

The Global Electricity Market Transition – Energy Efficiency

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AGENDA

Energy Efficiency – a key driver in the global electricity market transition

1. The global electricity market transition is real (across all major global electricity markets)
2. Energy efficiency is one of the keys
 - China in 2014
 - India accelerating from a standing start in 2014
 - Japan post Fukushima
 - Australia – price elasticity of demand drives EE

1. Electricity Sector Transformation

- Increasing electricity system supply diversity
 - Renewables were more than half of global power capacity installs in 2014
- Failure of nuclear to deliver on expectations
 - Cost and time blowouts; Fukushima complicated the German transition – phasing out both nuclear and coal.
- Grid Efficiency
 - Smart grids to allow flexible demand and flexible supply; improved T&D efficiency; emergence of national & even internationally connected grids.
- Energy Efficiency

2. Energy Efficiency – The Opportunity

Globally, Statoil expects an improvement in energy efficiency of some 35% from today's level (IEEFA note: 1.5-2.0% pa).

2014 Statoil Energy Perspectives

China improved energy use per unit of GDP by 4.8% in 2014, beating its target of 3.9% and the previous year's 3.7% drop; exceeding its 12th FYP target of a 16% improvement over 2010-2015. 2015 target is 3.1%.

Reuters, 22 Jan'2015



Source: <http://www.energyrealities.org/technology-and-innovation/factors-will-drive-energy-demand-2030/>

2. Energy Efficiency - IEA

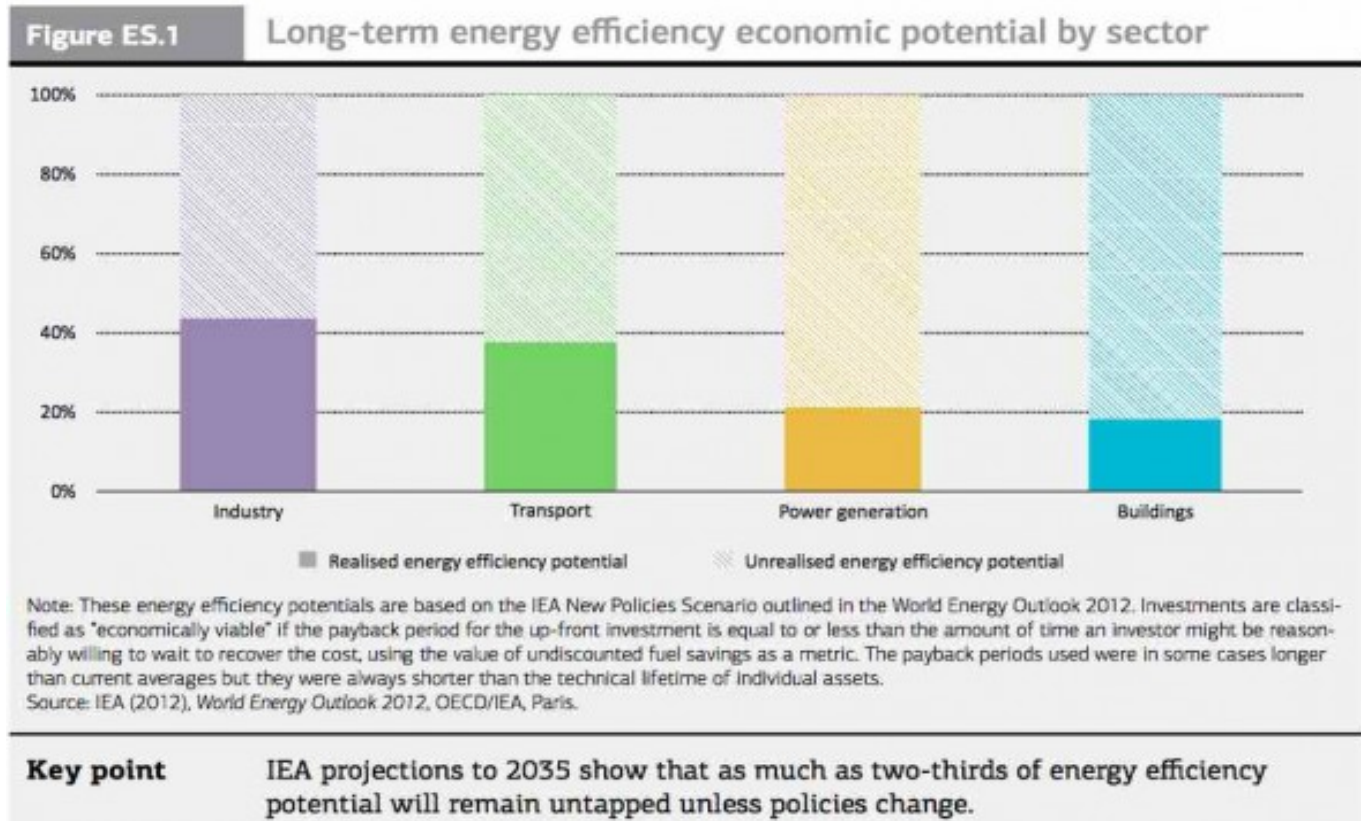
- i. Southeast Asia's energy demand increases by over 80% between today and 2035, a rise equivalent to current demand in Japan.
- ii. Despite recent reform efforts, fossil fuel subsidies remain a significant factor distorting energy markets. They encourage wasteful energy use, burden government budgets, and deter investment in energy infrastructure and efficient technologies.
- iii. While Southeast Asia has made some gains in energy efficiency, almost three-quarters of its full economic potential is set to remain untapped in 2035.
- iv. Efficient ASEAN Scenario: Lower electricity demand and the use of more efficient power plants reduce coal demand by 25%.

IEA South East Asia Energy Outlook, 2013



2. Energy Efficiency - IEA

The opportunity and the risk; EE is too often overlooked. Multiple benefits: jobs; investment; reduced pollution; energy security; reduced grid needs.



Source: IEA September 2014: <http://www.iea.org/Textbase/npsum/MultipleBenefits2014SUM.pdf>

2. Energy Efficiency - EIA

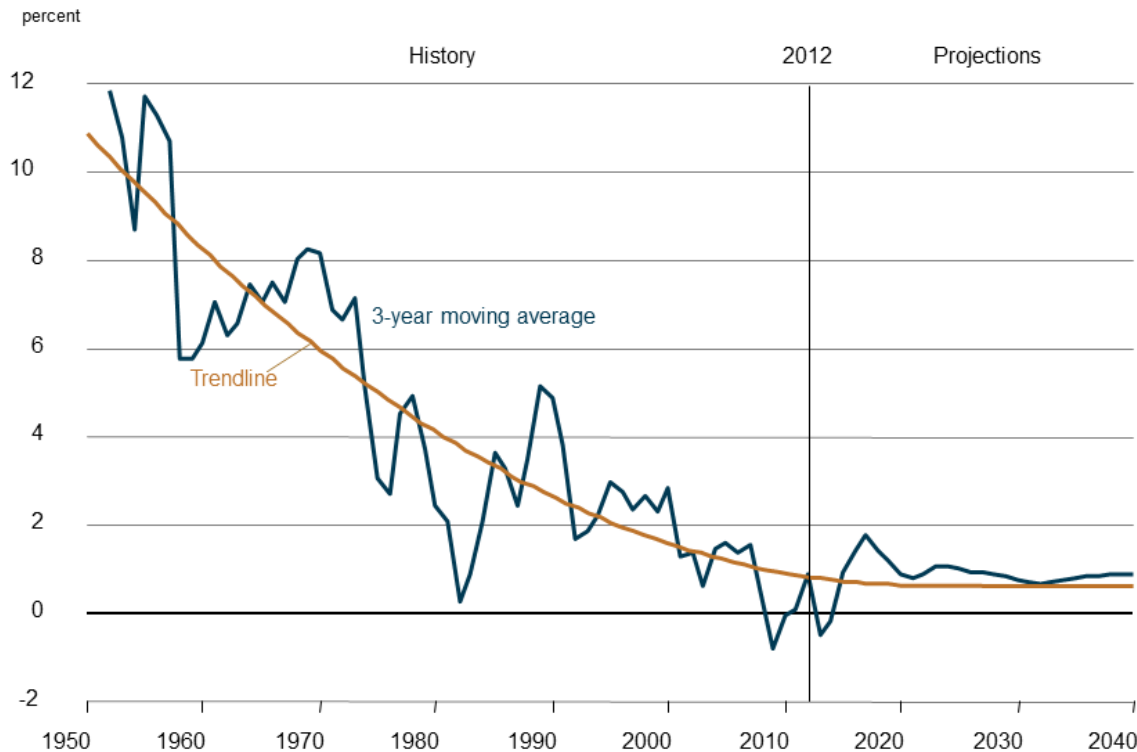
- I. EIA's Residential Energy Consumption Survey conducted since 1980 shows improvements in EE reduced energy intensity enough to offset 70% of the growth in both the number of households and the size of dwellings.

Feb 2015, EIA



2. Energy Efficiency - EIA

Figure MT-29. U.S. electricity demand growth in the Reference case, 1950-2040



This decline in energy intensity in the US is without a major price signal



Source: EIA May 2014 http://www.eia.gov/forecasts/aeo/MT_electric.cfm

2. Energy Efficiency

“The gains to be made from focusing on energy efficiency are as great as the benefits of increasing generation.”

The phase out of fossil fuel subsidies will raise the variable cost of energy and increase the application of energy efficiency.

March 2015, National Bank of Abu Dhabi



Source : http://www.nbad.com/content/dam/NBAD/documents/Business/FOE_Full_Report.pdf

2.1 China

Electricity transition: 2014 was a pivotal year in China

- *Real GDP* *up 7.4% yoy*
- *Electricity consumption* *up 3.8% yoy*
- *Coal consumption* *down 2.9%*
- *Coal imports* *down 9.0%*



2.2 India

India's Energy Minister Goyal stated November 2014:

1. *"I'm very confident of achieving these targets and am very confident that India's current account deficit will not be burdened with the amount of money we lose for imports of coal. Possibly in the next two or three years we should be able to stop imports of thermal coal."*
2. *Plans for the transformation of the Indian electricity system with 175GW of renewable energy installs by 2022. This involves a plan to treble wind installs to 6-8GW and lifting solar installs tenfold to 10GW annually.*
3. *Plans to treble India's domestic coal production to 1.5Bn tpa by 2019, requiring a massive investment in rail infrastructure, coal washing plants plus major new mine development – this is unsustainable!*
4. *A US\$50bn national grid upgrade has been announced, but very little detail on grid efficiency focus, for this transition to work, the 25% T&D loss rate must halve – Discoms lost US\$11bn in 2012/13 alone.*

100TWh or
6% EE saving
target for
2015: LEDs



2.3 Japan

Japan's thermal coal demand outlook: down 4% pa

1. **Energy efficiency** – 12% decline in electricity demand from 2010-2013 despite 1% pa GDP growth (a 5% pa reduction in electricity intensity)
2. **Nuclear restart** - Rate of restarts for the 42GW of idle nuclear capacity – up to US\$50bn of assets sitting idle for four years.
3. **Solar surge** – Japan installed 7GW in 2013 and 10GW in 2014; part of a 70GW pipeline of approved projects.

2.4 Australia

Retail price hikes up to 20% pa in recent years

1. *Even as wholesale electricity prices are at a decade low, T&D costs 50-60% of the retail price of electricity and taxes another 10%*
2. *At A55c/KWh peak and A28c/KWh (US28c in 2013) average, retail prices are high by global comparisons.*

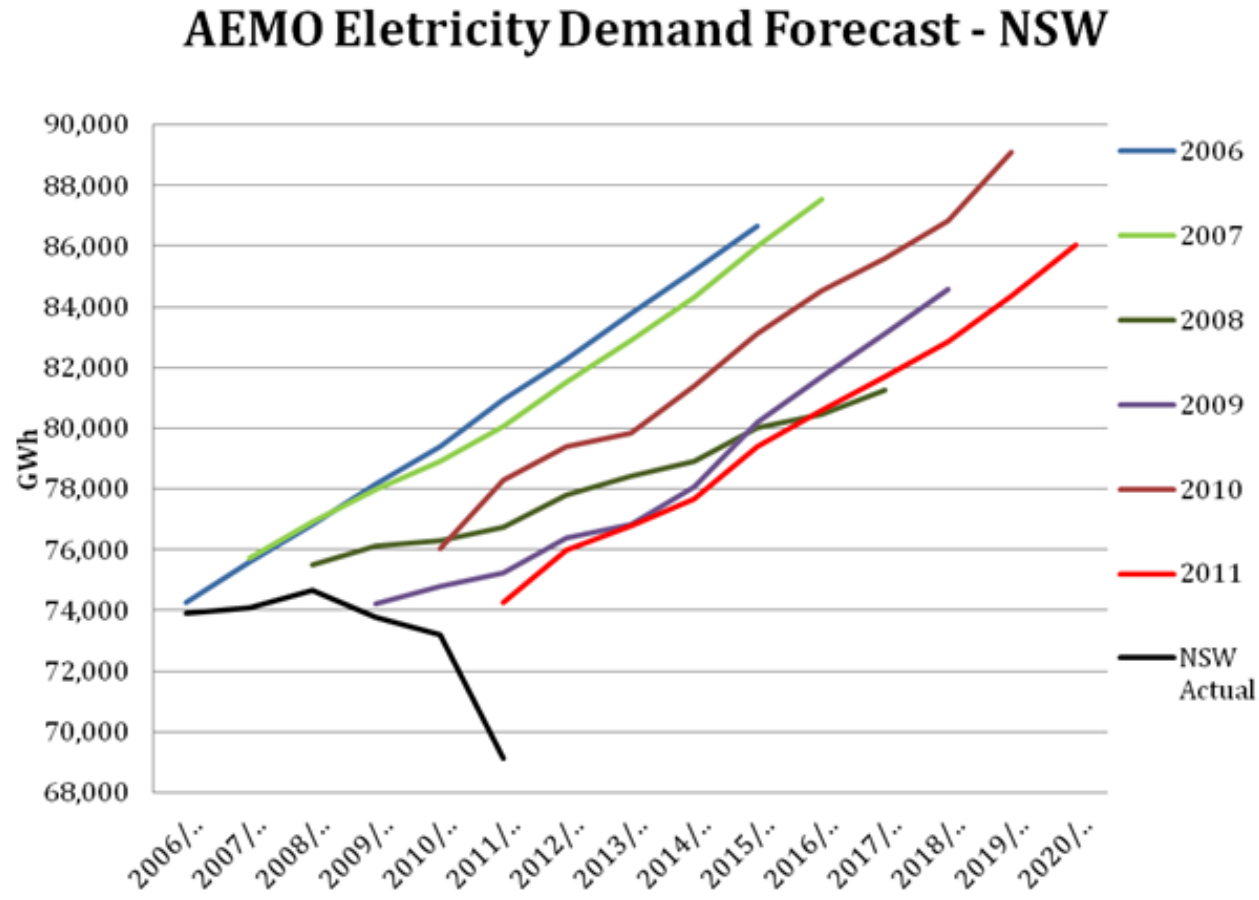
1. Energy efficiency

1. *In Australia over the 2005-2013 period real GDP was 2.8%, but electricity demand has declined 0.2% pa (a 3.0% pa reduction in electricity intensity).*
2. *From the start of 2009-2013, real GDP growth was 2.5% but electricity demand has declined 1.0% pa (a 3.5% pa reduction in electricity intensity).*
3. *These trends continued in 2014.*
4. *Increased price signal – ‘Time of use’ pricing helps manage peak demand*

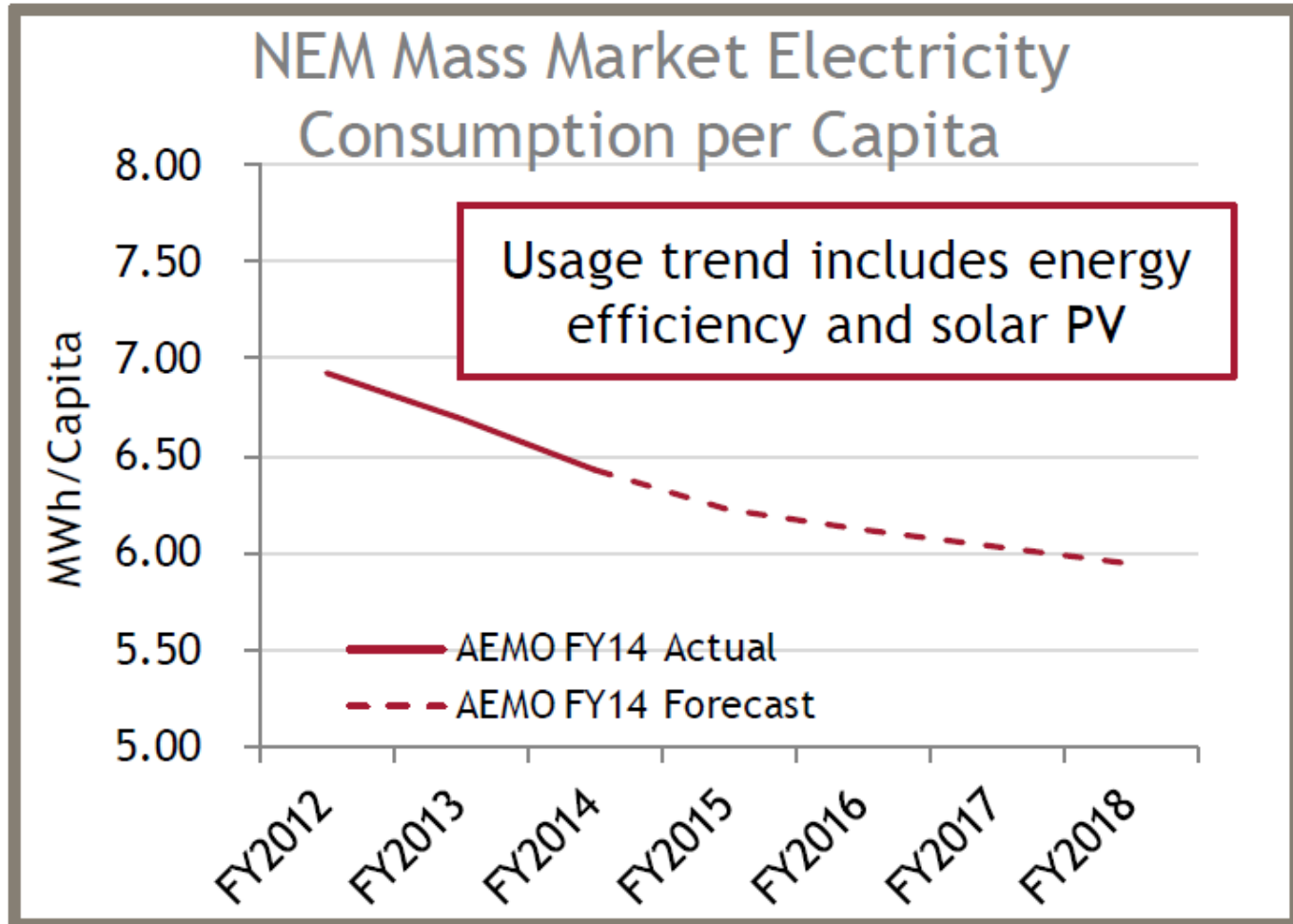


ClimateWorks March 2015 “Australia’s energy productivity opportunity” talks about the ability to double Oz energy productivity by 2030 by incorporating the latest technologies.

AEMO electricity demand NSW: forecasts v actual



AEMO electricity demand



Source: Origin Energy, CEO Presentation, Oct'2014

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