Centre for Energy and Environmental Markets

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Making markets that drive energy efficiency

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The question.. and a possible answer up front

- **Q** How can we make market-based mechanisms that drive appropriate levels of Energy Efficiency?

- **A** We can't be sure yet, however likely to require:
  - *Appropriate energy policy context – get energy market design and restructuring right –* ***prices probably will have to rise***
  - *Appropriate energy efficiency (EE) policy context – a mix of information, regulatory and more directly market based mechanisms*
  - *any Market-based trading mechanisms such as Energy Efficiency Certificate Trading (EECT) / White Certificates has to be very carefully designed*

Energy efficiency is…

- Only one of a range of possible means to an end
  - of delivering desired end-use energy services
- which is, itself, difficult to define
  - energy service needs versus wants, and their changes over time and with 'progress'
- + driven by diverse, sometimes conflicting objectives
  - affordability of an essential public good, energy security + increasingly environmental impacts
- that aren't fully represented in existing energy mkts
  - economic, social + environmental externalities
- which also exhibit other potential mkt failures
  - monopolies, information failures, incomplete mkts etc…
- **Nevertheless**, EE almost certainly one of our best options in meeting all these objectives (eg. IEA, G8 - Gleneagles, 2005)

Energy efficiency itself is…

- Hard to define in a meaningful way
  - since primary objective is to maximise societal benefits delivered by chosen mix of energy services against costs incurred delivering these
- since EE is only part of this
  - level of end-use energy services delivered per unit of energy consumed
- and there is great emphasis on 'cost-effective' EE
  - Private benefits derived from chosen energy services c.f. private costs – *energy + associated end-use equipment*
- EE can be even harder to measure
  - Bottom-up (technical) precise but incomplete – what of consumption?
  - Top-down (aggregate) measures multiple factors– what is EE?
  - All technologies + processes **are** energy technologies + processes => *EE is always relative to what would have happened otherwise*

Market-based approaches for driving EE…

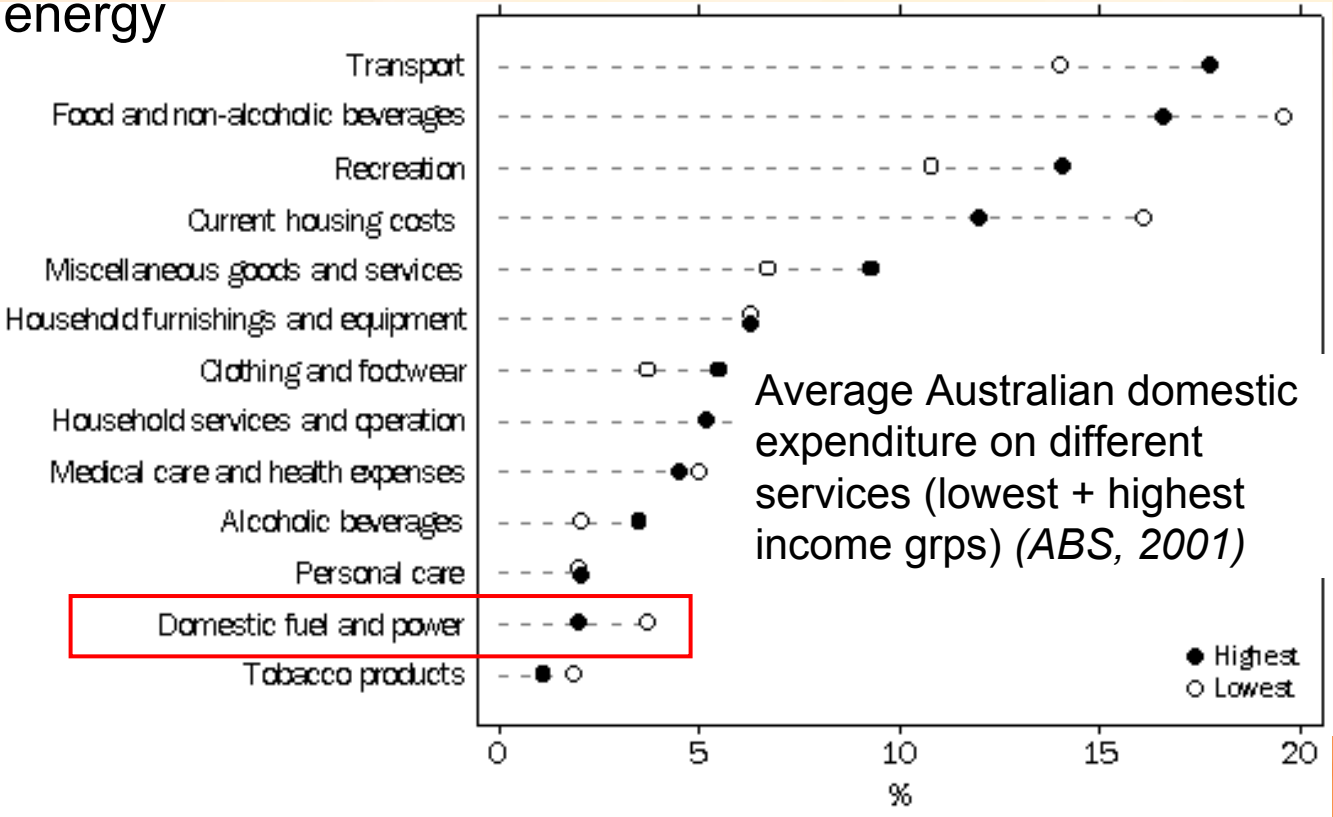
- work by changing supply or demand for EE through information, regulation and **prices**
- **Price based** mechanisms change *effective price* for decision makers of undertaking EE options
- Either **indirectly** through changing energy prices
  - driven by energy taxes, mkt design
  - even more indirectly via environmental instruments such as Emission Trading Schemes (ETS)
- or directly through approaches that price EE
  - reduce supply costs of EE – eg. regulatory impacts on building + appliance EE innovation, R&D tax incentives
  - increase demand benefits of EE – eg. tax credits
  - mandating increased demand to increase value of EE + allow trading **Energy Efficiency Certificate Trading (EECT) / White Certificates**

Driving EE through Energy Prices

- Relationship between energy prices and EE related decision making complex
  - Do energy costs matter to many end-users?
    - Large cost-effective yet untapped EE potential suggests not?
  - ***If they do,*** many complications
    - End-user final energy costs = $\frac{\text{energy services X } \mathbf{\text{energy costs}}}{\mathbf{\text{energy efficiency}}}$
    - Lack of information and capacity to act
    - Short-term *behavioural* vs longer-term *investment* elasticities
    - Expectations of where prices are going
  - ***And regardless***
    - What other EE policies may become possible with higher prices?

Many energy users don't pay much

- For many Australian businesses + in residential sector, stationary energy typically < 5% of total expenditure
- Even for most energy intensive Australian industries, energy costs approx. 20% of production costs
- Share of stationary energy costs for residential budgets in IEA countries fell 20-50% from early 80's to late 90's. Similar experience for most industries (IEA, 2005)



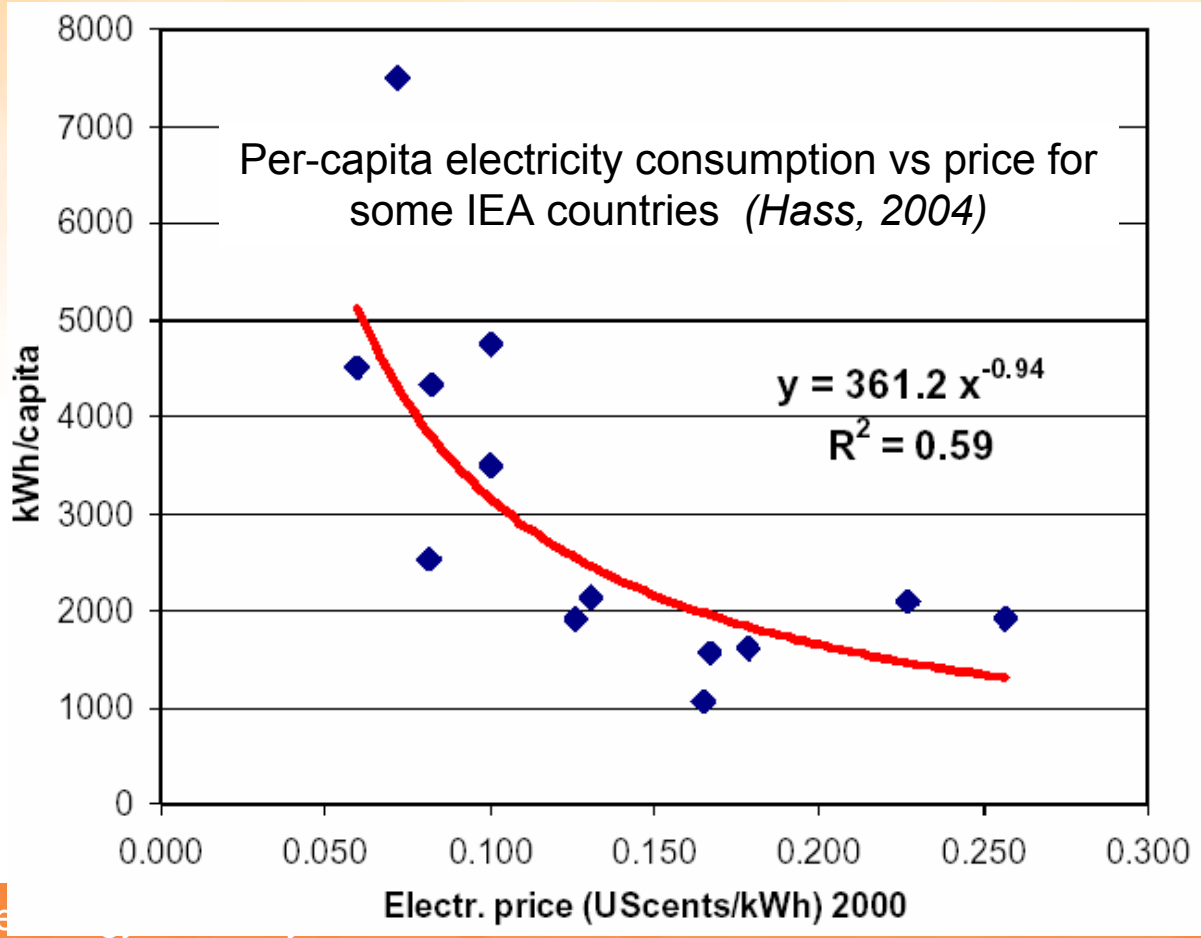
Average Australian domestic expenditure on different services (lowest + highest income grps) *(ABS, 2001)*

and nearly all are in retail markets

- Participants in wholesale markets:
  - Mostly large, with electricity as core business
- Participants in retail markets:
  - Mostly small, without electricity as core business
  - Don't see energy's time + locational price signals directly
  - Multiple decision makers with split incentives + only limited options
  - Retailers / suppliers / LSEs are often energy sales agents, not energy service providers

Still, clear that energy costs + EE related

- *Caveat:* relationships b/n EE + consumption are complex



Some policy conclusions on EE + energy prices

- Given energy's vital *economic*, *social* and *environmental* roles, low energy prices are a policy choice
  - even if chosen policy is no policy, or to keep prices down…
    - European Commission - "more needs to be done to ensure real and effective competition" yet "well aware of the dilemma of increased consumption resulting from lower prices caused by the greater efficiency secured by introducing market forces" EE Green Paper, 2005
- + have serious implications for EE + wider energy objectives *energy security + environmental impacts driven by consumption*
- However, many energy users
  - In dysfunctional retail markets, unlikely to be motivated by small price increases (already ignoring cost-effective EE options), even when motivated, may be poorly equipped to take action

=> wider policy framework is required to help these users to act

Emissions trading schemes and EE

- In theory, EE offers some of the lowest abatement costs + should do well within ETS schemes, **however**,
  - EE options often small + diffuse → higher transaction costs
  - Many users impacted only via impacts on energy **pricing**
    - Price impacts an outcome of scheme design + implementation *targets, permit allocation, coverage, market power…*
    - Will many consumers respond to price increases?
  - *and ETS objective is to minimise costs of meeting emissions targets*

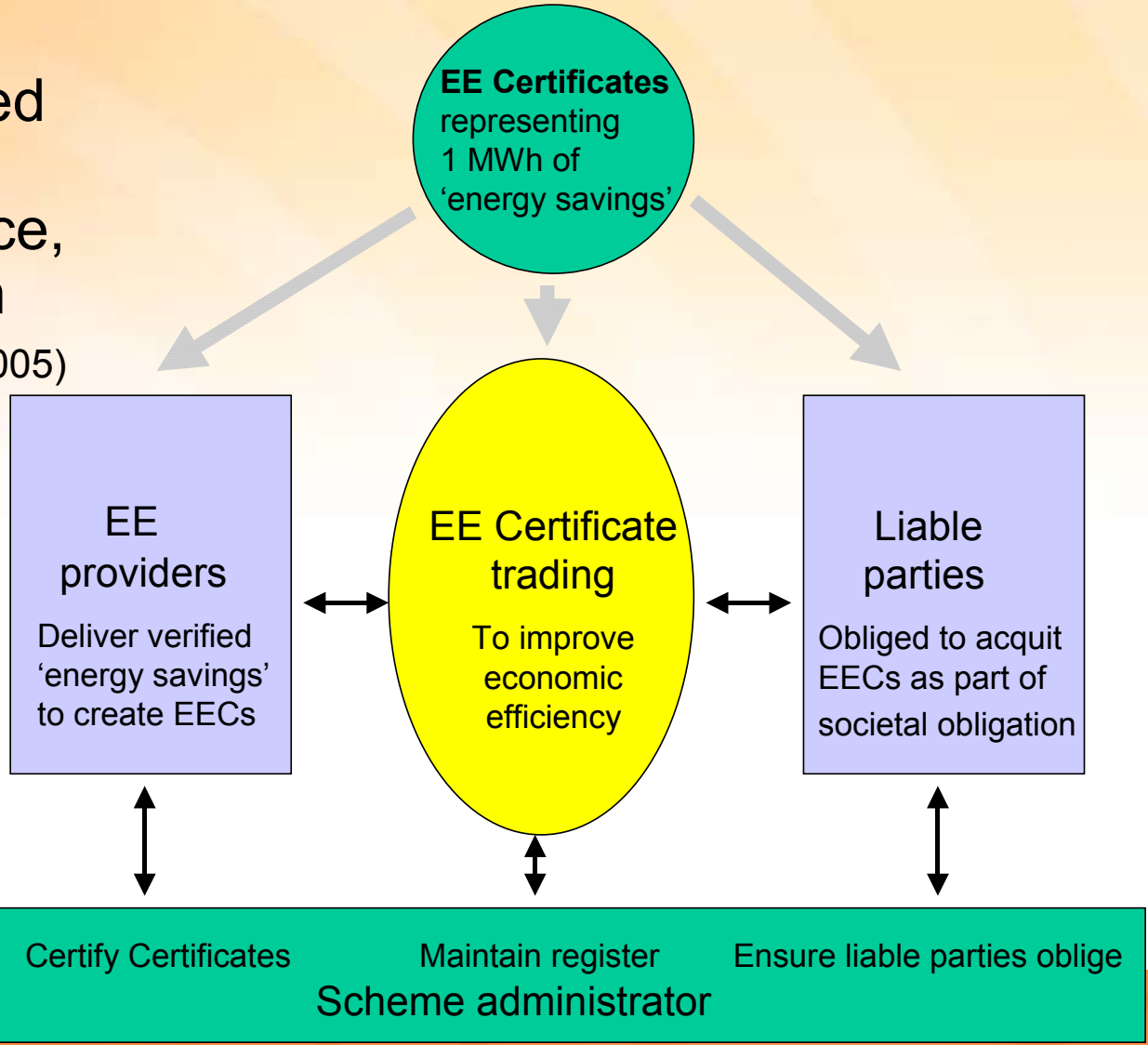
Value of EE can be changed *directly* …

- reduce supply costs of EE
  - Building + appliance EE regulation shown to reduce costs of EE through innovation + scale-up
- increase demand benefits of EE
  - Eg. tax credits that can be carefully targeted towards EE
- Energy Efficiency Certificate Trading (EECT) / (WC)

- Such approaches **may**
  - allow us to avoid policy challenges of 'higher energy prices'
    - provide separate cashflow directly targeted towards EE
  - drive energy user decision making better
    - focused incentives for those ready, willing + able to act with EE an investment opportunity rather than cost of doing business

EECT – a 'designer' market

- **EU:**
  partially implemented in UK + Italy, under preparation in France, under consideration in NL (EE Green Paper, 2005)
- **Australia:**
  included in NSW Greenhouse Scheme



Some key design issues

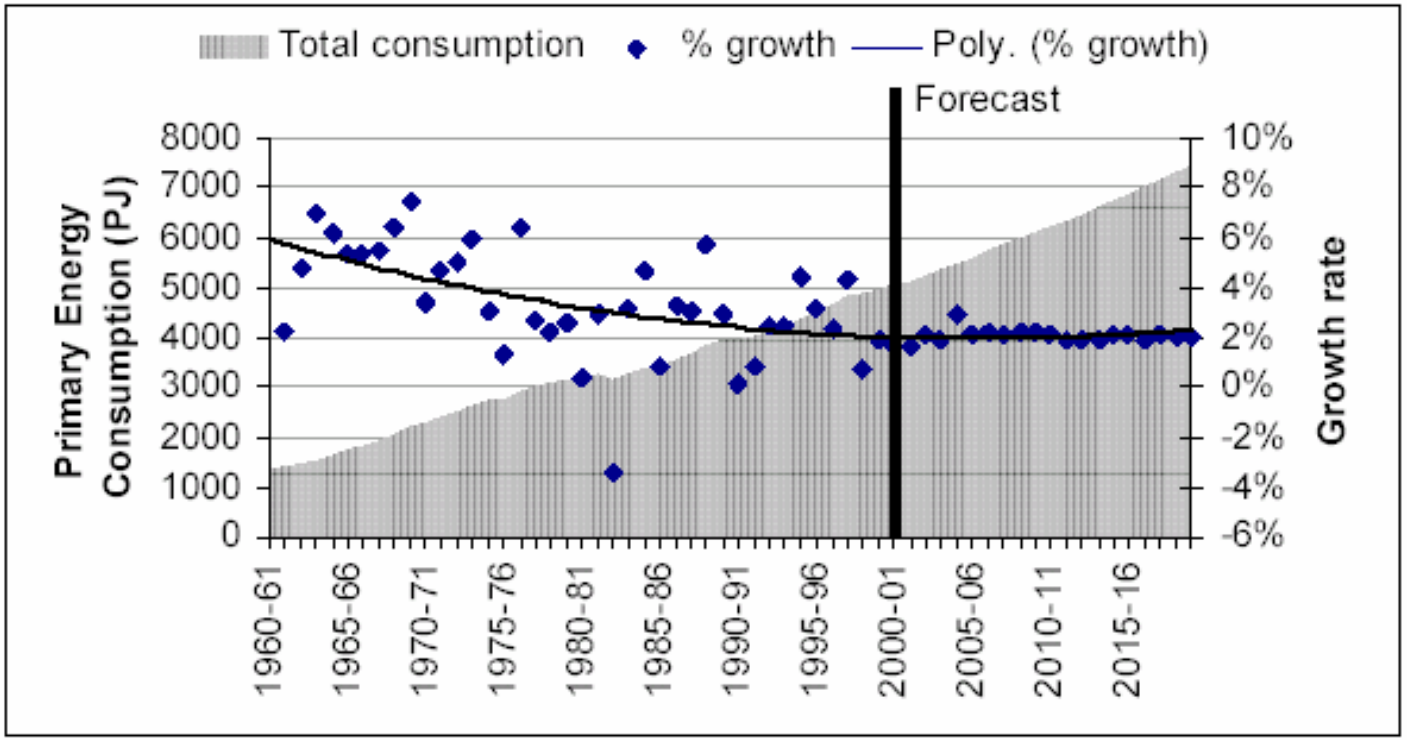
- Targets
  - Energy consumption (MWh), energy savings from BAU (MWh 'saved'), GHG reductions from BAU (tCO2 'abated')
- Scope
  - EE only, or a range of abatement options
  - Activities: industrial facilities ⇔ buildings⇔ appliances, Investment ⇔ behavioural changes
- Measurement + verification
  - Additionality beyond BAU or reductions in energy use
  - Reporting, transparency + auditing – complexity

Targets

- Environmental + energy security imperatives more about emissions than intensities like energy/$GDP or technical EE improvements
- Modest short-term targets based on energy savings from BAU projections may be hard to make meaningful (eg. proposed EU 1%EE/yr):
  targets can get lost in variability due to other factors

Annual variation in % growth in Australian primary energy consumption over the last four decades

(ACIL Tasman, 2003)



Scope, measurement + verification

- Increasing scope can increase efficiency but fungibility issues
  - Are Compact Lights directly fungible with cavity insulation?
- Additionality is hard to assess but it matters
  - Establishing baselines difficult (+ prone to errors, moral hazards) b/c have to estimate what would happen in absence of EECT
  - *Alternative*: simple requirement to *"reduce, or increase the efficiency of, their consumption of electricity"* **eg. NSW Scheme**
    - No test of additionality, yet many BAU reasons why these occur *Such an approach attracts participants doing something anway*
- Trading means risks of 'market for lemons'
  - Genuine projects have to compete with any free-riders
- Complexity a challenge
  - verification vs transaction costs *particularly if require additionality*

Some possible policy conclusions for EE

- Get the wider energy policy context right
  - Retail energy market restructuring is not delivering for EE
  - Rethink required on desirability of low energy prices – adversely impacts EE + key wider energy objectives
- Get the wider EE policy context right
  - Important limits to what price-based mechanisms alone can achieve
  - Market mechanisms rely on regulatory measures to set minimum acceptable performance, frontier measures to push the envelope
- For EECT
  - Reduce complexity by restricting scope, measurable targets
  - Get baselines right - restrict scope of activities to what can be shown to be largely additional, fungible, measurable + verifiable
  - Ensure transparency - for learning, and stakeholder confidence… public has 'rights' with schemes that gives their money to participants; moral hazards to negotiate for policy makers

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Thank you… and *questions*

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