DSMspotlight
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The Newsletter of the International Energy Agency Demand-Side Management Programme

DSM Brings Balance to Energy Systems

The acronym DSM (Demand Side Management) is highly connected to the regulatory regime experienced in the United States during the 1980s and early 1990s. The concept was that the regulated (monopoly) suppliers of electrical energy should have incentives to reduce the energy demand rather than build new power stations when activities on the demand side were the least costly alternatives. The planing process for the operations was called Integrated Resource Planning (IRP) and was designed to encompass both supply and demand.[1]

IEA DSM Programme Mission

To promote energy efficiency and DSM for global sustainable development and for business opportunities.

This interpretation of DSM, as being an instrument for monopoly regulation and being a tool for energy suppliers only, however is not universal. A view more dominant in European practice and one that is accepted by the IEA DSM Implementing Agreement is that the term "Demand Side" applies equally to all types of energy systems and activities on the demand side and can be undertaken by many actors, not only the suppliers. DSM can be looked upon either traditionally, as a tool to be used to change the demand for energy or more generally, as a tool for society to better use and distribute scarce resources. In both cases, at least as far as this Agreement is concerned, the main thrust and reason for DSM activities are due to the necessity to increase energy efficiency and receive better value for the capital invested in the energy system.

Focusing on the service (output) provided by the energy (input) and the equipment (transforming energy into service) opens up the way for many new combinations of services and also for new providers, see Figure 1 below.

The differences in valuation between demand and supply sides have motivated different approaches to tackle the problem. It has been shown that for an optimal energy system, the investments should be allocated to maximise the benefits over the costs. Hence, small investments in energy efficiency should be given priority over larger

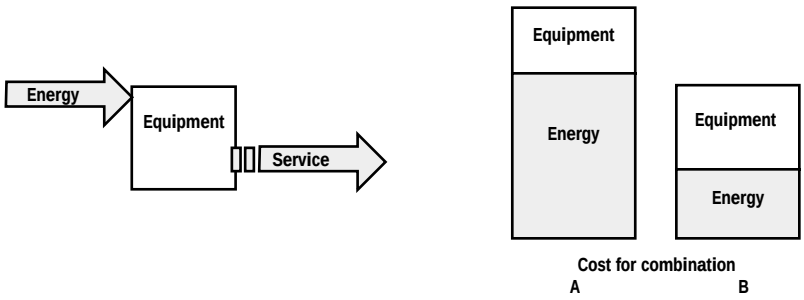

Figure 1. Energy plus Equipment delivers service. Service is obtained at different costs depending on the combination of energy and equipment. In case B more efficient equipment is used which requires less energy supply for the same service output.

[1] The term IRP is sometimes misleadingly used when only alternatives on the supply side are considered.

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COUNTRIES PARTICIPATING IN THE IEA DSM PROGRAMME

Australia
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Sweden
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United States

New Work

DSM Programme Initiates

Evaluation Guidebook on the Impact of DSM and EE Programmes for Kyoto's GHG Targets

The experts of Task I, International Database on Demand-Side Management, have proposed that the Task's work be taken a step further by developing guidelines to evaluate EE and DSM programs that have been implemented. With a desire to achieve their Kyoto targets, many countries want to know the impact that their EE and DSM programs are having on energy use and greenhouse gas abatement in addition to the costs.

The objective of this new subtask is to develop, test and promote an evaluation guidebook for government and non-government EE programs and utility-run DSM programs that are targeted at energy end-users and focused on meeting Kyoto targets. By evaluating DSM and EE programs, countries can ensure that harmonized, if not uniform, program information can be developed. Through this international collaboration, a better basis for a cross-country evaluation of national or regional programs can be created. Also, the quality of evaluations in each country can be improved at a lower cost, and the impact of EE and DSM programs on changes in emissions can be based on a common framework.

Since evaluations can cover a broad spectrum of items—number of participants, program duration, results, cost and avoided cost, energy savings, etc.—the new work will focus on:

- Programs that are targeted at energy end-users, excluding supply-side and R&D programs
- Program elements essential for cost effective CO_2 reduction measures. Modeling, analysis of energy indicators and specific program evaluations will be included, but will this not be the main focus.
- National and international (e.g., EU SAVE Program) programs.

A workshop to prepare a proposed work plan will be held 19 April 2001 in Utrecht, the Netherlands.

For more information contact the Task I Operating Agent, Harry Vreuls of NOVEM, the Netherlands, e-mail: h.vreuls@novem.nl and fax +31 46 452860.

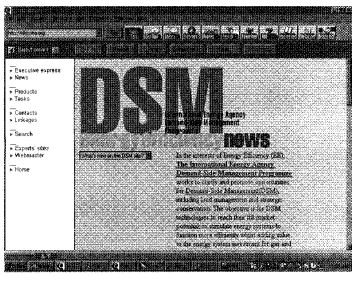
New Products and Services in Competitive Electricity Markets

Traditional utilities are having to change to meet the demands of privatization, deregulation, environmental concerns, development of IT technology and increased competition for customers. With these changes, many electricity companies are cutting back or terminating their DSM programs. Due to these power sector reforms, it is essential that a clear understanding of the roles of the utility industry, government and third parties (including ESCOs) need to play in promoting customer DSM and EE services. This new Task will work to clarify these roles in a competitive electricity market by:

- Studying what types of products and services related to DSM and EE are offered by the different playerson a commercial basis.
- Clarifying why and how these new products and services are offered (utility strategies).
- Assessing what the effects are on EE and the environment.
- Studying the potential that new products coming onto the market have based on existing pilot projects.
- Studying how government or regulations can stimulate the demand for the new products and reduce barriers in the market.

The results from this work are intended for utilities, third parties and governments. It is expected that the results will stimulate utilities and third parties to develop new commercial products, and governments to promote the acceptance of energy efficient and environmentally friendly products.

This Task is in the Task Definition Phase. For more information contact the Task XI Operating Agent, Seppo Kärkkäinen of the Technical Research Center of Finland, e-mail: seppo.karkkainen@vtt.fi and fax: +358 9 456 6538.



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invest The European Union (EU) has estimated an efficiency potential of 10-20% in the use of electricity in Europe. The realization of such a potential would save 10-20 billion ECU per year in the use of fossil fuels, reduce power plant capacity by 40,000-80,000 MW, saving 80-160 billion ECU in capital, and reduce CO_2 emissions by over 100 million tons.[2]

The liberalisation of markets and the desire to find instruments to deal with greenhouse gas emissions further underline that DSM is a concern for society if we are to understand the allocation of resources and take action to re-establish balance where necessary. Deregulation of monopolies in energy supply, however, reduces the interest of suppliers to support improving energy efficiency. Therefore, it is necessary to find new actors, and to re-regulate or create special incentives to make companies participate.

The structure of a liberalised market
The roles of a deregulated market will become more distinct, but also more fragmented, as cooperation among the parts are reduced.

As outlined in Figure 2, the generators in a liberalised market sell competitively into a power pool in order to dispatch and satisfy demand. Retailers, and some large consumers, buy the power from the pool and sell it competitively to customers. Generators and retailers hedge their exposure through all sorts of contracts, including third-party contracts. The monopoly network businesses receive mostly regulated transmission and distribution charges for the use of their wires.

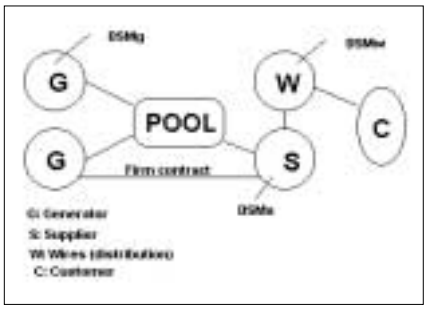

Figure 2. Structure of a liberalised market.

Table 1

	DSM to avoid new capacity	DSM to use capacity	DSM to position in market
SOCIETAL interest	YES	YES	--
COMPANY interest when business is vertically integrated	NO (but could be done subject to regulation)	YES (primarily for valley filling)	NO
COMPANY interest when market is deregulated			
a) Generators	a) NO	a) YES (valley filling)	a) –
b) Suppliers	b) NO	b) NO	b) YES (but limited)
c) Distributors (wires for Transmission and Distribution)	c) YES	c) YES	c) NO

Table 2

Market Form	Prices and Pricing	Investments	Security of Supply
Regulated monopoly	Costs distributed across customers	When Demand> Supply	Defined and agreed
Transition[3]	Fierce price competition by generators and retailers for market shares	When Revenue> Cost (but low activity due to over capacity)	Normally defined
Fully competitive market	Price taking	When Revenue> Cost	■ Ancillary service developed ■ Defined as products

Society may have a strong desire for energy resources to be used optimally, but find that the possibilities are limited due to the organisation and structure of the market. In a market with a vertically integrated energy supply, all the DSM measures can be overseen in the same company. In a deregulated market, companies may decide to participate in DSM activities for several reasons:

1. To avoid the costs for new capacity. The company may find few incentives for doing so, but due to competition, the risks are lower than increasing capacity.
2. To position the company in the market and to use energy efficiency as a tool in marketing. This becomes more important as price competition reaches its limits.
3. To maximize its wire capacity. Transmission and distribution companies are interested in flattening the load curve and postponing investments.

The interests and opportunities for energy companies under different market structures are shown in Table 1.

The gradual change of market functions towards liberalised systems creates a sit-

[2] Preparatory work for the draft IRP Directive made by Professor de Alemida.
[3] Some markets are fully liberalised and some only only partially.

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uation where the actors have to adjust to new rules of the game and where the rules can change to accommodate new behaviour. The present rules and their application could be said to be "in transitition" since they are not yet finally set, though the direction of the movement towards perfect competition with full transparency is the aspiration. See Table 2.

This transit situation and the present conditions also have bearing on energy security and its different aspects[4].

- System Reliability. Risk of power supply interruption can be lowered by a wider use of distributed power and embedded power in small systems when the transmission is the problem.
- Adequate Capacity Investment.The present overcapacity in systems is holding back new investments. With the traditional configuration of systems the power margin to enable meeting deliveries also under extreme conditions was deemed to be 20% (UCPTE rules)[5]. More small scale CHP and distributed power will also affect the risk of having "mono-technical" systems and fuel dependency.
- Fuel Diversification. See above.

The low prices in electricity markets today are due in part to reserve capacities being reduced or eliminated. However, much is due to the fact that in many countries competitive markets were introduced at a time of an overall excess of supply, but this can change quickly as seen in California and elsewhere. These actions will inevitably have some impact on the security of supply and merits deeper concern.

The Debate

In the 1980s and early 1990s, the arguments against increasing energy efficiency by involving the utilities stated that utilities would not conform to market functions, customer costs would increase, and it would be unfair to those who do not participate in the programs but would have to pay for its implementation. As the main idea of DSM is to reduce overall costs through sound energy management. DSM should be applied if it is cheaper than building new power plants and/or increasing capacity. In these cases, the resulting increase in costs will be lower than they would otherwise. Hence the expression Least Cost (or Integrated Resource) Planning.

Who is participating and who is paying is of interest, but not critical to the success of a DSM program. If it is possible to develop a program in which the participants pay the full cost, this will of course facilitate program implementation and make DSM more attractive to all parties as the costs are redistributed to all the customers and the program is easier to market. To the extent that DSM also contributes to the security of supply, it is also logical that the costs are distributed to everyone.

The present debate is focused on which customers are the most effective to target (small or big) to have a significant impact. Also related to this issue is how DSM service providers can be profitable businesses in their own right.

Conclusions

- **DSM** should be made a **general concept**, which relates to many activities tailored to improve the balance of energy systems and to make demand-side investments more comparable to supply-side investments, thus enabling a more rational use of resources for society.
- **Governments** should use Integrated Resource Planning **in their assessments** for policy setting.
- The importance of DSM measures and the relation of **improved energy efficiency to energy system security and diversification** should be further investigated and made subject to policy activities.
- **Energy service development for small customers** (households and SME) should be supported.

This article was contributed by Hans Nilsson of the IEA Paris and former chairman of the IEA DSM Programme. A full text version of this paper is available on the ECEEE web site at www.eceee.org.

[4] Electricity Market Reform. An IEA Handbook. IEA Paris 2000.

[5] Energy Efficiency in Poland. KAPE. Warszaw, 1999.

The DSM Spotlight is published four times a year to keep readers abreast of recent results of the IEA Demand-Side Management Programme and of related DSM issues. The viewpoints or policies expressed in this newsletter do not necessarily reflect those of the International Energy Agency, the IEA Demand-Side Management Programme member countries, or the participating researchers.

For more information on the Programme, its work and contact addresses, please visit our web site at
http://dsm.iea.org

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