



**Asia-Pacific
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Agenda: D2 6


Demand Response / Smart Grid Interfaces for Appliances – The Need for Global Standards

Submitted by: Australia





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 Australian Government
Department of Climate Change
and Energy Efficiency



Demand Response/Smart Grid interfaces for appliances – the need for global standards


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APEC EGEE&C 37 Meeting - March 2011

 **thinkchange** www.climatechange.gov.au

What I will cover?

- The problem of electricity system peak load
- The promise of the 'smart grid'
- Australia's plans for 'demand response' interfaces for selected appliances
- The need for international standards
- How APEC can help develop these

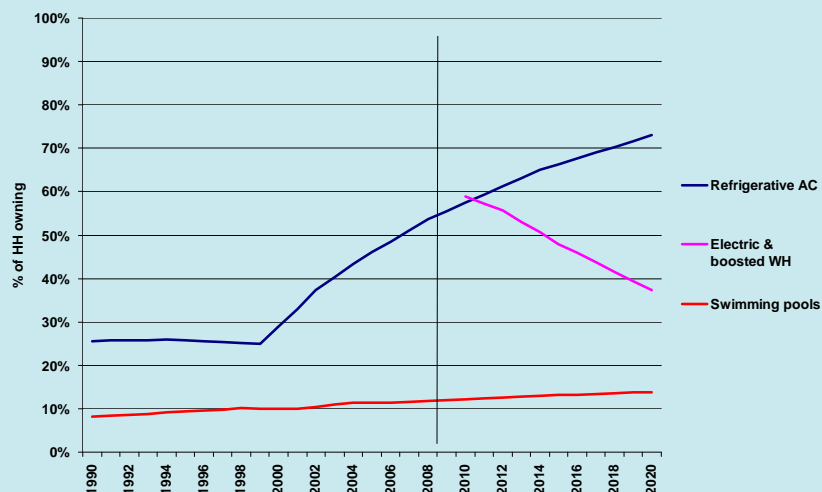
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Appliance contribution to peak load

- Household air conditioner use rising fast
 - 57% of households in Australia – will reach 73% by 2020
 - All Australian State elec systems now summer peaking
 - Air Cond use is driving economics of networks
 - \$45 billion investment in next 5 years – pushing up bills
- Hotter & longer heatwaves; higher peaks
 - Air Cond-related supply problems in early 2000s, 2009, 2011
- Pool pumps also contribute to summer peak
- Electric vehicle charging will make matters worse



'Problem' appliance projections



Government policy to address this

- Review of energy efficiency policy impacts on peak load (2004) concluded that:
 - Energy efficiency for buildings and appliances good for energy/greenhouse, but little impact on critical peaks
 - Demand Response is the most cost-effective way to address peak load problems
- Demand Response (DR) is automated change in appliance operation in response to external signal
 - Could be Direct Load Control by utility (with agreement)
 - Could be determined by user setting price preferences



Additional drivers for DR

- Smart metering and dynamic pricing
 - Automated DR provides more effective means of long-term consumer response than in-home displays
- Management of renewables-intensive grids
 - DR can shift load into periods of high renewable generation (if appliances capable of it)
- Replacement of old-style water heaters
 - Phasing out greenhouse-intensive electric water heaters, which relied on rigid 'off-peak' tariffs
 - Heat pump and solar-electric water heaters work better on flexible tariffs with demand response

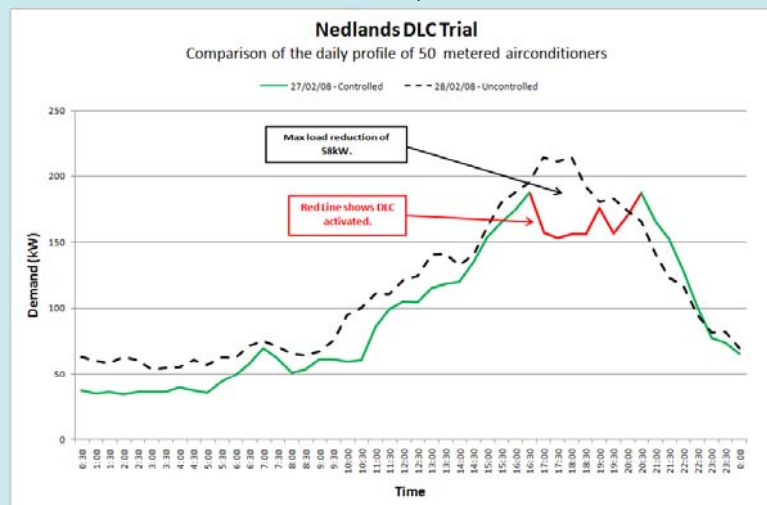


DR does work

- Proven in USA but Aust products & use different
 - Split unit Air Conds popular (not ducted)
 - Tend to be used only when hot (not all the time)
- Utility trials in WA, SA, NSW, Qld
 - Customers accept load control (may not even notice)
 - Achieves large reduction in substation peak loads
 - But costly to roll out on large scale because every air is different, hard to retrofit communications
- Standard interface reduces roll-out costs by 2/3



Actual trial results, Perth



Economic benefits

- Potential net benefit to community of \$A 13,600 million by 2025
- Equals \$170 saving per year per household
- Potential of 5,000 MW of controllable load during summer peak by 2025
 - 50% cycling, 30 hrs/yr activation
 - 10,000 MW available for emergency reductions
- Reduce network capital investment by 1/3



Standards Development

- Australia has published AS4755 for domestic use.
- Standards Australia is represented on IEC Strategic Group on Smart Grids (SG3)
- Australia has joined new Working Group of IEC TC59 (Appliances)
 - 'Home appliances interworking and interface between appliances for household and commercial use with Smart Grids'



Proposal for APEC workshop

- Many countries facing same challenges
 - How to realise potential of smart grids for appliances
 - US moves to recognise 'smart' products in Energy Star
- Australia proposes APEC workshop on Smart Grid/Demand Response standards for appliances
 - Suggest late 2011, probably in Asia, 2 days
 - Exchange information on country experience and plans
 - Explore options for convergence and harmonisation
 - Explore value of common APEC approach to IEC



To sum up:

- Smart grids need smart appliances
- Smart appliances will not achieve 'critical market mass' without standards
- The time is right to develop those standards
- APEC is ideally placed to help
- A workshop to exchange country information is a good place to start

