



INFORMATION PAPER NO. 6

ELECTRICITY DEMAND MANAGEMENT

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CONSUMER ADVISORY COMMITTEE

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1. WHAT IS ELECTRICITY DEMAND MANAGEMENT?

For the purposes of this paper, Electricity Demand Management (EDM) refers to initiatives (undertaken either directly by consumers or indirectly by electricity utilities or Governments) to modify consumer electricity demand patterns with the aim of meeting certain objectives.

These objectives are many and varied (refer Table 1), and may not always complement each other. In particular, EDM does not always seek to achieve a reduction in the level of electricity consumption.

Table 1 EDM Objectives

<u>Consumers:</u>	Reduce costs; improve comfort or amenity; cleaner environment.
<u>Utilities:</u>	Improve efficiency of operation of generating plant; defer need for new plant; improve supply reliability; defer need for network expansion; hedge risks in the National Electricity Market (NEM); improve customer service; improve financial performance; differentiate from competitors; be portrayed as responsible corporate citizen.
<u>Governments:</u>	Contribute to achievement of Government objectives for the electricity supply industry (ie competitive prices, reliable supply); efficient allocation of resources; enhance the environment (eg through reduction in greenhouse gas emissions).

Table 2 outlines the methods which each of the above groups might use to achieve such objectives.

Table 2 EDM Measures

Consumers:	Modify usage patterns (eg, through behaviour changes or electronic control equipment). Install more efficient equipment. Substitute gas, solar or other energy forms for electricity.
Utilities:	Seek to influence consumer demand patterns through <ul style="list-style-type: none"> - electricity management advisory services - marketing initiatives; - financial incentives (eg, time-of-use tariffs, demand tariffs, interruptible tariffs, reduction of cross subsidies); - direct control of demand.
Governments:	Seek to influence utility programs or consumer demand patterns through <ul style="list-style-type: none"> - electricity management advisory services; - financial incentives; - mandatory targets for utilities; - changes to NEC; - mandatory efficiency standards (eg, for appliances, buildings); - taxation initiatives (eg, carbon tax).



2. EDM ACTIVITIES OF THE SA GOVERNMENT

The SA Government has pursued various EDM initiatives over the past 20 years, both through ETSA (prior to privatisation) and through the Energy Division within the Department of Mines and Energy (now the Office of Energy Policy within the Department of Primary Industries and Resources).

2.1. 1980 - 1995

The Department of Mines and Energy had replaced the Department of Mines in the late 1970s following a major review of SA energy policy issues in the wake of the 1970s world oil crisis. Energy conservation was seen as having an important role to play in a comprehensive energy policy framework, but at that time the emphasis was on conservation of liquid fuels. Electricity demand management assumed somewhat greater importance during the 1980s, as issues of gas supply and price, and availability of local coals, created uncertainty about electricity supply and electricity price competitiveness in SA. However, the impact of EDM on these issues was unclear. Some modelling work undertaken in the late 1980s did seek to quantify the impact on ETSA (eg, in financial and supply reliability terms) of such generic EDM strategies as shifting load (from peak to off-peak periods) and reducing peak loads, and provided some further impetus for EDM initiatives in these areas. Furthermore, the rise of the Greenhouse issue from about 1990 focussed attention on the need to increase the efficiency of electricity usage in all end-use sectors.

Major EDM initiatives by the State Government during this period are summarised in Table 3.

Table 3 EDM initiatives by SA Government, 1980-1995

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| <ul style="list-style-type: none"> ▲ Establishment of Energy Information Centre, and related measures, to inform consumers about EDM. ▲ Establishment of Government Energy Management Program to assist Government agencies in reducing energy costs. ▲ Low energy housing demonstration programs. ▲ Joint work with Commonwealth and other States in developing: <ul style="list-style-type: none"> - energy labelling for appliances; - minimum energy performance standards for appliances; - home energy rating scheme; - energy targets for commercial buildings. ▲ Research into EDM technologies via SENRAC and other funding sources. ▲ Fostering co-generation initiatives in the industrial and commercial sectors. |
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2.2. Current

In early 1999, the State Government released for public comment, a draft Energy Policy Framework statement, which sought to articulate the Government's overall approach to energy policy in an environment dominated by market-based reforms.

The draft statement emphasised that a sustainable energy sector, characterised by new and innovative energy efficient end-use technologies and practices and use of renewable energy technologies, is a key aspect of the Energy Policy Framework. The statement also noted that open and competitive national markets for electricity and gas are fundamental to a sustainable energy sector, providing new opportunities for technologies based on renewable energy, co-generation and energy efficient services to compete with conventional energy sources. A sustainable energy sector is also essential to assist in meeting international obligations to reduce Greenhouse gas emissions.

The Office of Energy Policy continues to co-ordinate State Government EDM programs and policies. The programs are similar in scope to earlier initiatives outlined in Table 3, but are at a more advanced stage of implementation. Many EDM programs are implemented nationally, with joint State and Commonwealth involvement. Furthermore, a significant level of funding is now available through the Australian Greenhouse Office, reflecting the commitment of the Commonwealth Government to meet international targets for reduction of Greenhouse Gas emissions.

The Office of Energy Policy is currently establishing a new enhanced "sustainable energy web site" which will shift the emphasis of energy advice/information to a more dynamic web-based specific service delivery.

In order to provide sufficient momentum for sustainable energy programs, particularly programs associated with Greenhouse objectives, several jurisdictions have found it necessary to establish separate statutory authorities with the express purpose of developing and implementing such programs. In July 1998, the State Government introduced into Parliament legislation to establish the SA Sustainable Energy Authority. This legislation has now lapsed. The proposed functions of the Authority were to:

- ▲ investigate and promote the development, commercialisation and use of sustainable energy technology;
- ▲ provide information, education, training, financial accommodation and other assistance to persons engaged in the development, commercialisation, promotion and use of sustainable energy technology;
- ▲ advise other persons on matters relating to the development, commercialisation, promotion and use of sustainable energy technology;
- ▲ accredit schemes for the generation of energy from sustainable sources;
- ▲ perform any other function assigned by or under this measure or any other Act.

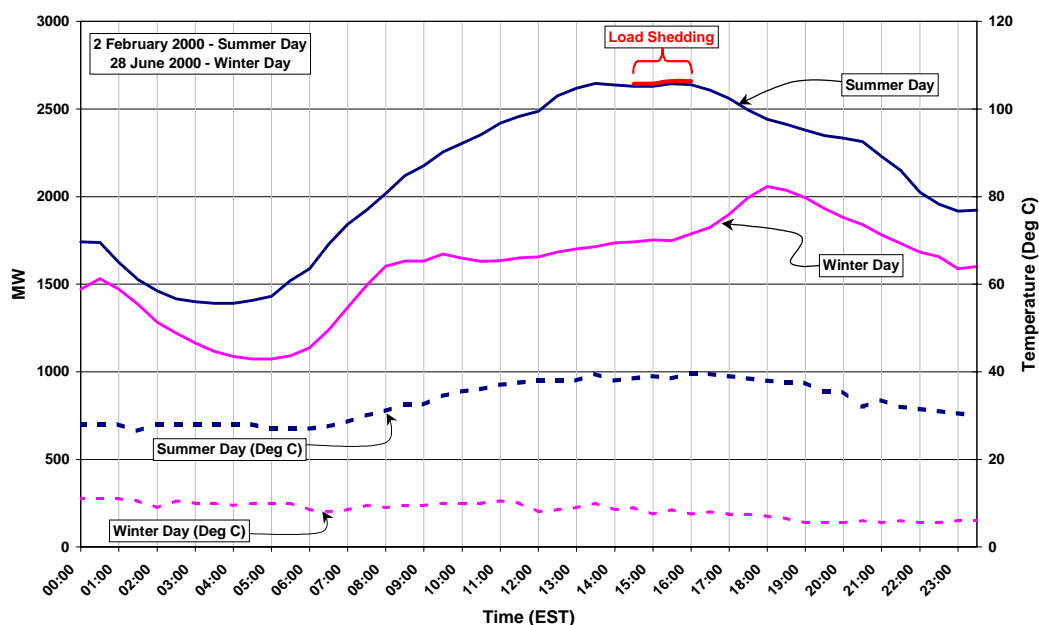


3. MANAGING PEAK ELECTRICITY DEMANDS

A further important issue for SA in terms of the relevance of EDM concerns the management of peak electricity demands. These occur during the summer period, driven particularly by domestic and commercial air-conditioning load. The Electricity Supply Industry Planning Council (ESIPC) provides a detailed review of these matters, and resultant impacts on the electricity supply/demand balance, as part of its Annual Planning Review published in September 2000. The Office of Energy Policy is also investigating these issues.

Figure 1 depicts the electricity demand profiles, and corresponding temperature profiles, for the peak summer and winter days during 2000.

Figure 1 – Peak Winter and Summer Demand Days



The ESIPC review highlights a number of issues, including the following:

- ▲ SA faces an impending electricity supply/demand imbalance, with a possible capacity deficit by 2001/02 *given the currently committed generation projects*.
- ▲ The need for new generation capacity is driven primarily by growth in system peak demands. Near-peak demands occur very infrequently. In SA, the average demand is about 45% of peak demand, while demands in excess of 2600 MW occur for just a few hours each year.
- ▲ Growth in peak summer demand is outstripping that of peak winter demand. For example, peak summer demand has increased by about 25% (or 500 MW) since the mid-1990s, with peak winter demand increasing by about 15% (270 MW) over the same period. The ESIPC

estimates that, over the last three years, the contribution of sales of new air conditioning units to increases in peak summer demand has been about 60 MW per annum.

- ▲ EDM could be used to reduce peak load and the need for additional generating capacity (eg through interruptible contracts between retailers and large customers). However, the scope for such a contribution in the context of the NEM is unclear at present (refer also Section 4 of this paper).

The management of peak summer electricity demands in SA is an important short-term issue for the State. AGL SA has recently launched a “Switch it Off” campaign, endorsed by the SAIR, to advise consumers about appropriate techniques to reduce electricity demands at such times without compromising comfort.



4. EDM AND THE NATIONAL ELECTRICITY MARKET

A key issue concerns the continued relevance of EDM in the context of the NEM. A number of observations can be made on this matter:

- ▲ The goals of the NEM and those of EDM are broadly complementary. Outcomes which are economically efficient should advance long-term cost effective EDM options. In particular, pricing which is more cost reflective (by time of day, customer category and geographic region) should act as an incentive for EDM initiatives by consumers.
- ▲ Competition between retailers should also lead to the development of a greater range of EDM choices for consumers, as retailers seek to differentiate their products.
- ▲ Structural changes in the electricity supply industry, however, may have weakened the utility rationale for EDM, since the impacts on individual components of the industry (retailers, network businesses, generators) are difficult to evaluate, particularly in the context of the NEM which is characterised as a set of loosely connected regional markets. Retailers may be in the best position to influence consumer demand patterns, but the benefits of EDM may be in another sector (eg, reduction in peak summer demands is felt in the generation sector). A retailer may strike a deal with a consumer for an interruptible contract, but the details and impact of such a deal could be unknown to the system controller.
- ▲ International Greenhouse gas emission targets will continue to be a key driver of Government initiatives to promote energy efficiency programs within the electricity sector. The manner in which such environmentally-driven programs are implemented in the context of a competitive electricity market is a source of uncertainty.

The National Electricity Code Administrator (NECA) has recently been reviewing what it terms “demand-side participation” in the NEM. This review has included undertaking a survey (of contestable customers and market participants – ie electricity retailers, network service providers and generators) to understand attitudes to such participation, as well as publication of a consultation paper on possible NEC changes designed to enhance demand-side participation.

The consultation paper, dated September 2000, notes that demand-side participation can add value to the broader market through:

- ▲ direct participation in the energy market as a demand-side bid (an option already permitted under the NEC), independent customer price responsiveness as a wholesale market participant or under a retail tariff arrangement;
- ▲ provision of ancillary services, for example, for frequency or voltage control, under contract to NEMMCO or through competitive bidding under likely revised ancillary service arrangements; and
- ▲ network services, for example, for localised voltage control and peak or contingency load management.

The present Code provisions for demand-side bidding are rarely used by end-use customers. The proposed Code changes seek to address the perceived disincentives to demand-side bidding through a restructuring of the arrangements for such bidding.

Customers who participated in the NECA survey almost exclusively purchased electricity under fixed price contracts which provide full protection from the price volatility of the pool. The overwhelming driver for participating in demand-side programs amongst these customers was the prospect of financial gain. Many of the surveyed customers agreed that some form of incentive ought to be developed to promote voluntary demand-side response as a means of freeing up system capacity during peak periods. Amongst the surveyed market participants, the main factors influencing demand-side projects included managing exposure to pool prices, regulatory requirements, customer relationships, and increased asset utilisation (network service providers).

The survey report suggested that mechanisms to encourage greater demand-side participation would need to focus on:

- ▲ refinement to the NEC (as is already proposed);
- ▲ improving customer understanding of the NEM (particularly wholesale market, risk management issues and the benefit of demand-side participation);
- ▲ encouraging greater participation in the market by specialist third-party demand-side aggregators and co-operatives; and
- ▲ encouraging jurisdictional regulators to review the rules governing the regulated functions of the market to ensure that appropriate signals exist to encourage (or, at least, not discourage) demand-side responses as an alternative to traditional network capacity upgrades.



5. A ROLE FOR THE SAIIR

The various regulatory documents for which the SAIIR has some administrative responsibility contain only limited explicit references to EDM. However, consideration of the EDM option may be implied more broadly in these documents. Relevant provisions are summarised in Table 4 below:

Table 4

INDEPENDENT INDUSTRY REGULATOR ACT 1999

Nothing explicit in the defined functions of the SAIIR (S.5(1)) although S.5(1)(d) states a function of the Industry Regulator is to assist consumers and others with information and other services: this could realistically require provision of information on demand management opportunities. Indirectly, achievement of the objectives of S.5(2) may require support for EDM, particularly:

- promotion of economic efficiency;
- facilitation of entry into relevant markets;
- prevention of misuse of monopoly or market power.

ELECTRICITY ACT 1996

The objects of the Act (S.3) include the promotion of efficiency and competition in the electricity supply industry, inferring support as appropriate for EDM options. The Act also places obligations on the SAIIR to include in distribution and retail licences the provisions outlined below.

Section 6C of the Act establishes the Electricity Supply Industry Planning Council. Functions of the Council which are relevant to a consideration of EDM include:

- development of overall electricity load forecasts;
- preparation of advice on matters relating to the future capacity and reliability of the SA power system; and
- preparation or review of proposals for significant projects relating to the transmission network in SA (taking into account possible alternatives to those projects such as the augmentation or extension of a distribution network, the construction or augmentation of the capacity of a generating plant and measures for reducing demand for electricity from the transmission network) and to make reports and recommendations to the Minister and the SAIIR in relation to such proposals.

RETAIL LICENCES

The following provision is contained at Clause 13 of the AGL SA licence and Clause 11 of the licence held by each contestable retailer:

- (i) The Licensee must investigate strategies for:
 - (a) achieving a reduction of greenhouse gas emissions to such targets as may be set by the Environment Protection Authority from time to time or such levels as may be binding on the Licensee from time to time; and
 - (b) promoting the efficient use of electricity and the sale, as far as is commercially and technically feasible, of electricity produced through co-generation or from sustainable sources.
- (ii) The Licensee must prepare and publish annual reports on the implementation of the strategies set out in Clause (i).

DISTRIBUTION LICENCES

The following provision is contained at Clause 14 of the ETSA Utilities licence:

- (i) Before undertaking any significant expansion of its distribution network, or the capacity of its distribution network, the Licensee must investigate whether it would be cost-effective to avoid or postpone the expansion by implementing measures for the reduction of demand for electricity from the distribution network.
- (ii) The Licensee must prepare and publish reports in relation to the investigations and measures carried out by it pursuant to this clause.

RETAIL CODE

Clause 12 of the Retail Code (currently applicable only to AGL SA) provides that:

A retailer must provide to a residential customer on request and free of charge:

- (a) general advice on how a residential customer may reduce its electricity costs;
- (b) advice on how, and at what estimated cost, a residential customer may arrange for an energy audit of the customer's supply address; and
- (c) advice on the typical running costs of major domestic appliances.

Clause 6.3 of the Retail Code requires the retailer to implement measures which might assist the customer in assessing its electricity consumption (and hence ways in which the consumption might be reduced), including specification on a bill of the customer's current average daily usage and the average daily usage for the same period in the previous year.

The SAIIR's primary long-term role in the electricity supply industry, to regulate prices and standards of service and supply for the distribution network, arguably could involve consideration of the role of EDM. In particular, price structures should support cost-effective EDM options, while network expansions which have not been appropriately evaluated against alternatives such as EDM should not be incorporated into the regulated asset base.

An important function of the SAIIR is to assist consumers with information about the electricity supply industry (refer S.5.1(d) of the Independent Industry Regulator Act 1999). In particular, consumers need access to information about the NEM and its impacts, including EDM options. There is presently a shortage of objective and practical information for SA consumers about such issues. The SAIIR should seek to fill this gap, in concert with relevant Government agencies.

In summary, the present regulatory arrangements do not confer on the SAIIR a major explicit role in promoting EDM. However, the SAIIR has broader implied powers to encourage equitable consideration of EDM options if considered necessary. The SAIIR could amend licences and Codes to take on a stronger explicit role.



6. CONCLUSIONS

This paper has reviewed issues and options associated with implementation of EDM, particularly in the context of the NEM. Key points are that:

- ▲ Consumers, utilities and Governments bring a wide range of objectives (not always complementary) to the consideration of EDM options.
- ▲ Successive SA Governments have initiated a number of EDM programs over the past 20 years in response to changing energy policy priorities. Current initiatives, with a strong emphasis on programs, are co-ordinated through the Office of Energy Policy.
- ▲ Management of peak summer electricity demands is an important issue for SA, given the current state of electricity supply options.
- ▲ There is a current shortage of objective and practical information for consumers about the NEM and its impacts, including EDM options.
- ▲ The goals of competitive energy markets and EDM are broadly complementary. However, structural changes in the electricity supply industry have weakened the utility rationale for EDM. NECA has reviewed the issue of demand-side participation and is proposing Code changes. Demand-side programs are unlikely to play a major role in the NEM until Code changes are implemented and consumers are given additional incentive to participate in such programs.
- ▲ The Greenhouse issue will continue to be a key long-term driver for energy efficiency programs in the electricity sector.

It is not considered that the SAIIR has a major role in promoting EDM at the present time, particularly if other areas of Government are fulfilling this role. However, in the short term it should:

- ▲ ensure that relevant licensees comply with current licence and Code provisions concerning EDM;
- ▲ liaise with the Electricity Supply Industry Planning Council, the ACCC and relevant licensees concerning the evaluation of EDM options as an alternative to expansion of the transmission or distribution network – ie seek to better understand the means by which such an evaluation can be performed;
- ▲ ensure that EDM issues are considered in current preparatory work for the first distribution price review;
- ▲ develop, in liaison with relevant Government agencies, information programs for consumers concerning the operations of the NEM, including the options for demand-side participation.