
Demand Response for Air Conditioners: a new use for labels

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What the energy label can do

- Introducing the energy label made energy important
 - » To product buyers
 - » To product suppliers
 - » To intermediaries
- Putting other things on the label can make them important as well

What the label says

- How much energy a product uses (kWh)
- How efficient compared with others (stars)
- Other useful things
 - » Capacity and output (kg, kW)
 - » Noise (eg for pool pumps)
 - » For Air Conds, whether heats as well as cools
 - » If it has special features that are not reflected in the energy test (eg variable output)
- And now...

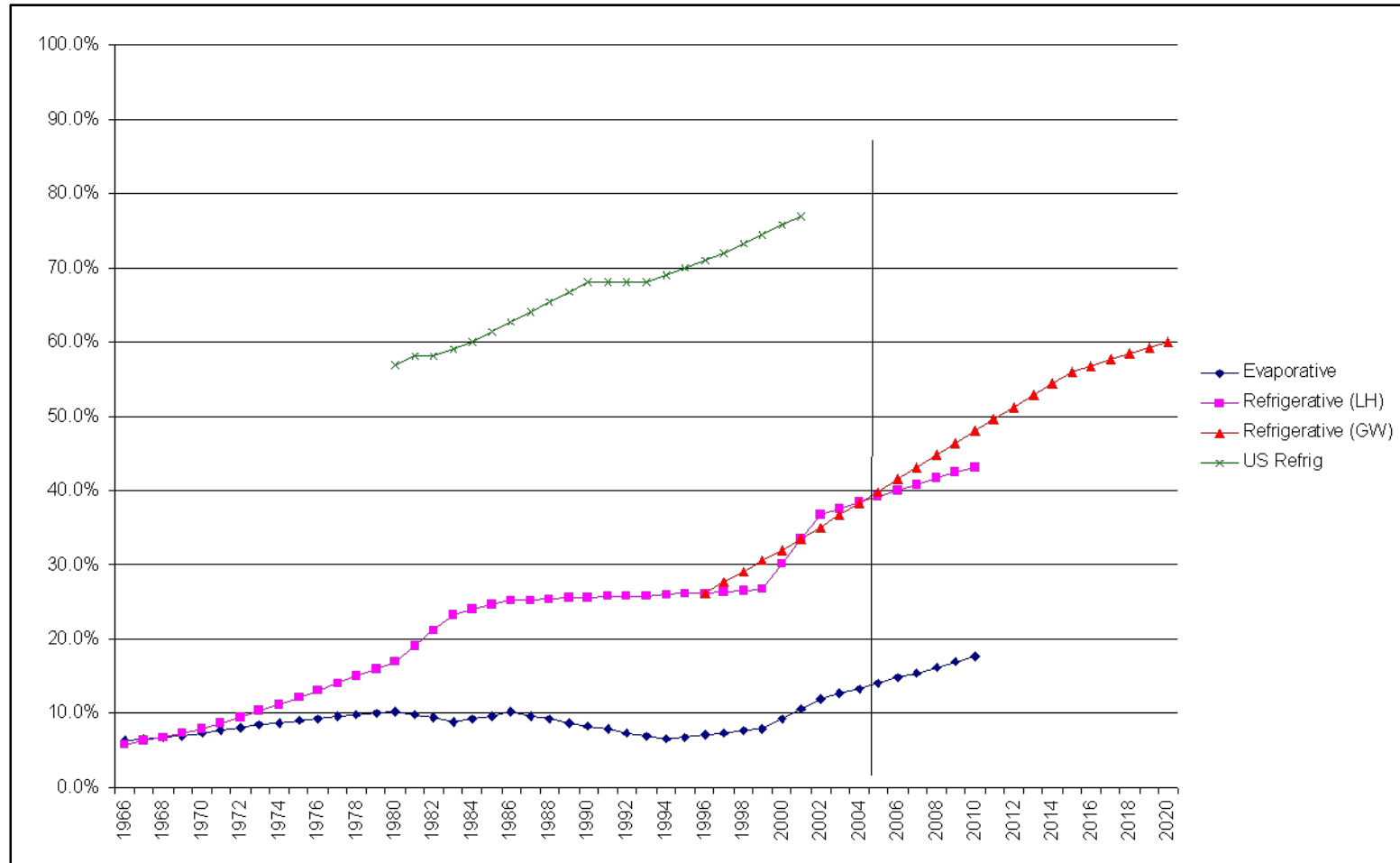
First, the problem...

- Australian energy label has covered Air Conditioners since 1986
- BUT AC ownership took off around 2000
- Household AC load caused summer peaks on electricity supply systems
- Brownouts in Perth, Adelaide, Melbourne in early 2000s
- Driving investment in electricity network

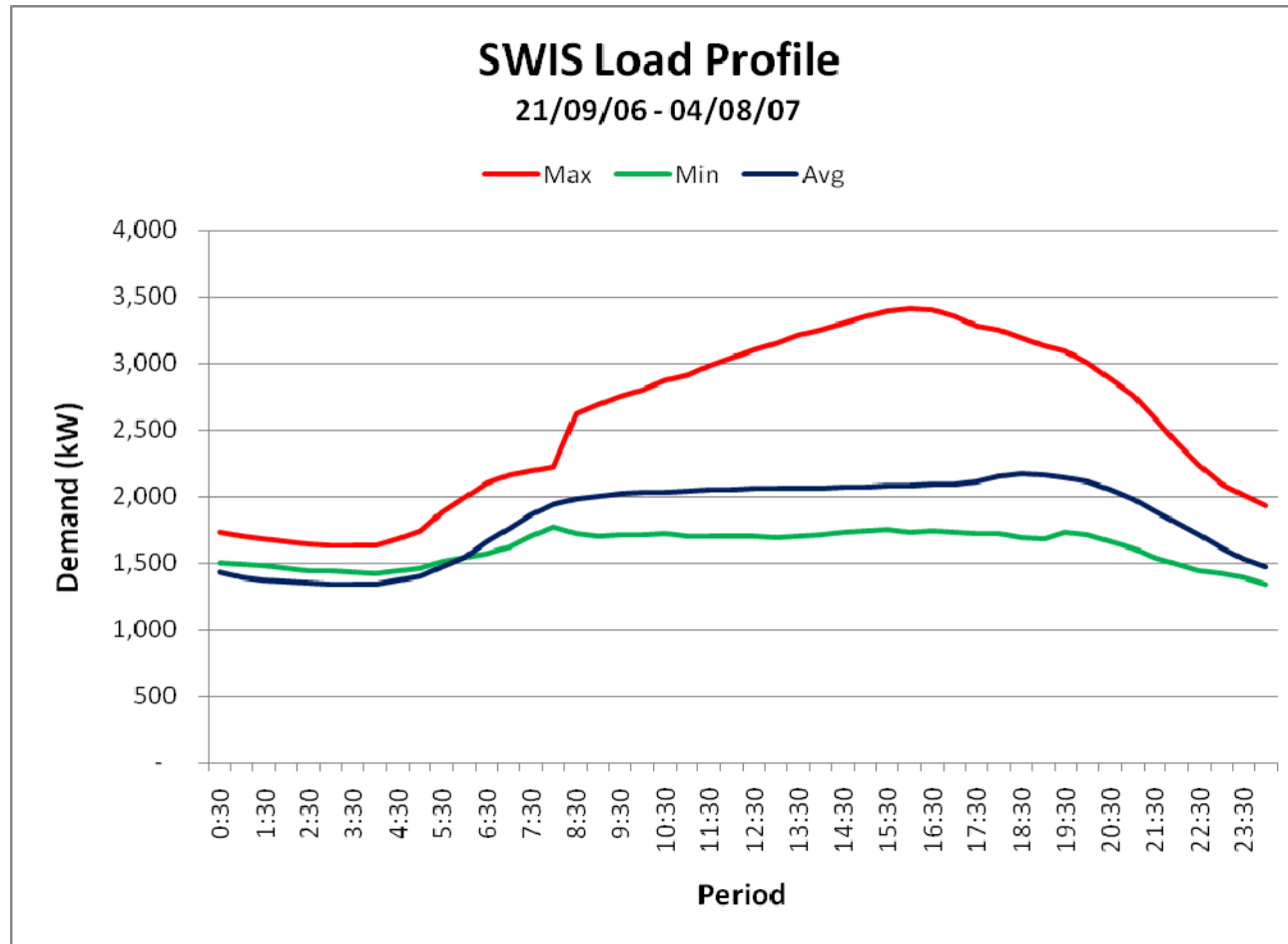
Why has AC ownership grown?

- Real AC prices have fallen
- Real incomes have risen strongly
- Real costs of operation masked
 - » Lack of price signals from utilities
- Long term promotion by some utilities
- Bundling with new home finance
- Poorly designed and shaded houses
- Growing noise, crime, high-rise stresses
- Early signs of global warming

% homes with AC, Australia



Peak day influence on demand



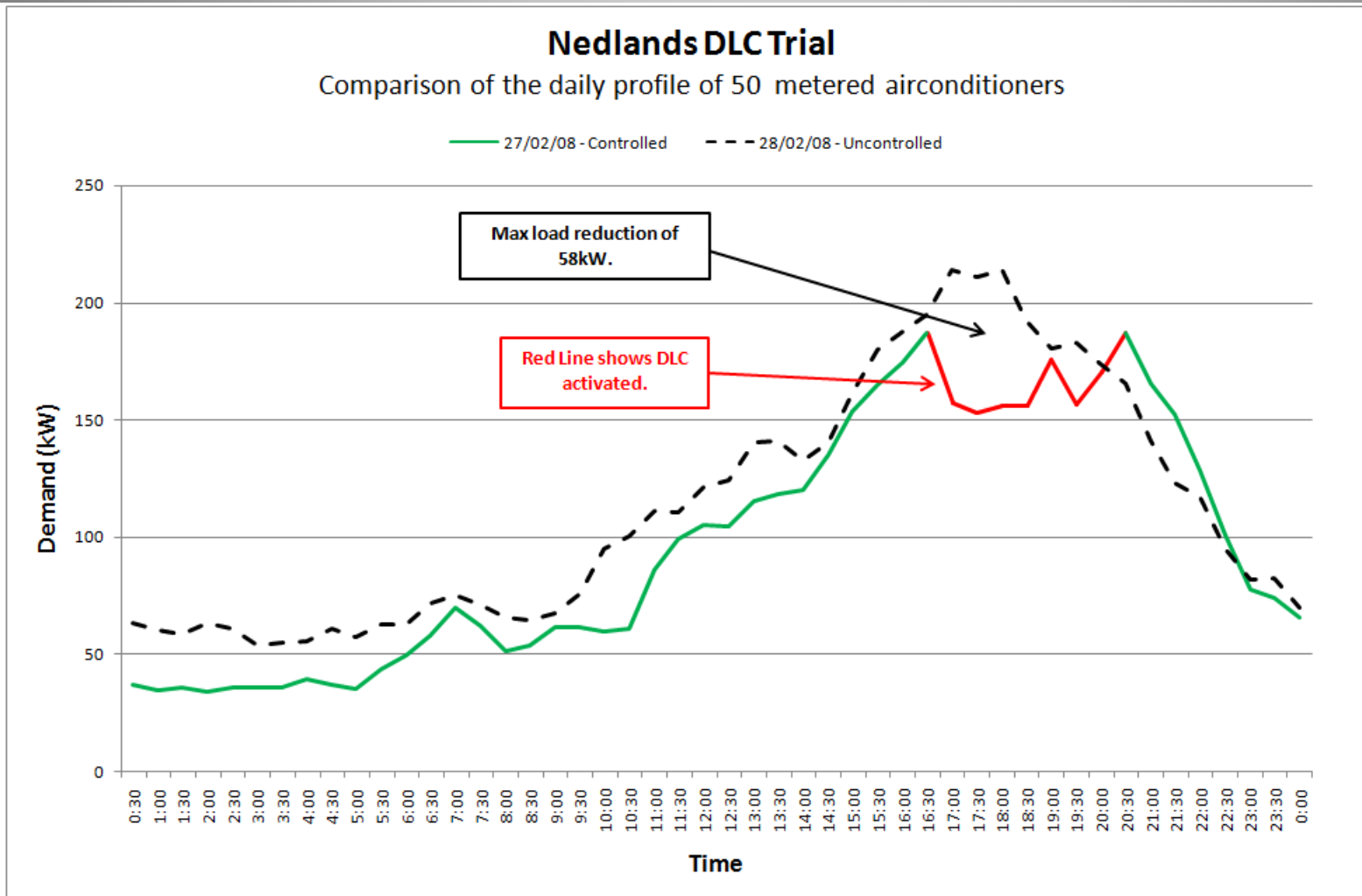
The solutions...

- Improve thermal performance of houses
 - » Yes, but slow (90% of 2015 stock already there)
 - » Did not slow AC growth in the past
- Improve efficiency of the Acs themselves
 - » Have had increasingly stringent MEPS
 - » Faster (90% of 2015 stock still to be made)
 - » BUT has not slowed AC growth in the past
- Decided in 2005 we need Demand response as well.

What is Demand Response?

- Defined in AS 4755-2007
 - » The automated alteration of an electrical product's normal mode of operation in response to an initiating signal originating from or defined by a remote agent
- Australian market dominated by split systems, so US approaches not applicable
 - » Capability already built into many products
 - » BUT not used because no easy way to access it

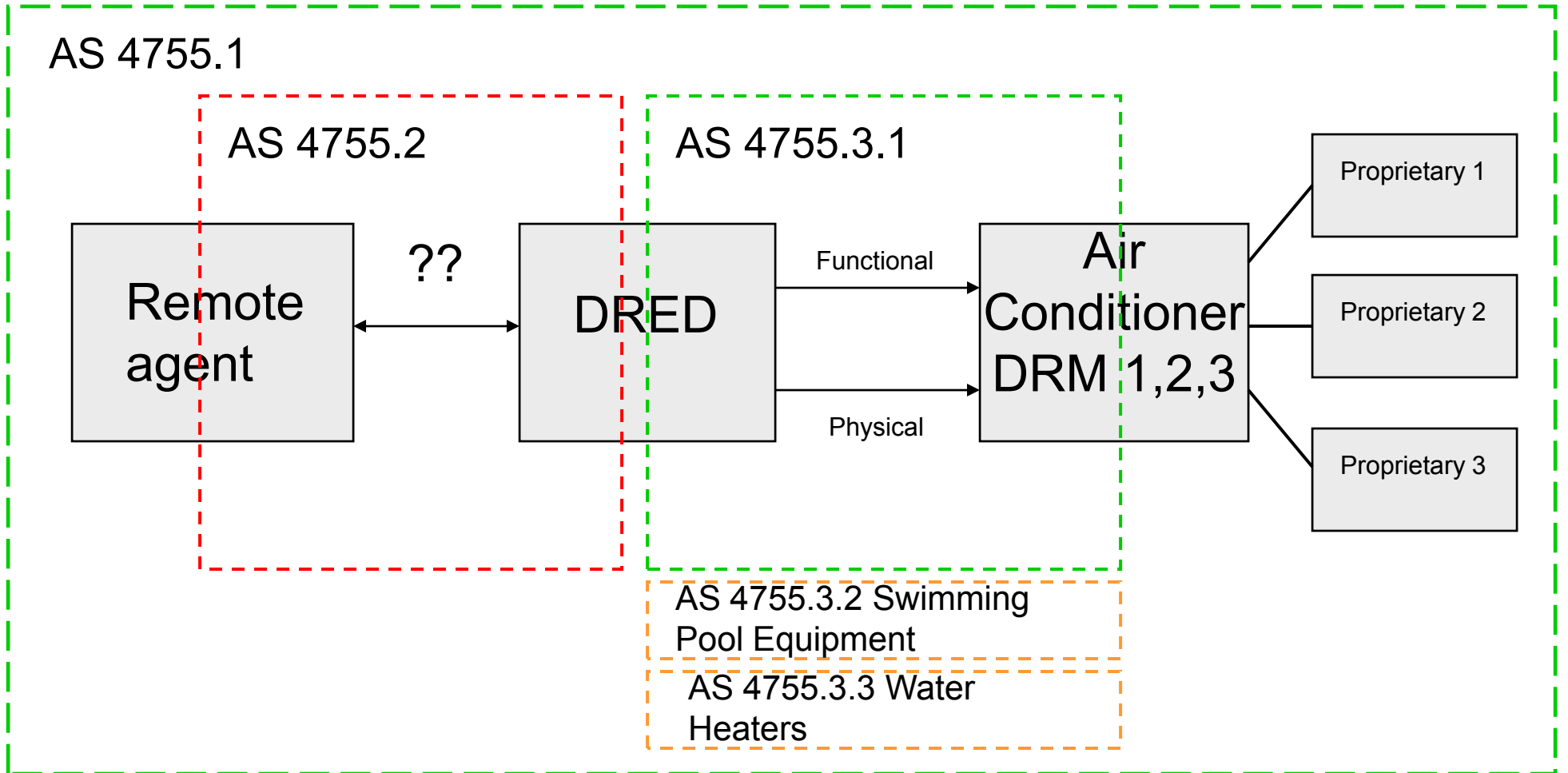
Is it effective?



But how to 'mainstream' it?

- AC suppliers need clear rules for what 'DR capability' is and how to provide it
- Electricity network operators need to know how to communicate with and connect the AC to a Demand Response Enabling Device (DRED)
- The key was a standard interface
 - » Allows both parties to get on with their core business
- Expressed in suite of new Aust Standards
- Could be model for international approach

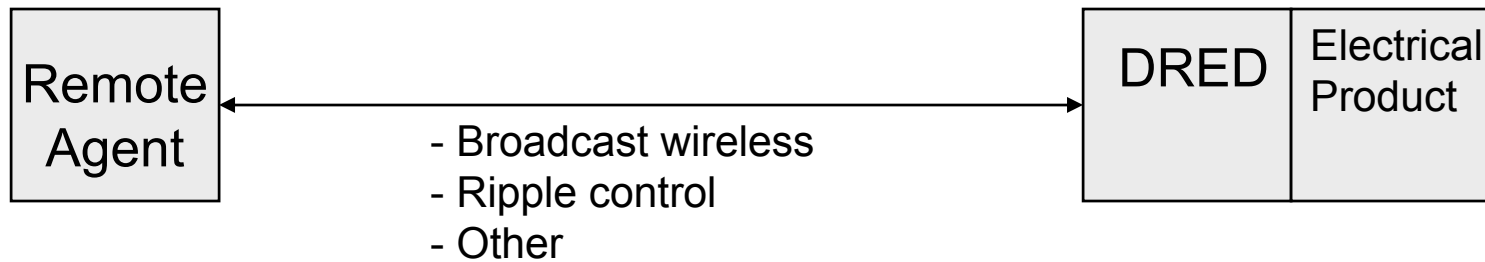
Demand Response Standards



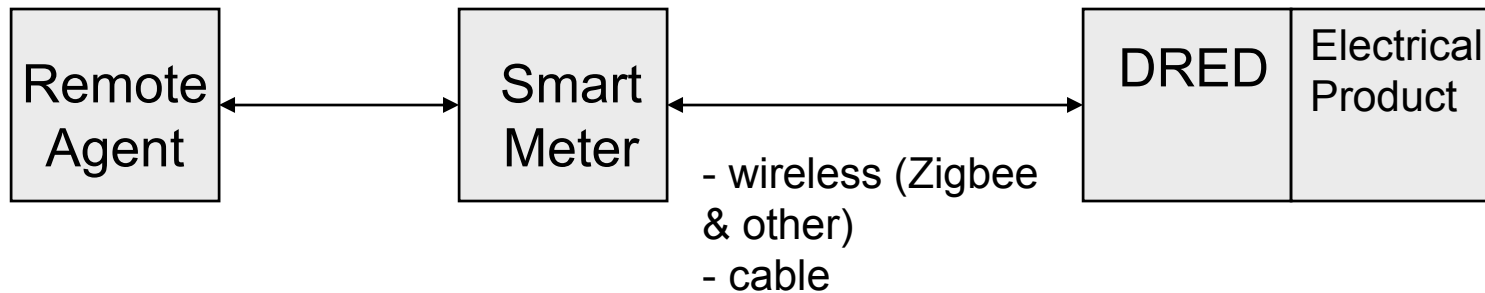
Features of AS 4755.3.1

- Physical LV connections from DRED to AC
 - » 4 terminals (3 DRMs and common) or RJ45
- DRM 1: compressor off
- DRM 2: $\leq 50\%$ of rated capacity
 - » Whether in heating, cooling or auto mode
- DRM 3: $\leq 75\%$ of rated capacity
- Complying products to have at least DRM 1
 - » Level (or absence) of DRM capability on register
 - » Level/s to be indicated on energy label

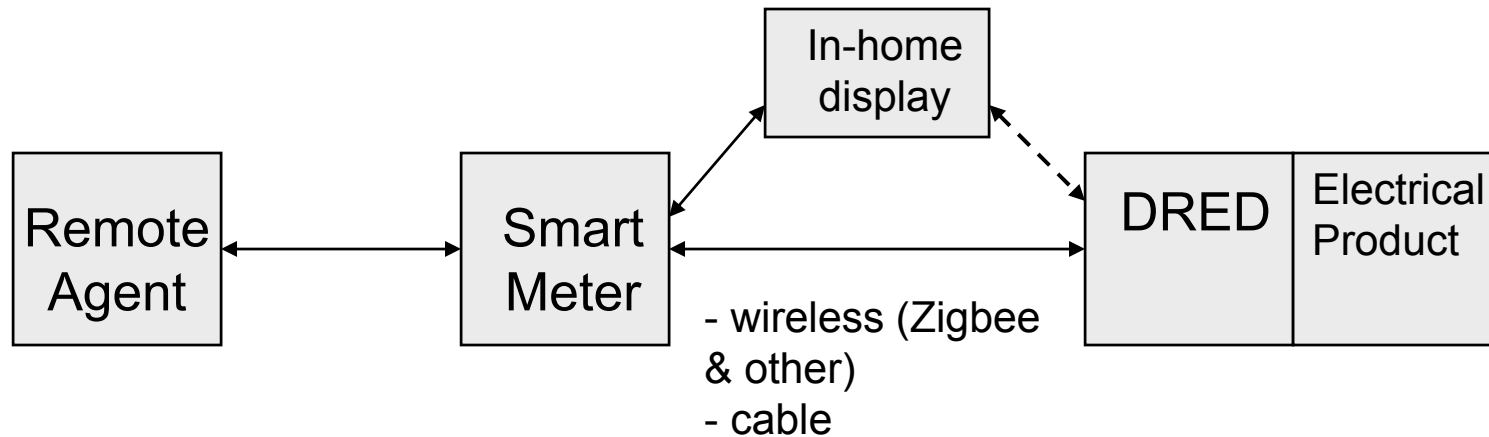
Possible configurations - 1



Possible configurations - 2



Possible configurations - 3



A standard is not enough...

- Need other drivers for suppliers to offer DR capability
- May be 'push' of network-funded rebates
- May be 'pull' from users on Time of Use (TOU) or Critical Critical Peak pricing
- May eventually be mandated

The energy label can help

- Enables buyers and energy utilities to identify DR-capable products
 - » Can support \$ incentive schemes, like water labels
- Energy label register will be resource for installers
 - » Search whether model is DR-capable
- Creates interest among AC buyers
- Collect data to support making DR mandatory



ENERGY RATING

A joint government and industry program
Kool and Kosy Komfort air conditioner
Model KRKM001

Capacity Output kW

Cooling 4.45	Heating 4.75
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Power Input kW

Cooling 1.61	Heating 1.64
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Variable output compressor YES NO

When tested in accordance with AS/NZS 3823.2
Actual energy use and running costs will depend on how you use the appliance

For more information, refer to
www.energyrating.gov.au

DRM (AS 4755)	1	2	3
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Next steps

- Once 4755.3.1 adopted, AC suppliers can start offering DR-capable products and labelling them
- Will need to register whether product is DR capable
- Work on DREDs (AS4755.2) has started
 - » Eventually, DREDs will migrate on to the product
- Several utilities already using AS4755 in negotiating with AC and DRED suppliers

Conclusions

- Energy label has done a good job on making energy efficiency important
- We can use it as a platform for making other product attributes important as well
- Of course, need to be selective
 - » Do not compromise the main message
 - » Do not overload the graphics
 - » Make sure info relates to main function of product

Further Information

- <http://www.saiglobal.com/shop/Script/Details.asp?DocN=MSWD08197ATCRD>
- DR 08297