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Progress Report to Advocacy Panel – Project No. 118

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Introduction

It is known that there is significant variation in the absolute level of demand (in kW or kVA) placed on the network by different households. It is also known that there is significant variation in the overall volume of energy consumed by different households. All households are subject to identical network tariffs and similar retail tariffs based purely on overall levels of consumption and not peak demand.

If peak demand is found to be in reasonable proportion to consumption then existing tariff structures can be said to provide an equitable and efficient price signal. However, in reality some level of cross-subsidy between households of different types will occur.

This project is seeking to determine the extent of the cross-subsidy and whether the types of households involved can be characterised.

Mechanisms for pricing electricity supply to households based on more than simple consumption are more complicated and hence are likely to involve costly metering systems that may absorb any benefits available. By determining the characteristics of households and their relative contribution to peak demand it may be possible to establish simple, cost-reflective pricing mechanisms.

Methodology

Activities to date include:

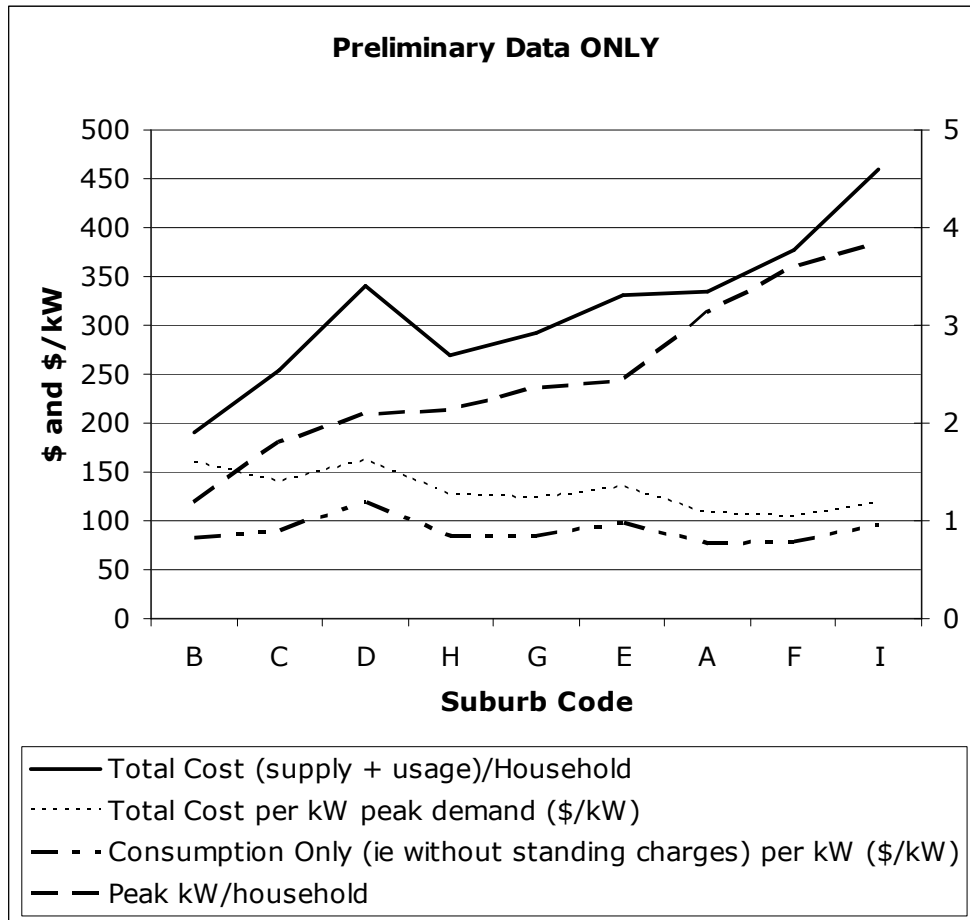
- the analysis of ETSA 'pole top' data from a number of Adelaide suburbs (serving residential customers only, focussing on the particularly hot summer of 2000-01);
- a review of relevant ABS data;
- contact through industry networks to determine whether any other useful data exists; and
- regular meetings between Monica Oliphant, South Australian Housing Trust (Murray Hutchesson), the Energy Division of the South Australian Government Department of Transport Energy and Infrastructure (Mark Pedler) and Sustainable Focus (Jake Bugden and Andrew Nance).

Preliminary findings

Analysis of pole top data has focussed on trying to understand the degree of variation in the extent to which different households contribute to peak demand on the network compared to their relative contribution to the associated costs (ie through differing levels of overall energy consumption).

The available aggregated data sets for the chosen suburbs provide a fairly broad cross section of typical housing types in metropolitan South Australia (Adelaide). Further, the data can be correlated to survey information regarding the type and number of air-conditioners in use in the subject households as well as limited other household characteristics.

Preliminary analysis is showing significant variation in per-household 'peak demand' (from 1.2 kW to 3.8 kW – as a diversified average across the suburb sample) and, more importantly, significant variation in the associated contributions to network costs (from approx \$104/kW to over \$160/kW of peak demand per annum) that appear to relate strongly to the influence of fixed 'Supply Charges'. Refer to the following chart.



Supporting information has also been found in the 2005 release of ABS Publication “Domestic Use of Water and Energy, South Australia, October 2004” (ABS cat. no. 4618.4). The report categorises data by tenure type – home owners, mortgagees, for “renters with a govt housing authority” [ie South Australian Housing Trust (SAHT), Aboriginal Housing Authority (AHA) and SA Community Housing Association (SACHA) - around 51,800 households] and “other renters” as well as by income quintiles – and reports on type of air conditioner (and number).

Points of interest in the ABS work to date include:

- tenure type rather than income provides significantly stronger indicators for air conditioner penetration. We expect that tenure type is closely related to the building construction type in relation to “renters with a government housing authority” as these tend to be smaller dwellings with other known construction attributes.
- 90% of housing authority renters either have no air conditioner or use one mounted in a wall or window. These units are unlikely to have a power draw of more than around 2kW – about the same as boiling the kettle. 66% of the lowest income decile are in the same situation and 62% of ‘other renters’ fit the same criteria. The average figure for all households is 49%.

Further work

In completing the project by the end of February, 2006 as per the funding agreement we intend to undertake the work detailed below.

Further analysis of pole top data

Further analysis of the available pole top data to expand on the preliminary findings presented above, including:

- narrow the data to focus on characteristics during the summer peak period;
- from July 1st 2005, ETSA Utilities (the monopoly Distribution Network Service provider for SA) has introduced a two-part residential network tariff that provides the first 4,000 kWh of annual consumption at a lower rate than subsequent consumption (approx 17%). This may have a moderating effect on the variation in \$/kW reported above and efforts will be made to incorporate this into the analysis;
- the preliminary analysis indicates that suburbs at the lower end of the \$/kW range tend to have greater air conditioner penetration (particularly of ducted systems) and those at the higher end tend to have not only lower penetration but report smaller air conditioners. Analysis will be performed to try and better identify correlations with air conditioner information; and
- preliminary data analysis demonstrates graphically the impacts of house design on energy consumption. Further analysis will allow the identification of trends regarding energy use, peak demand and house design.

Analysis of additional ABS data

The ABS has collected information relating to energy consumption (billing data) from over half of their sample. This data is still being analysed by the ABS and is hoped to be available by early 2006 in time to be able to be incorporated in this study.

Final report

Prepare a final report including recommendations for further data collection (including sample sizes) as well as to identify household or home construction attributes that can characterise any confirmed inequities in the contributions households make to the cost of peak demand in South Australia.

If possible data will be presented in the format of load duration curves and estimates of 'Load Factor' (ratio of the average to peak load) to allow comparison with network wide information presented by the Electricity Supply Industry Planning Council (ESIPC) in their Annual Planning Report.