate Change

Consultancy Service for activities in Demand Side Management

Client: Tata Power Company Limited (on account of International Institute for Energy Conservation)

Tata Power Company Limited (TPC) has initiated a DSM programme targeting mainly Industrial and Commercial sectors, in accordance with the directives issued by Maharashtra Electricity Regulatory Commission. Consortium of ABPS Infra and IIEC has been appointed to develop the DSM implementation strategy for Tata Power distribution area in Mumbai.

Consortium of ABPS Infra and IIEC provided assistance in execution of the following tasks:

- Preparation of Strategy Report
- Identification and Submission of quick gain demand side management plan

- Assistance in obtaining approval from MERC and roll out of quick gain demand side management programme
- Preparation of Request for Proposal document for Load Research and Energy Audit
- Assistance in appointment of Agencies for LR & EA
- Preparation and submission of consolidated report of Load Research and EA with detailed cost benefit analysis
- Preparation of templates from programme design and Monitoring and Verification
- Preparation and submission of detailed category wise DSM plan by taking approval from MERC
- Preparation of report with evaluation of DSM programme.

Consultancy Support to Forum of Regulators

Client: Bureau of Energy Efficiency and Forum of Regulators

The Forum of Regulators (FOR) created under Section 166(2) of the Electricity Act 2003 consists of Chairpersons of all State Electricity Regulatory Commissions (SERC) as members with Chairperson of the CERC as Chairman of the Forum, with the responsibility to evolve common and coordinated approach to various issues faced by the SERCs in the country. In order to be able to develop such common and coordinated approach, the FOR in its meeting held on June 13, 2008 decided to constitute a Working Group on "DSM and Energy Efficiency" to deal with the issue of developing approaches for implementation of 'Energy Efficiency and Demand Side Management' in the distribution sector in the country. Director General of Bureau of Energy Efficiency was invited to join the Working Group as a Permanent Invitee and Bureau has been requested to provide secretarial and domain sector support to the said Working Group of FOR. The Working Group submitted its Report to the Forum of Regulators which was accepted by FOR in its meeting held at Khajuraho on September 26, 2008. Also, FOR has requested BEE to provide continuous support and suggest undertaking several tasks on priority basis. In this regard, BEE has appointed ABPS Infrastructure Advisory Private Limited (ABPS Infra) to provide necessary assistance in execution of the following tasks:

- Development of DSM Regulations for DSM & EE for adoption by FOR and SERCs;
- Development of standard process for design, development and implementation of DSM programmes;
- Development of Monitoring & Verification protocol for DSM projects;

- Development of Outreach Programmes for DSM & EE;
- Development of Cost Benefit Analysis protocol for DSM Programmes;
- Development of mechanism on institutionalizing DSM processes;
- Development of training programmes for Regulators and Utilities;
- Analysis of various reports and documents referred by FOR Working Group;
- Provide necessary assistance in any other works related to DSM & EE;

4.2 Energy Audit

Preliminary Energy Audit for Rice Mills and Irrigation Pump sets

Client: Chhattisgarh State Electricity Board

ABPS Infra was appointed by CSEB to take up the study in demand side management, load study and energy conservation that would lead to planning and launching DSM programmes in the state bringing benefits to a cross-section of end uses in the HT, Small Industries and Agricultural sectors. To identify the energy conservation measures and evaluation of possible energy conservation potential, ABPS Infra carried out preliminary energy audit of three rice mills (Arwa & Parboiled) and ten irrigation pumpsets. ABPS Infra performed the following main activities during the course of energy audit exercise:

- Collection and Analysis of monthly electricity bills for last twelve / twenty four months
- Measurement and analysis of demand and power factor and accordingly suggestions to reduce the demand and power factor;
- Evaluation of installed capacitors to ensure deliverance of desired output, level of losses, management of system power factor and operations of capacitors.
- Establish Specific energy consumption of the unit with the help of past energy data/quick power measurement;
- Identify the most likely and the easiest areas for attention like major power consuming electrical equipments (Air Compressors, Pumps, Blowers, Conveyors etc) and energy balancing
- Performance evaluation of suggested and selected motors, 3 HP and above, to identify under and over loading of the motors;
- Identify main electrical energy conservation measures;

4.3 Training and Capacity Building

Assistance in review of DSM Plans, Pilot Schemes Design and Monitoring

Client: Maharashtra Electricity Regulatory Commission

ABPS Infra was engaged by MERC for Capacity Building within the distribution licensees in Maharashtra, viz., MSEDCL, REL, BEST, and TPC, for making DSM an integral part of Utility operations and providing technical assistance and advice to the distribution licensees in the design, development, implementation and evaluation of DSM projects and programmes. The main tasks included:

- Review of existing and proposed DSM Plans of the Distribution Licensees
- Evaluation of benefits derived from the DSM activities.
- Analysis of merits and demerits of each type of DSM programme
- Assistance to licensee for design of DSM programmes
- Develop a mechanism for monitoring and evaluation of the benefits
- Conduct workshops for key personnel as a capacity building measure.

4.4 Monitoring & Verification

Design and implement regulatory and tariff intervention strategies for DSM

Client: Maharashtra Electricity Regulatory Commission

ABPS Infra was engaged by MERC to develop regulatory and tariff intervention strategies to make DSM an integral part of the tariff determination process. Some of the measures suggested by ABPS Infra and adopted by the Regulator include:

- Time of Day tariff for selected consumer categories
- Reduction in allowable power purchase quantum by 2% with a direction to reduce the power consumption by 2% through DSM measures
- Direction to licensees to include DSM as an integral part of their long-term power procurement plan.
- Direction to distribution licensees to initiate systematic load research on a continuous basis and to make it an integral part of their operations.

Validation of AP Power Consumption for the FY 2007-08 & 2008-09 as reported by Punjab State Electricity Board

Client: Punjab State Electricity Regulatory Commission

Punjab State Electricity Board (PSEB) had submitted revised AP consumption of 10012 MU for the year 2007-08, in its ARR for the year 2008-09. The PSEB in its ARR had also submitted that method used by them for assessing AP consumption is fairly accurate and reliable. However, Punjab State Electricity Regulatory Commission (PSERC) while approving the AP consumption for the year 2007-08 had observed several issues such as malfunctioning of sample meters, unavailability of verified actual connected load & lack of transparency in computing figures of load increase on account of VDS. In this regard, PSERC has appointed ABPS Infrastructure Advisory Private Limited (ABPS Infra) as an independent agency to validate the AP consumption data submitted by the PSEB. The main task included:

- Collection of various data such as distribution sub division wise account numbers, month wise load of each consumer from consumer ledger ; month wise AP consumption reading along with number of supply hours and total connected AP load – division wise and month wise for the five distribution circles;
- Analysis of the data & identification of AP connections which show abnormally high or low consumption and defective and burnt meters;
- Discussion with PSERC & PSEB to decide modalities for checking the actual connected load at site and working status of meter;
- Physical verification of load and meter status and amendment of the figures of load and consumption accordingly for calculation of AP factor;
- Estimation of the AP consumption of selected circles for the year 2007-08 and for the three quarters of 2008-09;
- Comparison of new calculated AP consumption and AP consumption value supplied by PSEB to the Commission;

4.5 End Use Energy Efficiency Improvement

Development of Bidding Document for Energy Services in Public Buildings

Client: Indian Renewable Energy Development Agency

Currently, IREDA is operating a line of credit to promote and finance energy efficiency/conservation projects. There is significant Energy Efficiency potential in the large commercial buildings in India. IIEC, under contract from IREDA, appointed ABPS

Infra for development of six 'Request for Proposal' documents based on six energy audit reports of public buildings such as New Secretariat Buildings in Kolkata, Headquarters of West Bengal State Electricity Board (WBSEB), High Court Building at Ahmedabad, etc. ABPS Infra prepared the Request for Proposal documents, which considered the following critical issues:

- Selection criteria to short list the Energy Service Companies (ESCOs)
- Criteria for Performance Guarantee/shared savings
- Desired payment schedules
- Contractual obligations of the parties involved
- Penalties and resource mechanisms
- Arbitration and dispute resolution.

Development of Demonstration Project using Distributed Generation as DSM measures under Task XV of IEA DSM Programme

Client: BEE/DHBVNL

Government of India became party to the demand side management programme of International Energy Agency (IEA) by signing the 'Implementing Agreement' on January 22, 2007. In view of the growing investment needs of transmission and distribution sector, it has been decided to participate in the Task XV of the DSM programme which focuses on 'Network Driven DSM'. As a part of this task, ABPS Infra has been appointed to assist BEE in Development and Implementation of demonstration project using Distributed Generation as DSM measures to avoid load shedding and to optimise the investment in transmission and distribution network. ABPS Infra is assisting BEE in the execution of the following tasks:

- Preparation of Feasibility Report on Demonstration Project using Distributed Generation as DSM options considering various aspects.
- Providing assistance during Regulatory approval to the proposed concept
- Preparation of draft Petition & assistance to DHBVN filing.
- Assistance to DHBVN during Regulatory Process
- Analysis of Final Order and finalisation of Implementation of Plan
- Assistance in implementation of demonstration project based on the Regulatory approval.

5 Clientele of ABPS Infra

Corporate Entities / Investors	Bharti Airtel Limited CLP Power India Private Limited Erudite Engineers Private Ltd. Essar Power Ltd Garware Polyester Limited Gupta Coalfield and Washeries Limited Kalyani Steel Limited Lanco Infratech Limited Nagreeka Export Limited Navayuga Power Corporation Limited Neelkamal Realtors Suburban Private Limited Pioneer Distilleries Limited Senergy Global Private Limited Spectrum Power Generation Ltd. Usha Martin Limited Veolia Environment Services Asia Pvt. Ltd. Wartsila India Limited
International Clients	Emerging Markets Ltd., UK European Investor active in Renewable Energy Genting Group Malaysia Ranhill Corporation Bhd., Malaysia RE Partners, LLP
Government and Regulatory Commissions	Assam Electricity Regulatory Commission Bureau of Energy Efficiency Central Electricity Regulatory Commission Chhattisgarh Electricity Regulatory Commission Forum of Regulators Forum of Indian Regulators Gujarat Electricity Regulatory Commission Maharashtra Electricity Regulatory Commission Ministry of New and Renewable Energy Punjab State Electricity Regulatory Commission Rajasthan Electricity Regulatory Commission Uttarakhand Electricity Regulatory Commission Kerala State Electricity Regulatory Commission
Industry Associations & Institutions	Himachal Small Hydro Power Association Independent Power Producers Association of India Indian Wind Energy Association World Institute of Sustainable Energy
Utilities	BSES Rajdhani Power Limited BSES Yamuna Power Limited Bhilai Steel Plant (Steel Authority of India Ltd) Chhattisgarh State Electricity Board

	Maharashtra State Electricity Distribution Company Ltd Maharashtra State Electricity Transmission Company Ltd Maharashtra State Power Generation Company Ltd South East Central Railway The Tata Power Company Limited The Mula Pravara Electric Co-operative Society Ltd. Transmission Corporation of Andhra Pradesh Ltd WESCO, NESCO and SOUTHCO SEZs in the State of Maharashtra and Gujarat

6 Contacts

For any clarification/queries on this document or on ABPS Infra, please contact any of the following:

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