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An energy efficiency policy model that addresses the influences of the Infrastructures of Provision

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eceee

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Project rationale

- Conventional approach to driving uptake of EE & DG often emphasises price signals and information
- Assumes customer makes rational decisions to maximise their own welfare, and that energy supply system simply responds to their demand
- Clearly other influences at work
  - people install PV even though it may never pay itself off
  - people don't implement EE with 1 or 2 year paybacks
- This paper is essentially about developing a process
  1. Characterise a subset of those influences
  2. Develop policy accordingly

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Our approach in summary

- move beyond price signals and information
- move away from technology and price-focused models
- instead focus on **end-users**, and the **decisions** they make
- look at the various **influences** on these decisions (in addition to prices and information)

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Presentation outline

- What are the different influences?
  - Infrastructures of Provision influences
  - Broader Social Context influences
- Overcoming IoP influences
- Overcoming BSC influences
- Conclusions

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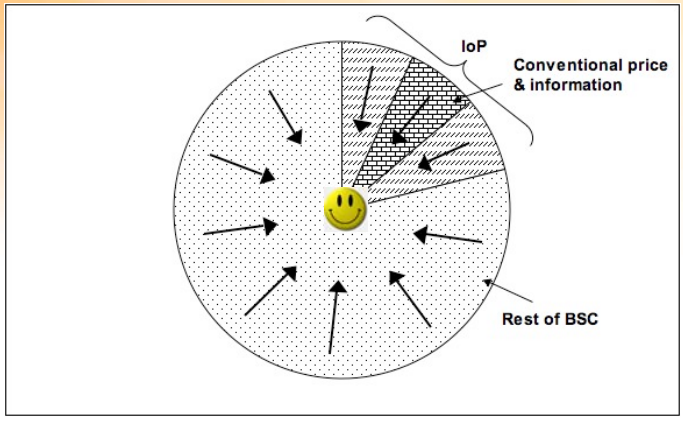
Influences on end-users' 'energy decisions'



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Infrastructures of Provision

Draws on a broader definition of technology (www.iiasa.ac.at)

- ***hardware*** involved in delivery of energy services (from electricity generation through to end-use equipment and housing stock)
- ***software*** (the knowledge to appropriately design, manufacture and use the hardware)
- ***orgware*** (the associated commercial and governance systems and institutional frameworks required to deploy and integrate the hardware eg. National Electricity Market, Electricity Retailer Licences, Australian Standards, Building Codes etc)

Helps to reinforce the importance of these aspects of technology

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Residential hot water service case study

Examples of IoP influences

1. Energy supply industry:

Those more derived from the energy supply industry

- eg. near universal supply of cheap electricity
- eg. the nature of the electricity tariffs (cheap off peak -> storage heaters)
- eg. high standing charges reduce incentive to reduce electricity use
- eg. sale of ACs by electricity retailers….

2. Associated physical infrastructure:

Those related to the infrastructure more closely associated with the end-user

- eg. whether the householder owns the premises
- eg. State & local government building regulations and requirements
- eg. solar access, both at the time of installation and in the future

3. End-user technology:

Those that are more directly related to the technologies themselves

- eg. higher capital cost of solar water heaters
- eg. relative availability of SWHs vs conventional
- eg. availability of personnel to install and maintain them

System that supplies hot water energy service is not simply meeting demand of end-users, but is also shaping that demand

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No single price sensitivity, payback time influenced by:

(even if everyone completely rational, excluding behavioural influences)

- Prior to installation
  - the variety of different water heaters that may be replaced,
  - whether electricity or gas was used,
  - the net cost of electricity or gas (including standing charges) and whether the homeowner was on a particular type of tariff, and
  - whether low-flow shower heads or flow restrictors were used.
- After installation
  - the cost of different water heaters that may be used to replace the old,
  - whether electricity, gas or solar is used,
  - the net cost of electricity or gas and whether the homeowner is on a particular type of tariff,
  - whether low-flow shower heads or flow restrictors are used,
  - the availability of rebates etc. and whether change was driven by some mandate, and
  - whether the homeowner is prepared to change their water use habits (related to BSC influences discussed below).
- A bell-shaped distribution curve of payback times across pop?

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Broader Social Context influences

- Energy use and interest in EE options:
  - Supply-side mentality: buy bigger water heater, not use low-flow showerheads
  - Fixed budget to build house, little left over for 'discretionary items'
  - Emergency situation usually means replacement with what had before
  - Prefer to be wise cynic not naïve green ideologue
  - Evening water use reduces effectiveness of SWHs with off peak boost
- Response to programs aiming to drive EE
  - Cultural differences, language barriers, workshops unfamiliar
  - Disadvantaged communities difficult to reach
  - Energy use (and GHG emissions) is government & energy industry's problem
  - People tend to discount benefits more than is 'sensible'
  - People are sometimes simply not rational

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Presentation outline

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  - Broader Social Context influences
- **Overcoming IoP influences**
- Overcoming BSC influences
- Conclusions

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Overcoming IoP influences

1. Energy supply industry-related:
   - eg. near universal supply of **cheap electricity**
   - eg. the nature of the **electricity tariffs** (cheap off peak -> storage heaters)
   - eg. high **standing charges** reduce incentive to reduce electricity use.

Suggested policies:

- Command and control measures help enforce more efficient appliances
- Capital grants, low interest loans, and White Certificate schemes (or Energy Sales Targets) help overcome upfront costs relative to savings
- White Certificate schemes (or ESTs) can drive uptake of EE independent of energy tariffs
- ESCOs help overcome upfront costs relative to savings, and could bundle standing charges into energy use tariffs

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Overcoming IoP influences (cont.)

2. Associated physical infrastructure:
   - eg. whether the householder **owns the premises**
   - eg. State & local government building **regulations and requirements**
   - eg. **solar access**, both at the time of installation and in the future.

Suggested policies:

- Command and control measures could force owner to implement EE (eg, BASIX)
- Capital grants, low interest loans, White Certificate schemes (or ESTs) and ESCOs help overcome split incentive
- State & local government requirements can be standardised and streamlined to enable EE, and can even be used to drive it - similarly for solar access

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Overcoming IoP influences (cont.)

3. End-user technology:
   - eg. higher **capital cost** of solar water heaters
   - eg. **relative availability** of systems
   - eg. **availability of personnel** to install and maintain them

Suggested policies:

- Command and control measures, capital grants, low interest loans, White Certificate schemes (or ESTs) and ESCOs can all be used to overcome the upfront cost
- White Certificate schemes (or ESTs) and ESCOs can be used to 'make' EE hardware more available and reduce their costs
- Training and certification processes are required to make EE skills more mainstream

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BSC influences

How to deal with BSC influences?????

- May be that the best way to do this is simply to take the decision-making out of the hands of end-users, especially in the residential sector….
- Command & control, White Certificate schemes (or ESTs) and ESCOs can help do this

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Main conclusions

1. Because of people's different circumstances & behaviour, generic financial costs and values are of limited value in modeling uptake of residential EE & DG.
2. Because of the IoP and BSC influences, policy used to drive EE & DG should not rely on selected information and price signals to evoke rational responses.
3. Not saying that C&C, WCs, ESTs, ESCOs and regulations and training are all the policies that we need, or even that they are the best policies.
4. Process shows WHY we need such policies (what particular issues they address), and therefore that we DO need such policies.
5. A number of coherent policies within an integrated energy policy framework are likely to be required to drive effective and efficient deployment of EE & DG.

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Thank you… and *questions*

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