

IEA DSM TASK XV

Network-Driven Demand Side Management



Background

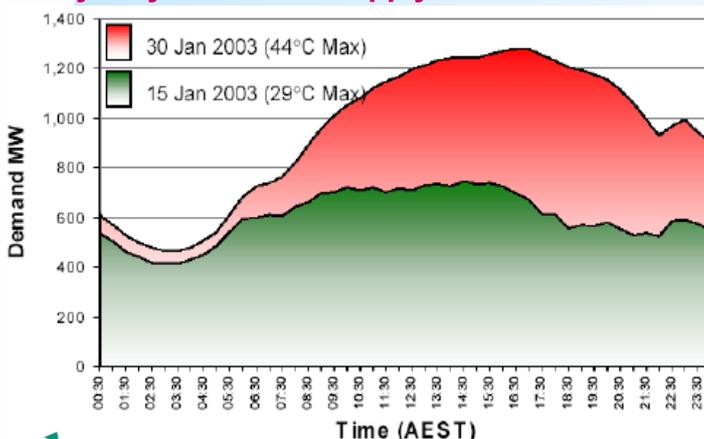
Task XV is the first broad and systematic investigation of the potential for DSM to effectively support electricity networks.

Problems in electricity networks are becoming significant in countries where electricity demand is increasing and network infrastructure ('poles and wires') is ageing. As loads grow and infrastructure reaches the end of its economic life, the potential cost of augmenting and providing support services for electricity networks is increasing exponentially.

Task XV is identifying and developing a wide range of DSM measures that can:

- relieve constraints on electricity distribution and/or transmission networks at lower costs than building 'poles and wires' solutions; and
- provide operational support services for electricity networks, achieving peak load reductions with various response times.

Sydney West Bulk Supply Point Load Profile



Peak Load—A Major Problem on Electricity Networks that Can be Addressed by DSM Measures

Main Activities

Task XV is investigating DSM measures which can be used to relieve constraints on electricity networks, whether these constraints are time-related (e.g., occurring at times of the network system peak) or location-related (e.g., associ-

ated with particular lines or substations), or both. All types of constraint are being addressed, including capacity limitations, voltage fluctuations, reliability issues, etc. Such network-driven DSM measures are often more cost-effective, and may also have lower environmental impacts, than network augmentation (i.e., building 'poles and wires').

In addition to relieving network constraints, DSM measures can also provide operational support services for electricity networks, including: reactive supply and voltage control, regulation and frequency response, energy imbalances, spinning reserves, supplemental reserves, and generator imbalances. Task XV also covers the use of DSM measures to provide network support services.

Task XV is identifying and developing a wide range of DSM measures which can be used to relieve electricity network constraints and provide network support services, including: energy efficiency, fuel switching, demand response, direct load control, ability to interrupt, load shifting, distributed generation, power factor correction and pricing initiatives.

Subtasks

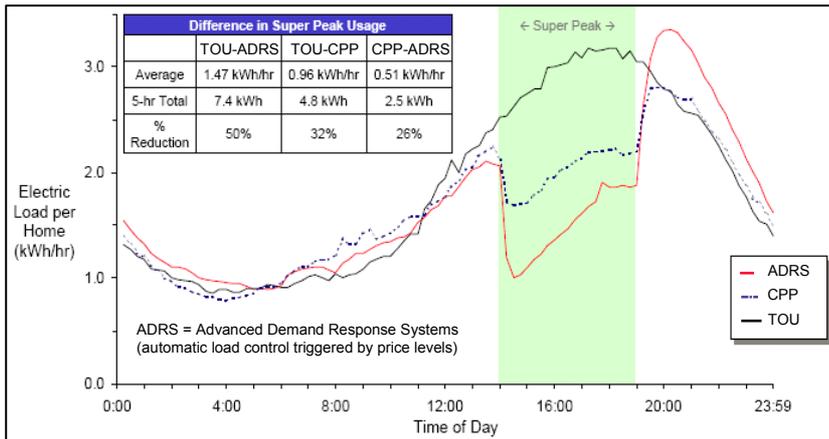
Task XV has six subtasks.

Subtask 1: Worldwide Survey of Network-Driven DSM Projects

In Subtask 1, 45 detailed case studies of network-driven DSM projects from around the world were researched and developed. These case studies provide detailed information about ways in which DSM measures can be used to relieve electricity network constraints and/or to provide network operational support services.

Subtask 2: Assessment and Development of Network-Driven DSM Measures

In Subtask 2, the 45 case studies from Subtask 1 were analysed to identify 10 main categories of DSM measures that can be used to achieve network-related objectives. The value propositions for these DSM measures were identified, including the specific network problems which each measure can successfully address. In addition, the factors which result in a network-driven DSM measure being successful in cost-effectively



Peak Load Reductions Achieved by Direct Load Control and Critical Peak Pricing in California

A survey of currently available load control and smart metering technologies is being carried out that focuses on the functionalities and capabilities of load control and smart metering devices that can be used to achieve network-related objectives. The load control and smart metering projects included in the Task XV case studies data base are being reviewed and new case studies developed to identify the factors that contribute to making such projects effective. Best practices in the use of load control and smart metering to achieve network-related objectives are being identified.

achieving network-related objectives were determined.

Subtask 3: Incorporation of DSM Measures into Network Planning

In Subtask 3, analyses were carried out of the interaction between network-driven DSM measures and the electricity market structures and regulatory regimes in each participating country. The network planning processes implemented in each participating country were also identified and characterised. Options were then developed for modifying network planning processes to incorporate DSM measures as alternatives to network augmentation.

Subtask 4: Evaluation and Acquisition of Network-Driven DSM Resources

In Subtask 4, 'best practices' principles, procedures and methodologies for the evaluation and acquisition of network-driven DSM resources were identified and developed.

Subtask 5: Communication of Information About Network-Driven DSM

Subtask 5 is operating continuously through out Task XV to communicate and disseminate information about network-driven DSM to relevant audiences, including representatives of electricity network businesses, government agencies and electricity end-users.

Subtask 6: Role of Load Control and Smart Metering in Achieving Network-related Objective

The objective of this new Subtask is to investigate in detail the role of load control and smart metering in achieving network-related objectives.

Results

Subtasks 1 to 4 have been completed and the results are summarized on the Task XV website.

An extension to Task XV began in July 2007 and will continue for about 12 months. This extension includes Subtasks 5 and 6 and involves both the original four participating countries plus India, South Africa and New Zealand (as a Sponsor).

Participants

Participating in Task XV is a very effective way of gaining valuable information about international experience in using DSM to support electricity networks. Since the costs are shared among a number of countries, the financial contribution required from each country is quite small compared with the benefits gained.

Participating countries:

- Australia New Zealand (*Sponsor*) USA
- France South Africa
- India Spain

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Task XV Website

<http://www.leadsm.org/ViewTask.aspx?ID=16&Task=15&Sort=0>