The Role of Energy Efficiency in Job Creation

Global & Local Trends in Energy Efficiency

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Outline

- Setting the scene
- Current status of the Sustainable Energy Industry in Australia
- Some NSW measures to promote sustainable energy, energy efficiency
- The Sustainable Energy Jobs Report

Setting the scene

- Kyoto Ratification
- National Framework for Energy Efficiency
- Industry position
- Mandatory Renewable Energy Target
- Domestic Emissions Trading

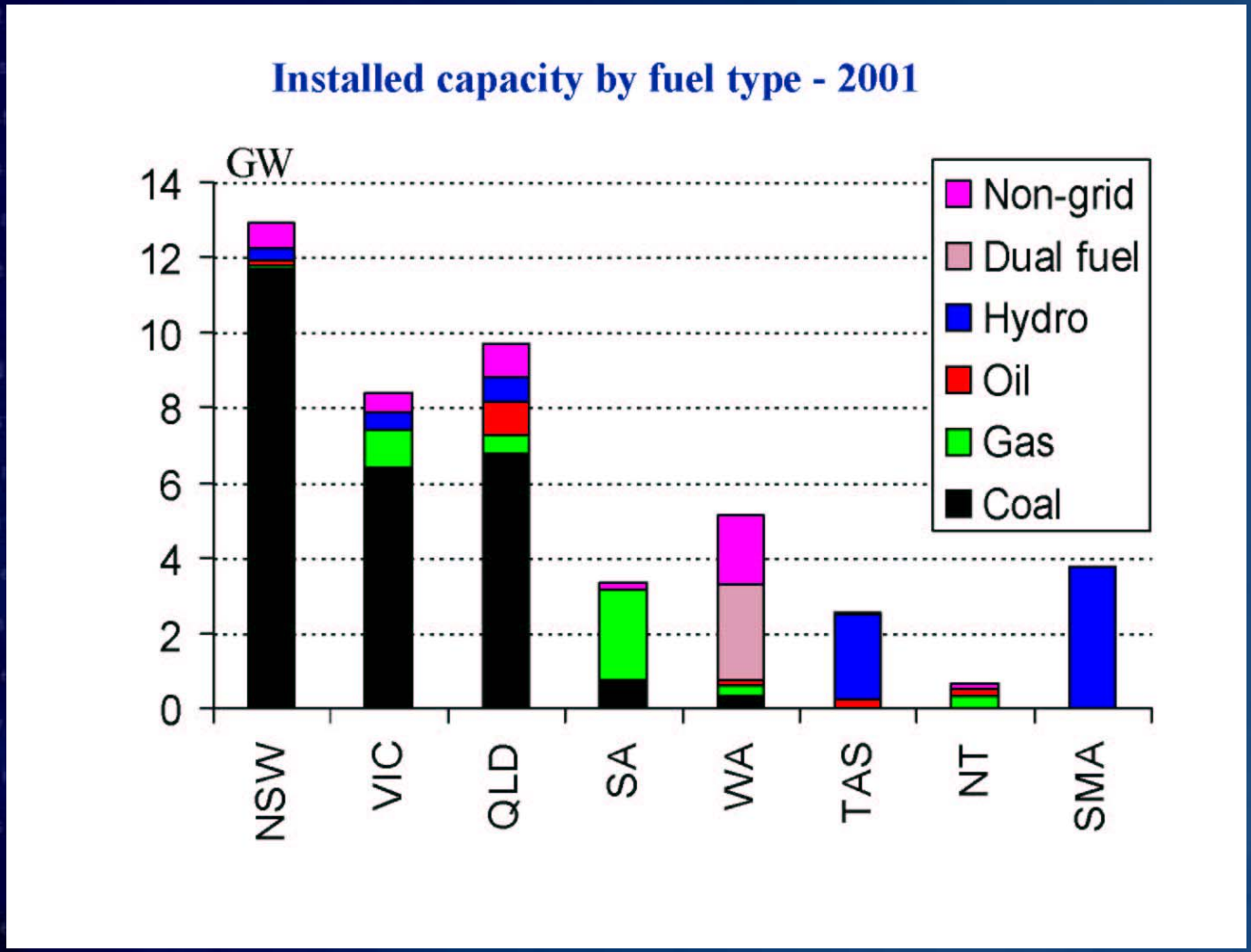



Australian energy sector

- Dominance of coal → Australian energy sector GHG emissions are high:
  - EU power sector = 353kg of CO2/MWh
  - US power sector = 720kg CO2/MWh
  - NSW = ~ 900kg CO2/MWh & rising
- Low cost energy economy – 3rd cheapest in OECD
- ABARE predicts electricity generation will grow 2.3% pa over 1999 –2020 (based on BaU econ growth & no policy change)
- By contrast, IEA's *World Energy Outlook 2002* [BaU scenario] estimates annual increase of 1.3%
- The 'Alternative Policy Scenario' estimates growth of 0.9% pa




Coal dominates installed capacity

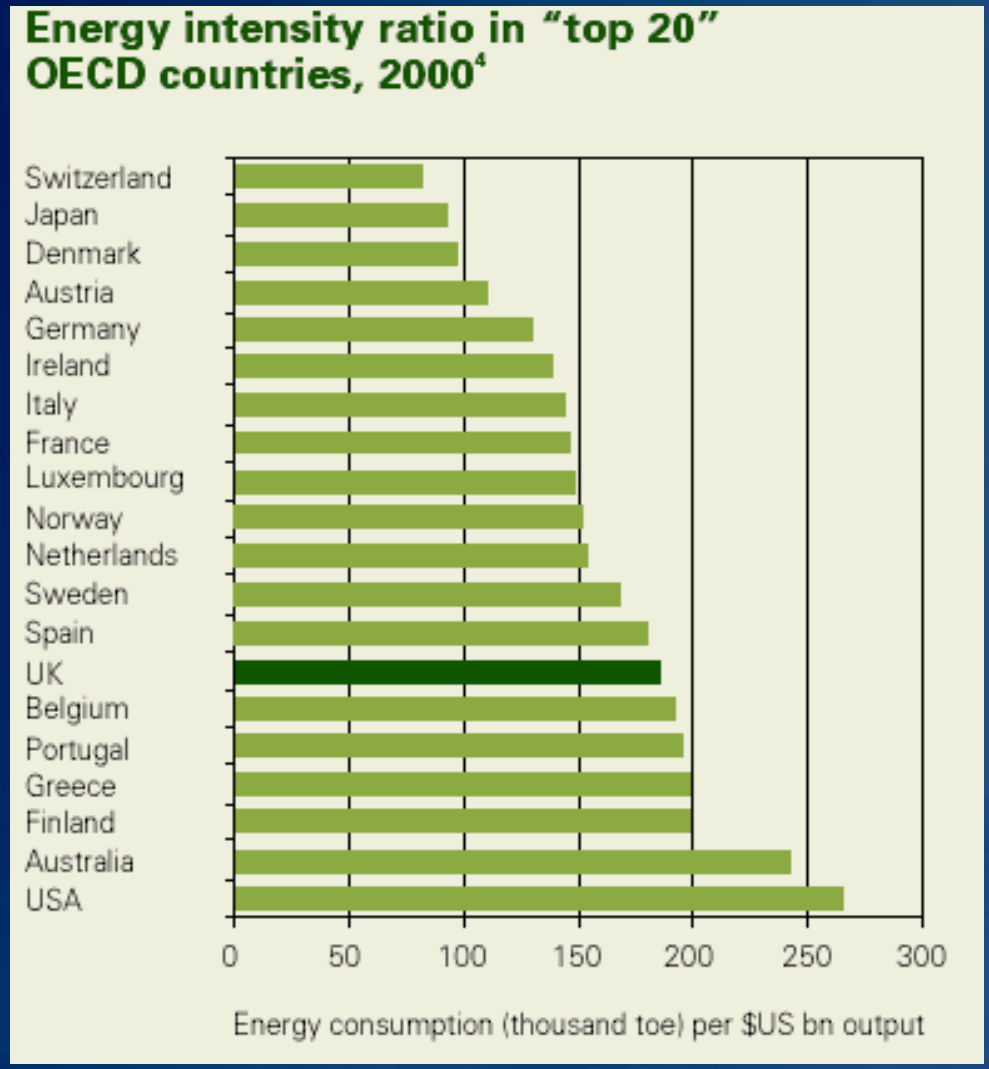





Energy intensity

- How do we perform on energy intensity? (amount of energy consumed per $ GDP)
- ABARE estimates energy intensity has declined 0.5% pa since 1974
- Looking forward, ABARE projects that this trend will continue & accelerate, with energy intensity declining 1.4% pa to 2020
- Recent analysis suggests structural economic change is the most important factor in this trend, rather than improving energy efficiency
- …. so greater effort is required to increase energy efficiency

Australia's ranking in energy intensity



→Only USA is more energy intensive than Australia.

Source: UK Energy White Paper




Australia's greenhouse profile

- Australia's total GHGe:
  - 7th highest in OECD, exceeded only by USA, Japan, Russia, Germany, UK & Canada.
  - emissions > Italy & France (with 3 x Australia's pop.)
  - highest GHGe per capita
- Australia is "within striking distance" of our 108% Kyoto Protocol target
- Future commitment periods likely to be tougher, with no 'free kick' from LUCF
- We will be impacted regardless – eg Japanese coal tax; exclusion from emissions trading
- Clear need to transition to a less carbon intensive economy

Kyoto Ratification?

Commonwealth Government has indicated it will not ratify the Kyoto Protocol but NSW Government takes a different view…




NSW position on Kyoto

- In response to lack of Cth action, NSW has taken action at state level with the aim of reducing GHG emissions
- However NSW supports ratification of the Kyoto Protocol & introduction of a national emissions trading scheme
- Premier Carr established the *Kyoto Ratification Advisory Group* to examine
  - Costs & benefits to Australia from ratification compared to non-ratification for 2008-12
  - Risks & benefits of ratification with respect to post-2012 period
- NSW, Victoria & SA calling on Cth to ratify, based on risk assessment




Findings

- Kyoto Ratification Advisory Group's *Risk Assessment* concludes
  - Economic impact of meeting KP target is low, *whether or not* we ratify [so little risk of carbon leakage or trade impacts]
  - However economic impact of meeting target is less than half if we ratify because access to KP 'flex mex' would soften impact of 108% target on coal-fired electricity generation, aluminium.
  - In GDP terms, meeting target without ratifying reduces GDP by 0.26% pa [= $2b pa] compared to not meeting the target
  - Meeting target from *within* the KP framework means GDP is only 0.11% lower [= $875m pa]




Findings cont.

- Ratification → further driver for development & uptake of low emission technologies for domestic & export markets
- Failure to ratify means no participation in emissions trading, CDM or JI, so we miss out on:
  - inbound investment [eg in forestry sinks] &
  - opportunities under CDM to export Australian technologies to the region
- Failure to ratify also means we can't participate in negotiations re future commitment periods which may involve tougher targets → "negligible influence" if we are outside the process
- However ratification would only bind Australia to meet 1st commitment period target – does not compel us to accept future targets




Conclusion?

- Robust risk assessment for post-2012 not possible because too many uncertainties
- Future commitment periods may have greater economic impact on Australia
- But this must be weighed against risk that Australia could "fail to respond to global developments in the energy use & traded goods sectors & thereby face *greater economic impacts over the longer term*".
- Report rejects Commonwealth view that we should wait until 2nd commitment period target is negotiated before we ratify.

….. → On balance: better for Australia to ratify.

What does this mean for NSW?




NSW energy sector

- Largest installed generation capacity in the country & more coal than any other state → potentially large exposure to carbon costs
- Less renewable capacity & less gas than other states (but new pipelines → more capacity feasible)
- Fastest growing population (esp Western Sydney) → *scope to promote efficient new development*
- Largest industrial/manufacturing sector in Australia – *strong scope for energy efficiency*
- Energy demand – esp peak demand – rising rapidly; shift to summer peak due to air con
- Now need to invest in significant new generation &/or demand side capacity [up to 25% increase]




Trends → costly implications

- Rising demand & shift to summer peak means:
  - now 2 peak demand periods (winter & summer) so weeks not months for doing maintenance
  - generation units less efficient in high temps & lines sag in hot weather → carry less power
  - means more generation & network capacity required to meet peak demand & ensure security
  - very significant investment required (billions of dollars) → cost borne by users, whole economy
  - 10% of network used < 1% of the time: sub-optimal use of capital
  - Cost effective DM opportunities continue to be overlooked → *reducing peak demand produces large savings*
  - rising energy demand also means increase in wide range of environmental impacts

… The time is right to create new drivers to promote energy efficiency by facilitating a shift in investment focus.




Benefits of a new approach?

- Key time in the NSW energy sector: a chance to promote investment that delivers optimal environmental & economic outcomes, including
  - Reduce capital expenditure, household & business energy costs,
  - Reduce GHG & other environmental impacts
  - Promote resource efficiency
  - Grow SEI & regional jobs as well as economy-wide jobs
  - Import substitution [higher Australian content in renewables than in conventional energy → more manufacturing jobs in Australia]
  - Access growing export opportunities, esp in Asia Pacific




Benefits of energy efficiency

- Energy efficiency = particularly attractive Kyoto abatement option b/c Australia has more scope to improve efficiency than other OECD countries → 'lower hanging fruit'
- … a 'win win' for the economy & jobs:
  - Low cost abatement through EE reduces impacts on other sectors, allows time for adjustment → less economic dislocation than if supply side options [eg fuel switching] are used to meet target
  - Business saves on energy costs & becomes more efficient → helps maintain competitiveness in an increasingly carbon conscious market [failure to improve efficiency → could risk losing mkt share, jobs]
  - Business, household energy cost savings → released into economy & grow jobs

… So what is the current status of the sustainable energy sector in NSW?




Current status of SEI

- 1999 survey of NSW Sustainable Energy Industry (SEI):
  - Annual sales of $1b, incl >$170m in exports
  - Directly employed >4,000 staff
  - Growth outstripped tourism & IT
- 2002 survey of National SEI:
  - National sales estimated at $3.8b pa
  - NSW companies = 40% of national sales (estimated to be worth $1.5b pa)
  - Employed 5,500 staff & stimulated up to 12,000 additional jobs
  - 70% of NSW SEI jobs relate to energy efficiency
  - SEI growth has slowed but remains at 10%
  - NSW SEI exports growing at around 37% pa …. Expected to be worth > $100m in 2002/03

Measures to grow the SEI

Multi-pronged approach

Market Transformation

- SEDA
- Energy Smart Business

Least cost abatement measures

- NSW Benchmarks

Voluntary programs

- Green Power
- Australian Building Greenhouse Rating Scheme

Renewable Energy

- Wind
- Solar
- Bioenergy
- Hydro

Quantity

- Commonwealth Mandatory Renewable Energy Target




How are we promoting Energy Efficiency?

NSW Benchmarks:

- Seeks to reduce emissions by requiring retailers, large users to reduce emissions via cleaner supply, sinks & *demand side abatement* [unique feature of scheme]
- Important opportunity to promote EE but need targeted action to realise optimal result

Demand Management Code of Practice:

- Requires distributors to examine alternatives to network augmentation
- Publish Electricity System Development Reviews & call for demand side proposals to help avoid need for augmentation
- SEDA working with distributors to avoid augmentation though demand side measures

Voluntary programs to promote EE

- Energy Smart Business:
  - 170 companies saving >$20m pa on energy costs; 38% IRR on investments of >$50m
  - And yet it takes 7 months on average to sign up partners due to non-cost barriers
- Australian Building Greenhouse Rating Sheme:
  - Rating tool for efficiency of commercial buildings
  - Creating demand for efficiency in the commercial building market
  - Leading to savings on energy costs, more jobs in the sustainable energy sector
- Plus other programs to raise awareness & build industry capacity

Energy efficiency also has strong potential to grow jobs in the wider economy, as outlined in the Sustainable Energy Jobs Report.




Why do the Sustainable Energy Jobs Report?

- Why?
  - Estimate sustainable energy's economic contribution
  - Assess impact of DM, EE & renewables (pros & cons)
  - Raise awareness, foster debate, engage stakeholders
- Aim? Present alternative viewpoint to those who say

  "GH abatement measures have an immediate economic cost to the community. It is simply not possible to reduce emissions without imposing an immediate economic cost on the community." [Dec 2002, *Review of Energy Marker Directions*]
- Who? Allen Consulting Group for SEDA, with steering committee comprising representatives of unions, industry & NSW Labor Council




Sustainable Energy Jobs Report

- Assesses potential economic contribution of SEI in terms of GSP & jobs [separate to Kyoto Ratification Advisory Group report]
- Models impact of increasing renewables & demand management/ energy efficiency
- Concludes that a package approach can deliver net economic and jobs *growth*
- Contrasts with view that economy will grind to a halt
- Briefly examines strategies to help realise the potential of the SEI – notes importance of government

More detail…

- Examines world & Australian energy supply/ demand trends, incl World Energy Outlook (BaU & APS)
- Reviews current costs of sustainable energy relative to conventional energy; importance of govt support:
- Globally, government intervention to grow renewables & EE is strong – Australia being left behind despite great potential
- Report highlights importance of learning by doing: sustainable energy technologies (SETs) in their infancy require support but costs fall exponentially as production grows

  "The best way to learn about SETs & to be competitive is to practice their application. Jurisdictions that do not support devt & application of SETs now will be at a disadvantage later on."




Economic modelling

- Report uses general equilibrium economic modeling to quantify potential contribution of SEI [ie estimates economy wide impacts, not just energy sector impacts]
- Includes improved modelling of renewables & energy efficiency/peak demand reduction
- Quantifies benefits [energy cost savings, jobs] as well as costs.
- Concludes that strong econ & enviro benefits can result from a multi pronged approach to push both EE/DM & renewables




What does the economic modelling say?

- 3 potential scenarios modeled:
  - Demand management [6 key measures → peak demand reduction of 1,070 MW]
  - Expanded Mandatory Renewable Energy Target [19,000 GWh or ~5% MRET]
  - SEI Development Fund [to facilitate supply & demand side abatement]
- Results were compared against base case to illustrate economic impact of various approaches
- Scenarios do not reflect Government policy




Modelling results (DM):

- DM (Scenario 3): Models the impact of 6 measures that are estimated to result in 1,070 MW of demand reduction
- Leads to strong economic benefits because peak demand reduction means you can avoid/defer capital expenditure on generation & network capacity.
- Companies/ households save money on energy which is released into economy *& grows jobs – nearly all in the wider economy, rather than in the sustainable energy sector*.
- NSW Gross State Product (GSP) up by $510 m pa
- Rest of economy jobs up by 3,470
- Net result: jobs up 3,400 [some jobs lost in elec gen sector – both fossil fuels & renewables]
- Some GHG reduction (about 1/3 of 1,070 MW demand reduction related to peak clipping, so ltd GHG savings)




Modelling results (MRET):

- Modeled impact of increasing MRET to 19,000 GWh (~5%)
- Leads to GHG reduction of 2.3Mt CO2e
- Renewable energy costs more than conventional energy → so increasing MRET projected to result in net economic loss (since $$ are drawn from elsewhere in the economy).
- SEI Jobs increase by 1,140 (especially in the regions) but increase is offset by overall slowing in future job growth, relative to the base case.
- Results are conservative as they do not factor in
  - strong export potential of local SEI
  - import substitution benefits of increasing local content (cf high % imports in conventional energy supply)




Modelling results (Fund)

- Hypothetical SEI Development Fund of $375m over 5 yrs (assumes 50:50 govt/private funding)
  - Leverage rate is very conservative [eg ESB Program is 10:1] so scenario overstates need for government $$
- Fund invested on both supply & demand side measures: 1/3 on renewables & 2/3 on DM
- Results show: boost efficiency & renewables at same time → strong economic gains b/c savings from EE more than offset cost of renewables.
- GSP up $170m pa. GHGe down. 1,400 new jobs.
- Fund is used as a proxy to 'shock' the model but similar impacts could be achieved through other measures (eg promoting EE/DM through planning framework, favouring DM alternatives over network augmentation, strong MEPs etc).




Net results?

- Report concludes that a concerted SEI package of measures, promoting both supply & demand side action, would:
  - Increase GSP by $518m pa [=0.17%]
  - 4,100 new jobs, based on
    - SEI jobs up 1,310
    - Rest of economy jobs up 3,060
    - Fossil fuel jobs down 270
  - GHGe down 2.8Mt CO2e




Key messages

- SEI can make a significant economic & enviro contribution via a package approach
- To reduce emissions & remain competitive, you need to promote EE at same time as renewables
- Govt intervention is key – DM & renewables will not grow without govt support to grow demand, lower costs, overcome info, institutional, cultural barriers
- Least cost GHG abatement measures do not overcome the many 'non-cost' barriers to DSM:
  - familiarity with current way of doing things;
  - lack of knowledge, time to implement alternatives;
  - institutional structures (energy manager – v – financial controller) ... eg ESB
- Optimal economic result does not follow without targeted action (strongly recognised in UK Energy White Paper)

Global trends

- Governments globally working to grow the SEI via policy measures as ‘insurance’ against impact on competitiveness of C costs
- Growing support for KP & concern re other environmental impacts, as well as opportunities re jobs & export markets.
- IEA Report (2002) states that > 200 new measures were implemented by IEA countries in 2000 to address energy-related emissions (many directed to improving EE)
- Governments recognise need for a multi-pronged approach – increasing recognition that ‘least cost’ measures like emissions trading will not suffice to deliver optimal EE, abatement [eg UK Energy White Paper]




Scope for Energy Efficiency?

- UK Cabinet Office (2002) *Energy Review* estimates
  - cost effective EE potential (zero net cost) = 30% of present energy demand → potential savings of £12b pa
- *EE Potential in SA*
  - could cost effectively reduce energy demand 20% by 2020
- IPCC Third Assessment Report [Working Group 3]
  - EE could contribute around 1/2 of potential abatement [buildings, transport & industrial]
  - most at negative cost due to energy cost savings
- IPART's Demand Management Inquiry recognises overlooked opportunities in NSW
- SEDA's *Distributed Energy Solutions Compendium* – strong potential on both the supply & demand side




Policy challenges

- Many policy challenges to overcome, especially in a low cost energy economy
- To increase energy efficiency & reduce peak demand, we need to:
  - facilitate demand side responses via improved pricing signals, inclusion of DM in asset base, improved process for facilitating DM responses
  - increase efficiency in industrial sector
  - increase efficiency in commercial & residential sector through planning & good design - important to address air con peaks
- Also need to ensure that renewable technologies are optimally efficient in order to maximise their effectiveness

…… Government has a key role to play in all this.




Benefits of strong SEI

- While the challenges are many, so are the benefits:
  - Households & businesses save on energy costs (& save on other inputs as resource efficiency increases)
  - Avoid or defer capital expenditure on infrastructure
  - Savings released into economy → grow jobs in the sustainable energy sector & wider economy
  - Reduce exposure to current & future carbon costs, border tax adjustments etc
  - Maintain competitiveness in a post-Kyoto world dominated increasingly by low carbon economies
  - Help avoid risk of economic shocks associated with sudden emission cuts, economic dislocation
  - Reduce environmental impacts of conventional energy supply & use [GHGe and other impacts]




Conclusion

- Need targeted measures to increase energy efficiency & realise jobs potential
- Need to build energy efficiency into market reforms
- Need to learn from around the world re what has and has not worked
- Great opportunity to discuss the issue today

Thank you

- Link to website for the Jobs Report (and accompanying Wind Case Study)

http://www.seda.nsw.gov.au/pdf/PDF_GH_DIS_PAGE6_182.pdf

http://www.seda.nsw.gov.au/pdf/PDF_GH_DIS_PAGE13_43.pdf

- Link to Kyoto Ratification Advisory Group's Risk Assessment

http://www.cabinet.nsw.gov.au/pdfs/kyoto.pdf