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Managing consolidation in the gas boom: Making joint ventures work

When a large number of people use their high-energy appliances simultaneously, it can result in a peak in electricity demand and a corresponding rise in electricity prices. Demand peaks and troughs occur daily, and supply is met through a combination of base-load and 'peaking' generation plants at a variety of price points (see Figure 1).

Australia has a particularly 'peaky' electricity demand profile, and during hot summer afternoons it is not uncommon for use of appliances such as pool pumps, air conditioners and plasma televisions to result in demand peaks requiring generators to ramp-up production and place strain on electricity transmission and distribution assets (see Figure 2).

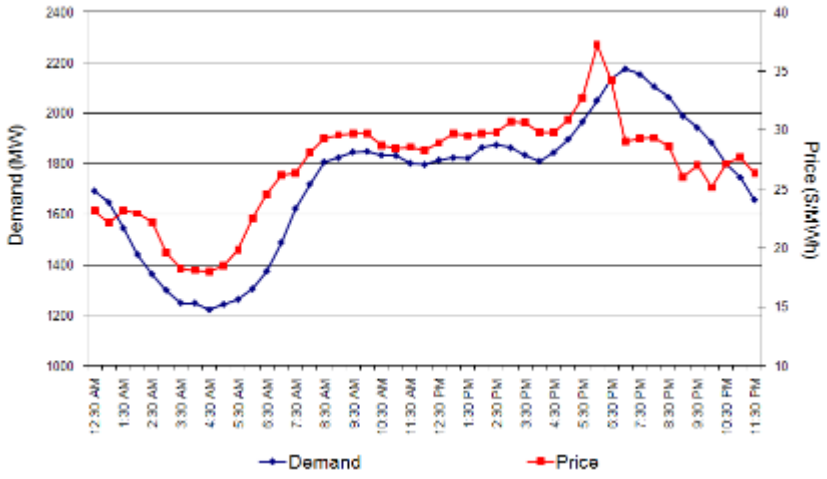

Figure 1: Example daily demand and price curves for a winter day in South Australia, with peak demand occurring between 4:30pm and 7:30pm. As supply responds to demand signals, price closely follows the demand curve.

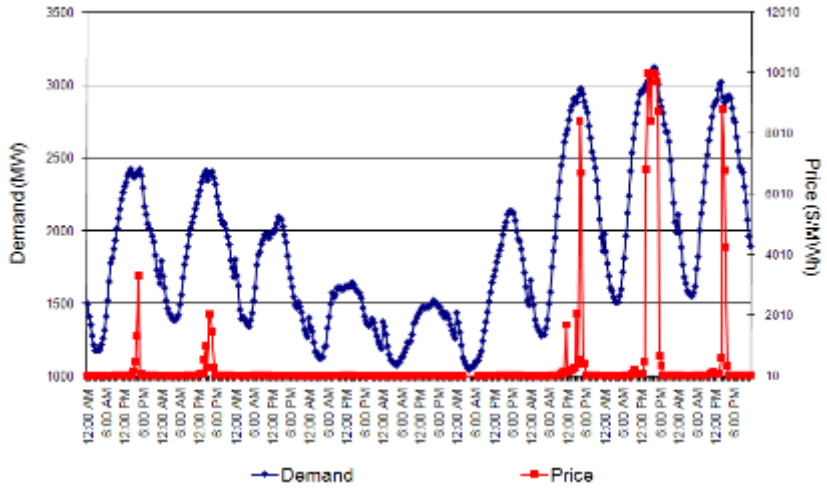

Figure 2: This example from South Australia during summer months shows extreme price events driven by peak demand over a 10 day period. In Australia, demand profiles tend to have particularly high peaks on days of very high temperature, where peak load is often associated with significant

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price spikes.

There is no doubt that building an infrastructure of peak generators and electricity networks with sufficient capacity to meet peak demand, which only occurs a few hours each year, is an expensive approach. To overcome the apparently never-ending investment in 'capacity upgrades', utilities and regulators alike have begun to look seriously at ways to reduce peak demand, investigating or investing in a raft of demand side management (DSM) initiatives. DSM is an industry term used to describe non-network alternatives to asset investment to reduce strain on network capacity caused by high peak demand through better management of real-time power consumption.

However, implementing a DSM program is no simple task. In Australia's disaggregated electricity markets, the interests of consumers, retailers, and distribution business can seemingly conflict and it may become the role of industry Regulators to determine who shall be responsible for DSM. This debate covers social, economic, technical and regulatory ground and may affect regulations, policy, consumer behaviour, retailer products and distributor services for many years to come.

Direct load control

Direct load control occurs when network operators remotely control a customer's power supply or energy devices. Operators are trialling devices which, when fitted to energy intensive appliances, enable them to be remotely switched off (or on) during peak demand periods or 'cycled' so that appliances are turned off for only very short periods on a rotating basis for customers in a given supply area. Whilst presently only deployed in customer premises on a voluntary basis, the roll-out of smart meters will allow distribution businesses to cycle loads across the entire network.

Distribution businesses typically have a preference for direct load control in order to optimise investment planning decisions and real-time network operations, balancing power requirements and investment constraints. In some cross-industry forums, distribution businesses have been pushing for the regulatory mandate to directly control load, without prior consumer consent. They argue it is favourable compared with the alternative; load shedding and brown-outs.

Customers may benefit in the long-term through the reduced need for capacity-based network investment and a better managed network with less brown-outs. However, the customers whose loads are under direct control are unlikely to experience any short-term benefits unless regulators mandate some level of compensation.

Voluntary load control – customer driven

Voluntary load control is achieved by raising customer awareness of peak consumption and its associated costs, and providing incentives for them to reduce power consumption when required.

Consumer groups are much more likely to advocate voluntary load control strategies where the customer has more choice and more control on consumption behaviours.

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Experience in the water industry with drought awareness and water saving campaigns has shown that the general public are capable of responding positively to conservation messages provided they are 'engaged' and well informed. In the electricity industry there are fewer examples, but Western Power's current "Power Down" advertising campaign aims to engage consumers around a message to conserve power between 4:00pm-9:00pm daily. As Managing Director of the Energy Networks Association, Andrew Blyth foresees, "*in the future, smart networks will enable ordinary Australians to take control of their energy usage in real time, which can lead to lower emissions and cheaper energy bills*".

This highlights that key to any consumer led voluntary load control is customer access to, and engagement with, real-time consumption information. The consumer maintains the benefit of choice and freedom of consumption though may indeed pay a higher price for it.

Voluntary load control – third party management

In the absence of consumer engagement, third parties, such as retailers, energy management companies (e.g. Energy Response, EnerNOC) or potentially even distribution networks may control a customer's energy on their behalf. This already occurs in the NEM, with customers receiving a small payment for having their load switched off during peak prices in the market. Similarly to customer driven load control, the amount of peak load that can be controlled will be a direct relation to the aggregate customers willingness-to-pay for peak load, and the incentives they receive to have their load controlled.

Working all angles

In reality, the most effective approach to DSM will incorporate all the above-mentioned approaches. Voluntary load control via pricing signals and public information campaigns may be enough to produce positive results on a broad scale, and customers may choose to "opt-in" to direct load control schemes by network companies. However, network peak load issues are often localised and there may be instances where peak load is not sufficiently reduced through voluntary load control in a given region. In such instances, the optimal cost-benefit trade-off for consumers may be a mandated direct load control scheme rather than a major network upgrade in that region.

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The challenge is how to manage multiple approaches within a single energy market and grid. Optimal DSM will require a concerted and coordinated effort from network businesses, regulators, government, retailers and consumers, where the benefits are equitably shared across distribution networks and consumers.

Where direct load control over certain customer devices is mandated, regulations over the level of control, and circumstances for the control of these loads will be critical to protect consumer interests. In addition, regulators need to remain cognoscente that DSM technologies contribute significantly less to a network business's regulated asset base and therefore may not be as financially attractive in the long term. Regulatory funding for DSM initiatives (such as the Australian Energy

Regulator's 'Demand Management Incentive Scheme' or the 'D Factor' scheme applied in NSW) coupled with well-considered rules for benefit sharing between network business and customers will be crucial.

Retailers can play a critical role in improving customer access to consumption information and benchmarks. Without this information, voluntary measures are not really feasible, let alone likely to be successful. Indeed we are yet to see the impact of a consumer base that is engaged and thinking about energy consumption patterns when purchasing devices, when using devices, when considering new energy production and storage technologies (such as solar energy production or battery storage in the home) and when selecting rate plans and tariff structures from electricity Retailers.

To achieve this level of consumer awareness, the information campaigns need to start sooner rather than later, and customers need transparent access to information about their own consumption patterns, what they can do to change, and a clear understanding about the real costs and benefits.

The challenge for government and regulators is to establish appropriate policies and legislation to allow this to happen.

In order for DSM to be fully effective, empowering customers, network operators and energy retailers, an appropriate level of access to customer consumption data is required. In Australia, legislation around customer data 'ownership' is immature and places significant limitations on data access for customers and retailers, even where smart meters are deployed such as in Victoria. Debate around data ownership and access continues and will be the topic of a future QSI article.

MARCHMENT HILL consulting

Marchment Hill Consulting has offices in three locations which serve Australia and New Zealand, Asia and the Middle East.

Melbourne
Level 4
530 Lonsdale Street
Melbourne VIC 3000
Ph: 03 9602 5604
Fax: 03 9642 5626

Brisbane
Level 5
199 George Street
Brisbane QLD 4000
Ph: 07 3012 7242

Perth
Unit 14
123a Colin Street
Perth WA 6005
Ph: 08 9322 5422

marchmenthill.com

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