



# Emerging technologies and distribution network services

## Case study analysis

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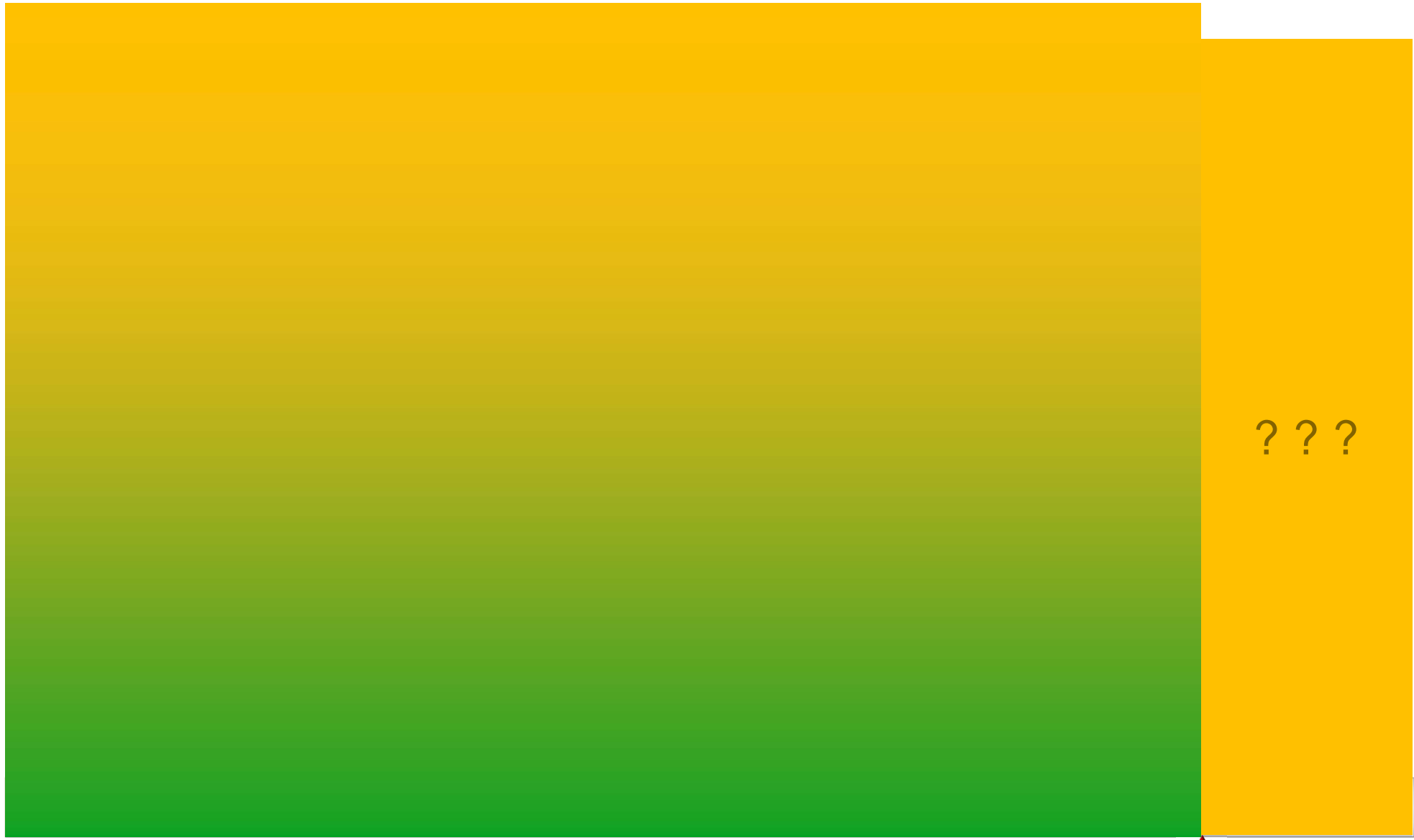
Sydney

26 February 2013

# The way we generate and consume electricity is changing

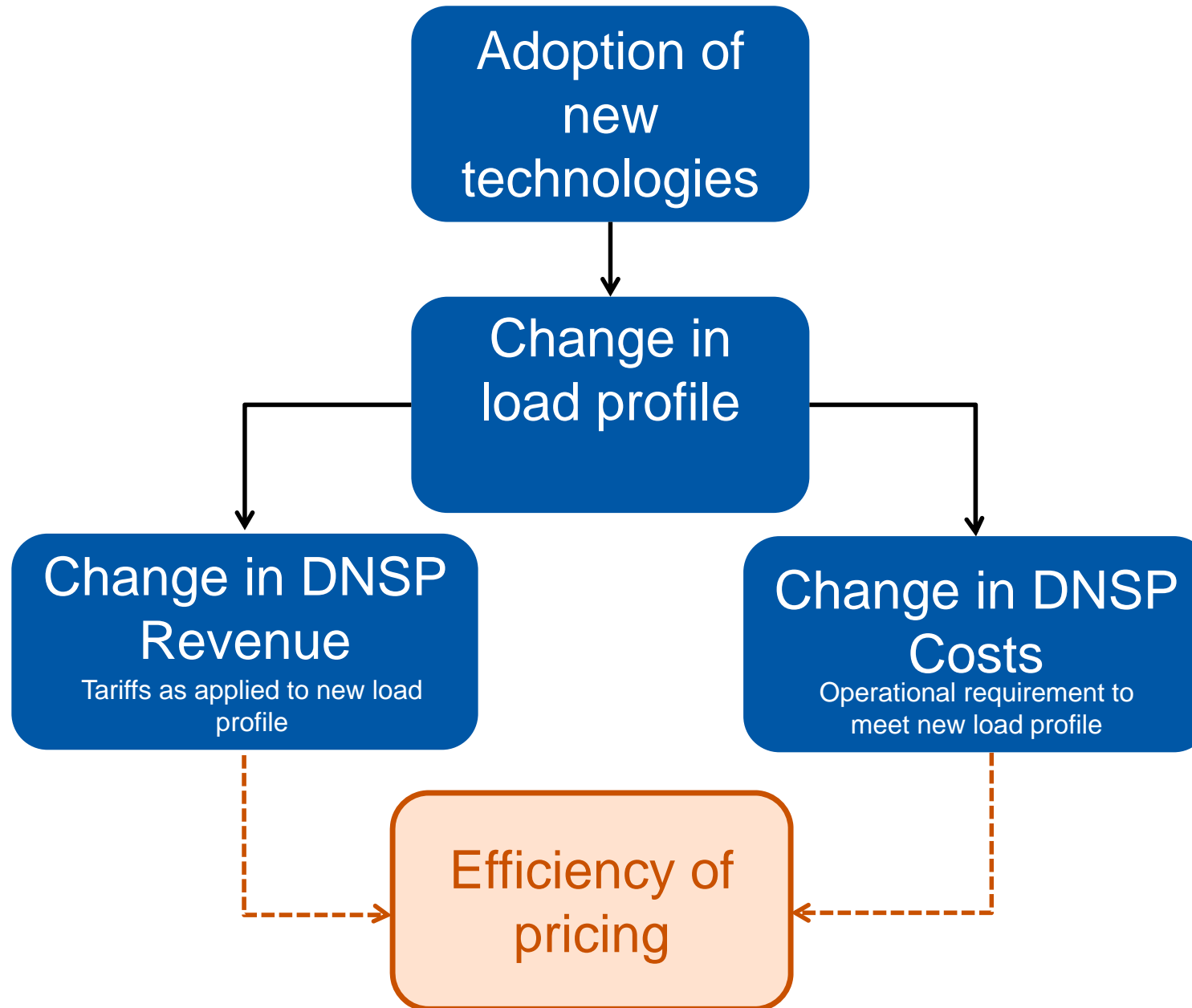


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Today

# What does that mean for pricing?





- The purpose of our study is to investigate these relationships.
  - which will inform the AEMC as to the efficiency of network pricing
  
- We will assess how emerging technologies will alter:
  - customer load profiles;
  - the network component of customers' bills; and
  - DNSP's network costs.



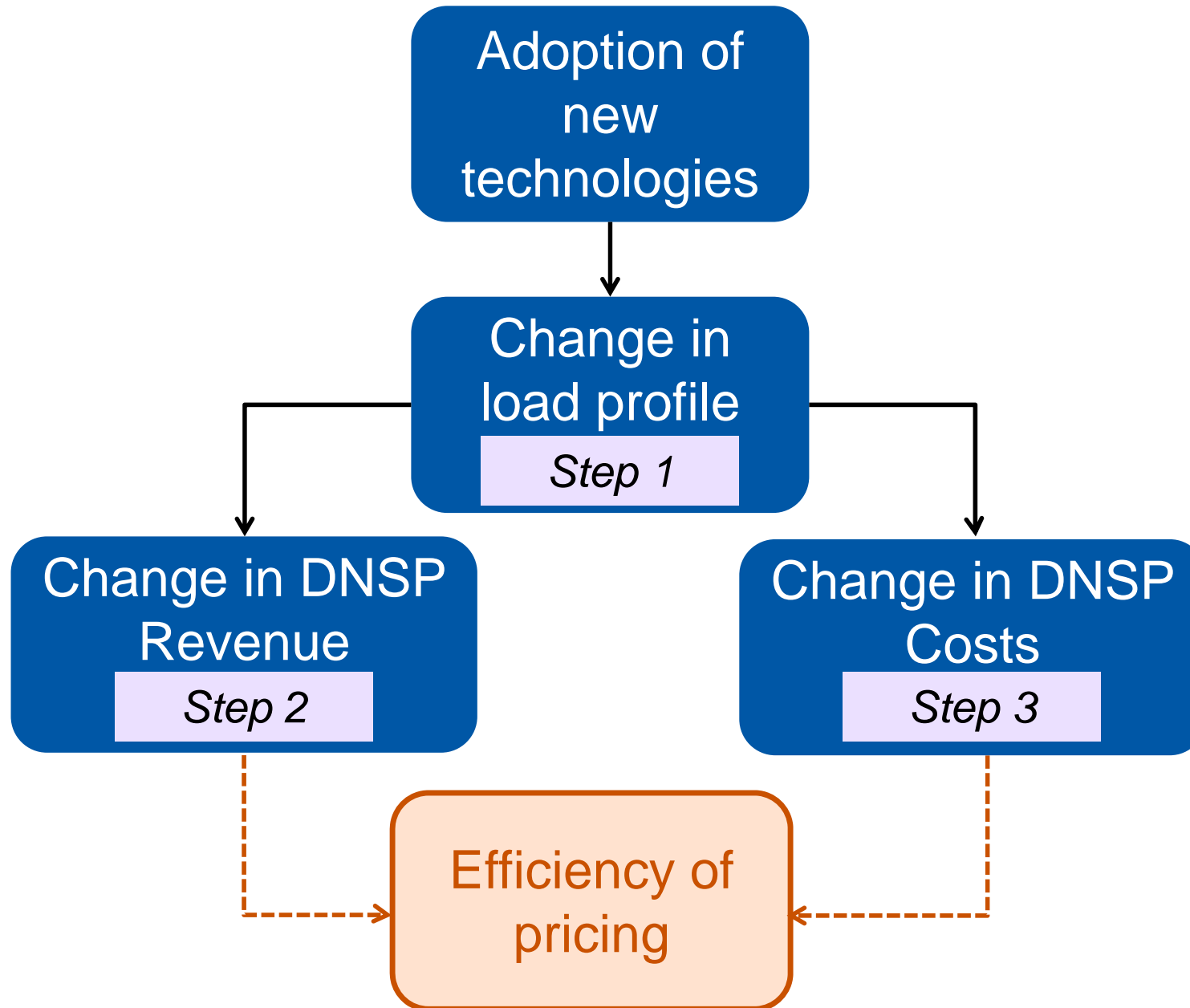
- Our analysis is based on four case studies:
  1. Air conditioners in Victoria
  2. Solar PV in South Australia
  3. Battery Storage in Queensland
  4. Electric Vehicles in New South Wales



## With and Without Analysis

	<u>Without</u> new technology	<u>With</u> new technology	<u>Change</u>
<b>Step 1</b>	Generate a representative customer load profile	Generate a representative customer load profile	<b>Change in load profile</b>
<b>Step 2</b>	Calculate DNSP revenue	Calculate DNSP revenue	<b>Change in DNSP revenue</b>
<b>Step 3</b>	Calculate the DNSP's costs of meeting network requirements	Calculate the DNSP's costs of meeting network requirements	<b>Change in DNSP costs</b>

Develop insights into the implications for future network costs

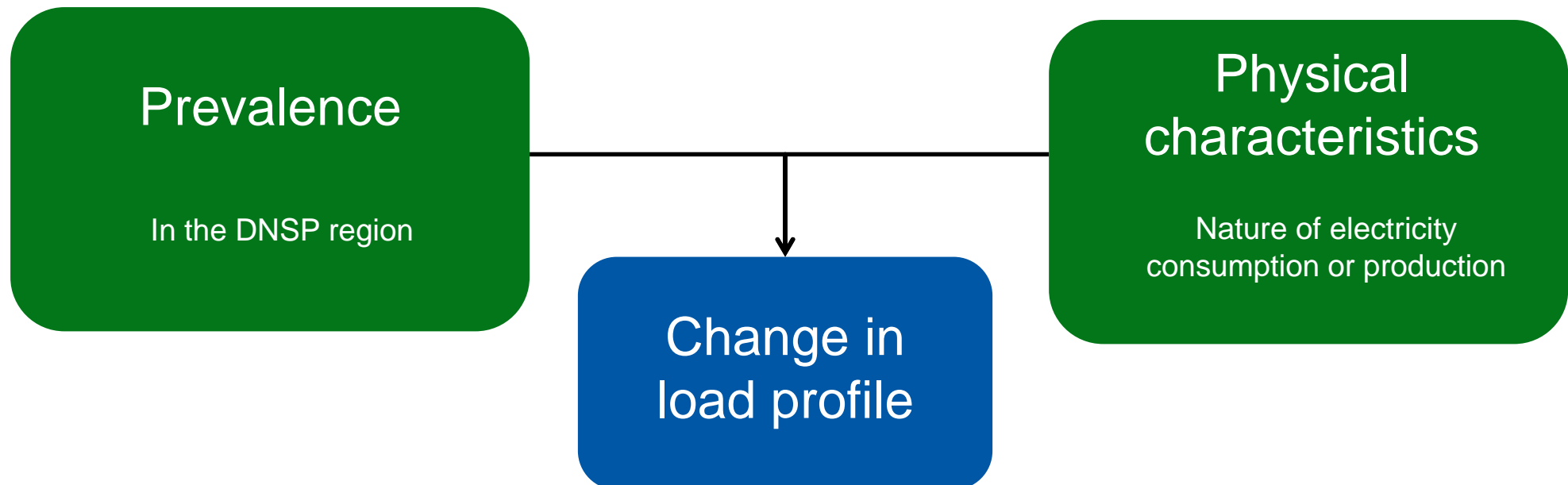




## Step 1: Change in load profile

Defined:

- over a year; and
- for a variety of geographic regions.

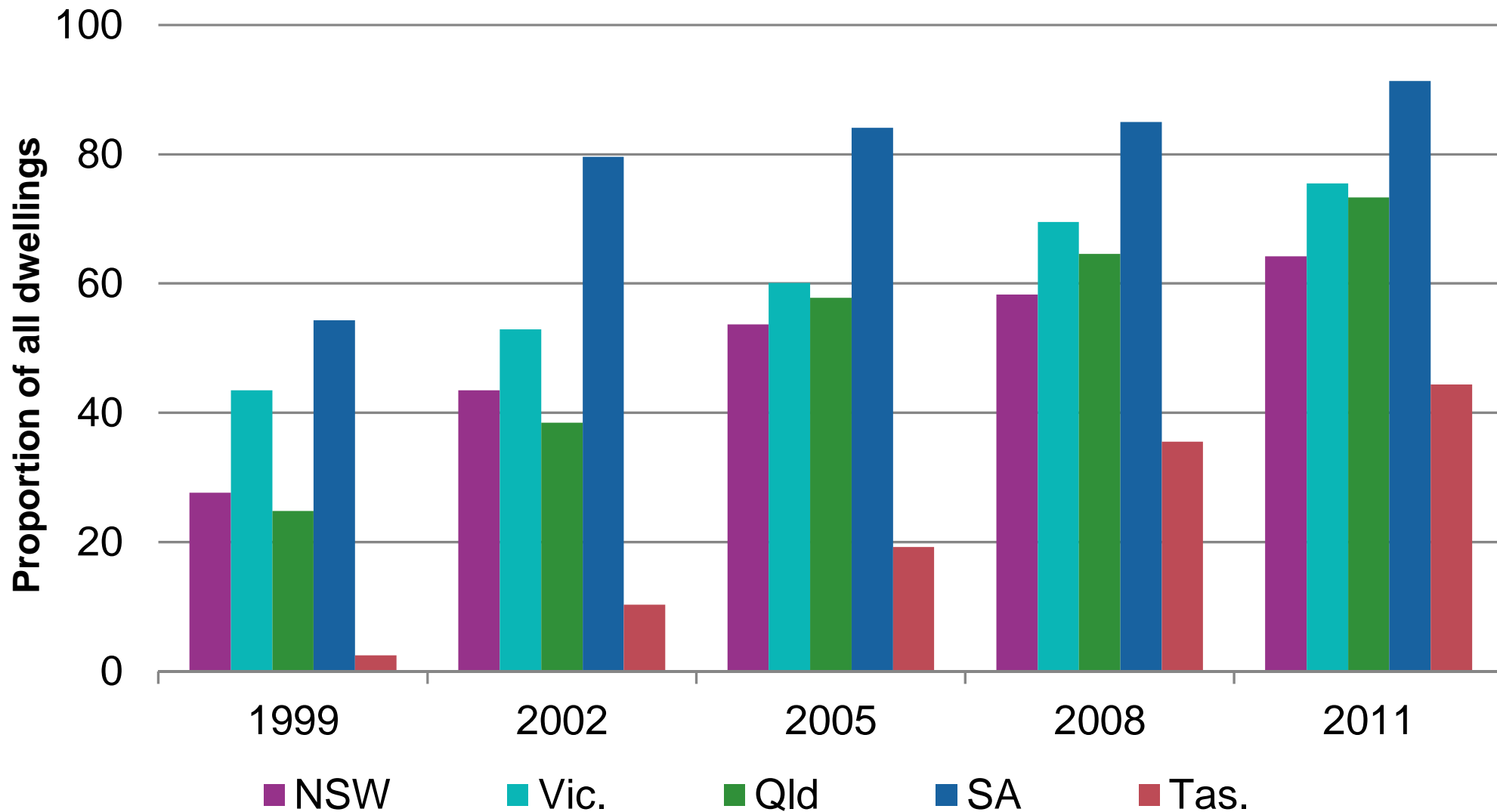




# Penetration of air-conditioners has doubled since 1999



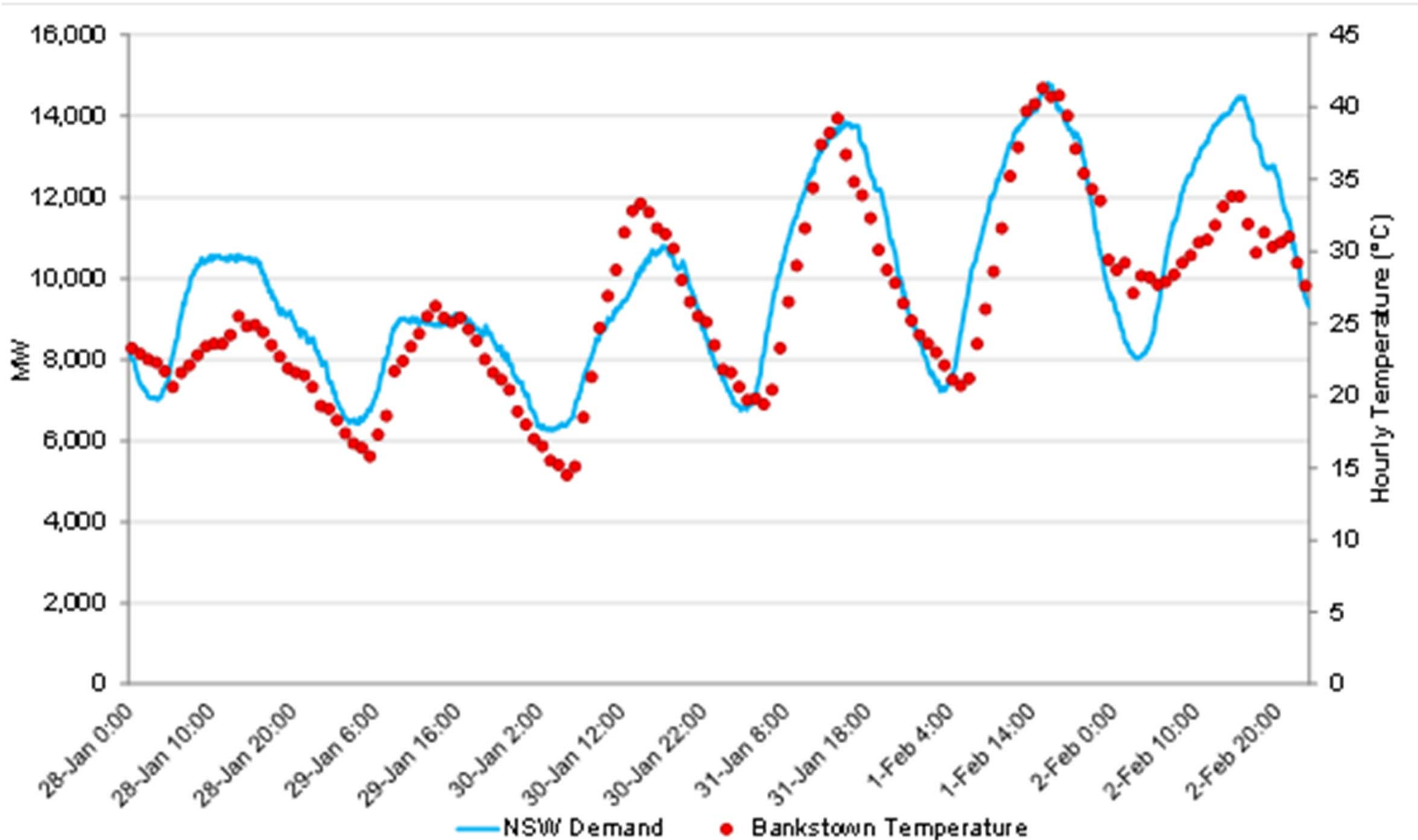
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# NSW load is highly responsive to temperature



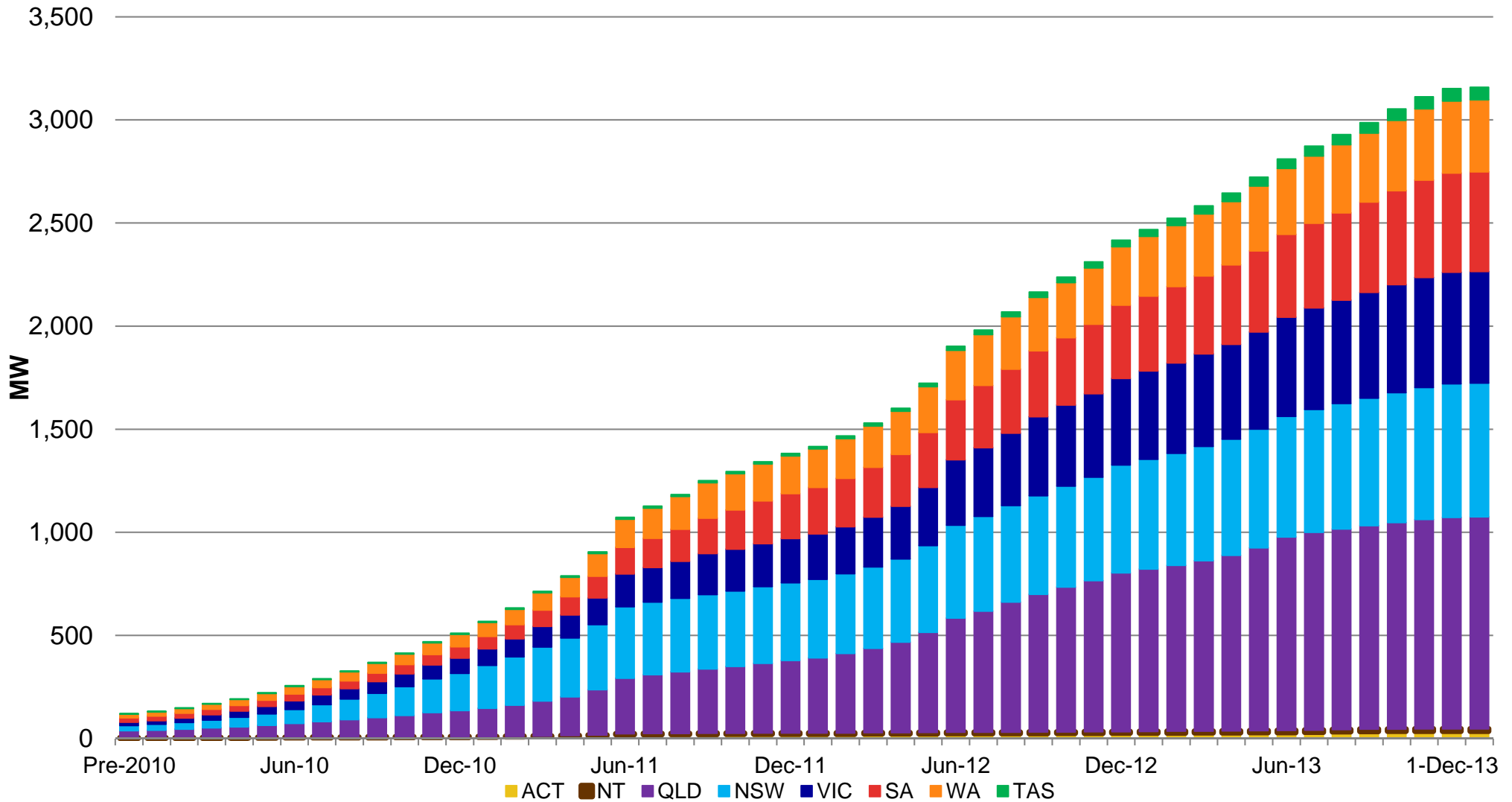
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# PV capacity has increased 24 fold in four years



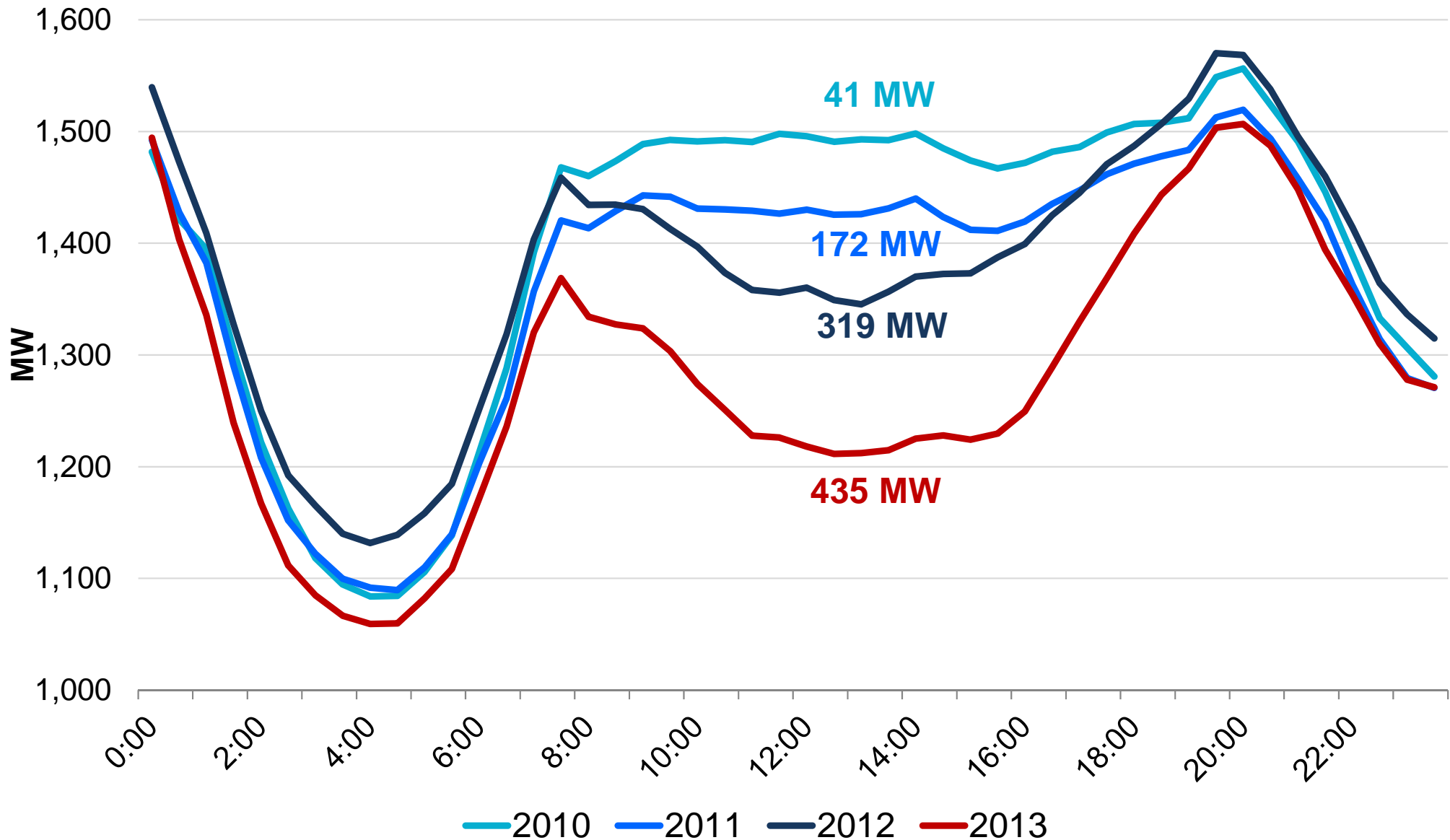
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# PVs are impacting on daily load shape



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# Battery storage



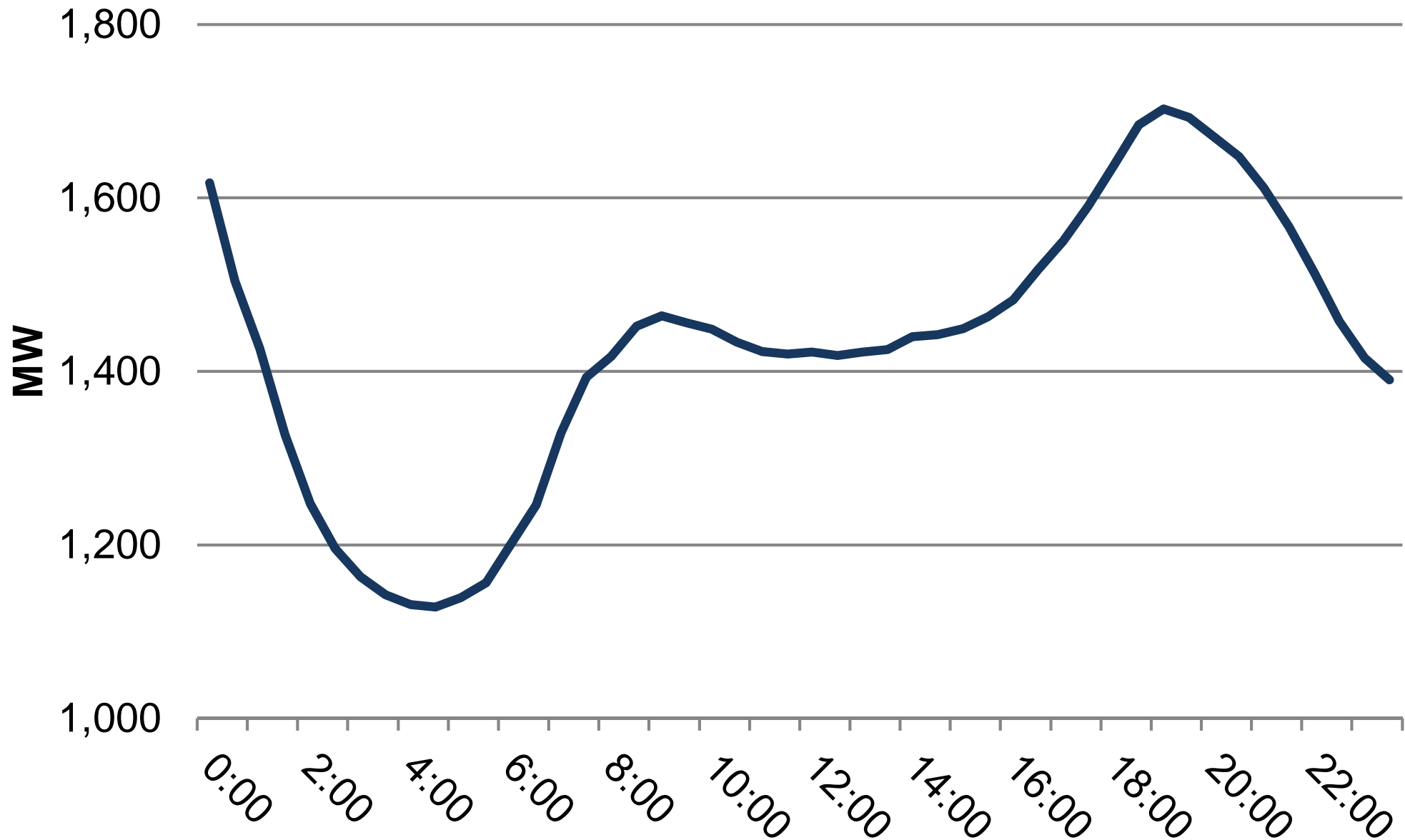
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- The penetration of PV systems with batteries is unknown but likely low.
- Battery efficiency and availability is improving .
- However, they are still prohibitively expensive.

# SA's 2013 average daily load profile



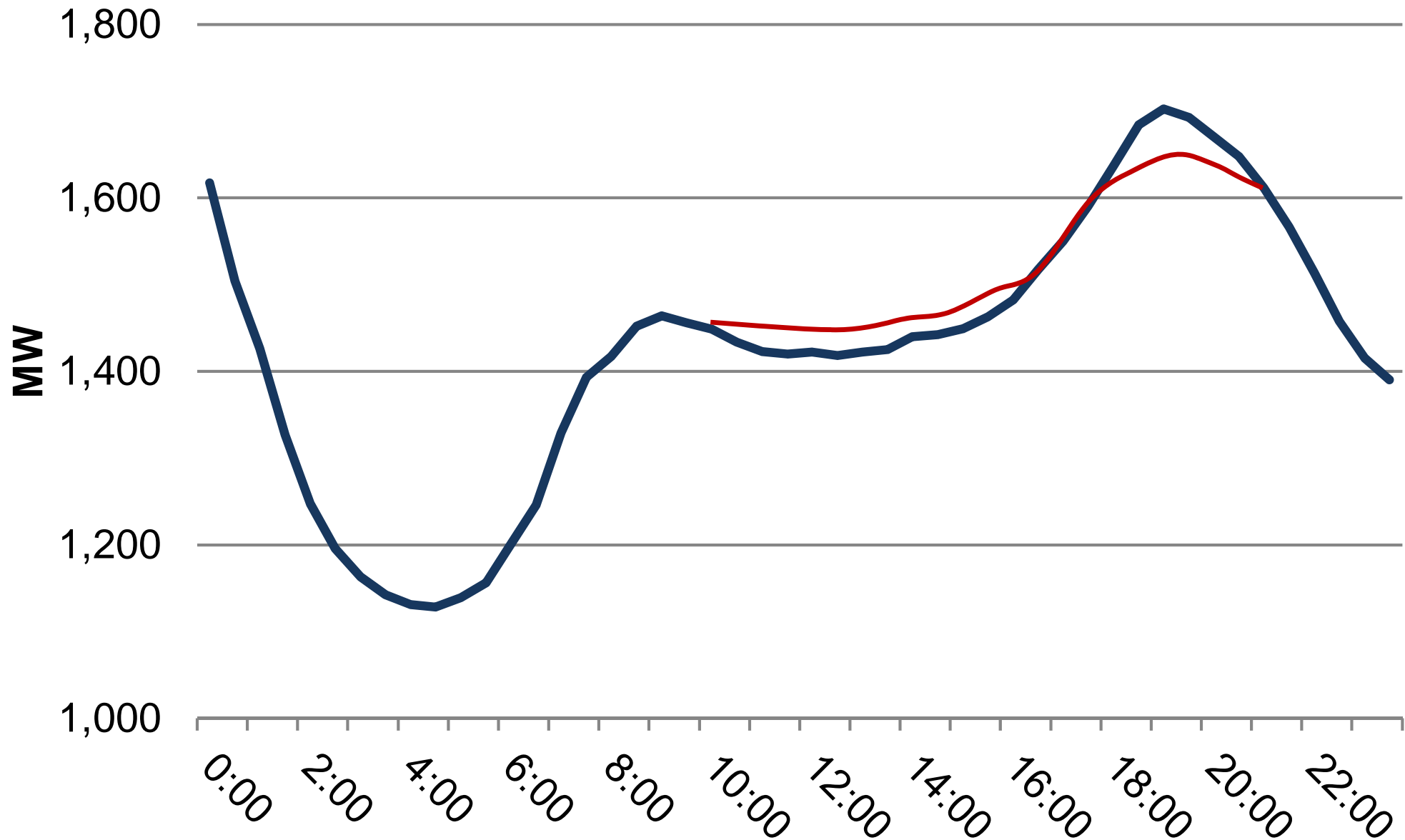
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# Load profile is smoother with batteries



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- Very few presently in use
  - Adoption may increase over the longer term
- Adoption is likely to increase off peak electricity demand
  - Charged when parked over night
- Adopters may take advantage of electric vehicles' battery capability
  - Arbitrage price differences between peak and off-peak
  - Pricing signals should encourage the smoothing of the load profile





## Step 2: DNSP revenue

- Determine the relevant current tariffs for representative customers
- Apply those tariffs to the load profiles developed under Step 1
- Consider the change in revenue under cost reflective tariffs



## Step 3: DNSP costs

- Costs will be affected by:
  - the nature of technical constraints
  - existing capacity over peak demand in the network
- Change in costs should be independent of the cost of replacing existing equipment
  - Costs should reflect augmentation not replacement
- Informed by discussions and data provided by the DNSPs

- Data requirements
  - Knowledge of the physical characteristics of case study technologies
  - Representative customer loads with and without the technologies
  - Tariffs applicable to representative customers
  - Costs to augment the network



# Contact Us

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