

Whose Problem is Cooling?: Utility Impacts

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Plan

- Economics of electrical loads created by air conditioning
- Utility strategies to reduce the air conditioning peak
- Trends that will change the relationships and responsibilities
- How will climate change affect utilities?

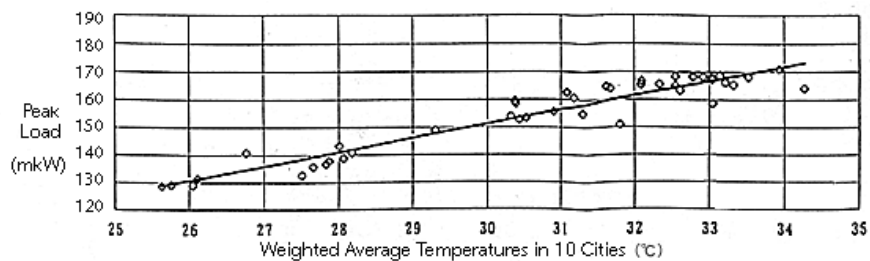


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Japan: High Temperatures Cause Peak Demand

Correlation Ratio between Peak load and Temperature for 10 Japanese Cities



Source: Hiroji Ohta, FEPC Chairman, 10 September 1999



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More Utilities Have Peak Demand in the Summer

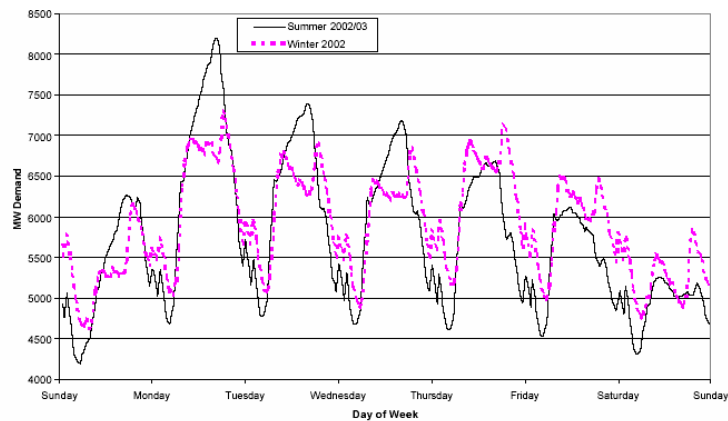
- As air conditioning became more popular in North America, the summer peak moved north
 - ◆ Now cold Minneapolis and Toronto have summer peaks
- In Australia, the summer peak moved south



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Australia's Summer Peak has Overtaken its Winter Peak



Source: Sustainable Energy Authority Victoria

Figure 2.5 - Summer 2002/2003 and Winter 2002 Maximum Demand Weeks



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For Victoria (Australia)

- **Peak demand growing faster than growth in consumption (approx 200 to 300 MW/year):**
 - ◆ 2003 to 08: 1.5%pa; **2.6% summer**; 1.8% winter
 - ◆ 2008 to 13: 2.1%pa; **3.2% summer**; 2.1% winter
- **Growth in summer demand is being driven by increased cooling load (~50%)**
- **Peak demand is characterised by sharp 'needle peaks' caused by:**
 - ◆ periods of hot weather, and/or
 - ◆ unforeseen loss in generation capacity – demand response is of particular importance



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How Far North Will Europe Become Summer Peaking?

- Greece, Italy, Iberian Peninsula
- Winter-peaking utilities can have capacity constraints in summer
- Some American regions experience a new peak every winter & summer
 - ◆ Hazards of encouraging heat pumps and resistance heating



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Supplying Summer Peak Power is Expensive

- Capital cost spread over few kWh generated
- Peaking plants are typically less efficient
- Line losses are higher in summer
- Utilities lose money supplying peak power



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Utility's Goal: Cut the Peak

- Blackouts
- Tariffs
 - ◆ Capacity charges
 - ◆ Seasonal and time of use rates
 - ◆ Interruptible loads
- DSM programs
 - ◆ Load shifting
 - ◆ More efficient equipment
 - ◆ Consumer education



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Trends

- De-regulation of utilities
- Smarter meters and innovative tariffs
- Increasing use of air conditioning
- Climate change...
 - ◆ Greater variability in weather
 - ◆ “Needle peaks” will be more common
 - ◆ More droughts, smaller reserve margins



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Conclusions

Utilities becoming *less* prepared for the electricity demands created by a warming climate

Buildings will be “caught in the middle” between occupants wanting more comfort and utilities unable to supply reliable power

