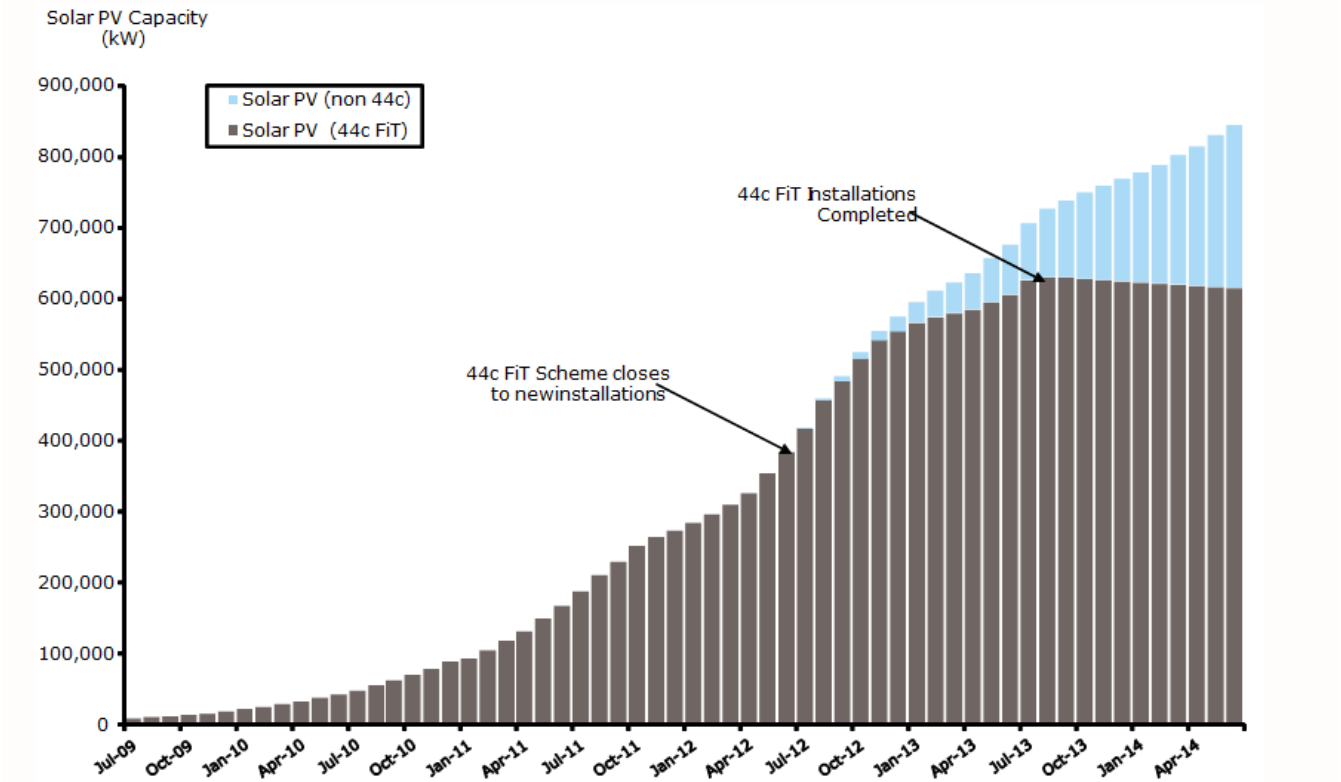
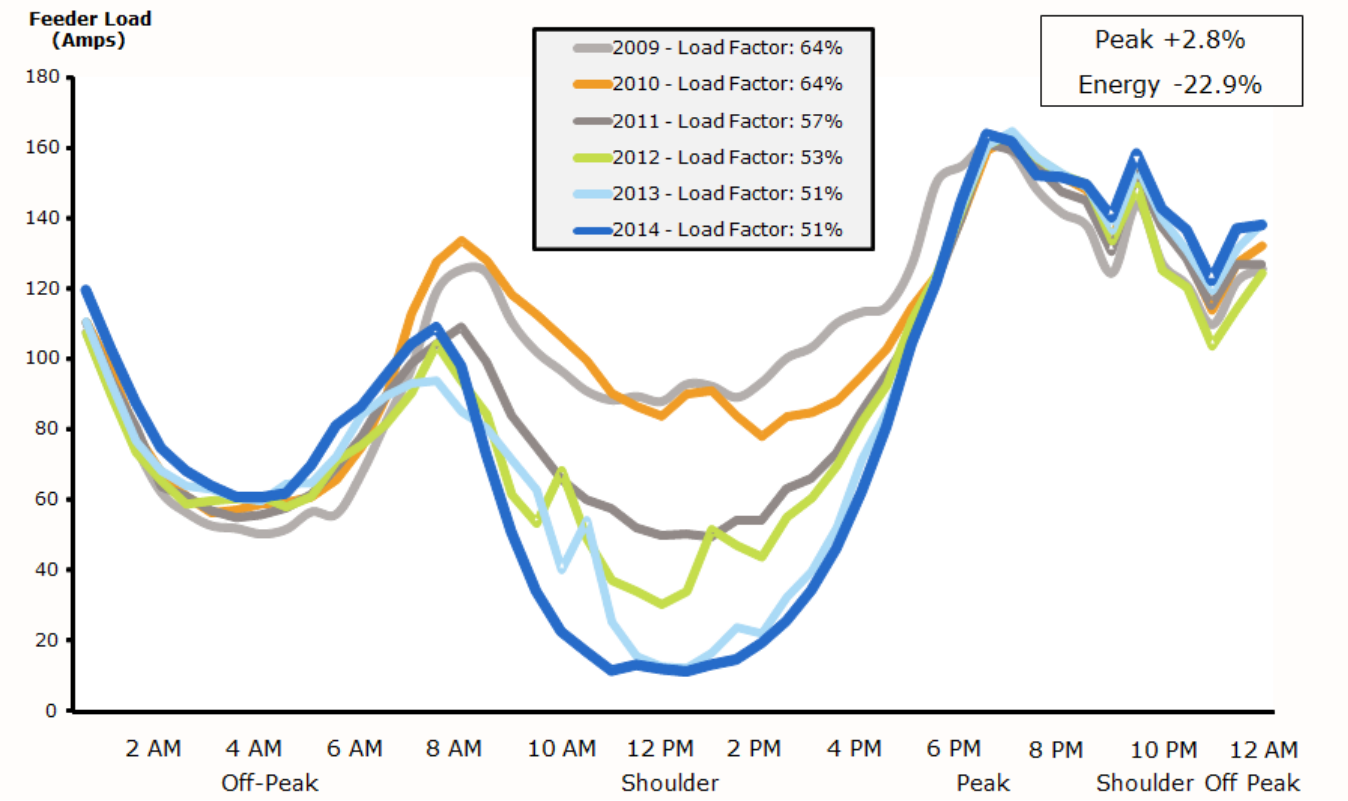
Tariff Instability - nature of the problem

- Southeast Queensland Network:
  - Globally significant example of an emerging dynamic
  - Two-part network tariff now highly unstable
  - 1.24 million residential connections, 4900 MW peak load
- 75% of households have an air-conditioner (historic peak load problem)
- Severe blackouts in 2004 (tightening of reliability standards)
- Sharp network tariff increases scheduled from 2009 onwards
- By 2014/15, network tariffs increased 112% (vs plan of 56%)
  - Half of the increase unrelated to capex or peak load
- 1-in-4 detached homes have installed a solar PV (and rising)
  - Average size 3.2 kW - marginal installation 4.3 kW (and rising)
  - Solar FiT funded by raising network tariffs above regulated set-point
  - As Felder (2010) observes – 'the kWh is a regressive metric'

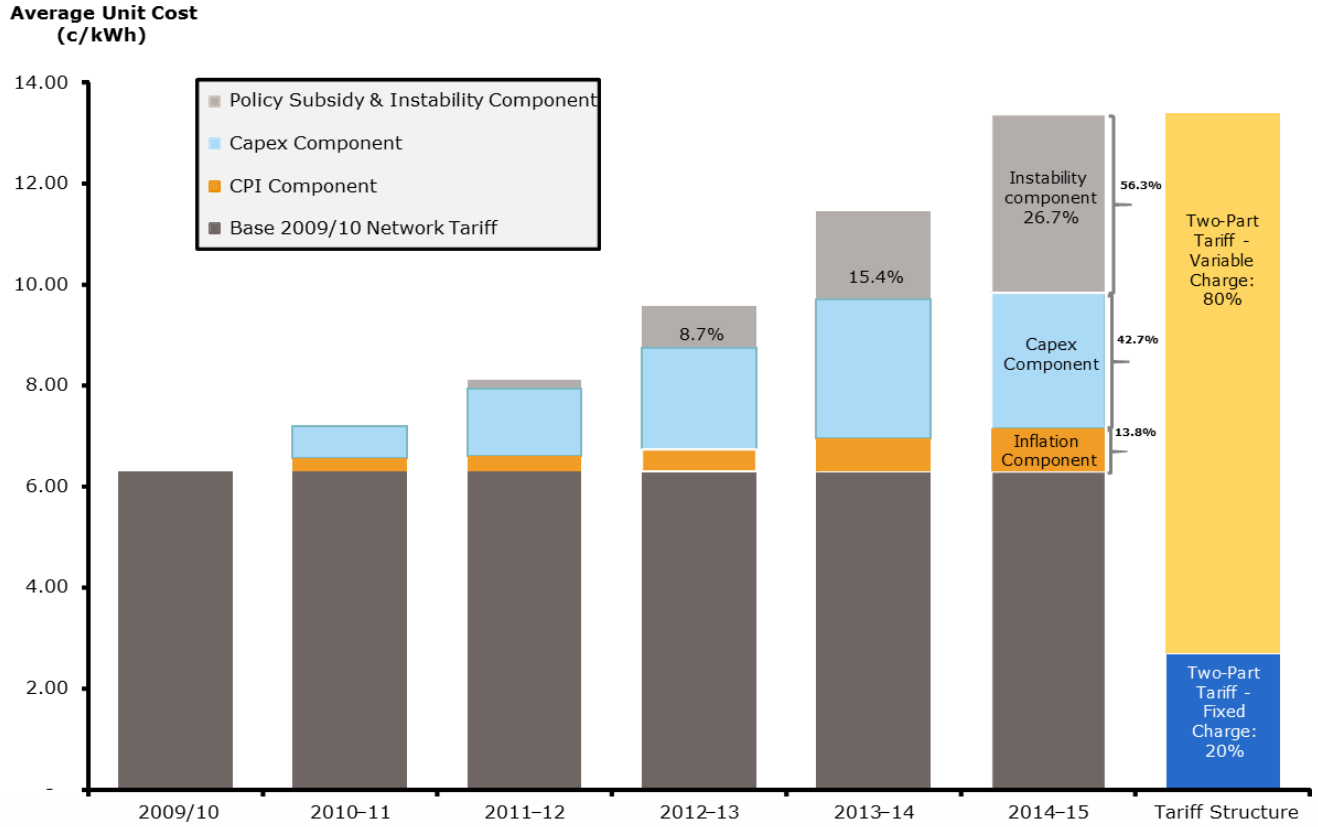
Southeast Queensland solar PV installations



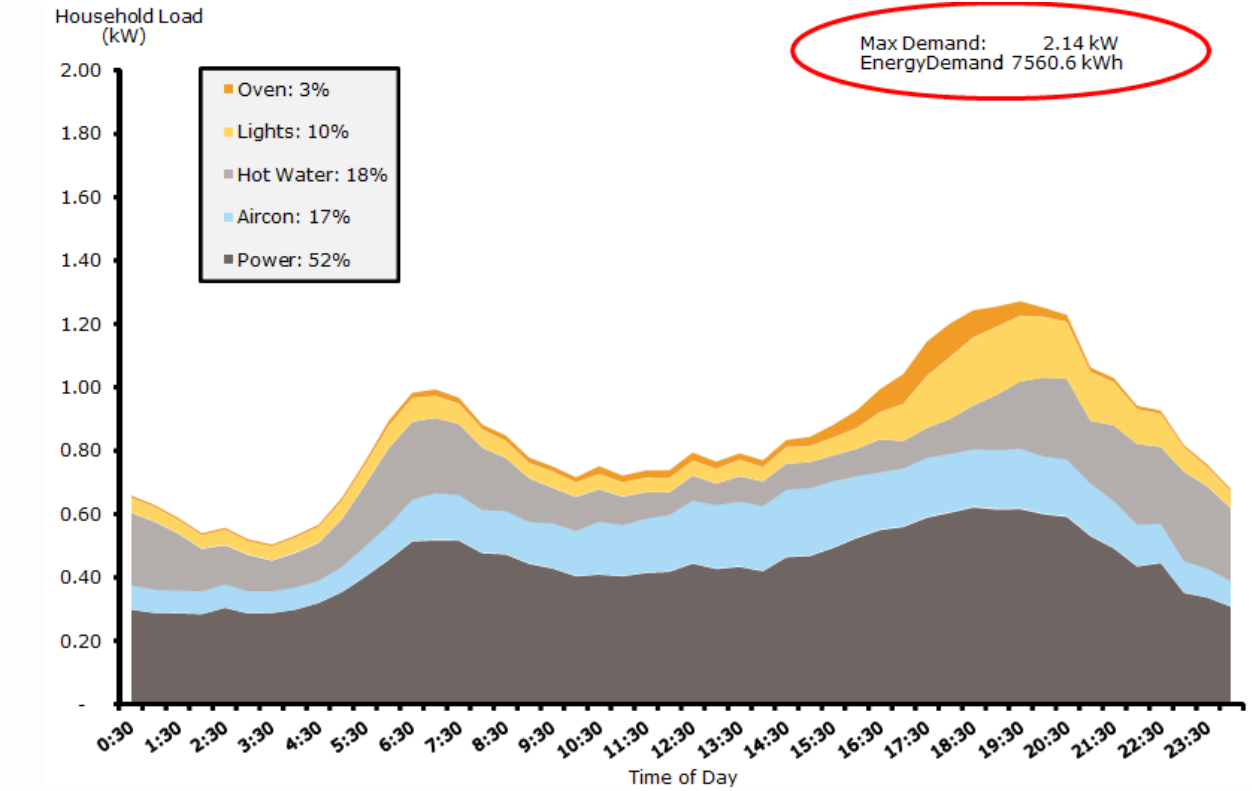
Network element (Sunshine Coast) 37%



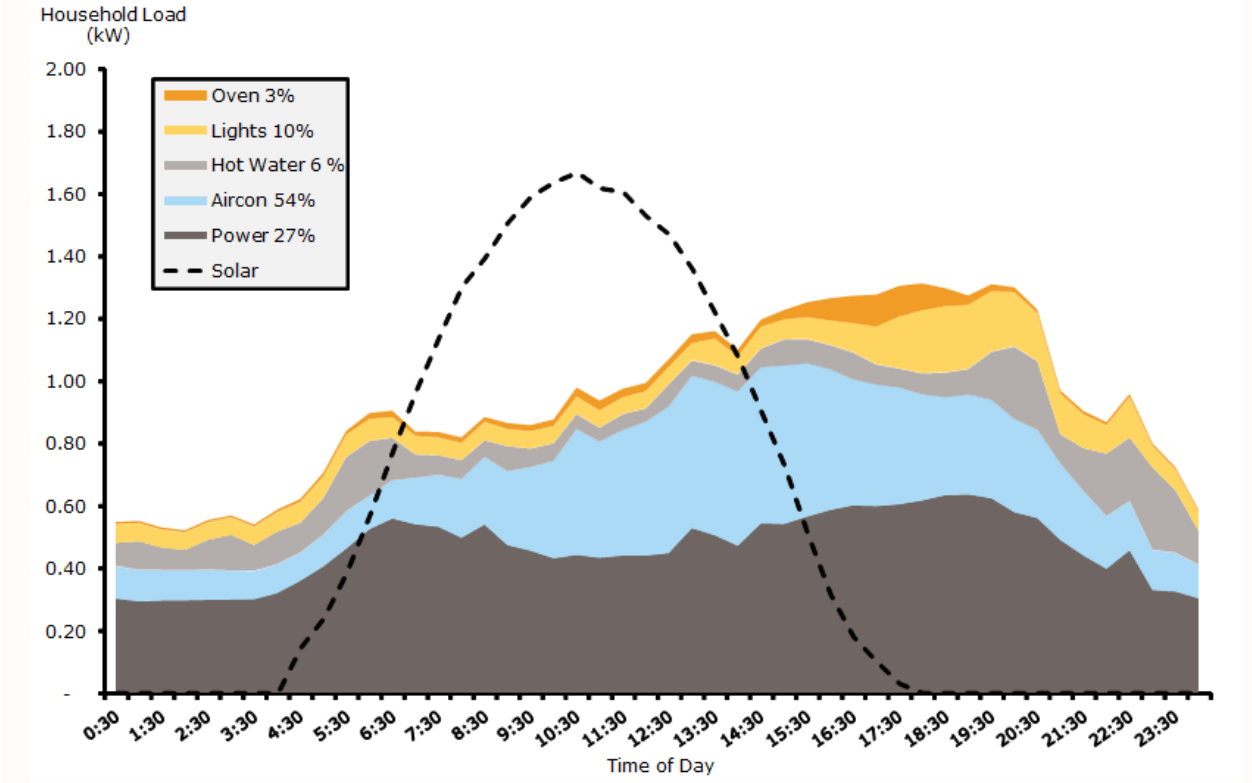
SEQ Network tariffs & the 'instability component'



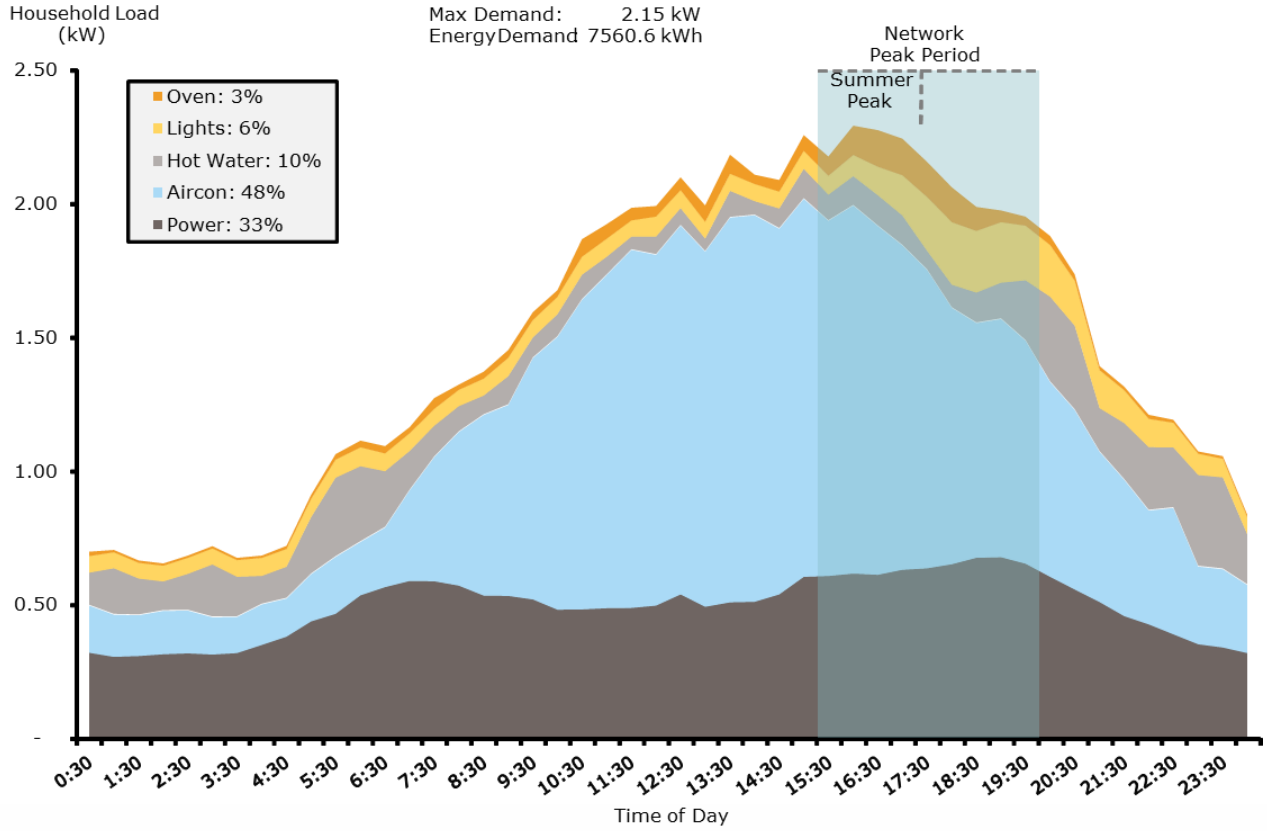
Qld Household annual average weekday load (at the customer switchboard circuit level)



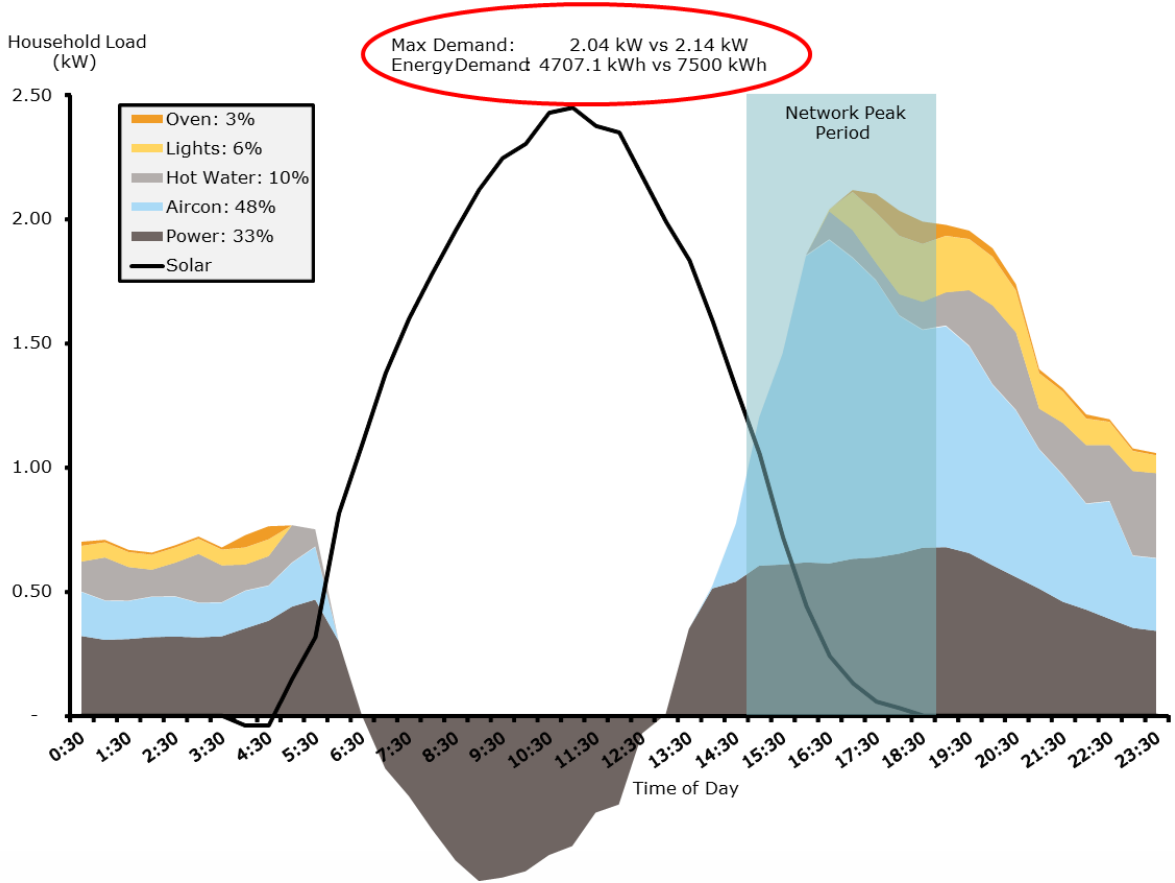
Qld Average household load – summer weekdays



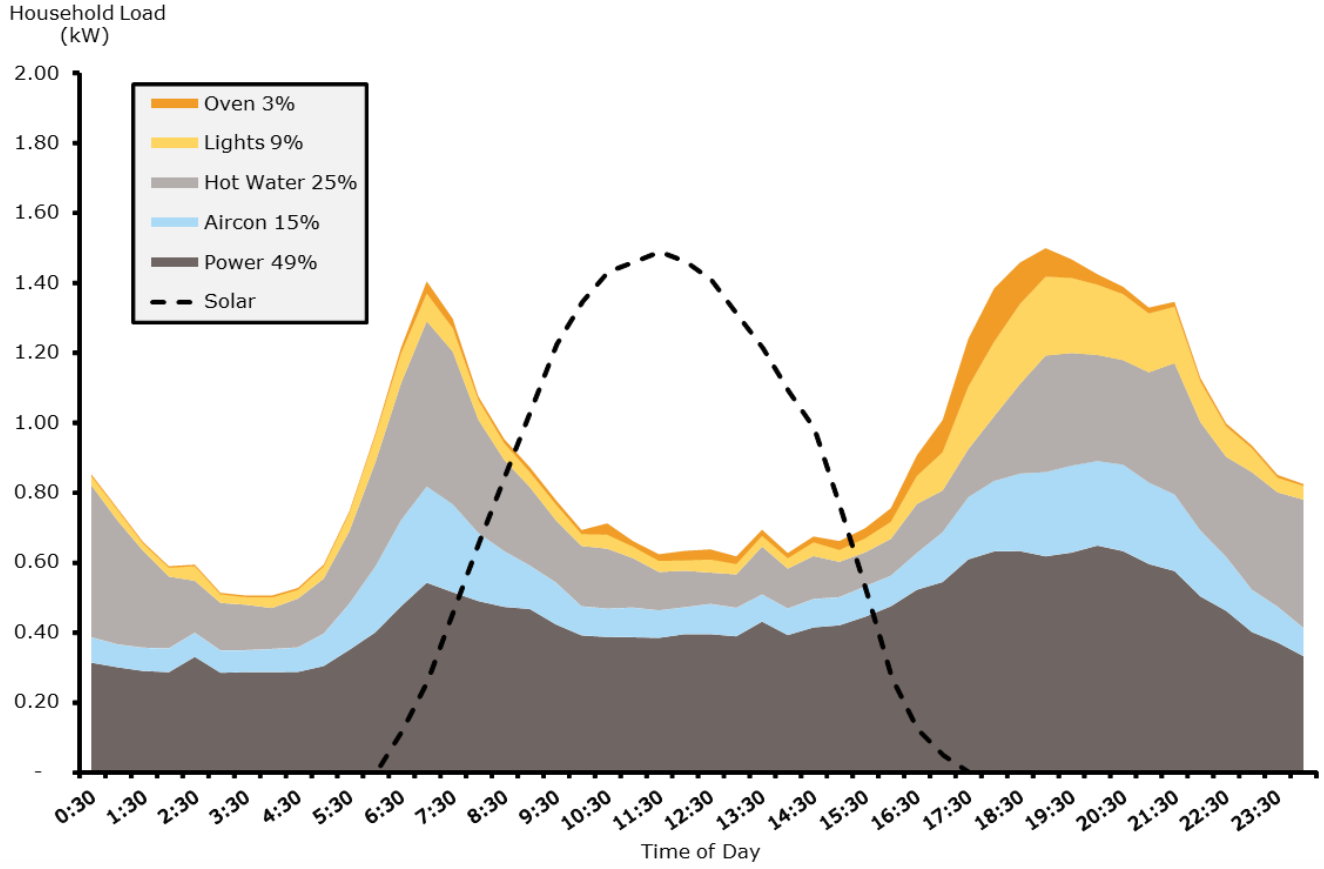
Qld 'Critical Event' summer weekday



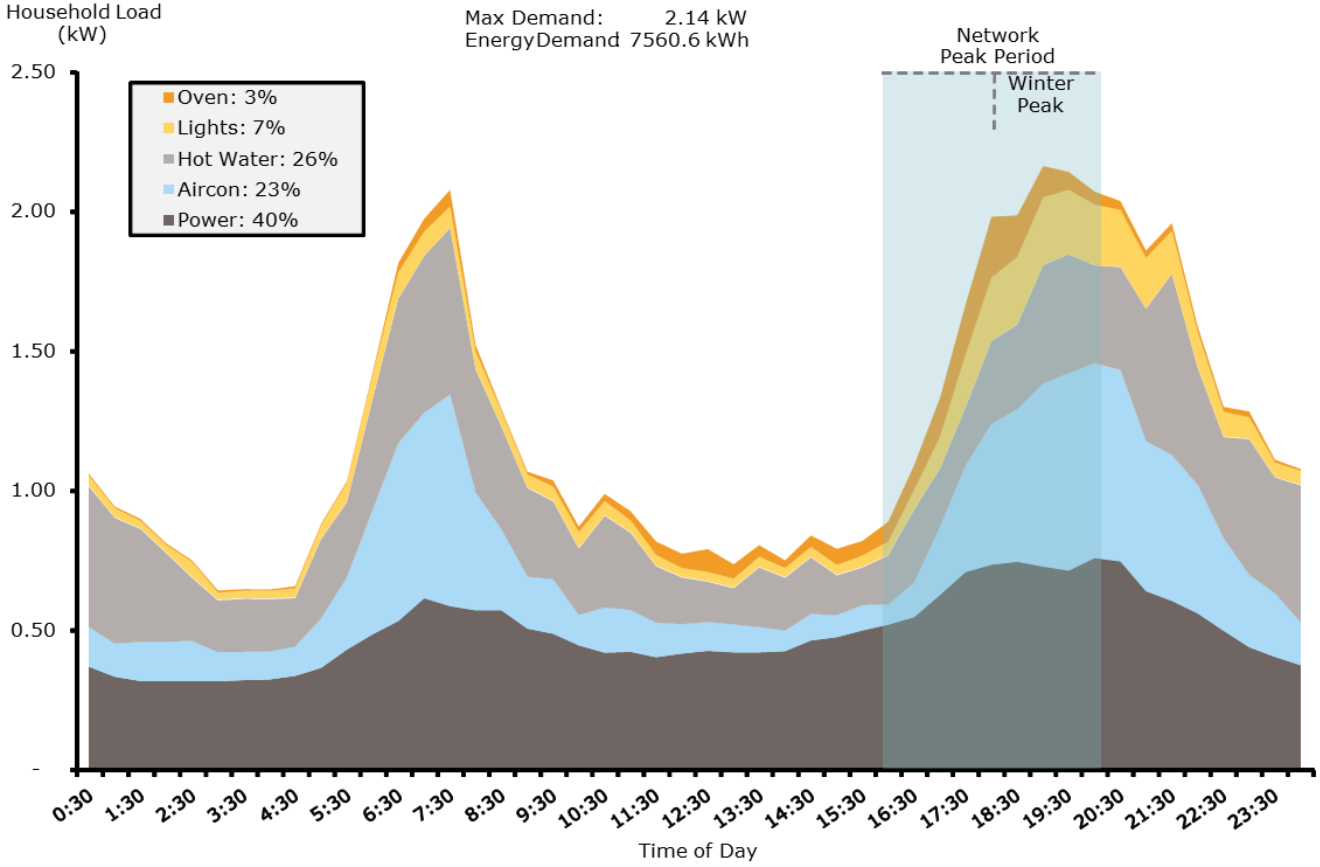
Qld Critical Event 'net load' – summer



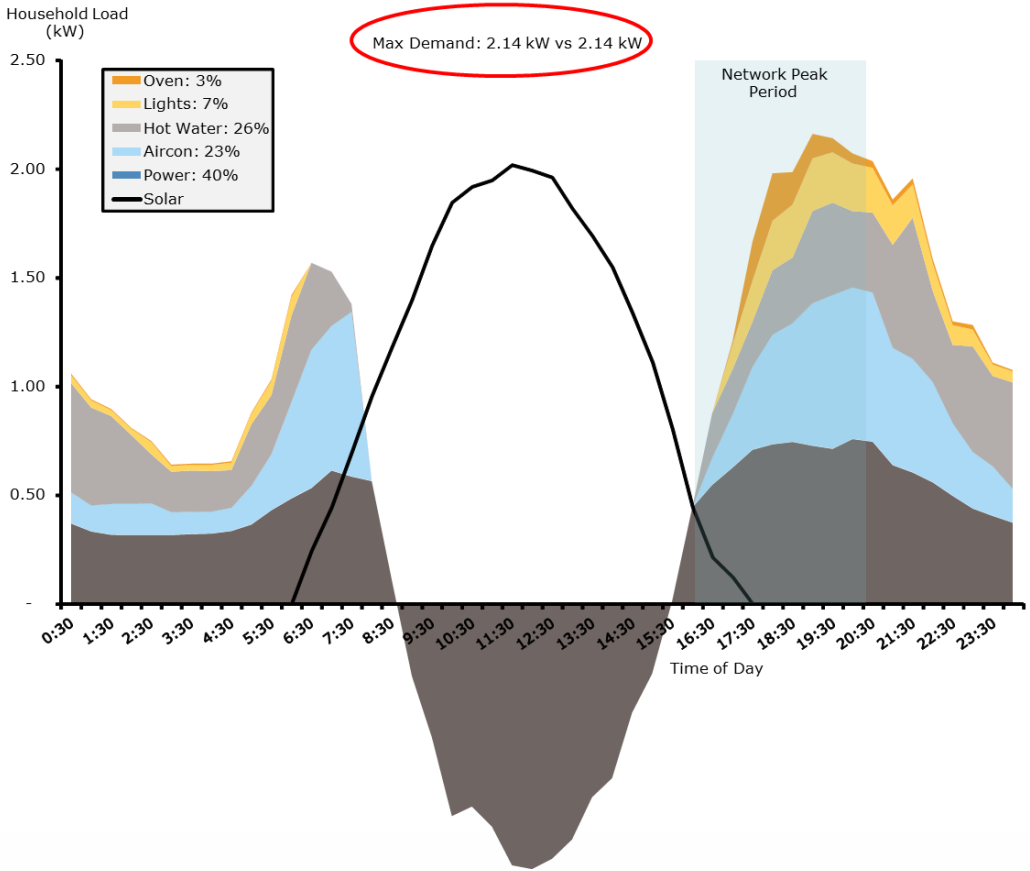
Qld Average household load – winter weekdays



Qld 'Critical Event' winter days



Qld Critical Event 'net load' – winter

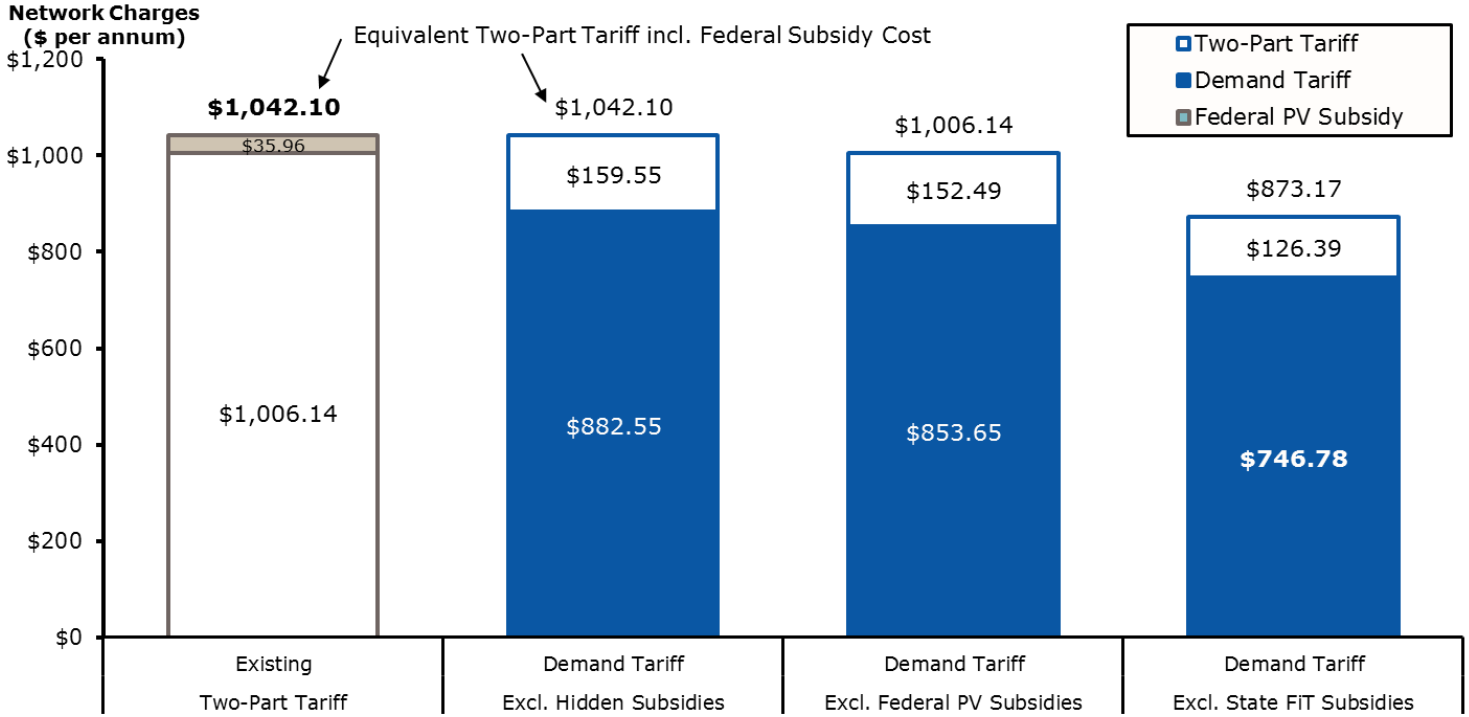


Tariff design

- Ornate structures originated in the electricity industry to deal with the very large problem of sunk costs
  - Hopkinson (1892), Wright (1896), Greene (1896), Doherty (1900)
  - Application refined by economists 1938-1952, especially Hotelling (1938), Lewis (1941), Boiteux (1949), Houthakker (1951), Boiteux & Stasi (1952)
- Many different tariff structures
  - Conventional two-part tariff (fixed charge, flat-rate variable charge)
  - Time-of-Use tariffs
  - Dynamic tariffs (critical peak pricing, peak-time rebates)
  - Three-part demand tariffs (fixed charge, demand charge, variable rate, used extensively in the industrial market for 100+ years)
  - There are many others - declining & inclining block rates (synthetic periodic demand charge, scale economies, conservation motive)

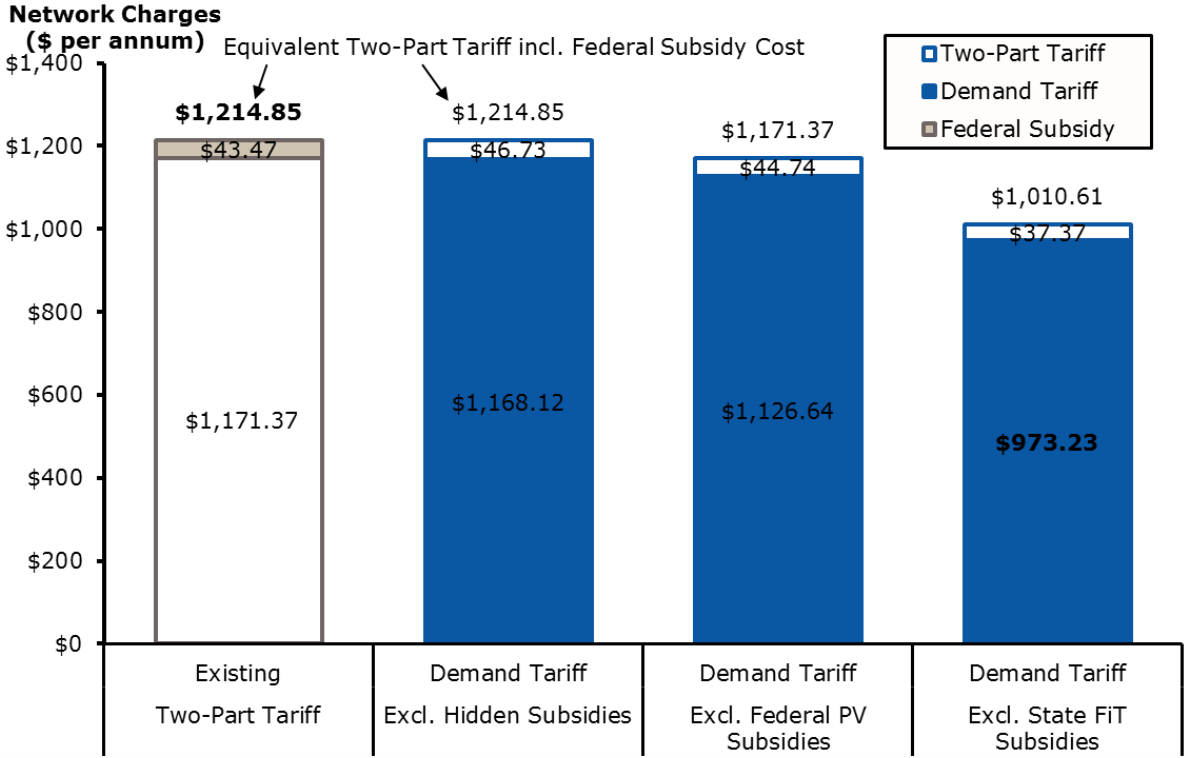
Household A: no air-con, no solar PV

Deviation: +$295.32 (+39.5%)

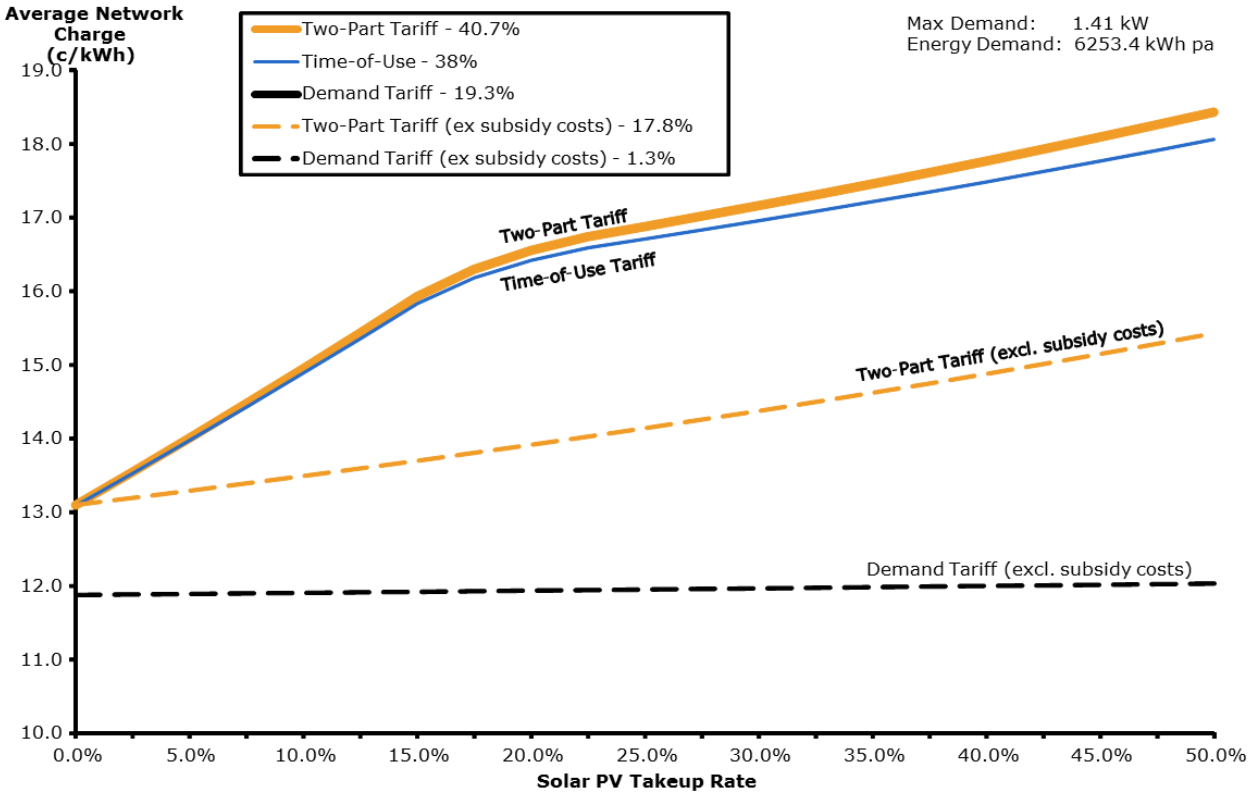


Household B: + air-con, no solar PV

Deviation: +$241.61 (+24.8%)



Tariff Stability Household A: no air-con, no solar PV



Conclusion

- Network variable rates have been lifted above efficient levels to recover residual policy-subsidy costs.
- Historically, lifting variable rates was seen as 'non-distortionary'
- Two-part tariffs are becoming unstable.
- Problem simultaneously occurring in South Australia, Western Australia, California, Arizona, Kansas, Idaho, Brazil, South Africa etc…
- Persisting with current two-part tariff design violates the most widely accepted canon of fair pricing
- However, Solar households signed up to FiTs and SRES benefits in good faith, and so those commitments must be honoured
- Conversely, Air-Cond and Solar PV households are receiving an unintended benefit due to the inefficiency of the prevailing tariff structure:
  - If solar PV reduces coincident peak load, such households should benefit on a proportional basis,