Societal Uptake of Alternative Energy Futures

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BACKGROUND

There is increasing recognition of the public role in the process of technological innovation. Indeed, public perspectives and their relationship with technologies can change the very trajectory of technology uptake. This is particularly pertinent in the case of energy technologies for achieving greenhouse emission reductions, where there is a strong argument for active public engagement.

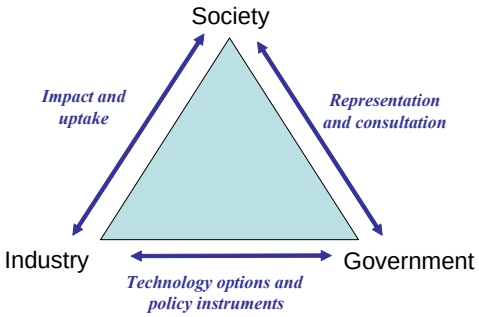


Figure 1: The links between technology and society

To this end, research was undertaken as part of the CSIRO Energy Transformed Flagship that sought to understand the social perspectives that will shape Australia's energy future. This research ran parallel to and informed the work of the Energy Futures Forum.

A key aim of this research was to provide small groups of randomly selected public participants the opportunity to reflect in detail on Australia's energy options. Three 'citizen's panels' were conducted, each involving approximately 20 people, in Western Australia, New South Wales and Victoria.

A range of measures were used to record the perspectives of these groups and any changes the occurred over the three-day period. This information was used to build a coherent picture of responses and the dynamics of the discussion.

DEMOGRAPHICS

The recruitment involved sending an invitation to a selection of 2000 people across each State reflecting a cross section of the public. Those interested in participating were asked to respond with essential demographic information and a self assessment of their knowledge regarding energy technologies and their personal response to technology adoption.

Over 250 responses were received, 110 from WA, 71 from NSW, and 81 from Victoria. A random stratification process was used to select individuals so that each major demographic category was represented by at least one person. Where this was not possible, preference was given to those categories that most strongly influence attitudes towards technology, such as age and education level. Once this was achieved, the next priority was to achieve quotas for each of the demographic categories that reflect the proportions within the population for the catchment area, based on Australian Bureau of Statistics (ABS) data. The final composition of the Citizens' Panels comprised 23 citizens from around Western Australia and 18 people from New South Wales and 18 from Victoria.

PROCESS

The Citizens' Panels provided the means for participants to explore their perspectives in depth, in ways consistent with deliberative ideals. The task of the Panels was twofold:

1. to evaluate the range of energy technologies that might be part of a future energy system for Australia; and
2. to make recommendations for their preferred energy future.

An important component of the research design was to ensure that these perspectives, and the way they changed as deliberation proceeded, could be captured. As such, participants were asked to undertake identical survey exercises at the beginning, half way through and at the end of the process.

The survey method involved responding to a set of statements. These statements were obtained by sampling opinions, dialogue or interviews about the issue. Participants were asked to rate how much they agreed with each statement. They were also asked to provide some feedback to the Energy Futures Forum (EFF) on two specific issues:

1. the plausibility of the scenarios being developed by the EFF; and
2. the comprehensiveness of those scenarios.

RESULTS

Different Types of Discourse

Analysis of the data revealed five different types of "discourse" or "factors" that emerged from participants' responses, offering a range of public perspectives on energy issues facing Australia.

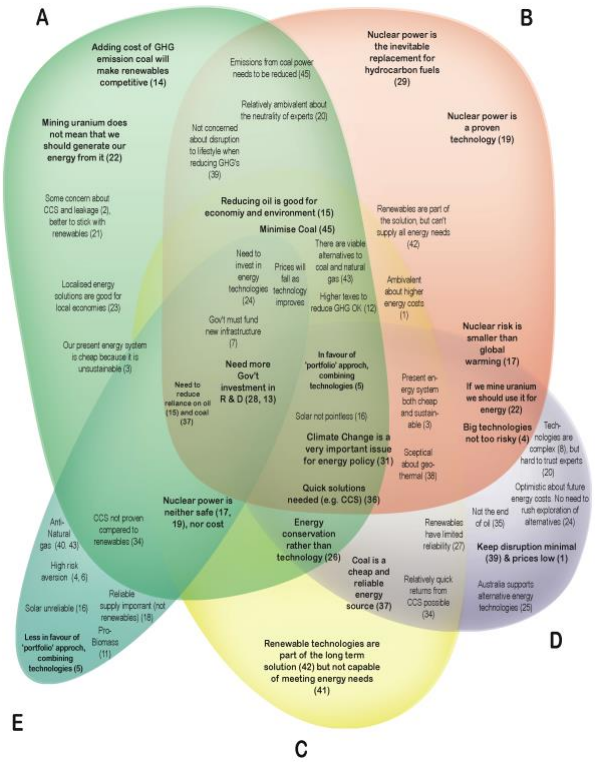


Figure 2: Prevalent public discourses with typifying statements from surveys.

These discourses reflect the way that values and beliefs are organised into regular themes within the public sphere regarding energy technologies. These are loosely characterised as follows:

A. Broad Scale Reform
Discourse A is associated with a 'whole energy system' approach and a belief that all technologies can compete once all externalities are factored in. This discourse is attracted to renewable technologies, with a willingness to endure some impact on lifestyle.

B. Centralised Energy Generation
This discourse is most strongly associated with an emphasis on centralised generation and distribution of energy, and technologically intensive approaches to greenhouse gas reduction. It is consistent with a high degree of faith in large-scale solutions and the expertise in the policy and regulatory systems that implement them. Although there is sympathy for alternative energy solutions, such as renewable energy, this is tempered by a belief that they are not reliable enough to supply a large proportion of energy needs. While nuclear is not ruled out, it is not seen as the sole solution, just one that can have a fit with the aims of security of supply, large scale generation and low emissions.

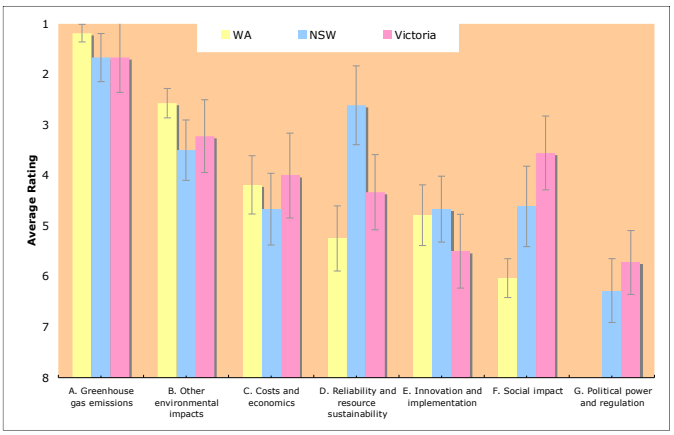
C. Orderly Reform
Discourse C reflects concern about energy policy and how it might drive the system to evolve into a more sustainable future. There is a considered enthusiasm for technological possibilities. Incremental technology innovation across a spectrum of approaches, combined with demand management, is seen as the primary solution to reducing greenhouse gas emissions.

D. Technologically Conservative
This discourse represents a potentially spirited defence of Australia's energy policy system. It is the most technologically conservative and price-sensitive of the discourses. There is evidence of cynicism in the role of experts; however greater emphasis is placed on behaviour and demand to reduce greenhouse gas emissions. There is also a preference for approaches that 'adapt' rather than 'mitigate' climate change.

E. Radically Alternative
This discourse is concerned about many of the large-scale technologies, partly because of the risk involved. Rather than driving the agenda for change to the energy system, technology should follow the lead. Mechanisms for achieving solutions are heavily centralist, with a strong role for government.

The first three discourses were the most strongly represented and all of these share serious concern about greenhouse emissions and climate change, which manifests in different combinations of energy technologies and different trajectories for the future. Tensions between the risks associated with large-scale technologies and a desire for energy security are the main distinguishing features between the discourses, as well as concern about the resulting impacts on society.

Technology Assessment Exercise (Criteria Analysis)
In each Panel, participants were asked to consider what priority they would place on investing in nine different technologies accompanied by a quasi multi-criteria Technology Assessment Exercise (TAE). This began with participants identifying the criteria they felt were most important when assessing the value of different energy technologies to Australia's future. The results illustrated below show greenhouse gas emissions clearly dominated for all panels, followed by other environmental impacts.



** Criteria G was not included in the WA survey*

Figure 3: Assessment criteria for technology options

Technology Priority Exercise

Participants then assessed each technology by rating them against each of these criteria. The results were then aggregated as shown in figure 4 below. When compared with their raw prioritisation of technologies at the end of the process, there were two consistent differences across all three panels:

1. hydroelectricity ranks higher in the structured technology assessment exercise than in the more subjective priority ranking exercise;
2. carbon capture and storage ranks consistently lower in the structured technology assessment.

Possible explanations for these differences are varied, but might partly reflect the difference between assessing technologies in isolation and deciding on their role as part of a whole energy system in discussion with other participants.

There were no significant differences between how the three Panels ranked technologies, and their rankings revealed distinct preferences for particular technologies. For instance, solar power consistently scored highly, particularly in WA, with coal (without carbon capture and storage) scoring poorly overall.

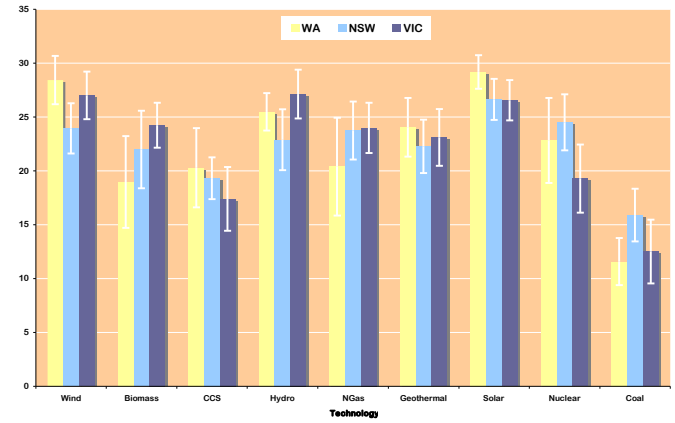


Figure 4: Average Aggregate Score for each technology, by state

Shifts in Perspectives

Technology Priorities

The Technology Priority surveys were undertaken three times throughout the process to examine any changes that emerged.

Figure 5 shows how the technology priorities of each panel as a whole changed during the deliberative process. Each bar represents the change in average rank for each of the nine technologies in the Technology Priority survey. A positive value indicates a shift in favour of a technology and vice versa for a negative value.

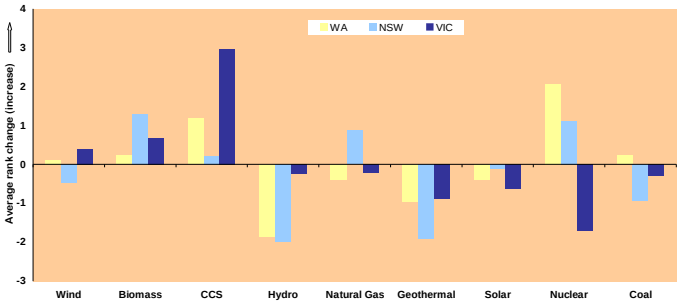


Figure 5: Average Technology Priority Ranks before and after dialogue

Technology Discourses

Alongside these changes to technology priorities were shifts in the strength of the five different discourses during the Panel processes. Each of the panels changed in different ways (with WA and NSW being reasonably similar and Victoria substantially different). Overall trends include:

- For some participants, interest in renewable energy was offset by an emphasis on current limitations such as meeting peak energy demand and high costs, thus shifting to favour large-scale centralised solutions.
- A shift towards orderly reform involving transition technologies occurred where there was a concern with the short-term viability of renewables but a long-term desire for their widespread use.
- The strength of the initially smaller discourses D: “Technologically Conservative” and E: “Radically Alternative” both declined during deliberation.

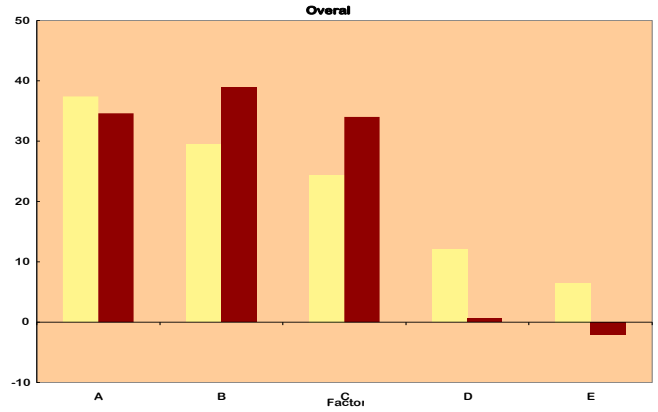


Figure: Shifts in perspectives as a result of the panel process

CONCLUSIONS

The ability to reduce greenhouse gas emissions clearly dominated as the preferred attribute of energy technologies, followed by other environmental impacts, and then costs and economics. Other important attributes included reliability, social impact and the ease of implementation, but there were variations between the different panels on the relative importance of these criteria. Participants were able to make trade-offs between environmental impacts and reliability and security of supply, and engaged rapidly with the concept of interim technologies as a means of enabling an orderly transition over the 100-year period as a step towards a desired future.

The general consensus in all panels was that a paradigm shift is required to enable Australia to become a more synergistic society where goods are shared, wastes are reduced, re-used and/or recycled and services are provided on the basis of lifecycle management. This was not seen as necessarily being detrimental to the economy if we can think differently about how to run our businesses. The Panels were prepared to pay more in taxes to make this happen, but wanted reassurance that the money raised was going to encourage low emission energy pathways.