PV in Australia 2005
Markets & Performance

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Outline

- Current status of the Australian PV market
- Discussion of PV performance in selected case studies
- Trends and implications

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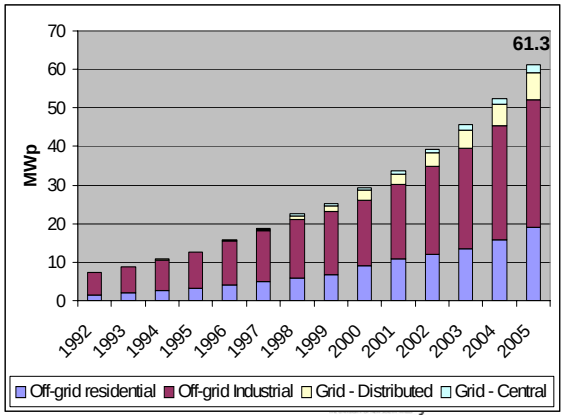
Cumulative PV Installations

(Australian PVPS Consortium, 2006)



2005 PV Installations

(Australian PVPS Consortium, 2006)

Sector	***MWp installed***
Off Grid Residential	3.0
Off Grid Industrial	3.5
Grid – distributed	1.8
Diesel Grids	0.7
TOTAL	***9.0***

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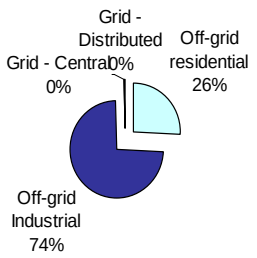
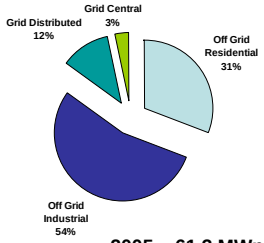
Cumulative Installations

(Australian PVPS Consortium, 2006)



1995 – 12.7 MWp



2005 – 61.3 MWp

Other trends

(Australian PVPS Consortium, 2006)

- Increasing imports
  - <10% to ~ 60% over a decade
- Reduced % of local BOS components
- Government support:
  - 40% of total market
  - PVRP 63% of grid market
  - RRPGP & PVRP 35% of off-grid market
- > 80% of cells exported
- > 4.5MWp of modules / systems exported (including imported modules)

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Case Study

Photo: BP Solar

NSW Department of Planning

Newington Solar Village

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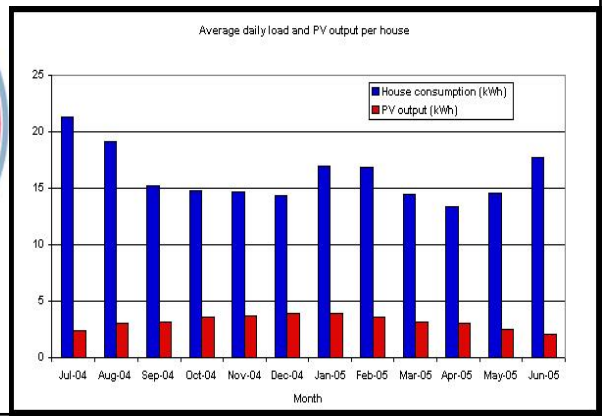
Newington Solar Village

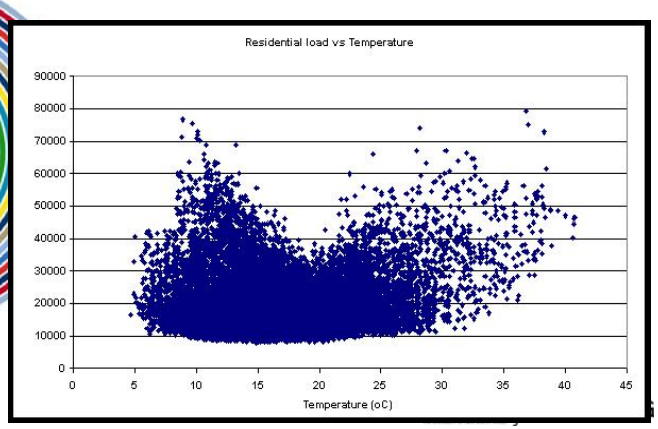
- 780 homes with 1000 Wp of PV and 199 houses with 500 Wp.
- Passive solar design features, energy efficient appliances
  - Loads nevertheless av 16 kWh/day cf 7.5 design
  - Load profile much 'peakier' than for normal houses, thus providing less opportunity for PV to reduce peak
- 30 homes monitored July 04-June 05
  - Average daily PV output per house 3.2 kWh (~20% of load)
  - 2 systems faulty -> 3.4 kWh/house, about 10% lower than expected (although 2005 may not have been a typical year)
  - 0.65% of available capacity (accounting for faults but not accounting for temperature or tilt angle)
  - Average peak output 13 kW
  - Zone substation peak demand reduced by 30% of rated PV capacity

Household Load and PV Output

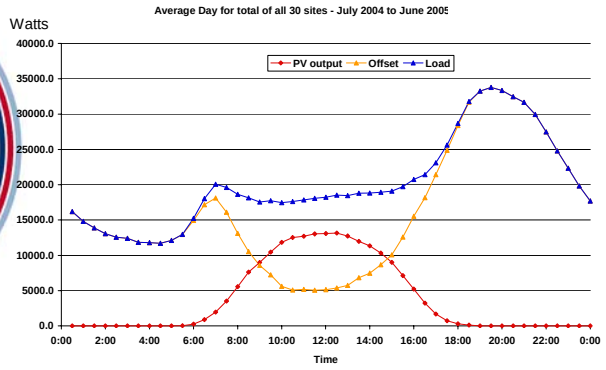
average over 30 houses
(NSW Dept of Planning, Newington study)



Relationship between electricity use and temperature, Newington



Annual Average Daily PV Output, Household Load and Offset, Newington



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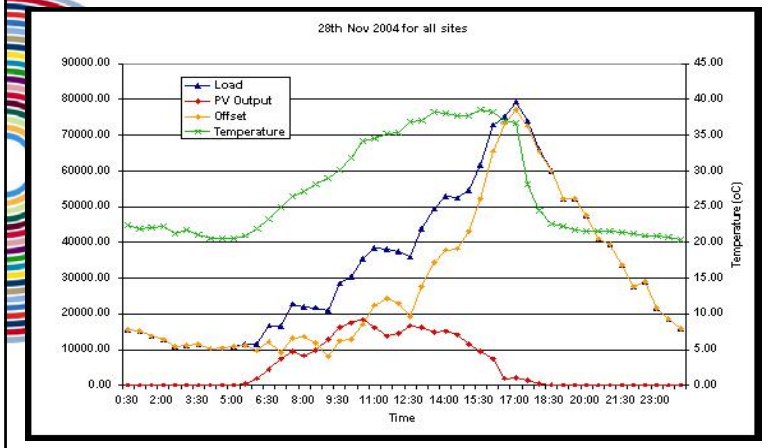
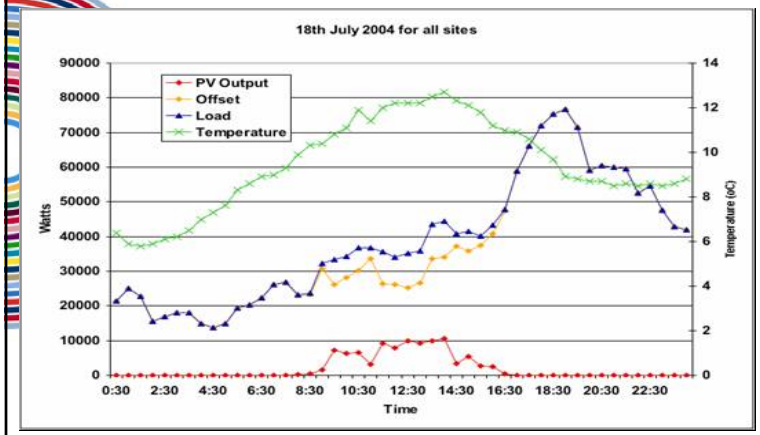
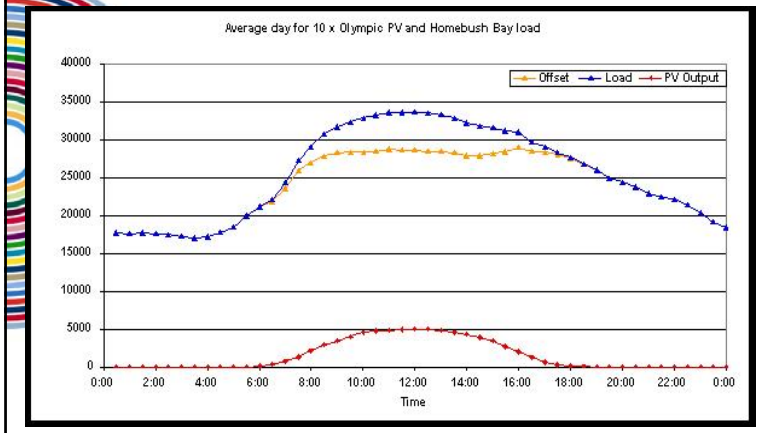
PV Output, Household Load and Temperature - Peak Summer Day, Newington



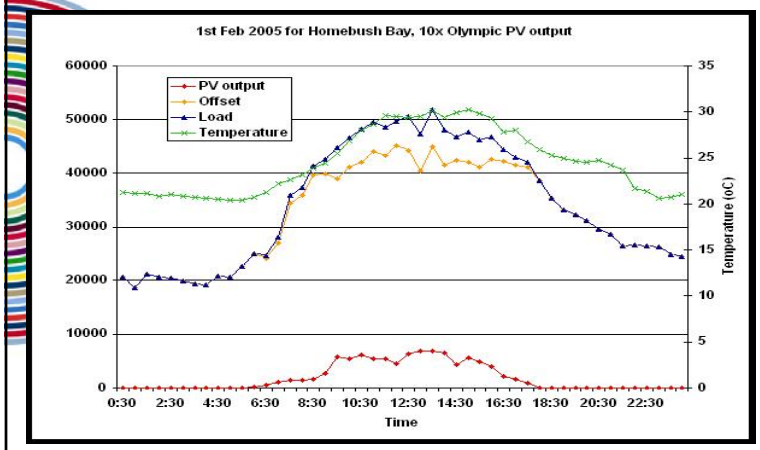
PV Output, Household Load and Temperature - Peak Winter Day, Newington



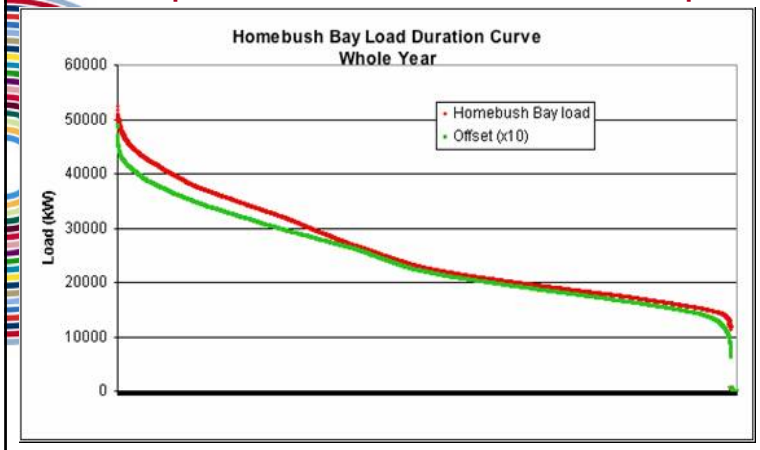
Annual Average PV Output (X10) and Homebush Bay Substation Load



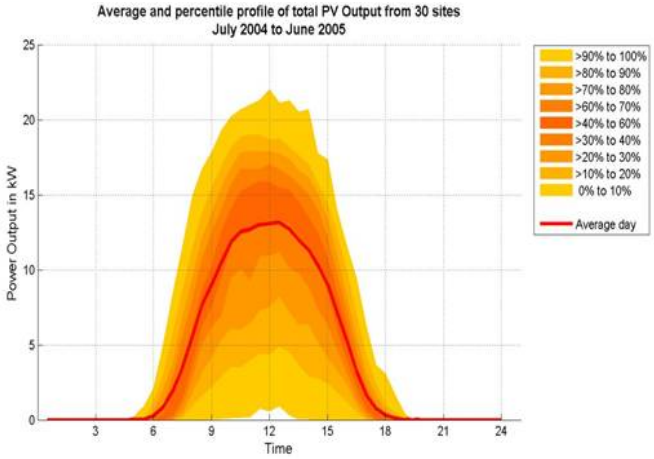
PV Output, Homebush Bay Substation Load and Temperature - Peak Load Summer Day



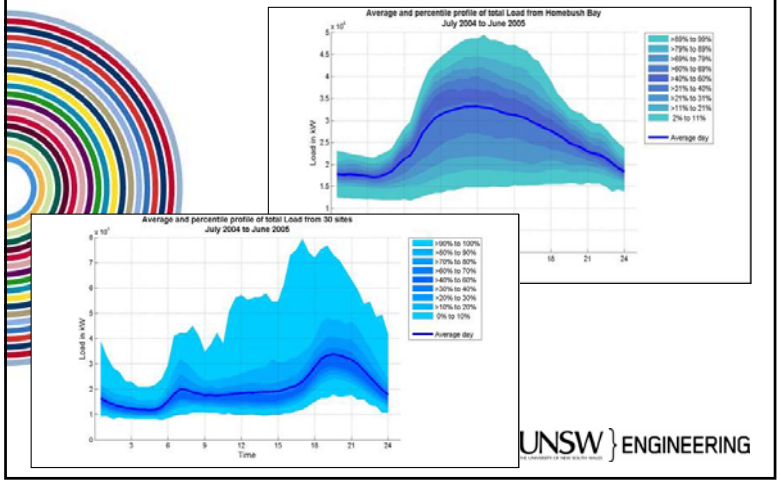
Load Duration Curve Homebush Bay with impact of 10X current PV Output



PV output varies



But so does load….



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Case Study

Photo: Energy Australia

NSW Department of Planning

Kogarah Town Square

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Kogarah Town Square

- 160 kWp (2800m^2) BiPV commissioned 2003
  - a-Si roof tiles
  - Glass-glass modules
- Most at 20° pitch, some 10°
- Most at 53° W of N, some 100°, 190°, 280°
- 58 inverters (1.2 and 2.5 kW rating)
- Combined residential / commercial but predominantly commercial load
- Connected to Carlton zone substation

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Summer PV Performance, Kogarah

- Average daily output 473 kWh (3 kWh/kWp)
- 74% of rated capacity if temperature, shading & orientation considered
- Peak site demand reduced by 35% of available PV capacity
  - Demand often high through afternoon
  - Zone substation demand reduced by 24% of available capacity
- 40% of inverters had failed within 1 year of installation
  - Under-rated internal connection, readily fixed on discovery
- PV value – 7c/kWh if spot price paid cf 4.41 c/kWh @ average prices and 11 c/kWh if net metered

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Technical Issues for Australian PV Systems

- Temperature
  - Ratings should be at 45 deg or higher?
  - Already provided at 25 and 45 for some modules
- Siting
  - Orientation, shading, tilt angle
- Maintenance
  - Information needed
  - Responsibility needs to be specified
- Inverters
  - Configuration and numbers
  - Rating – temperature, PV output
- Link to energy use and efficiency
  - End user knowledge and interest essential

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Market Issues for Australia

- Large increase in international PV demand
- Critical silicon shortage
  - 2 years to resolution
  - Difficult to access wafers / modules for small market
  - Pressures on price
- What is Australia's place in the new PV market?
  - PV / BOS Manufacture
  - Systems
  - New technology
  - Expertise
  - How can we maintain the above?
- How can we grow the Australian market?
  - Selection of sites based on substation profiles
  - Products linked to controllable loads / air conditioning
  - Use MRET for larger systems
  - Feed-in-tariffs?

References

- NSW Dept of Planning, 2005, ***Kogarah Town Square Photovoltaic Power System Demand Management Analysis,*** Report by Energy Australia.
- Australian IEA PVPS Consortium, 2006, ***PV in Australia 2005,*** Watt, M.
- NSW Dept of Planning, 2006, ***Newington Village - An analysis of photovoltaic output, residential load and PV's ability to reduce peak demand***, Report by Watt, Passey, Barker & Rivier, CEEM.

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