



International knowledge of our complex
global environment
informing *local action*.

Global Local NEWS

This issue: Introducing 2050 & the Future of Solar Energy

Scientific research is decoding our complex world, but there is a gap between science knowledge and practice. Global Local attempts to bridge this gap with snapshots of reliable information on scientific findings and informed action relating the built environment.

Fast Facts: Solar Energy

1. Incandescent light globes deliver 100W. A toaster uses 1000-2000W.
2. Solar energy reaching the atmosphere is 1376W/m²
3. Peak Solar energy on the earth is 1000W/m²
4. Average annual solar energy on the earth is 250W/m²
5. Riding a bike at 30km/h generates 150W
6. Residential energy use increased 60% since 1975 with 35% population increase

What is 2050?

The dynamic organisation called '2050' is young professionals involved in the built environment. It was formed as a result of the 2004 Year of the Built Environment and 'Youthquake' conference and the efforts of Kate Wagner and Michael Manikas.

There was consensus that sustainability requires the combined expertise of people working together. The 2050 membership ranges from future leaders in the areas of finance and development, to government, to engineers and architects.

The mission statement:

“2050 exists to drive national initiatives towards a more sustainable Australia, with passion, commitment and youthful energy.”

Each individual is to strive to show initiative to drive 'green-smart' options in their field, recognising that actions in the built environment have consequences on the natural environment. The collective action that results forms a critical mass.

Over 120 young professionals of 2050 recently held their 'Future Shock' conference at QUT in Brisbane. Mr Adam Spencer of the ABC's QUANTUM spoke of the increasing interest of Australian youth in science, sparking debate on the role of expert knowledge.

Hypothetical scenarios from the year 2050

from engineers Fiona Berry and Adam Beck from the international firm Ove Arup, Di Jay of CEO of Planning Institute of Australia, architect Janet Henriksen and Dr Shane Greive of Curtin University opened broad discussion that concluded that Australia's approach to technology and urban planning are critical to sustainability.

The 2050 delegates debated urban living versus suburban with strong consensus that suburban sprawl was detrimental, however, Australian suburbia could be more sustainable.

Expert planners, developers and architects including Maria Atkinson of the Property Council of Australia, Adam Hadow of SJB Architects and Ian Sinclair of EDGE Land planning (who provides advice to local and state government), led a debate that concluded that Australia was approaching sustainability correctly but that action was still lagging behind rhetoric.

The 2050 conference outcomes were a submission to the NSW Parliamentary Inquiry Into Children, Young People and the Built Environment, a website for sharing knowledge and each individual was inspired to work for small but achievable sustainable outcomes.



To find out more www.2050.org.au
or Katie Cadman, email: nsw@2050.org.au

The State of Solar Energy

To complement the opening of the new National Solar Energy Centre, in Newcastle on March 31st, world experts on renewable energy gathered to discuss the way forward for solar technology.

A kilometre by kilometre solar field in California has been producing electricity for 20 years and can now produce electricity for 12-15cents/kWh. Spain's government is again investing in solar electricity production with a number of new plants, including the trial of large scale point focus tower technology.

Australia has taken a different approach, favouring small applications using 'off the shelf' components as at the National Solar Energy Centre in Newcastle and the Liddell

Power Station, where 10000m² of solar collectors are used to heat steam. Alternately commonly available expertise is used as in the dish developed at ANU, Canberra.



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At present solar technology is well developed can deliver 600°C up to 1000°C. Further development is occurring in component development and performance improvement,

with specific work on how to use solar energy to separate hydrogen, for a hydrogen economy.

The USA is leading the development of a hydrogen economy. Professor Tamaura explained why Japan sees Australia as a key partner in using solar energy to produce

hydrogen. As yet, production of hydrogen from water using Solar Energy is not achievable, a significant barrier being the heat required in the process.

The CSIRO sees solar energy as Australia's largest energy resource, with huge regions of the country receiving the maximum possible average daily sunshine, which with current technology could supply all of Australia's electricity needs. However, they see small scale plants near as most efficient, due to transmission losses. The most exciting development is the integration of the solar towers near buildings such as in Newcastle and into buildings such as that of the ANU developed dish at the Weismann Institute in Israel.

Dr Stein of the CSIRO pointed out that biomass is only 1% efficient. The efficiency in converting the energy from coal is 28%, whereas photovoltaics had an efficiency of up to 20% and a solar hot water an efficiency of 65%!

Dr Ward of the CSIRO Energy Centre, who has been working with Hornsby Council to incorporate renewable technology into their buildings, is of the opinion hydrogen should be seen as another fuel, like natural gas, only more expensive.

Mr Priem of Hamburg based SunTechnics sees a future for solar technologies in Australia, saying there is a cost saving if photovoltaics are integrated in the roof or wall sheet. There is a synergy if one long lasting, low maintenance building element can be both structural cladding and produce free electrical power.

Comment

Australia has significant potential solar energy resources. At present, solar energy is vastly under utilized. For over 25 years solar hot water systems have proven their reliability and their ability to pay back the initial investment and deliver low cost hot water. However, in NSW, where average daily sunshine ranges from 6-9 hours (CSIRO), which is amongst the highest in the world, only 2% of hot water systems are solar (Solarhart). This low penetration is even more puzzling in that Australia has very high carbon dioxide emissions of which 31% of *all residential* emissions are due to hot water heating! (AGO,1990)

So why hasn't residential Australia exploited it's abundant solar energy?

The most significant factors seem to be the initial cost and that the 'Jones do not have one'. The dominance of decisions based on initial cost is due to the fact that Australian's do not stay in a house long enough for the hot water system to 'pay back'. A staggering 6.6 million Australian's moved house between 1991 and 1996 (ABS). Many moved in the same local area indicating they may be on-selling on a rising market for profit. For those who are building dream homes, there are few people in their social circle to pass on solar experience. Government can take a lead role. Legislation is now favours solar hot water heaters, but, government could do much more by good example. If every government building had solar power the community would see it as commonplace, and, the costs would be reduced with mass production.

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