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What can be done in the longer term?

Energy at home: Current issues for consumers

Prices, products, pressures, protections. And politics

Iain MacGill

Associate Professor, School of Electrical Engineering and Telecommunications
Joint Director (Engineering), CEEM

ACOSS / choice briefing and discussion
Parliament House
Canberra, 13 September 2011

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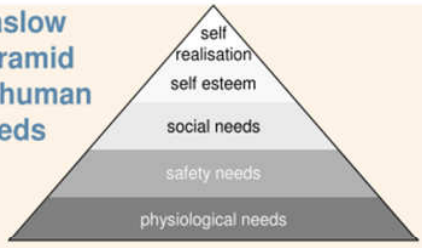
Possible take-home messages

- Electricity industry (EI) trends not destiny… but likely default
- A changing context for energy policies
  - In the past very significantly driven by societal welfare and economic development concerns; access, security, affordability, equity
  - A relatively recent increased focus on efficiency
  - *What now?… particularly wrt climate change*
- What role for prices? two NEM market worlds – wholesale prices vs retail 'schedule of fees', What role for carbon pricing?
- Key opportunities going forward lie on the demand-side; Energy Efficiency, Demand-Side Participation
- Have we, can we, establish a social license for change?
- Possible governance lessons from, and for, the NEM

The longer-term starts with trends … shaped by earlier energy policies … and emerging issues

Maslow pyramid of human needs



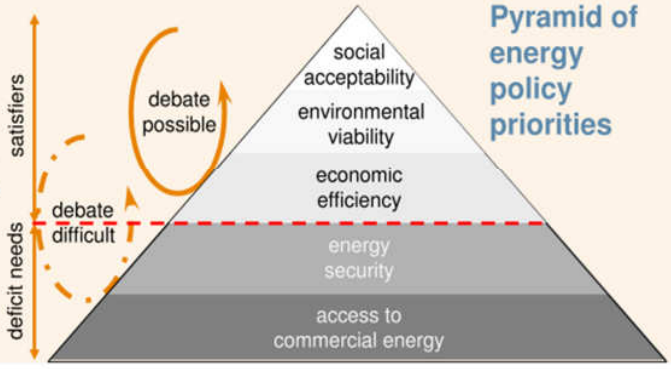
"A person who is lacking food, safety, love and esteem would most probably hunger for food more strongly than for anything else," stated the American psychologist Abraham Maslow in 1943 while formulating a theory to explain the motivational structure of a healthy person.

If Maslow were in Energy Politics…

Abraham Maslow

… he would argue that access to energy, supply security, energy costs, environmental issues and social acceptance are not subject to trade-off, but to a hierarchy: we cannot successfully address higher order issues before proposing and implementing solutions for more direct needs.

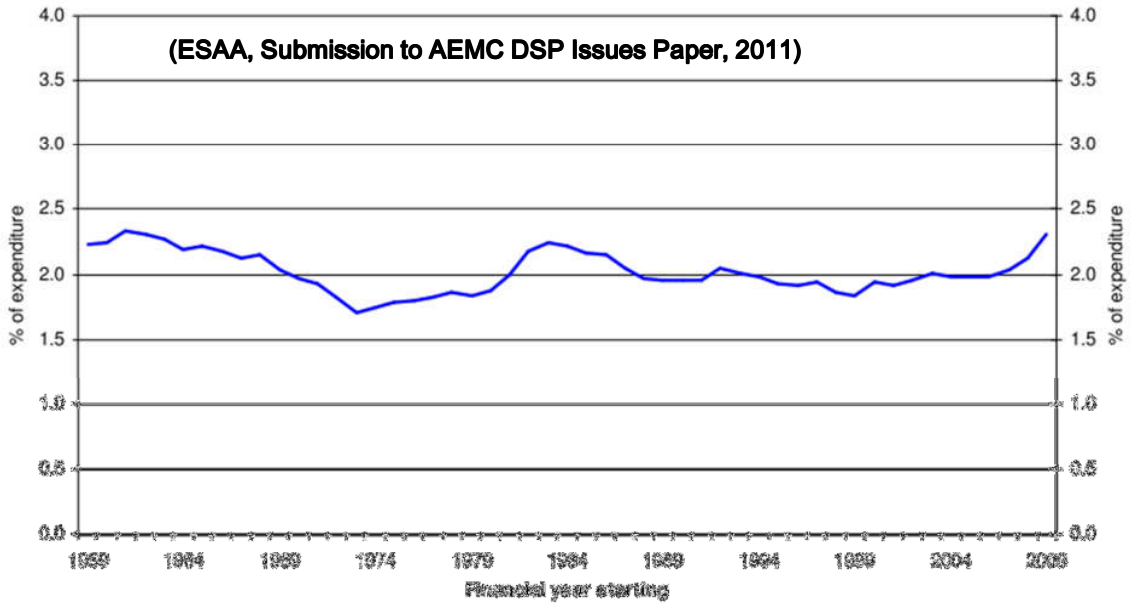
Pyramid of energy policy priorities



(World Energy Council, 2010)

Australian household expenditure on electricity, gas

Chart 3: Share of Household Final Consumption Expenditure on Electricity, Gas and Other Fuels, 1959-2009 (per cent)



(ESAA, Submission to AEMC DSP Issues Paper, 2011)

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Now, climate change

- Generally worsening scientific prognosis for warming, impacts
- Increasing global emissions
- An evident weakening international response

Climate

a Business Spectator publication

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No breakthrough in Bonn as climate divide deepens

Stephen Minas

Published 6:55 AM, 21 Jun 2011
Updated 7:02 AM, 21 Jun 2011

Tags
Bonn, UN climate talks, Policy & Science

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Two weeks of United Nations talks to prepare a new global framework to deal with climate change ended on Friday with little progress made. Countries remain at odds over the future of the Kyoto Protocol, the first period of which expires at the end of 2012. There was no movement on emissions reduction targets, despite a growing chorus of experts and activists warning that current pledges are insufficient and put the world on a hazardous pathway.

Modest progress was achieved on some aspects of the climate regime, but disagreement persisted on much else. The slow pace of talks bodes ill for the end-of-year meeting in Durban, South Africa – the deadline set by parties to give effect to much of December's Cancun Agreements.

Worst ever carbon emissions leave climate on the brink

Exclusive: Record rise, despite recession, means 2C target almost out of reach

Fiona Harvey, Environment correspondent
guardian.co.uk, Sunday 29 May 2011 22.00 BST

A larger | smaller

Economic recession has failed to curb rising emissions, undermining hope of keeping global warming to safe levels
Photograph: Dave Reede/All Canada Photos/Corbis

Greenhouse gas emissions increased by a record amount last year, to the highest carbon output in history, putting hopes of holding global warming to safe levels all but out of reach, according to unpublished estimates from the International Energy Agency.

The shock rise means the goal of preventing a temperature rise of more than 2 degrees Celsius – which scientists say is the threshold for potentially "dangerous climate change" – is likely to be just "a nice Utopia", according to Fatih Birol, chief economist of the IEA. It also shows the most serious global recession for 80 years has had only a minimal effect on emissions, contrary to some predictions.

Last year, a record 30.6 gigatonnes of carbon dioxide poured into the atmosphere, mainly from burning fossil fuel – a rise of 1.6Gt on 2009, according to estimates from the IEA regarded the gold standard for emissions data.

"I am very worried. This is the worst news on emissions," Birol told the Guardian. "It is becoming extremely challenging to remain below 2 degrees. The prospect is getting bleaker. That is what the numbers say."

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Australian energy policy objectives

ENHANCING AUSTRALIA'S ECONOMIC PROSPERITY

ENERGYWHITEPAPER

Providing secure, affordable and sustainable energy is critical to maintaining Australia's prosperity. For this reason the Government is committed to finalising an Energy White Paper in 2012.

As one of only three net energy exporting OECD countries, Australia is well positioned with many sources of energy to support our domestic requirements and the creation of jobs and income from export opportunities, particularly in the Asia Pacific region. With almost 20 per cent of OECD gas reserves, we must ensure that our energy resources are developed efficiently and sustainably in order to optimise the overall benefit for the Australian community.

The Government recognises that the energy sector is currently facing major challenges. Australia's economy is growing strongly, and demand for Australia's energy – both domestically and for export – is also growing strongly. However, this growth also creates competition for inputs, in particular skilled labour, putting upward pressure on [illegible] ance of replacing [illegible] pacity and thereby ensuring continued reliability of supply.

Possible policy implications: **Where are the formal affordability policies, climate must join the queue**

Continued security of, and access to a competitively priced energy supply for households and industry is a critical priority. Alongside this, Australia needs to continue the transition to a low emissions and environmentally sustainable economy. This will require the development and deployment of new and cleaner low emission technologies supported through actions such as the introduction of a price on carbon.

The Energy White Paper will deliver a clear and robust whole-of-government policy framework to provide certainty for investors as well as reliability and security for the

Overall objective for the NEM (NEL Sec. 7)

*The national electricity market objective is to promote efficient investment in, and efficient use of, electricity **services** for the long term interests of **consumers** of electricity with respect to **price, quality, reliability and security of supply** of electricity and the reliability, safety and security of the national electricity system*

- Are all objectives reflected in market design?
  - One reason there is effective competition in the Victorian Retail Market is "Because the provision of energy is viewed as a homogenous, low engagement service " AEMC, Effectiveness of Competition in Victoria, 2008

Possible policy implications: **Claimed market objective is 'services' – how and where is delivery of these being assessed?**

- Lack of environmental + wider sustainability objectives a **design choice**
  - *As government desires that NEM contributes to achieving such objectives must implement 'external' policies to drive changes*

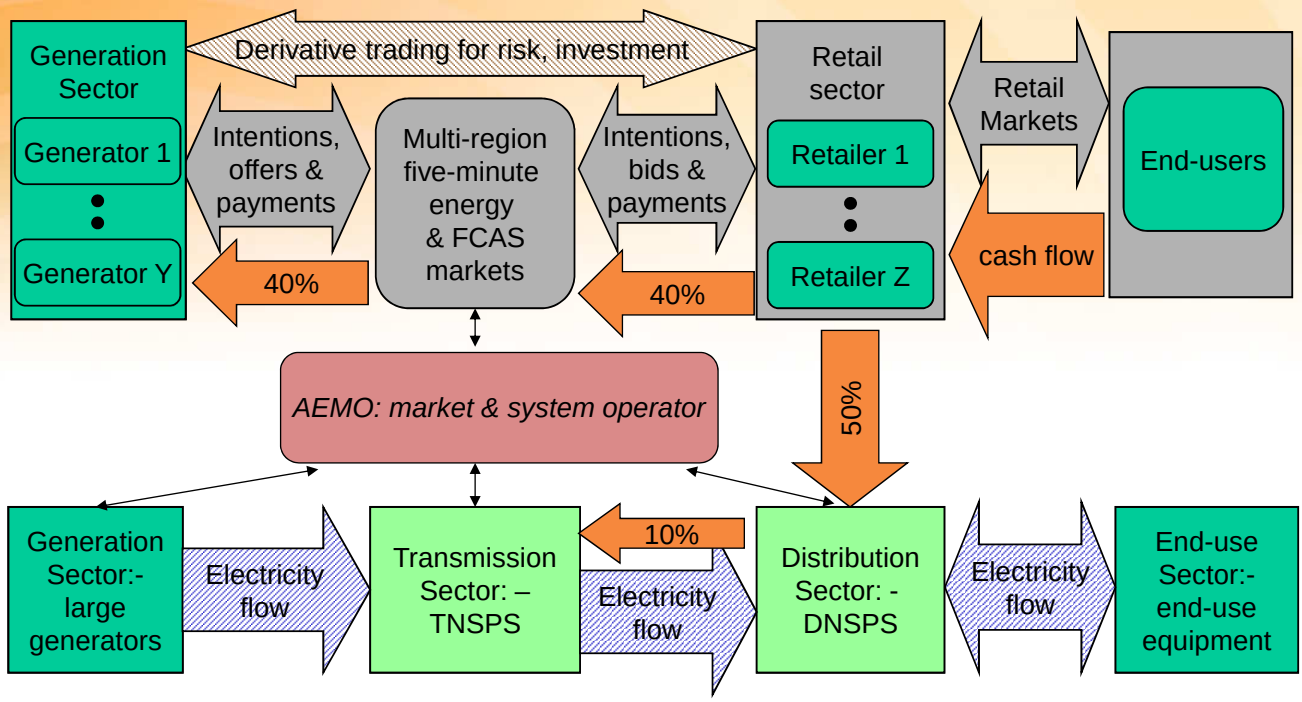
Possible policy implications: **not an imposition on participants but an obligation – role of NEM then to faciliate changes**

Possible alternatives – OFGEM (UK)

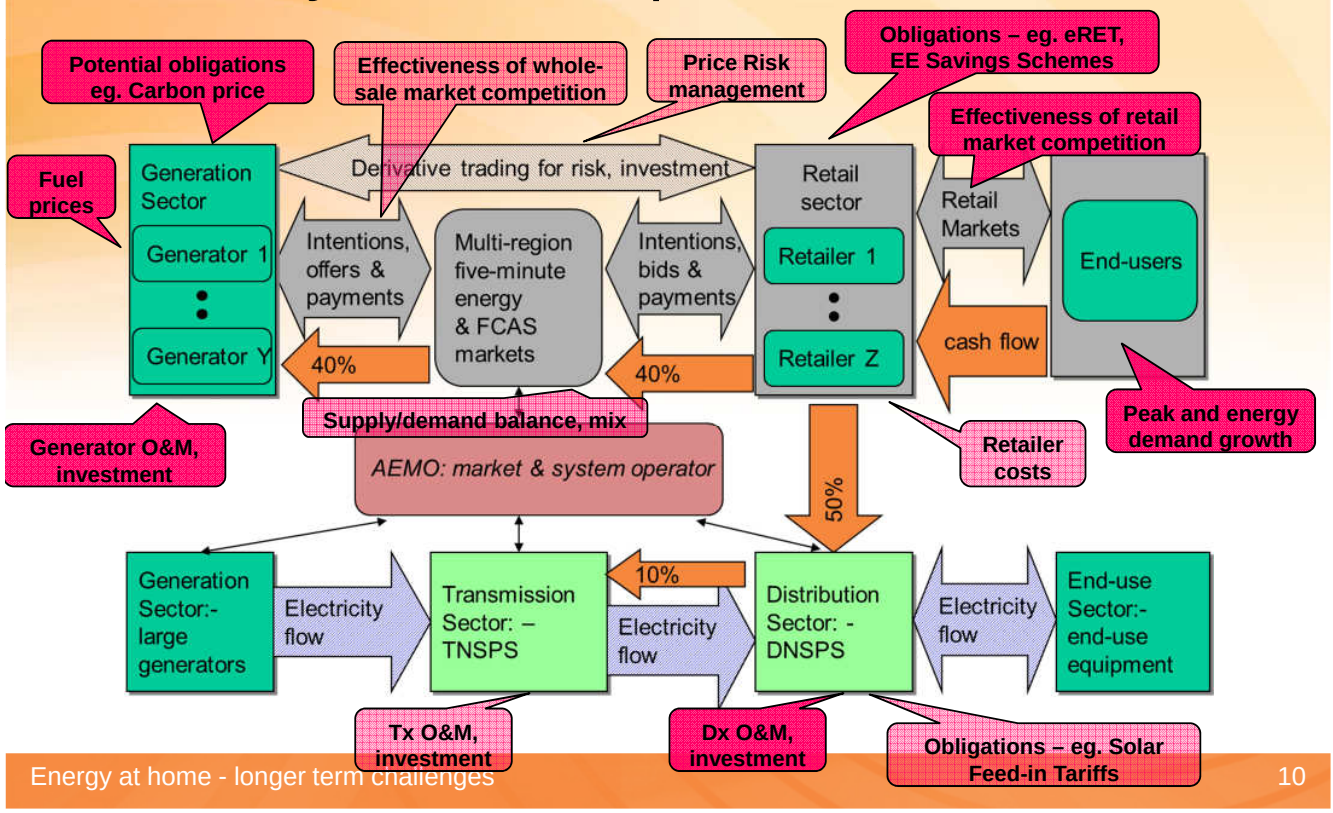
- "Protecting consumers is our first priority. We do this by promoting competition, wherever appropriate, and regulating the monopoly companies which run the gas and electricity networks. The interests of gas and electricity consumers are their interests taken as a whole, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity to them.
- Other priorities and influences include:
  - helping to secure Britain's energy supplies by promoting competitive gas and electricity markets - and regulating them so that there is adequate investment in the networks, and
  - contributing to the drive to curb climate change and other work aimed at sustainable development by, for example:
    - helping the gas and electricity industries to achieve environmental improvements as efficiently as possible; and
    - taking account of the needs of vulnerable customers, particularly older people, those with disabilities and those on low incomes."

The Australian NEM – complex, divided..

(adapted from Outhred, 2010)



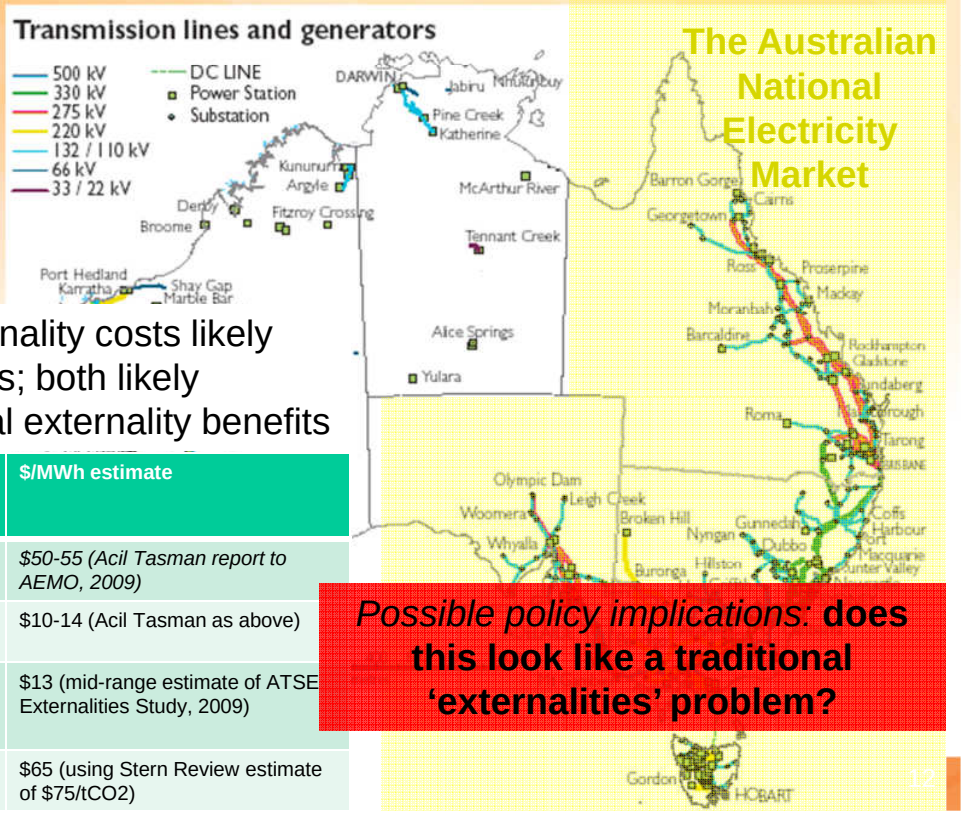
Some key drivers of price outcomes



Prices versus Schedules of Fees…

- NEM wholesale market has prices
- Predetermined retail electricity tariff (schedule of fees) is not a price in 'economic efficiency' sense of term
  - requires locational and temporally varying and uncertain spot and future prices for both energy and network services (Outhred and MacGill, 2006)
  - major reform of interface b/n supply and demand sides of electricity industry and NSPs required before genuine 'price discovery' can occur
  - Little apparent interest or willingness to do this to date by key players
- Electricity industries
  - traditionally 'charge' 'schedule of fees' sufficient to deliver essential current & future access to 'reliable' electricity supply 'service' s.t. underlying customer 'class' costs, wider considerations (eg. equity).
  - In restructured industries, an unresolved question, often only limited moves towards 'economically efficient' pricing wrt earlier arrangements

NEM: Aust's largest environmental (externalities) market



Environmental externality costs likely outweigh direct costs; both likely outweighed by social externality benefits

Coal-fired generation in NSW (2009-10) Note: supplying >90% of state electricity	$/MWh estimate
Direct Long Run Marginal Cost (new SC plant)	*$50-55 (Acil Tasman report to AEMO, 2009)*
Direct Short Run Marginal Cost (fuel, variable O&M)	$10-14 (Acil Tasman as above)
External Health damage costs (PM10, SOx, NOx)	$13 (mid-range estimate of ATSE Externalities Study, 2009)
External Climate Change damage cost	$65 (using Stern Review estimate of $75/tCO2)

Possible policy implications: **does this look like a traditional 'externalities' problem?**

What can governments do regarding **C**?

- ***Issue*** *is not whether to price carbon (will cost $ to reduce emissions, $ to 'adapt' if we don't)*
  instead*, who will pay how much to whom + when*
- Options: Tax, Spend and Regulate
  - millennia of experience in this
- … or, over last 2 decades, growing interest in creating 'designer' markets to achieve environmental objectives
  - Renewable Energy Targets, **Emissions Trading**
- Some insights
  - To spend is to tax - *Milton Friedman*
  - Taxation impacts: revenue, redistribution, repricing + representation
  - Regulation has a proven track record in environmental challenges … has only recently fallen out of favour

Ways forward: EE policy the 'Quiet' Achiever

Estimated emissions reductions over Kyoto significantly greater than renewable energy or direct abatement policies implemented to date

Name (Australian Govt, 2010)	Kyoto period average (Mt CO_2-e)
Clean Energy Initiative: CCS Flagship	Not estimated
Energy Efficiency in Government Operations	<0.1
Energy Efficient Homes Package: HIP	1.3
Greenhouse Challenge	<0.1
Greenhouse Gas Abatement Program (GGAP)	0.8
Industry Greenhouse Program	0.2
National Strategy on Energy Efficiency	14.0
Equipment Energy Efficiency (E3) Program	*6.3*
Energy efficiency requirements: Building codes	*4.2*
Mandatory disclosure requirements: Buildings	*<0.1*
Framework Cool Efficiency Program	*0.1*
Phase-out of incandescent lighting	*1.0*
Phase-out of inefficient water heaters	*0.1*
Energy Efficiency Opportunities Program	*2.4*

Key EE policies to date have been regulatory

… (continued)

(Australian Govt, 2010)

NSW Greenhouse Gas Abatement Scheme	0.7	
Greenhouse Gas Abatement Scheme		*0.7*
NSW Energy Savings Scheme		*0.1*
Queensland Gas Scheme	2.2	
Renewable Energy Target[3]	8.8	
Large-scale Renewable Energy Target (LRET)		*8.5*
Small-scale Renewable Energy Scheme (SRES)		*0.2*
Renewable Remote Power Generation Program (RRPGP) and Renewable Energy Commercialisation Program (RECP)	0.1	
Solar Cities	<0.1	
Victorian Energy Efficiency Target and Energy Saver Incentive Scheme	0.2	
Total	**29**	

Current State Energy Savings programs delivering very little abatement

Ways forward – broader DSP

- "DSP defined as ability of consumers to make informed decisions about quantity and timing of their electricity use, which is derived from value that they obtain from using electricity services… A key assumption behind this review is that consumers will always make the best decision from their viewpoint, based on the prices they face, the technology and equipment they have access to, the information they have and their individual transaction costs. …This will also allow third parties to assist consumers make optimal decisions under innovative business models." (AEMC, DSP Issues Paper, 2011)
- Too much emphasis on role of energy consumers directly undertaking DSP?
  - NEM a highly complex 'designer' market with network infrastructure, regulated monopolies, major asymmetries between supply + demand. *"In this context, expecting energy consumers to optimise their level of DSP without any support from third-parties and specific DSP schemes is* ***preposterous****… The EEC recommends that the AEMC focus this review on DSP schemes and barriers to third-parties driving DSP"* (EEC, Submission to DSP Issues Paper, 2011)
- *NEM needs Energy Service Companies (ESCOs) – how to facilitate?*

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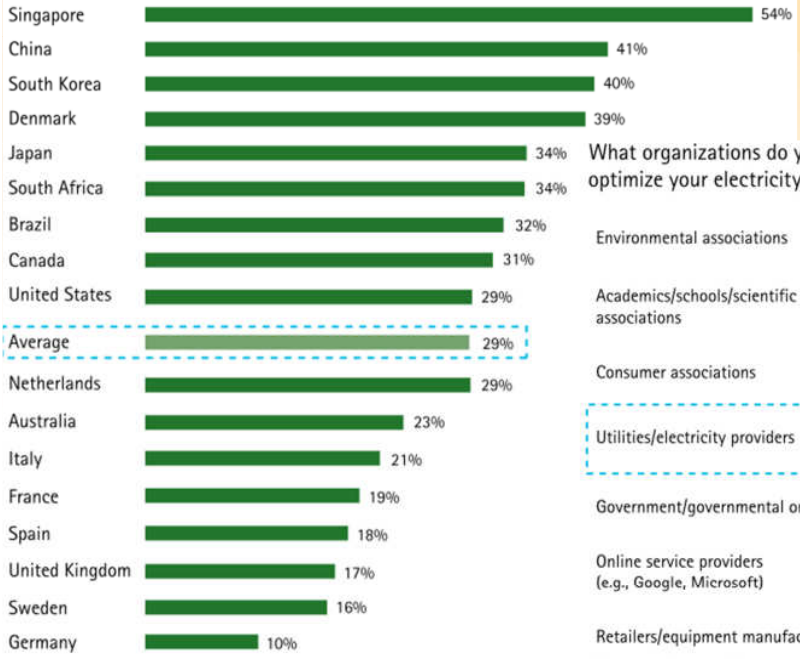
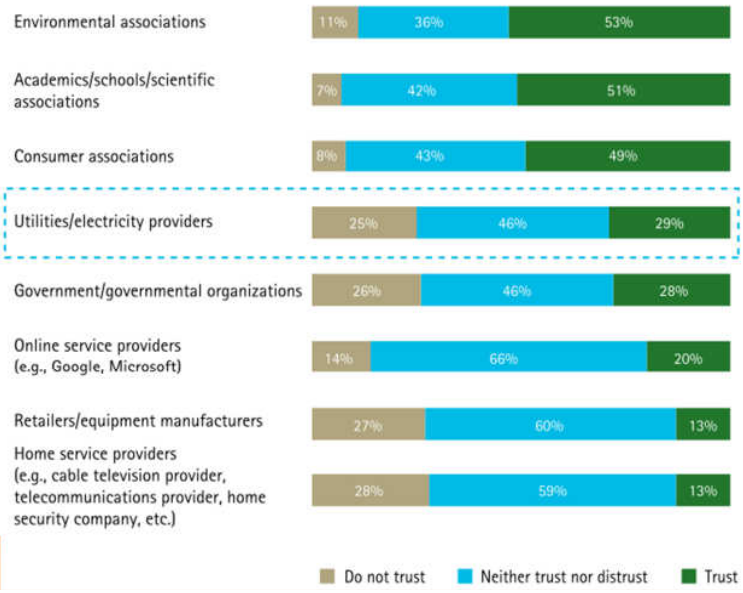
Currently some 'trust' issues for electricity providers

Do you trust your utilities/electricity providers to inform you about actions you can take to optimize your electricity consumption?



(Accenture, 2010)

What organizations do you trust to inform you about actions you can take to optimize your electricity consumption?



Energy at home - longer term challenges

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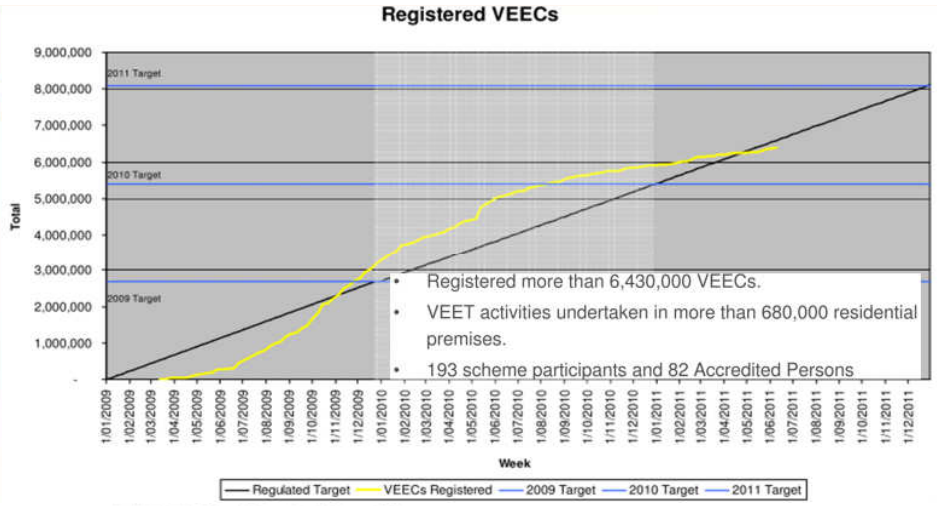
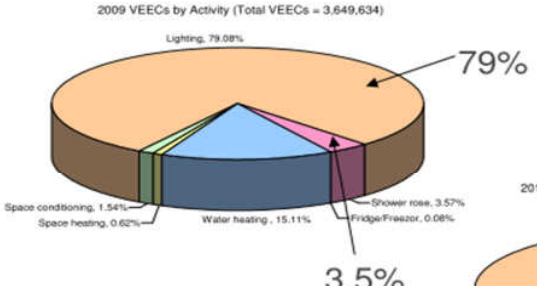
Current NEM (retailer) engagement in EE rather problematic



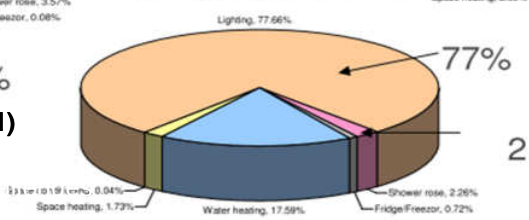
VEEC distribution

2009

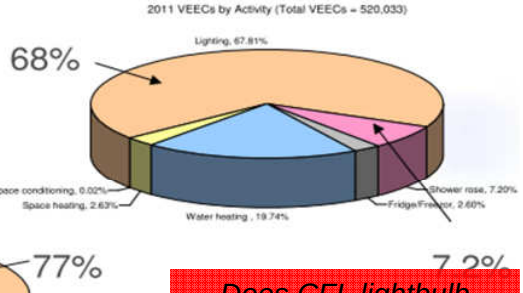


(ESC Public Forum, 2011)

2010



2011



Does CFL lightbulb switch-outs really require an Energy Savings Scheme?

A social license for change

- A growing issue for a range of current 'change' processes including coal-seam gas, renewables, smart meters
  - Contrast current social license for coal power plants, high energy consumption lifestyles
- Equity and support are key issues for successful change
  - *"Shadow Energy Minister Ian Macfarlane and South Australian Liberal Senator Simon Birmingham both reiterated the Federal Coalition's commitment to the Renewable Energy Target in meetings this week. But both warned that the Coalition's support for clean energy was not unconditional… Senator Birmingham warned the [clean energy] industry of the three key issues we have to address … **First, we must work harder to protect our social licence to operate;** second, we must demonstrate the economic case for developing clean energy; and finally, we must better explain the solutions to technology uncertainties that come with developing an emerging industry."*
    (CEC, Members Update, August 2011)

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Possible governance lessons from NEM Managing security + reliability

Maintaining NEM security has priority over commercial arrangements – widespread industry failure is not an option.

- Carefully designed interface between market and centralised security regimes
  - Price can range from -$1000 to $12,500 / MWh (for brief periods)
- If system security or reliability of supply threatened, AEMO has authority to use
  - Security and Reliability Directions
  - Load Shedding
  - Reserve Trading

Possible policy implications: **Robustness is critical: where are the security regimes to ensure we can achieve desired climate and energy equity objectives even if particular favored policies fail? Might this require policy 'portfolios' to manage risk?**

Other lessons from NEM Governance

- Very high transparency in market operation *on the supply side*
  - all participant physical and market behaviour is public (ex-post), market event reports, projections over weeks to decade timeframes
- Formal separation of powers and interfaces between policy making, rule making, operation and enforcement MCE, AEMC, AEMO, AER,ACCC
- Rules for changing the rules
  - Any party can propose a rule change at any time; triggers a formal process with high transparency and consultation

Possible climate policy implications: **Serious governance the key to successful market-based policy approaches like LRET, ETS**

- **High transparency with significant disclosure obligations**
- **Robust against the rent-seekers (often incumbents)**
- **Fixable: "market and investor' certainty should never over-ride necessary repairs and improvements**

NEM governance appears more robust than that for some other key environmental markets to date including MRET/eRET, NSW GGAS… *but is it sufficient for transformation of the electricity sector including demand-side participation, low-carbon transformation?*

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Thank you… and *questions*

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