



The Australian Alliance to Save Energy (A2SE)

Australian Energy Productivity Roadmap *Doubling Australia's Energy Productivity*

a2se.org.au





Australian Energy Productivity Roadmap

Project *foundations* supported by

Commonwealth Department of Industry
NSW Office of Environment & Heritage
Clean Energy Finance Corporation

Institute of Sustainable Futures
University of Technology, Sydney

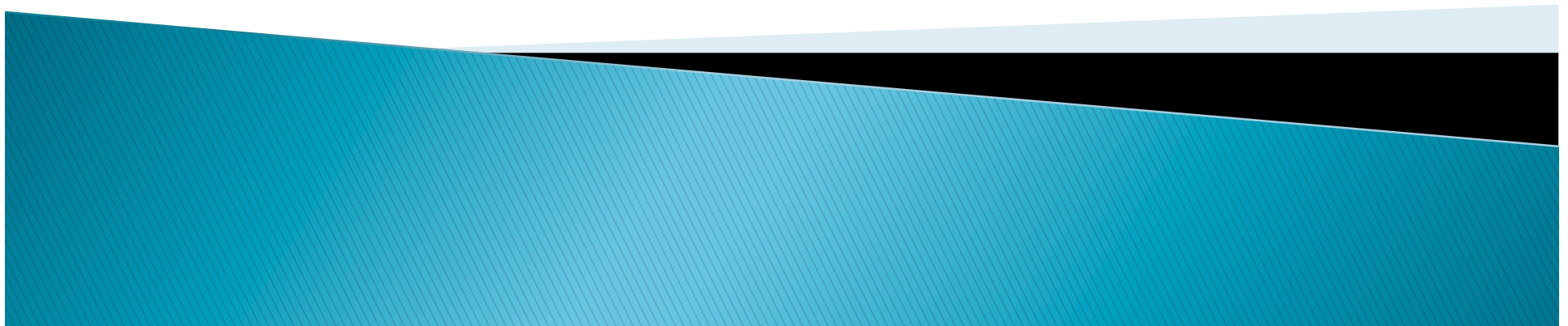
Energetics





Why we need to (and can) Double our Energy Productivity by 2030

Jonathan Jutsen, Chair – A2SE
September 18 2014



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- ▶ Why energy productivity is important for Australia's economy
- ▶ What is energy productivity?
- ▶ Size of the 2XEP task
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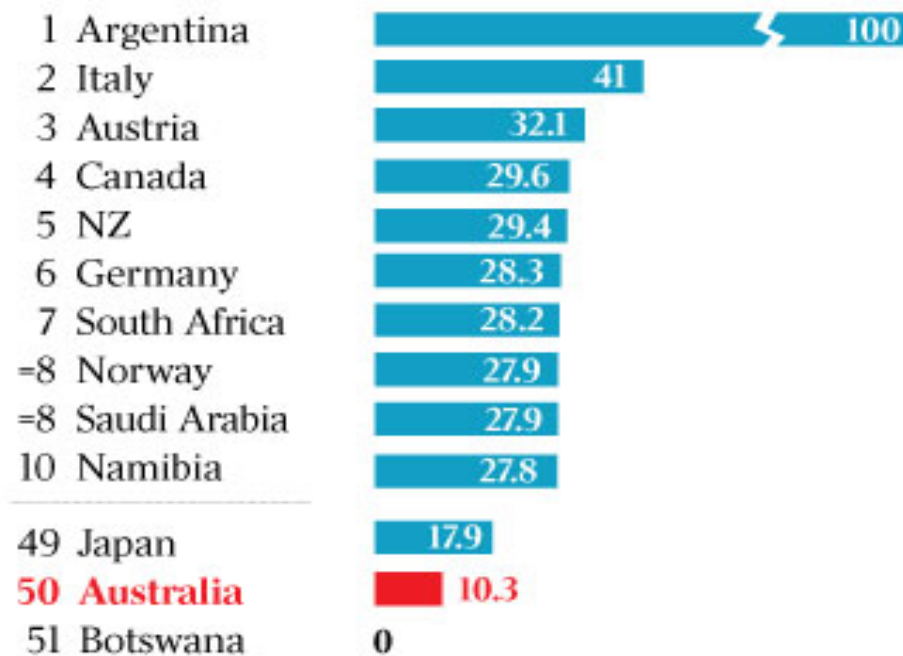


Productivity growth is key to future prosperity

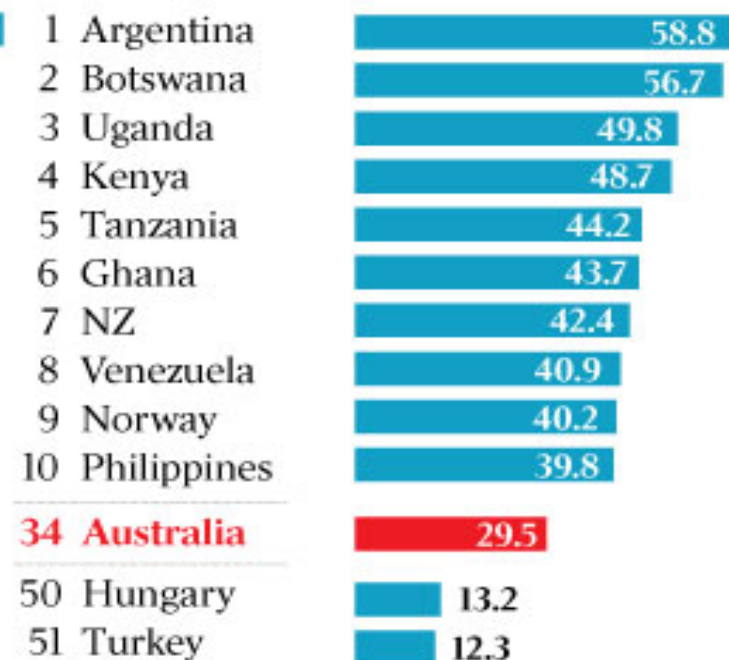


HOW WE RANK (Score/100)

Total factor productivity growth

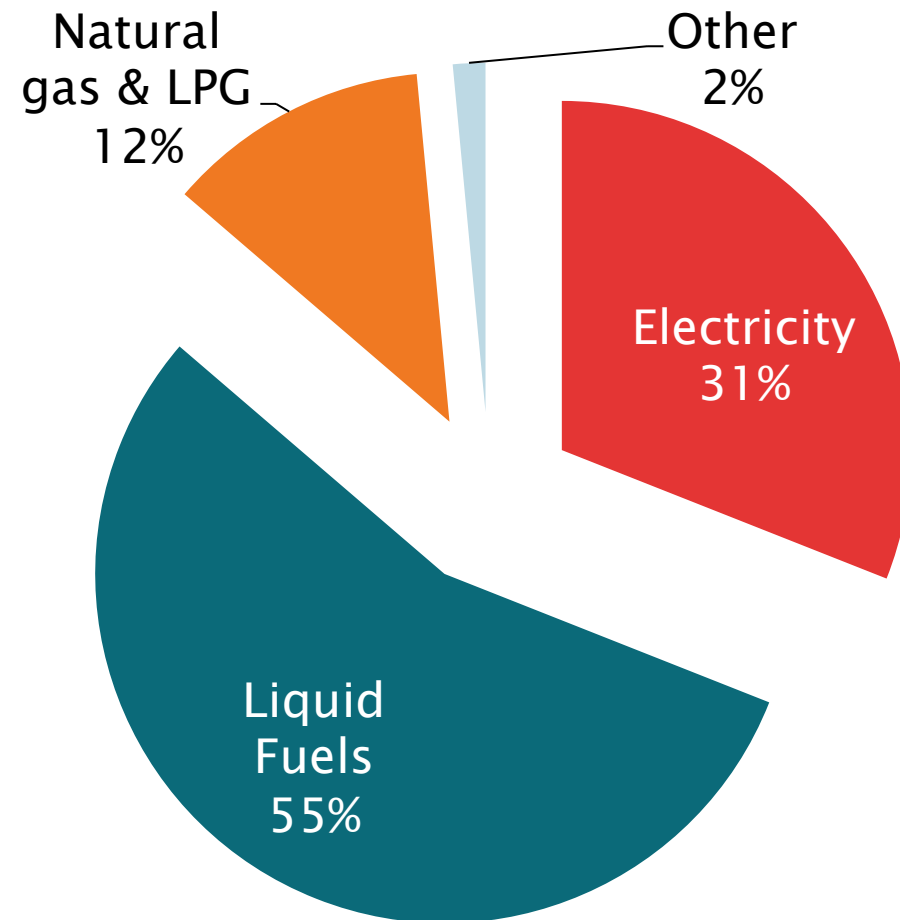


Economic performance



Source: Economist Intelligence Unit Workplace Flexibility Index 2011

End use energy cost is a major component in our economy

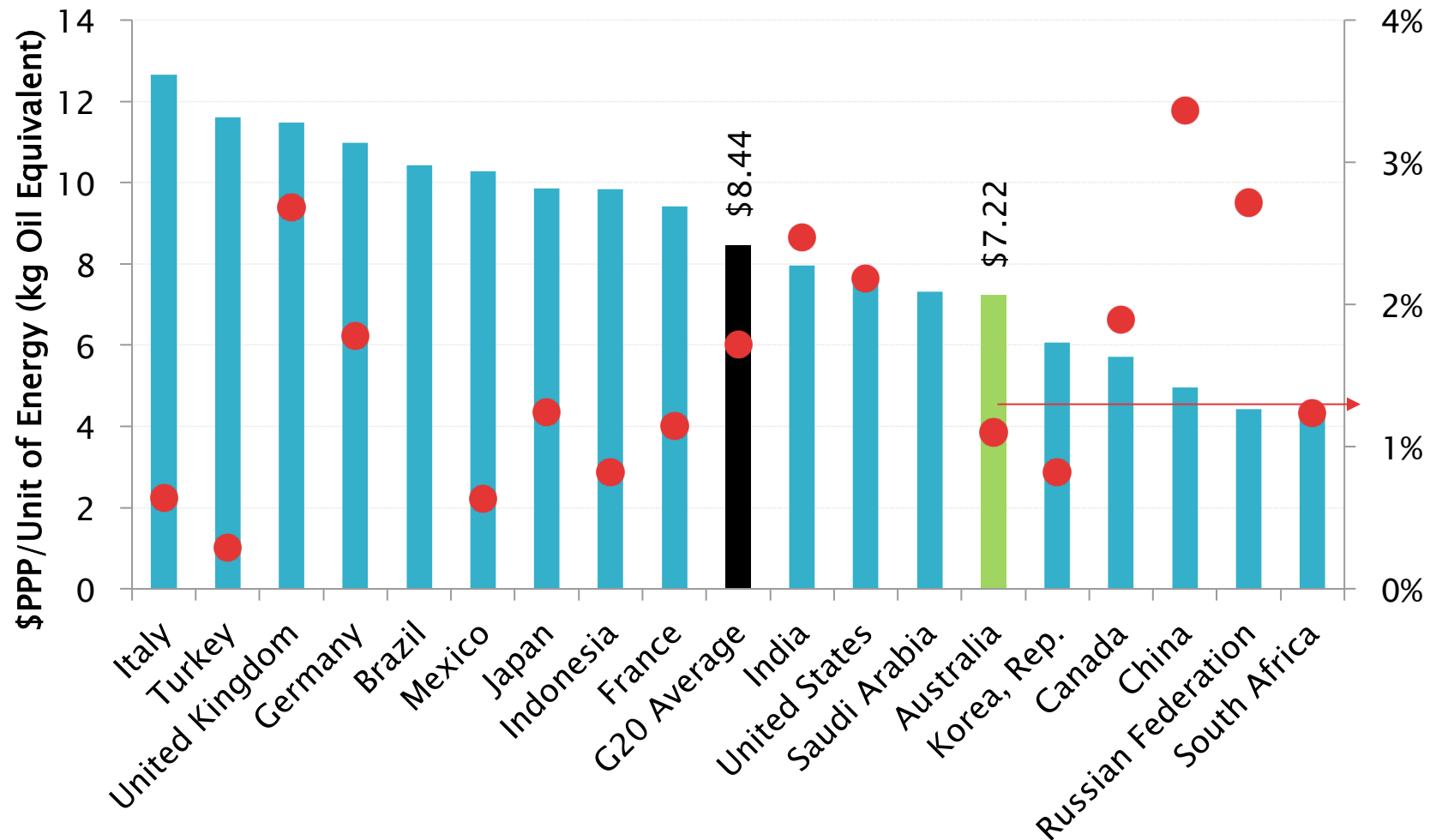


Domestic end use sectors* spent \$109B on energy in 2012 = 7.4% of GDP

** Excluding gas, electricity to the gas and electricity supply sectors and oil feedstock to refineries*



Our energy productivity challenge



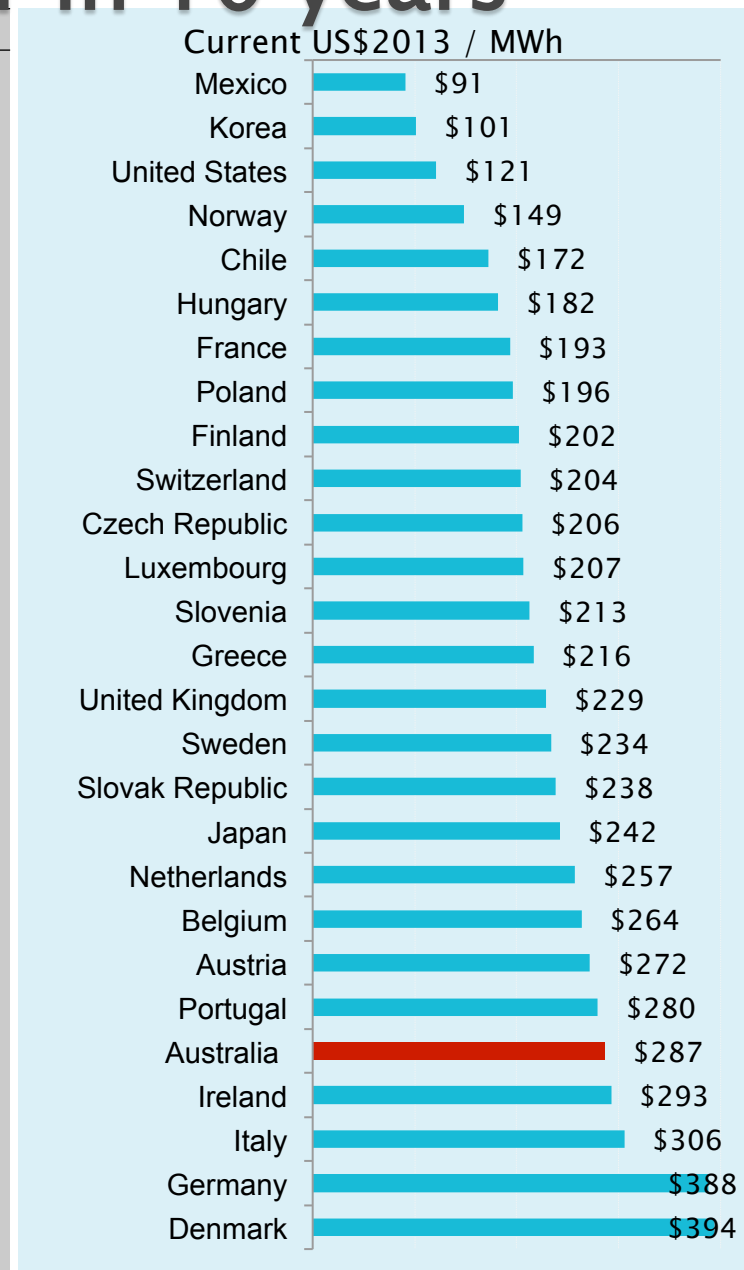
■ Latest available EP

● EP Improvement pa

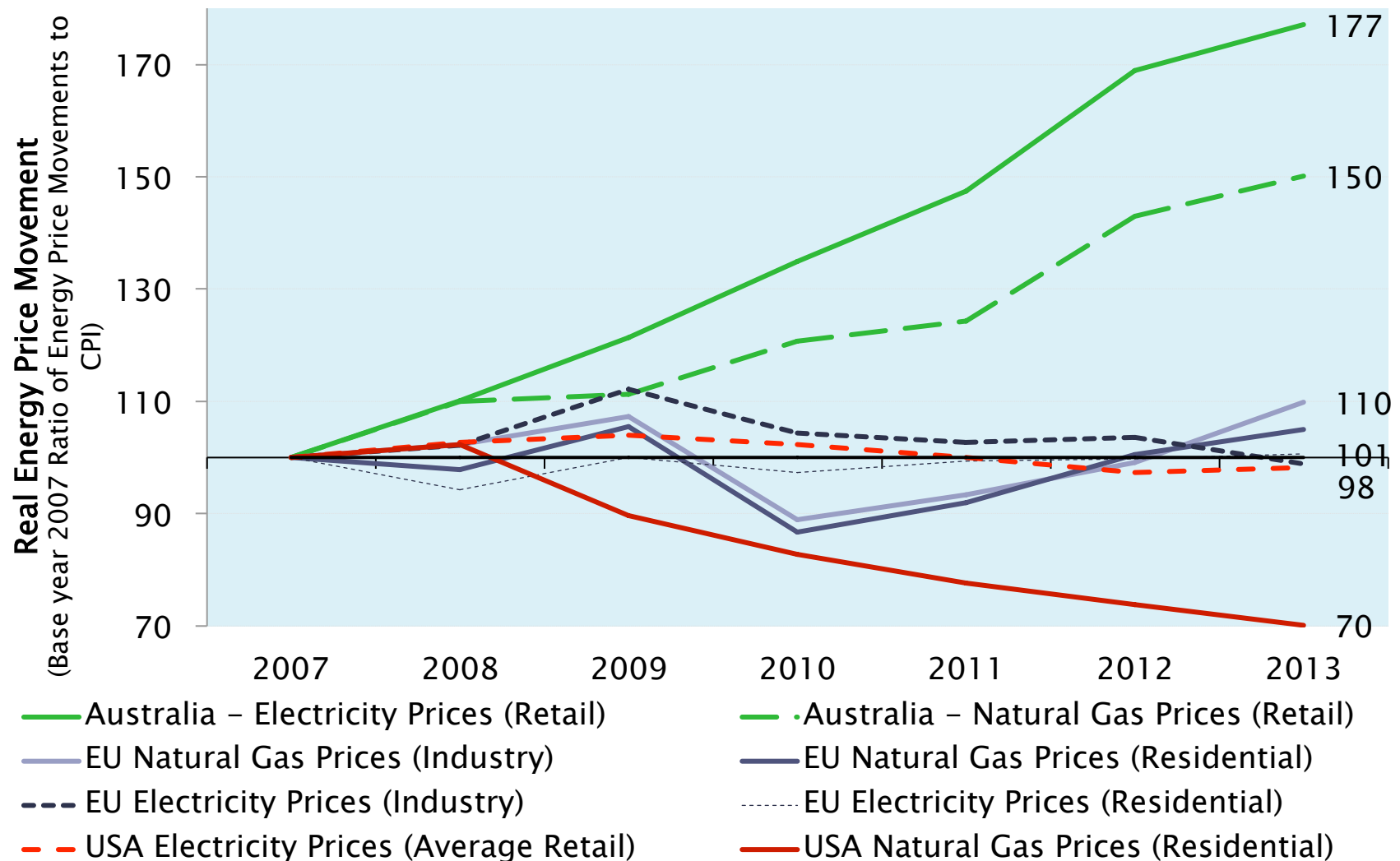


Rooster to feather duster in 10 years

Rank	2000 PPP	2010 PPP	2013 PPP
1	Australia (\$52/MWh)	Korea	Norway
2	Norway	United States	United States
3	United States	Norway	Korea
4	Finland	Switzerland	Switzerland
5	Switzerland	Finland	Mexico
6	Mexico	France	Finland
7	United Kingdom	Mexico	Luxembourg
8	Greece	Greece	France
9	Ireland	United Kingdom	Sweden
10	Luxembourg	Sweden	United Kingdom
11	France	Luxembourg	Japan
12	Korea	Japan	Netherlands
13	Germany	Netherlands	Belgium
14	Austria	Belgium	Chile
15	Slovak Republic	Ireland	Austria
16	Czech Republic	Slovenia	Greece
17	Japan	Austria	Slovenia
18	Poland	Australia (\$252/MWh)	Ireland
19	Netherlands	Czech Republic	Denmark
20	Chile	Italy	Czech Republic
21	Belgium	Portugal	Italy
22	Hungary	Denmark	Hungary
23	Italy	Poland	Poland
24	Portugal	Chile	Portugal
25	Denmark	Germany	Slovak Republic
26	Sweden	Slovak Republic	Germany
27	Slovenia	Hungary	Australia (\$444/MWh)



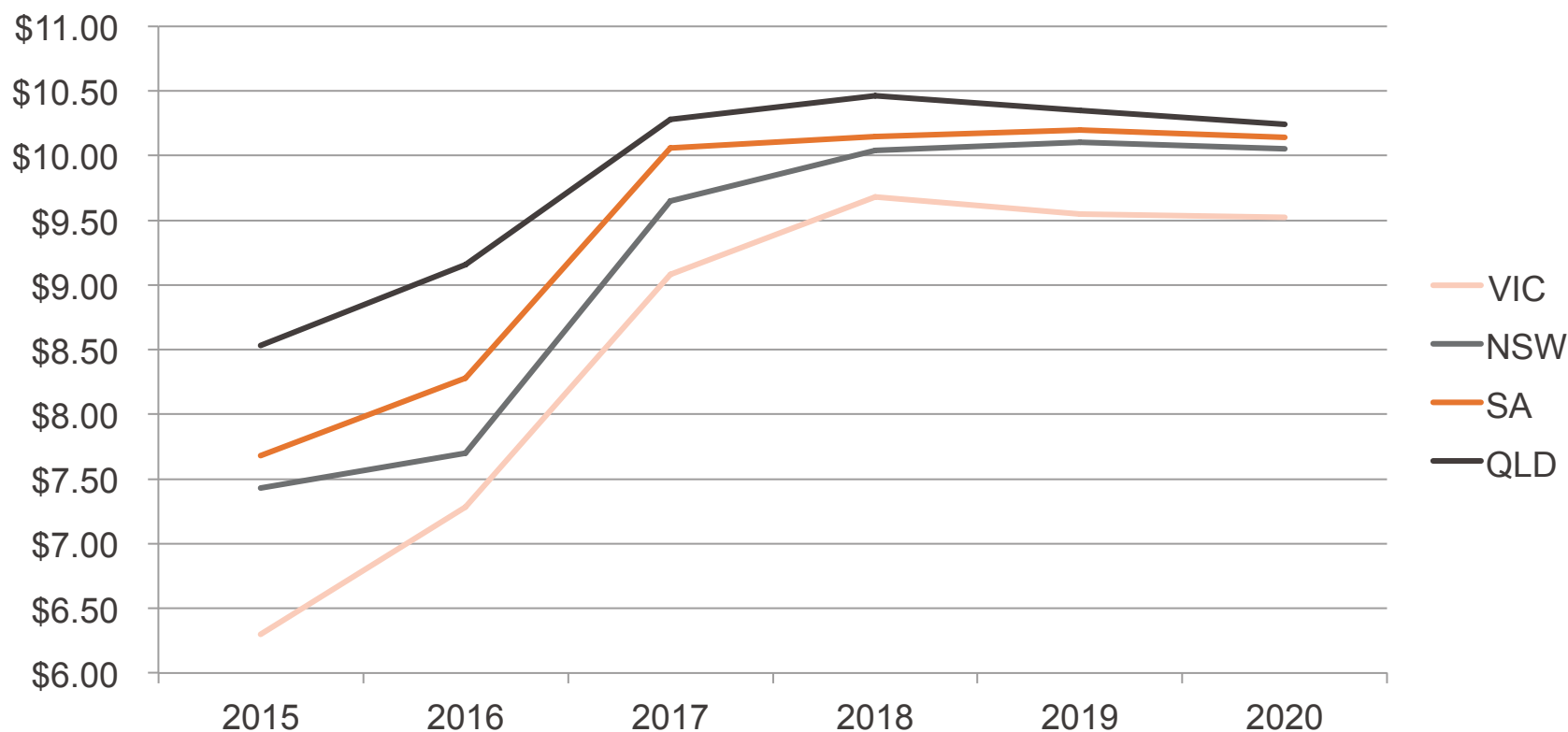
Escalating real energy prices + poor EP = competitiveness



And gas commodity prices forecast to double from current levels around \$5/GJ



**Energetics natural gas forecast –
commodity cost (median case) \$/GJ**



Energy Productivity is about getting more for our energy \$



- ▶ Energy Productivity is total value of economic output generated by energy we use.
- ▶ Aims to measure **multiple dividends** derived from effective application of energy resources.

$$\text{Energy Productivity} = \frac{\text{Gross Value Added (Real \$)}}{\text{Units of primary energy (GJ)}}$$

$$\text{Energy price competitiveness} = \frac{\text{Gross Value Added (\$current)}}{\text{Energy Cost (\$current)}}$$

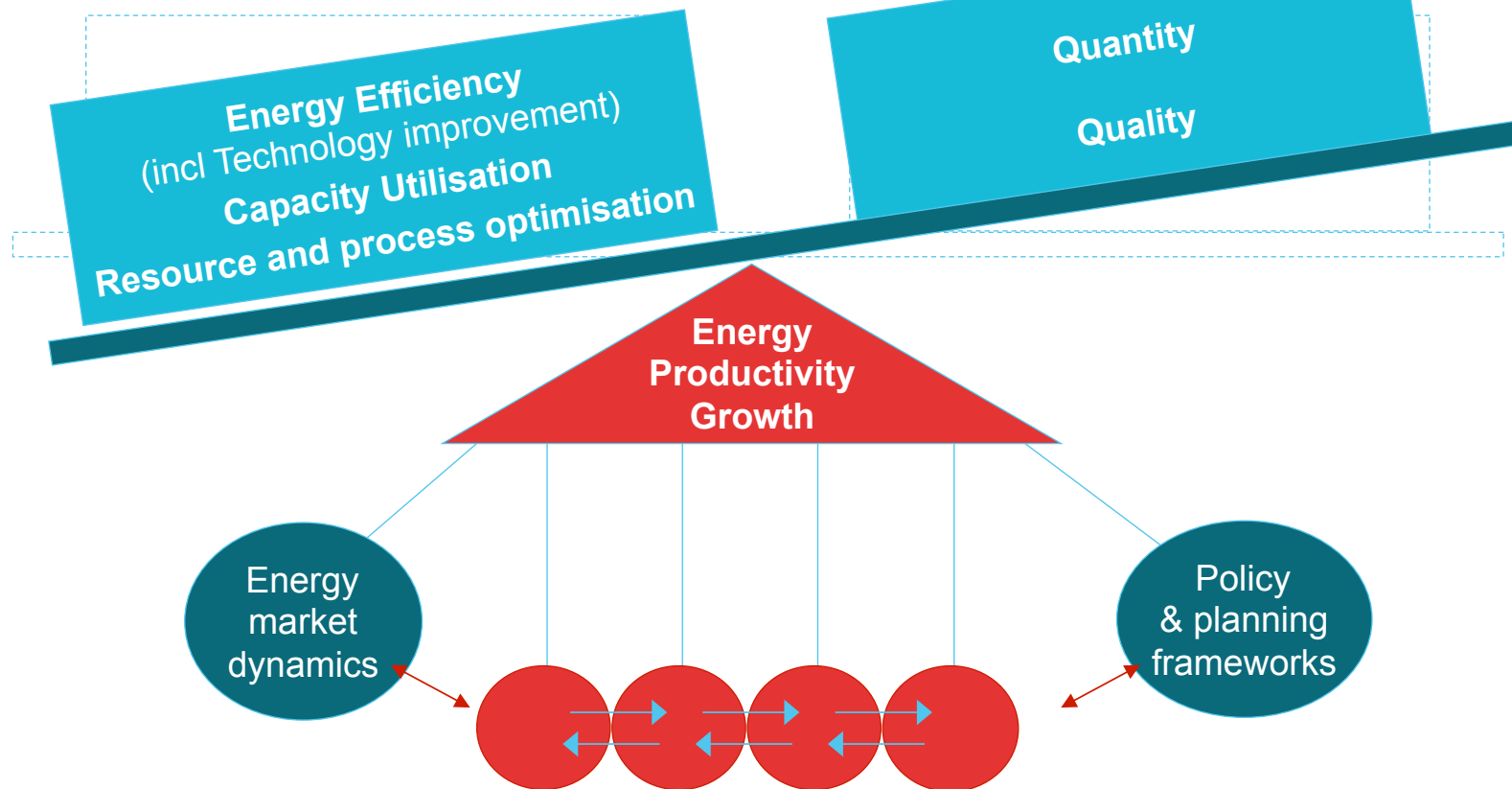
(also relative vulnerability to price Δ)

- ▶ Energy efficiency focuses on delivering same level of service or output using less energy. Important element of energy productivity.

Key determinants of EP...

**Factors directly impacting
energy input**

Output dimensions



Economy structure and stage of economic development

Example for manufacturing

$$\text{Energy Productivity metric 1} = \frac{\$ \text{ Sales (Real \$)}}{\text{Units of delivered energy (GJ)}}$$

$$\text{Energy Productivity metric 2} = \frac{\$ \text{ Sales}}{\$ \text{ energy cost}}$$

Company	Target	Features
Danone (Dairy)	30% reduction targeted in 5 years after 45% reduction in energy intensity in previous 5 years.	Visionary leadership. Business brand built around 'Nature' sustainability positioning
Nissan USA	25% reduction in energy intensity by 2020 after 30% reduction in previous 5 years	Created 'energy culture'. Everyone responsibility. Cross-functional teams. Zero-emissions mobility vision.
Dow Chemicals	25% reduction in energy intensity by 2015 after 38% reduction in previous 20 years.	Comprehensive continuous improvement program globally
3M	25% reduction in energy intensity by 2015 after 20% reduction in previous 5 years.	Brand built on innovation including in energy use

Improving manufacturing energy productivity has multiple dividends



Energy (\$) Dividends

Reduce energy costs through...

- Better information (metering and monitoring)
- Better operational controls
- Being more responsive to drivers of cost (e.g. demand management)

...and increase capital productivity

- Energy efficient technology
- Right-sizing energy using equipment
- Improved maintenance regimes extends life of equipment

Multiple dividends from better energy application:

Process optimisation increases throughput by...

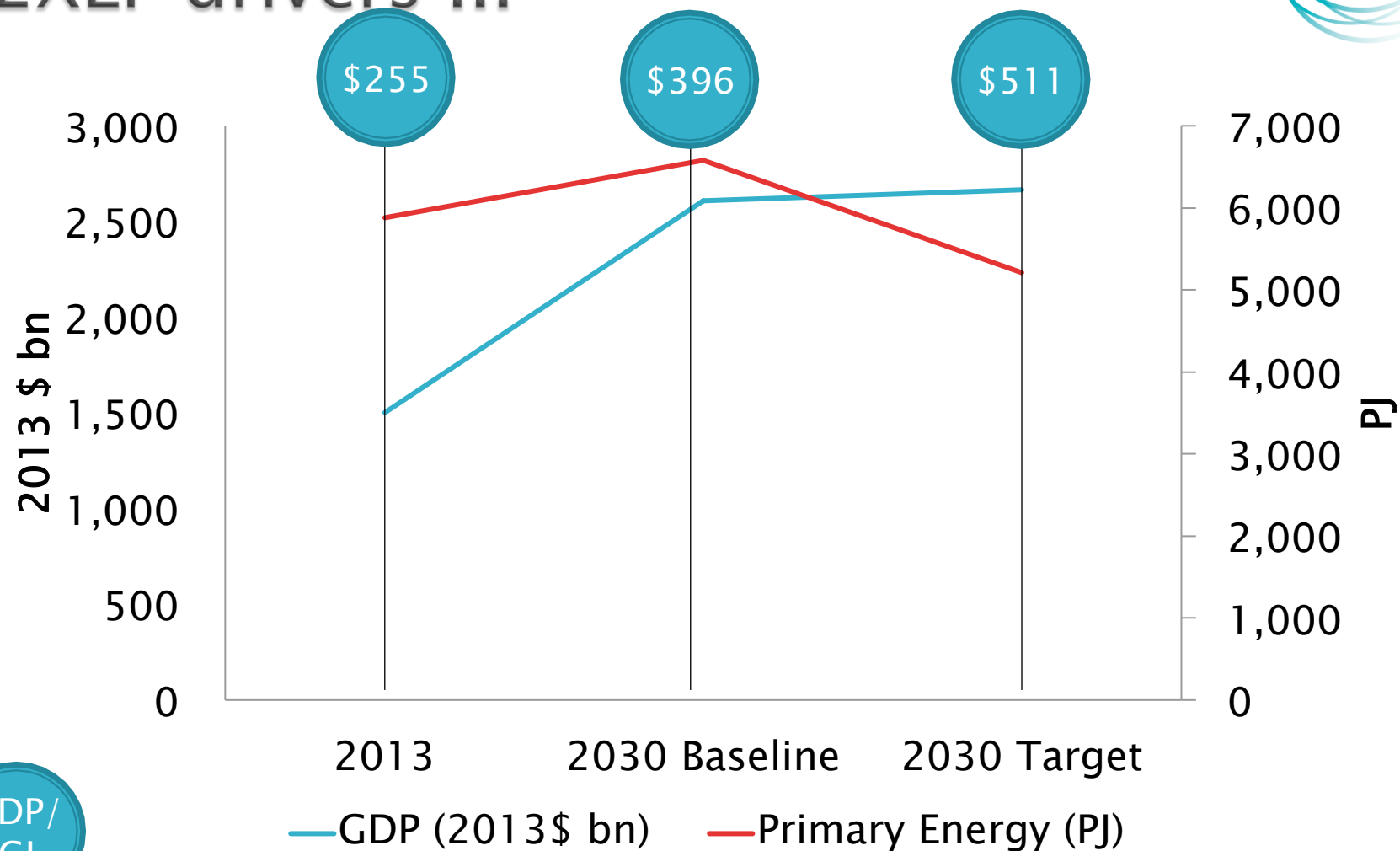
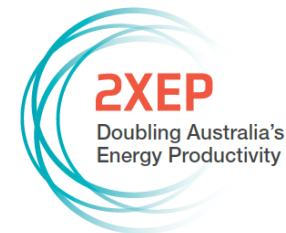
- De-bottlenecking and streamlining
- Reducing residence time
- Reducing cycle time
- Decreasing downtime
- Reducing maintenance costs

... which will **improve capital asset utilisation**

...and could also improve product quality (i.e. **increase value of outputs**)

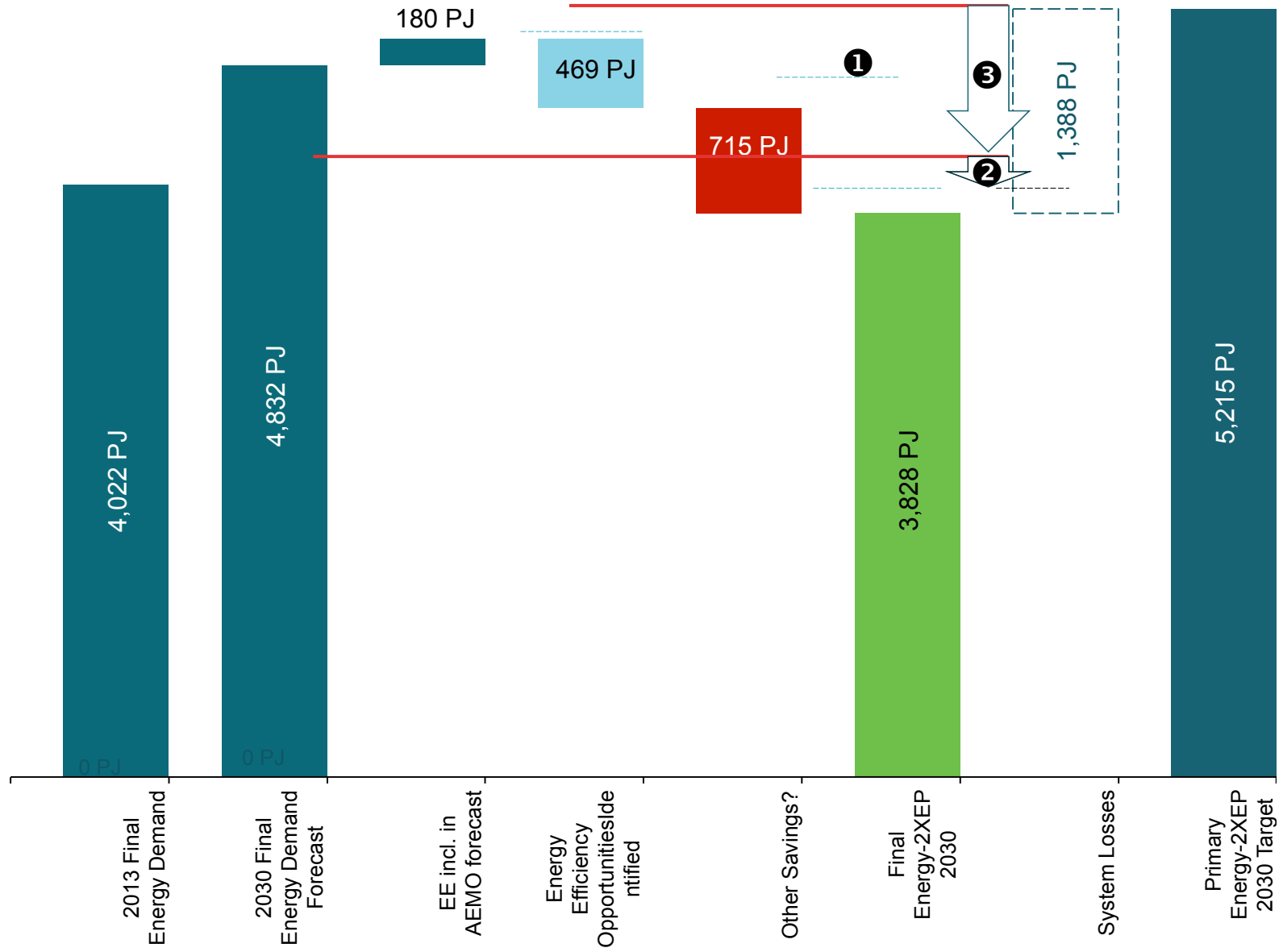


2XEP drivers ...

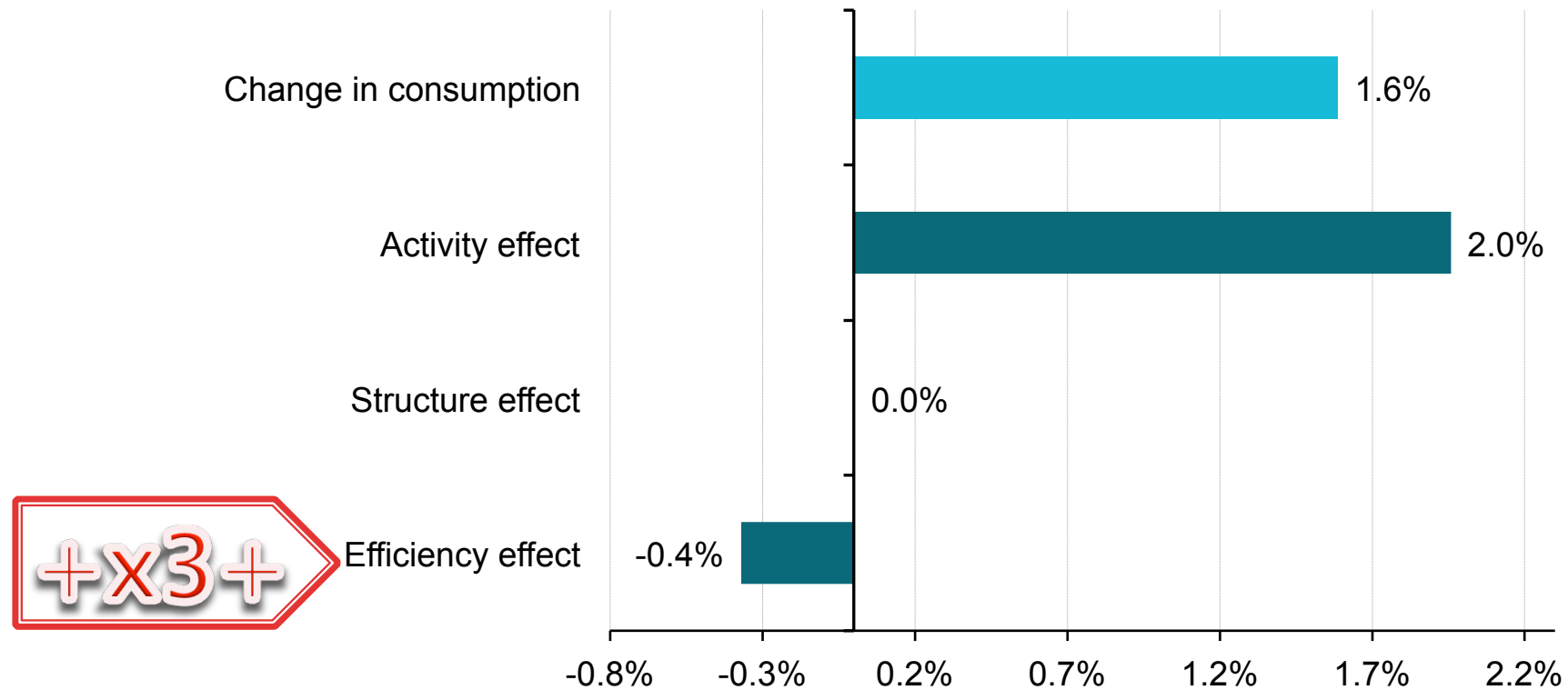


GDP/
GJ

How big is the 2XEP Task?



We need 1.4% further annual improvement in EP

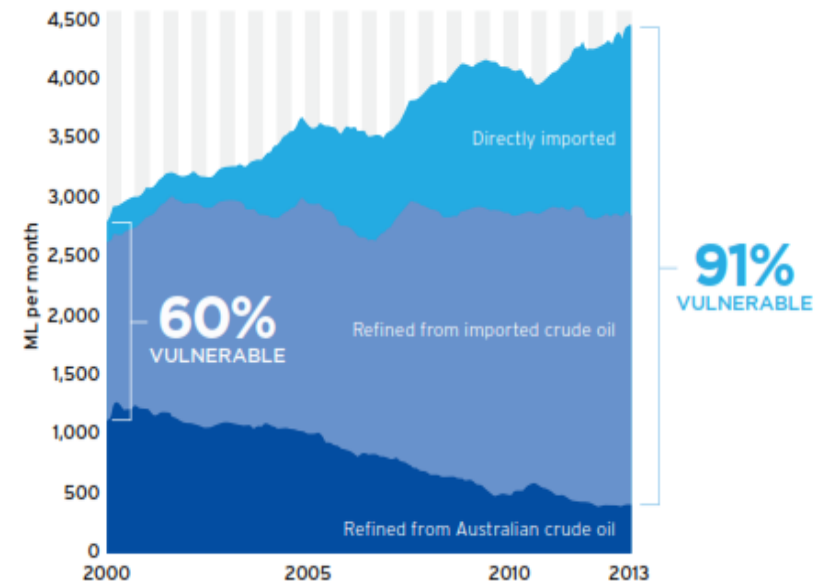


Average annual percentage change over the 8-year period ending June 2013

2XEP in National Energy Policy

2XEP is critical part of a national energy and climate policy:

- Competitiveness, jobs, economic growth
(Annual 1.4% increase in EE = 2030 boost in GDP/capital of \approx \$2000)
- Energy users save \approx \$30B in 2030
+ greater multiple dividends by 2030
- Most cost effective way to cut GHG emissions
 - USA 2XEP will cut 2030 emissions by 1/3 below 2005
 - Australia estimate \approx 20% reduction on forecasted 2030 emissions
- Cut oil vulnerability and improve balance of payments from oil imports (Currently \$37bn)



Note: All dollars \$2013

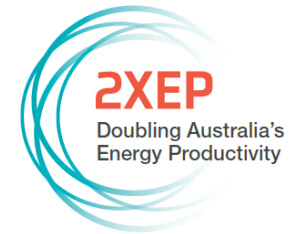
Obama Calls for Doubling US Energy Efficiency by 2030



The President makes a bold call for efficiency in his State of the Union address.

Stephen Lacey

February 13, 2013



The initiative – [Accelerate Energy Productivity 2030](#) – was [unveiled today](#) by Secretary of Energy Moniz – at the [2014 American Energy and Manufacturing Competitiveness \(AEMC\) Summit](#). A key goal of the new initiative is to dramatically increase the number of cities, states, organizations and companies that endorse the goal of doubling energy productivity and agree to do their part to make this goal a reality.



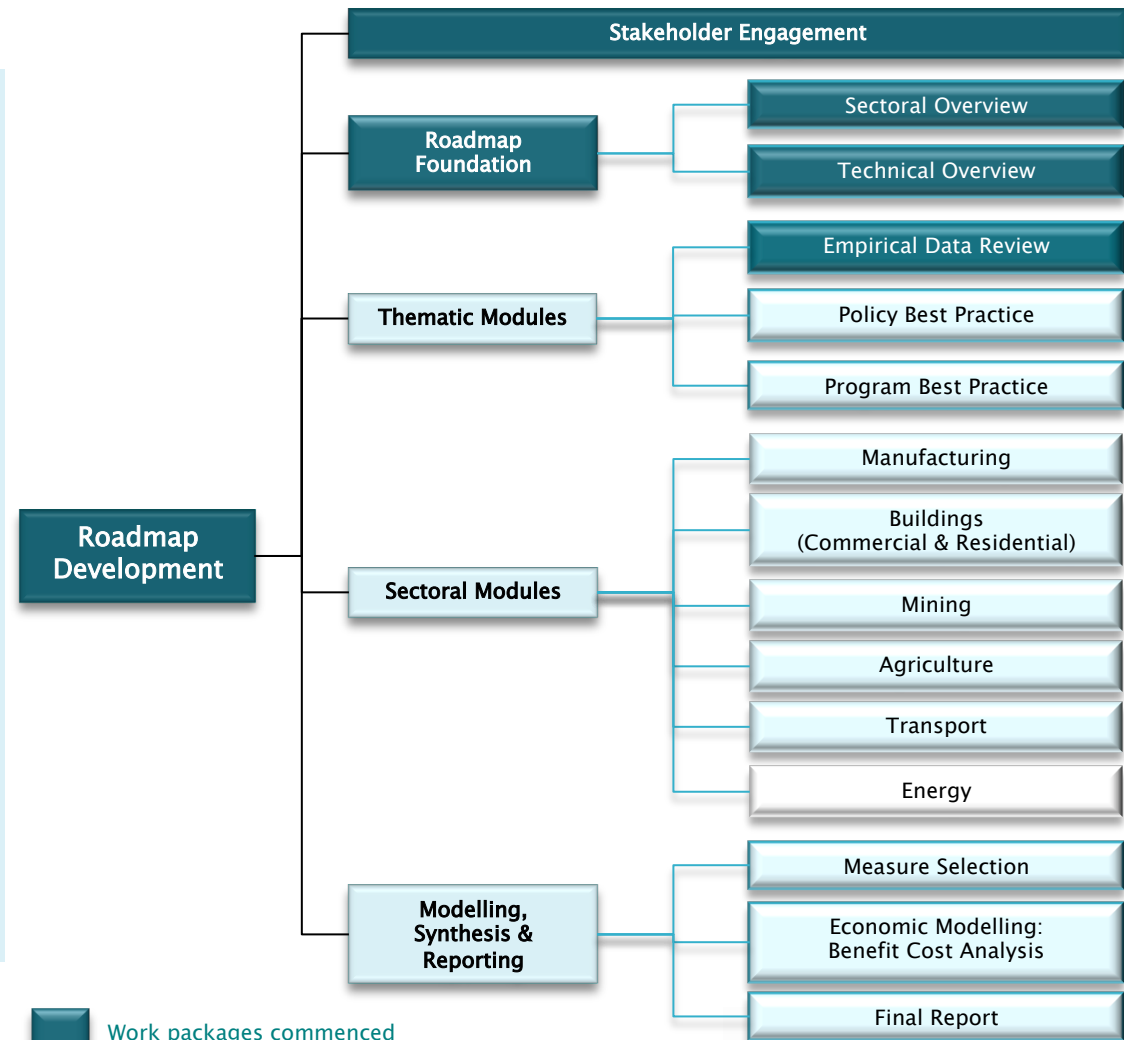
Australian Energy Productivity Roadmap



Provide a credible plan for 2XEP, through collaborative effort between business, government, research organisations, and community.

Work began in August with \$190k government funding.

Business needs to lead, and first step is to match initial funding from government



 Work packages commenced

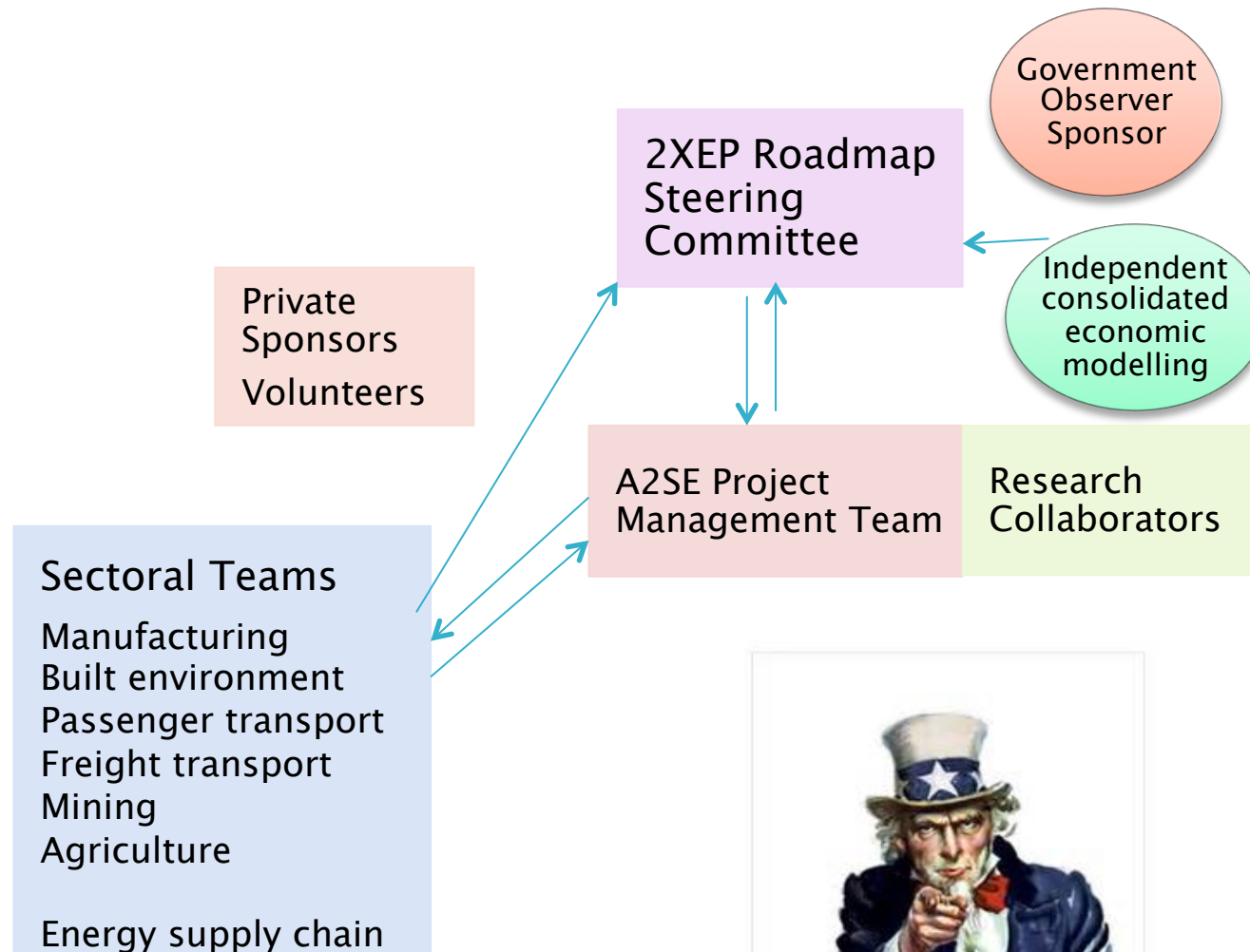


2XEP Features

- ▶ Industry lead
- ▶ Driving multiple dividends
- ▶ Collaborative
- ▶ Bi-partisan – outside politics
- ▶ Voluntary
- ▶ Long term and consistent



2XEP Roadmap Participants



We need you!



“Coming together is a beginning.

Keeping together is progress.

Working together is success.”

Henry Ford