DSMSpotlight

The Newsletter of the International Energy Agency Demand-Side Management Programme **December 2009**

NOTE FROM THE CHAIRMAN

Wonderful Copenhagen?

Will we have reason to hum the song "Wonderful Copenhagen," that Danny Kaye once made popular, after the turn of this year? Hopefully, but we are far from sure that the leaders of the world will make those decisions that they are all agreeing should be taken. They also, unfortunately, seem to agree that someone else should take the first step and that someone else should carry the heavier burden.

The IEA Secretariat has shown in their message to the leaders, given in the World Energy Outlook, WEO 2009, that just the reduction in emissions that we have to undertake to stay on the 450 ppm-level will primarily rely on a more efficient use of energy. More than 50% must come from such improvements in the end-use.

We, who deal with the large-scale deployment programmes that we "nickname" DSM, are happy to be able to say to our leaders: Yes we can deliver! Yes we can do it with profit! And, yes we can do it for both the customers/users of energy and the companies who do the job.

Many of the 25 recommendations that the IEA Secretariat have prepared for the G8 on energy efficiency have already been dealt with in the work of the IEA DSM Programme, and of course more can be done within this framework and scope.

This also enables us to take an even bolder step! Even if the politicians may hold back their targets in Copenhagen, we can open up the market to do more and do it faster! Why – because DSM is good business!

The spring in Copenhagen – and elsewhere – will be wonderful.

Hans Nilsson
IEA DSM Chairman

task XX

DSM Starts Work on Energy Efficiency Branding

For the first time in the history of the IEA, India is leading a research project. The Bureau of Energy Efficiency, under the Ministry of Power of the Government of India, has taken the leadership role for the *DSM Task XX on Branding for Energy Efficiency*. Working with Spain, France and the United States, Task experts will tackle key issues over the next two years.

"We are extremely pleased with the initiative of the Indian Bureau of Energy Efficiency and are confident they will lend solid expertise to the Demand Side Management Implementing Agreement", said Ambassador Richard Jones, Deputy Executive Director of the IEA, during his visit to New Delhi. *"The Agency has always sought and maintained an excellent dialogue with key world economies. This co-operation was recently accelerated in order to provide opportunities for*

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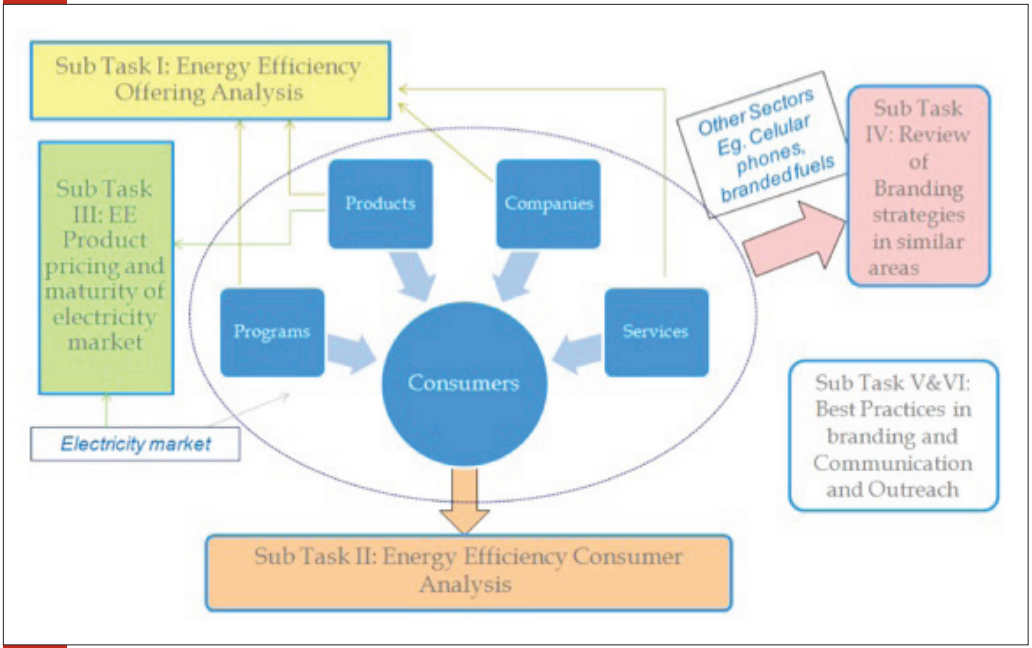


those economies to participate more closely with the IEA. This project is a sign of India's commitment to move from dialogue to action", Ambassador Jones added.

The Work

The objective of the Task is to develop a cogent and comprehensive framework to promote energy efficiency (EE) using branding policies in electricity markets at different levels of maturity. The Task work will generate significant understanding of the barriers associated with branding EE and the strategies needed to overcome these barriers.

As illustrated above, the Task is structured around six focus areas:

- Energy Efficiency Offerings Analysis
- Energy Efficiency Consumer Analysis
- Assessment of Relations Between Energy Efficiency Product Pricing and Maturity of Electricity Market
- Review of Branding Strategies in Similar Areas
- Identification of Best Practice in Branding of Energy Efficiency
- Communication and Outreach

Mr. Devender Singh, the Joint Secretary of the Ministry of Power, said that this project demonstrates India's strong commitment to energy efficiency and climate change concerns. India is committed to rapid economic growth to raise the standards of living and quality of life for its people but in an environmental friendly manner. Energy efficiency initiatives both on the supply side and demand side will ensure most economic use of this precious resource. *"The Hon. Prime Minister of India recently announced National Action Plan on Climate Change under which the Bureau is developing National Mission on Enhanced Energy Efficiency which will take forward energy efficiency movement in India in a coordinated manner. International projects such as Branding initiative will help India learn best practices in the area and develop an energy efficient economy."* Mr. Singh further added.

To learn more about the work and how to participate contact the Operating Agent, Balawant Joshi, balawant.joshi@abpsinfra.com of ABPS Infrastructure Advisory Private Limited, Mumbai, India or visit the Task page, http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=20&Sort=0

Sharing The Results & Lessons Learned

- Three Task newsletters
- Two regional workshops on branding efforts
- Series of Reports
  - –Energy efficiency products analysis and key drivers influencing markets for those products
  - –Possible products and services suitable for branding based on the market segment from the consumer's perspective
  - –The relationship between EE products pricing and maturity of electricity market.
  - –Branding strategies deployed for products and services in the participating countries
  - –Best practices in branding energy efficiency

task XXII

Energy Efficiency Portfolio Standards

In 2008, the European Commission set a policy target of "20 20 by 2020". The policy sets a target reduction of at least 20% in greenhouse gas (GHG) emissions by 2020, and energy efficiency is identified as a key component. This objective corresponds to achieving approximately 1.5% of real energy savings per year up to 2020.

If the policy is successful, this would mean that by 2020, the EU would use approximately 13% less energy than today, saving 100 billion euros and approximately 780 million tonnes of CO_2 each year, which is around 20% of the current emissions. Other countries around the world have also set policy targets for reducing emissions with energy efficiency as one of the key measures to reach their goal.

Why a New DSM Task?

To achieve energy efficiency targets, countries have introduced various policies and programmes targeting different sectors, such as appliances, buildings, and industry. These policies include a wide range of instruments, such as regulatory directives, voluntary agreements, incentives or subsidies, financing options, and education and outreach. Many of these types of programmes have evolved over time to meet specific needs as they arise. As a result, each programme tends to have its own objectives and implementation mechanisms. While a number of these programmes have been successful in achieving their objectives, in the absence of a unified approach, their full potential is often not realised. In addition, these programmes respond to their own incentive mechanisms and subsequently adhere to their own monitoring and verification protocols; therefore it is difficult to quantify the total energy efficiency savings, which is crucial from a government's perspective. To overcome the existing barriers for energy efficiency programmes and to realise their true potential, it is important that a coherent approach that encompasses all the efforts to implement these measures is undertaken.

Taking a lead from Renewable Portfolio Standards (RPS), which is a market-based instrument that promotes renewable energy generation from the most economical sources of generation, several states in the United States and a few European countries have adopted Energy Efficiency Portfolio Standards (EEPS) programmes as a part of their efforts to mobilise energy efficiency improvements. These programmes provide utilities with a market-based instrument to achieve a defined target for energy savings.

While these programmes have gained momentum recently, wide differences exist in their design and implementation, and they have met with varying degrees of success. Nevertheless, there is tremendous potential for the successful implementation of these programmes, and therefore, it is necessary to study and analyse their implementation.

The Task's Objective

The primary objective of *DSM Task XXII, Energy Efficiency Portfolio Standards*, is to develop a best practice guide for the design, development, implementation and monitoring of Energy Efficiency Portfolio Standards. The Task work is divided into three subtasks and will be completed over twelve months once initiated in 2010.

Sub Task I: Analysis of various approaches to promote EE and their relative efficacy

The objective is to analyse various approaches including EEPS-like approaches adopted to promote EE and suggest their relative efficacy in achieving the desired objective.

Sub Task II: Development of best practices in design of EEPS

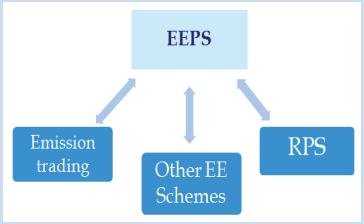
The objective is to analyse design parameters and to develop best practices in design of EEPS (see the table below)

Approach Adopted for EEPS (Top down or Bottom Up)	Participants
Enactment, regulation or voluntary basis	Coverage
Separate EEPS or part of existing programmes	Timing & Duration, Sunset date
Target Setting	Enforcement mechanism
Trading and Buying	Funding
Implementation mechanism	Monitoring & Verification

This Task will also identify and analyse inter-linkages of EEPS schemes with the other existing schemes such as energy efficiency schemes, renewable energy schemes and emission trading schemes for the development of best practice and to ensure effective operation of the proposed scheme.

Sub Task III: Communication and Outreach

The objective is to identify and engage various stakeholders to communicate and disseminate information on setting and development of EEPS.



Who Should Participate?

Experts are welcome from countries with EEPS programmes and countries planning to introduce EEPS programme. Participation in this Task will help countries review their programmes beyond any existing boundaries and consider a broader approach. Experts will also analyse inter-linkages between EEPS schemes and other schemes, such as energy efficiency, renewable energy and emissions trading.

To learn more about the work and how to participate contact the Operating Agent, Balawant Joshi of ABPS Infrastructure Private Limited, Mumbai, India, balawant.joshi@abpsinfra.com.

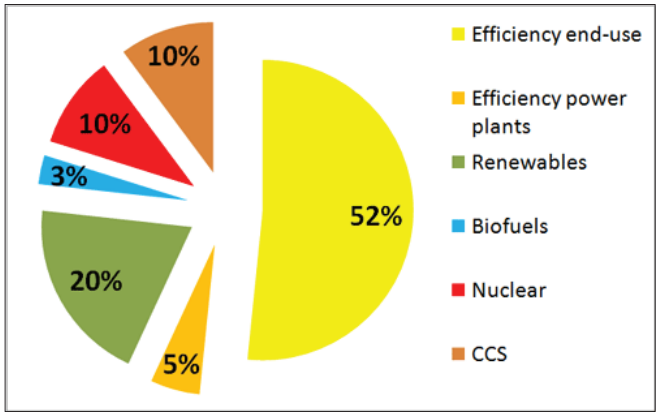
DSM Programme Covers a lot of Ground

The IEA DSM Programme began in the early 1990s and since then the energy sector has changed dramatically in many of the member countries, but one fact has remained constant – the vast potential for improvements on the demand side is largely untapped.

Demand Side Management (DSM)[1] refers to all changes that originate from the demand side of the market in order to achieve large scale energy efficiency improvements through the deployment of improved technologies. Depending on a country's market organisation these changes will involve different actors, but in most cases utilities are an active player.

A PLATFORM FOR LARGE SCALE DEPLOYMENT

Work on the energy demand side is more important than ever. The IEA World Energy Outlook 2009 shows that end-use efficiency is the largest contributor to CO_2 emissions abatement in 2030. To this end, large-scale deployment and diffusion of efficient products are key to its success.



IEA World Energy Outlook 2009 projection of means to abate CO_2 emissions in 2030

The IEA DSM Programme provides the global platform for such collaborative work and the exchange of experiences to assist countries both to develop models for implementation that facilitate trade across borders and to create a base for facilitating/enabling technologies to be developed, produced, shipped and used in a way that improves their performance and makes the cost for the applications acceptable.

The scope of the IEA DSM Pogramme work is broad yet focused. Below is a summary of the work being conducted by focus areas. This list relates to the IEA Secretariat's 25 recommendations for necessary Energy Efficiency improvements.

POLICY WORK

National Energy Efficiency Strategies and Energy Efficiency Goals

The assessment potentials and methods have been dealt with in,

- Task I/Subtask 9: Evaluation Guidebook on the Impact of DSM and Energy Efficiency Programmes for Kyoto's GHG Targets (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=99&Sort=1)
- And, will be continued in Task XXI: Standardisation of Energy Savings Calculations (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=21&Sort=0)

The operational issues to reach larger markets have also been studied in,

- Task V: Investigation of Techniques for Implementation of Demand-Side Management Technology in the Market Place (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=5&Sort=1)
- Task VII: International Collaboration on Market Transformation (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=7&Sort=1)

Compliance Monitoring, Enforcement and Evaluation

Much of the work in Task VI: Mechanisms for Promoting DSM and Energy Efficiency in Changing Electricity Businesses is still valid depending on how the country has organized its market (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=6&Sort=1)

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This work also was reported on in the article "Public Policy Analysis of Energy Efficiency and Load Management in Changing Electricity Business" in *Energy Policy*, 31 (2003), pp. 405-430.

Indicators

Indicators are addressed in the evaluation guidebook produced in,

- Task I/Subtask 9 : Evaluation Guidebook on the Impact of DSM and Energy Efficiency Programmes for Kyoto's GHG Targets (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=99&Sort=1)
- And, continued in Task XXI: Standardisation of Energy Savings Calculations (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=21&Sort=0)

ENERGY EFFICIENT APPLIANCES

This area of work has focused on policy packages and branding,

- Task XX: Branding of Energy Efficiency (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=20&Sort=0)
- Task XXII: Energy Portfolio Standards (web page under development)

ENERGY EFFICIENT INDUSTRY

Work in this area is focused on Load Management/Demand Response and various deployment programmes such as,

- Task XIV: White Certificates (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=14&Sort=1)
- Task XX: Branding (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=20&Sort=0)
- Task XXII: Energy Efficiency Portfolio Standards (web page under development)

Energy Management

The management techniques developed are primarily for ESCO-EPCs, but generally applicable also within companies.

- Task XVI: Competitive Energy Services (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=16&Sort=0)

ENERGY UTILITIES AND ENERGY EFFICIENCY

For DR (Load Shape), this issue was dealt with in,

- Task II: Communications Technologies for Demand-Side Management (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=2&Sort=1)
- Task XIII: Demand Response Resources (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=13&Sort=1)

For Load Level purposes, it was thoroughly investigated and documented in Task XIV: White Certificates (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=14&Sort=1)

Methods and applications were studied in,

- Task VIII: Demand-Side Bidding in a Competitive Electricity Market (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=8&Sort=1)
- Task XI: Time of Use Pricing and Energy Use for Demand Management Delivery (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=11&Sort=0)
- Task XIII: Demand Response Resources (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=13&Sort=1)
- Task XIX: Micro Demand Response and Energy Saving (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=19&Sort=0)

Work focused on grid companies was addressed in Task XV: Network Driven DSM (http://www.ieadsm.org/ViewTask.aspx?ID=17&Task=15&Sort=1)

Kyoto type mechanisms were addressed in Task XVIII: Demand Side Management and Climate Change (http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=18&Sort=0)

case study

Agricultural Pump Set Efficiency Improvement Programme - India

This is the third article in a series highlighting the case studies of DSM Task XV, Network Driven DSM. This Task demonstrated that DSM can be successfully used to support electricity networks in two main ways 1) by relieving constraints on distribution and/or transmission networks at lower costs than building 'poles and wires' solutions, and 2) by providing services for electricity network system operators, achieving peak load reductions with various response times for network operational support.

Introduction

Water pumping loads in the agricultural sector in India are important for the following reasons. Agricultural pump sets are often supplied by long rural lines that are costly to build and maintain and have large line losses. The electricity supply to pumps is often unmetered and electricity is effectively supplied free of charge. In these cases, electricity distributors have to bear the supply cost and there is no incentive for agricultural customers to use electricity efficiently.

The Agricultural Pump Set Efficiency Improvement Program was developed by the Noida Power Company Limited (NPCL), facilitated by USAID and World Bank experts and implemented with participation by companies manufacturing energy efficient pumps and other equipment and by financial institutions.

NPCL is an electricity distribution/retailing utility, privately owned by RPG Group since 1993, that provides services to the Greater Noida region of Uttar Pradesh.The transmission and distribution services NPCL provides covers about 335 square kilometres of Greater Noida city and 118 neighbouring villages, and supplied around 23,000 customers in 2003/04, increasing to approximately 40,000 customers in 2007/08.

Table 1. Summary of Results Achieved for Replacement of a Conventional 7.4 HP Pump Set with a High Efficiency 3.0 HP Pump Set

Parameter	Result Achieved
Pump motor capacity	Reduced by 4.5 HP
Power factor	Increased from 0.65 to 0.85
Water yield	Increased from 17 litres per second to 21 litres per second
Energy consumption	Reduced from 10,800 kWh to 3,510 kWh per year

Total energy supplied by NPCL is distributed as follow: 12% for agricultural pump sets; 64% for large industry and 24% for residential, institutional and small industry consumers.

Programme Objectives

The NPCL distribution system servicing the agricultural sector was characterised by high line losses, energy waste in running pump sets (7,500 kWh per agricultural consumer per annum), low revenue generation (selling price of INR0.46 per kWh against purchase cost of INR2.97) and high levels of theft and pilfering of electricity.

Consequently, the main objectives of the Agricultural Pump Set Efficiency Improvement Programme were:

- to achieve energy savings by improving the electrical performance of the pump motors through high efficiency;
- to increase the power factor above the average of 0.65 for conventional agricultural pump sets;
- to reduce line losses by converting low voltage supply to high voltage; and
- to inculcate responsible behaviour by customers towards the use of electricity and water by deploying metering at pump sets.

Programme Description

The programme was designed to showcase the benefits available from improving agricultural pump set performance through retrofitting with high efficiency motors of an optimum size matched to the average load of the pump. To begin, the NPCL staff conducted a survey of existing pumping systems to identify opportunities to improve efficiency, particularly in relation to the power factor and appropriate sizing of motors.

The project then replaced existing conventional belt-driven motor shaft coupled pump sets of 7.4 horsepower capacity with new higher efficiency, lower capacity 3.0 horsepower mono block pump sets. Additional capacitors to increase the power factor to 0.85 were installed with a metering system for the pump station. To reduce line losses, high voltage lines on the power distribution system in the area were extended, while insulated low voltage lines were installed at the grid connection point of the pumping systems.

To motivate customers to make the change, a funding mechanism was offered to all agricultural customers that provided free pump sets and a mix of 70% debt and 30%

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Table 2. Total Cost for Replacement of a Conventional 7.4 HP Pump Set with a High Efficiency 3.0 HP Pump Set	
Expenditure Item	Actual Cost
New mono block pump set	INR8,500
New high voltage line and transformer	INR75,000
Metering arrangements	INR8,000
Total	INR91,500

equity in the purchase and installation of capacitors and metering systems. NPCL also provided the conceptual design, technical support and administration for the programme. NPCL staff carried out the evaluation of the potential for extending the high voltage distribution system and pump set suppliers verified the efficiency levels of existing pumping systems.

NPCL and local community institutions worked together to promote and encourage agricultural customers to participate in the programme. Customers were given access to pump sets and provided with information on usage and system parameters for evaluation.

Monitoring and evaluation was undertaken to monitor progress and to report on the impact of the programme. NPCL used an energy audit as one of the monitoring and evaluation tools and took data output from meters installed at local substations and recorded the hourly performance from pump station logbooks. NPCL also used in-house technical personnel to analyse operational reports from the field and relied on local community organisations for assistance and guidance.

Photo: Flickr, CC

Results

From the perspective of NPCL, the reduction in peak load and energy demand resulting from the implementation of this programme:

- Reduced the cost of supplying electricity;
- Fostered customers relations; and
- Contributed to environmental benefits in society.

This article was contributed by David Crossley of Energy Future Australia Pty. Ltd. For more information on this case study and others, visit Task XV, Network Driven DSM at www.ieadsm.org/ViewTask.aspx?ID=17&Task=15&Sort=1.

www.ieadsm.org

Visit the DSM Programme's web site for easy access to reports, news and contact information.

The DSM Spotlight is published several times a year to keep readers abreast of recent results of the IEA Demand-Side Management Programme and of related DSM issues. IEADSM, also known as the IEA Implementing Agreement on Demand Side Management, functions within a framework created by the International Energy Agency (IEA). Views, findings and publications produced by IEADSM do not necessarily represent the views or policies of the IEA Secretariat or of the IEA's individual member countries.

For more information on the Programme, its work and contact addresses, please visit our website at **www.ieadsm.org**

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