Raising the product policy bar in Australia above the current setting of just matching current world best practice

A2SE, Sydney

Kevin Lane, 28 February 2013

Overview

- Background – IEA 4E studies: TFS, definitions
- Background - Australian policy on MEPS (the bar)
- Suggestions for more effective MEPS
- Developments in US & EU on costing MEPS
- What can Australia do to raise the bar?

Background – IEA projects

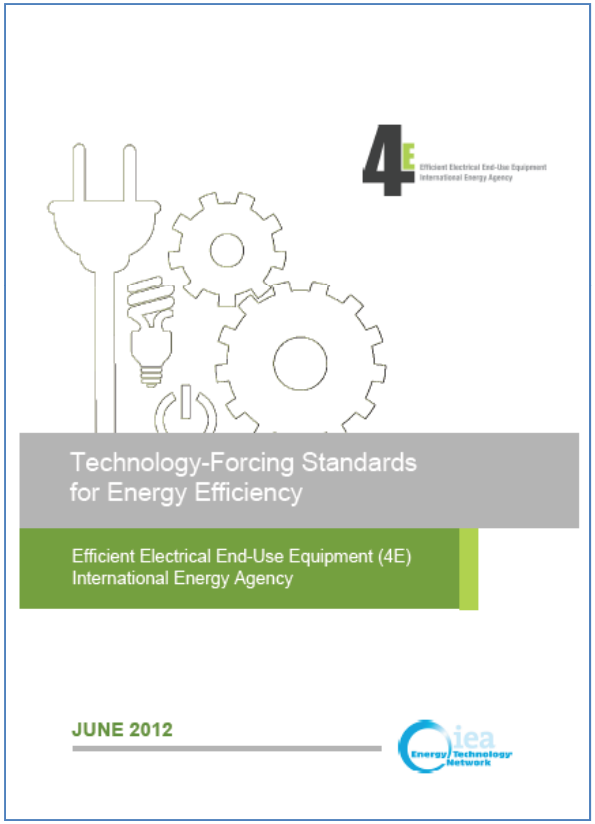
Small IEA 4E funded project, to examine:

- Past technology-forcing standards (TFS) experience
- Applicability for appliances

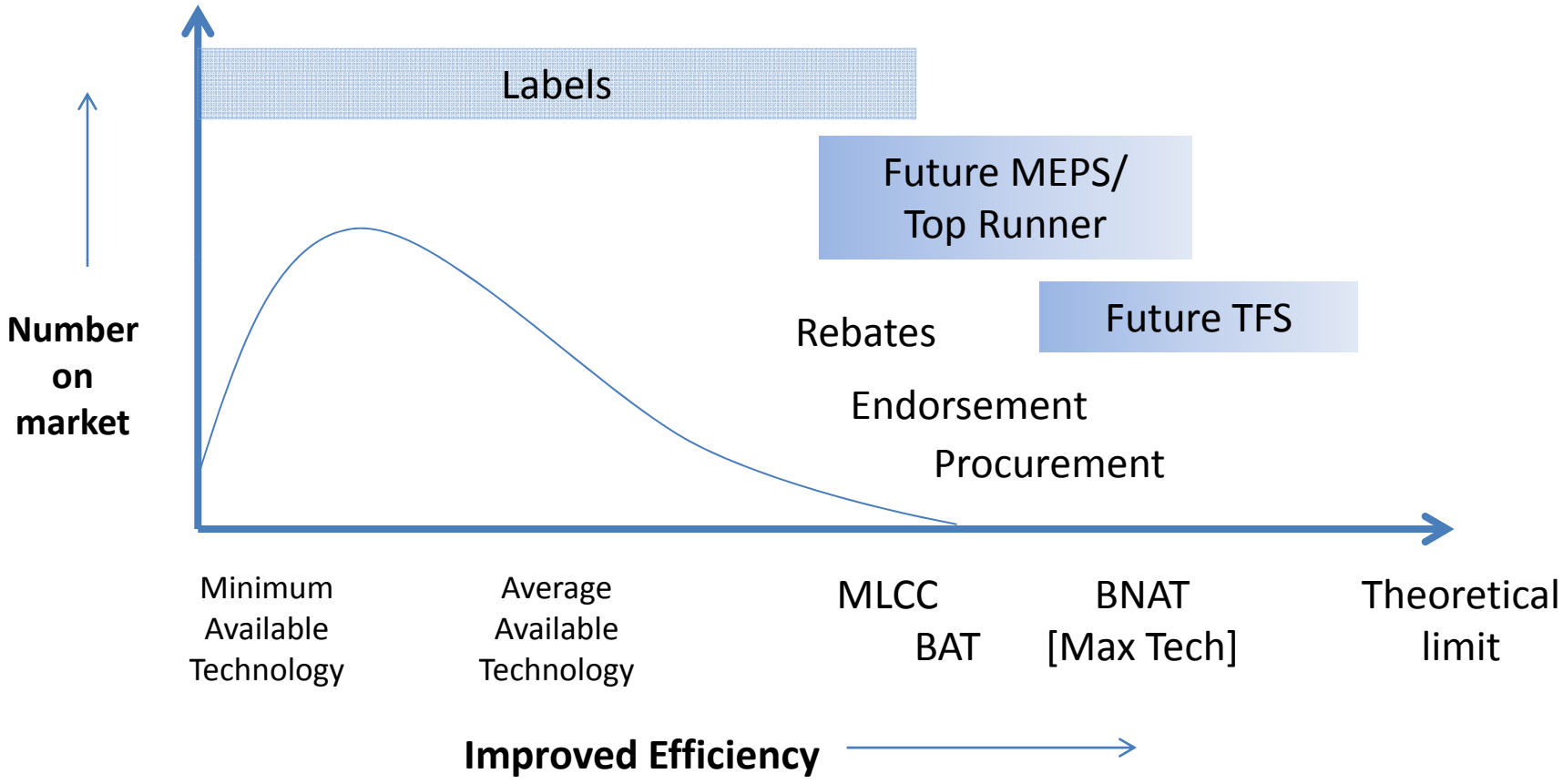
www.iea-4e.org

Follow-on project, just started:

- Definitions of technology performance levels
- Definitions of policy measures
- Strategic integration of policy



IEA 4E project, standard definitions



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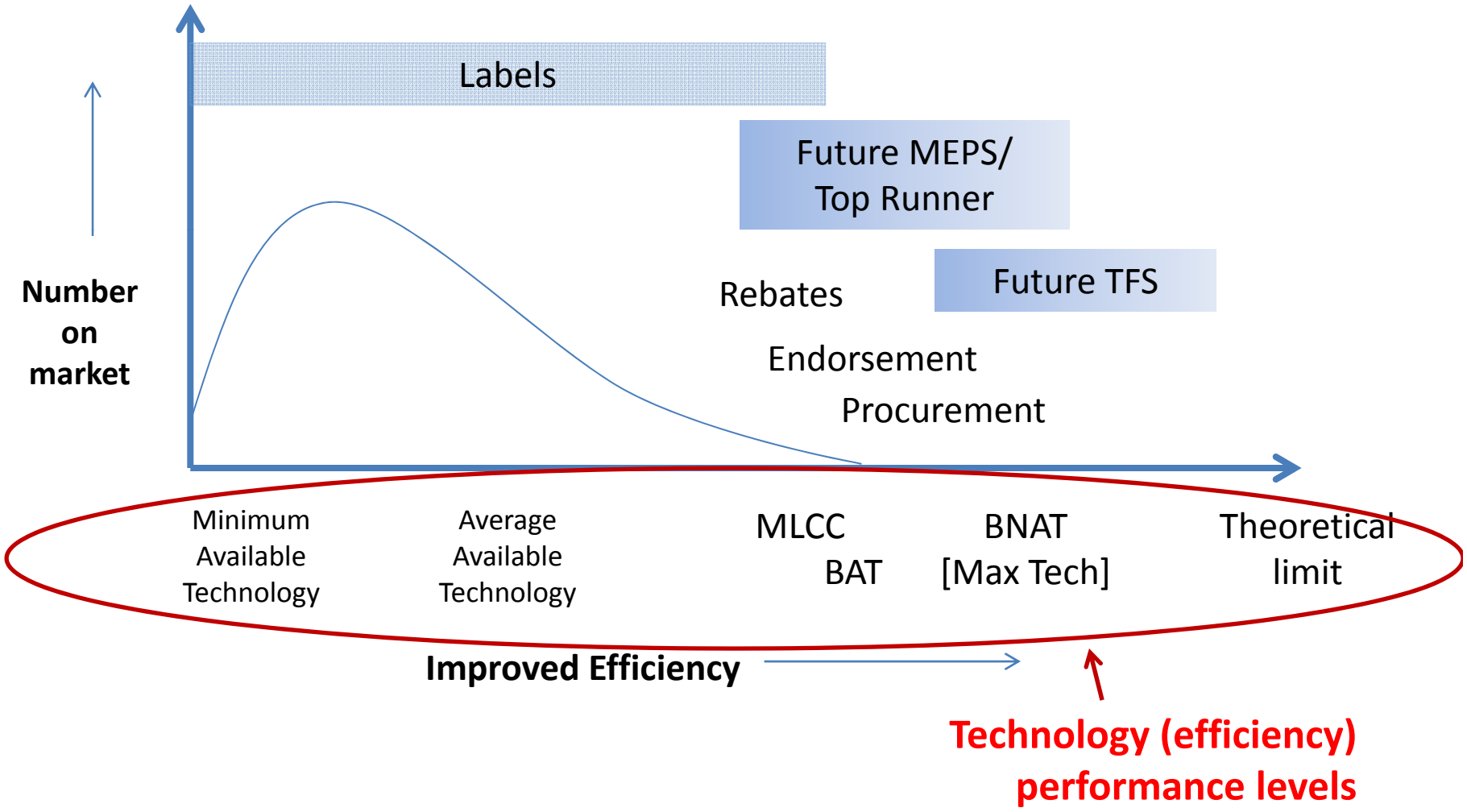
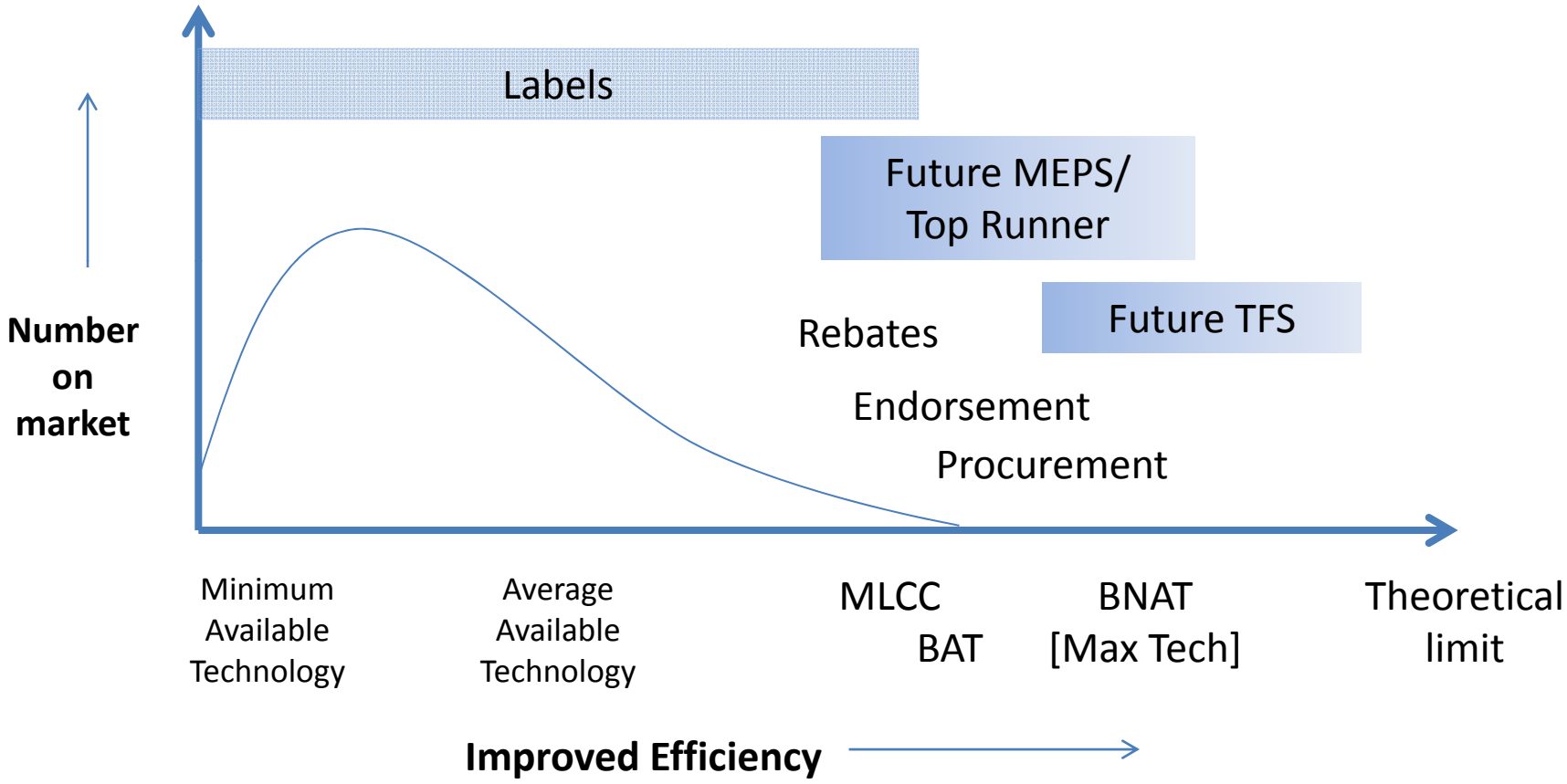


Towards standard definitions

(to be developed under IEA 4E project)

Technology level	Definition
MAT	Minimum Available Technology on the market.
AAT	Average Available Technology: the average efficiency of the available technology on the market place. Usually the sales-weighted average is used.
BAT	Best Available Technology on the market.
MLCC	Minimum Life Cycle Cost to the consumer of the product, where the life cycle costs include purchase and running costs.
BNAT	Best Not (yet) Available Technology that which is known to be under development and may be available as a prototype but not currently available commercially.
Theoretical limit	The highest efficiency using theoretical considerations and the current understanding of how the required can be delivered.

IEA 4E project, standard definitions



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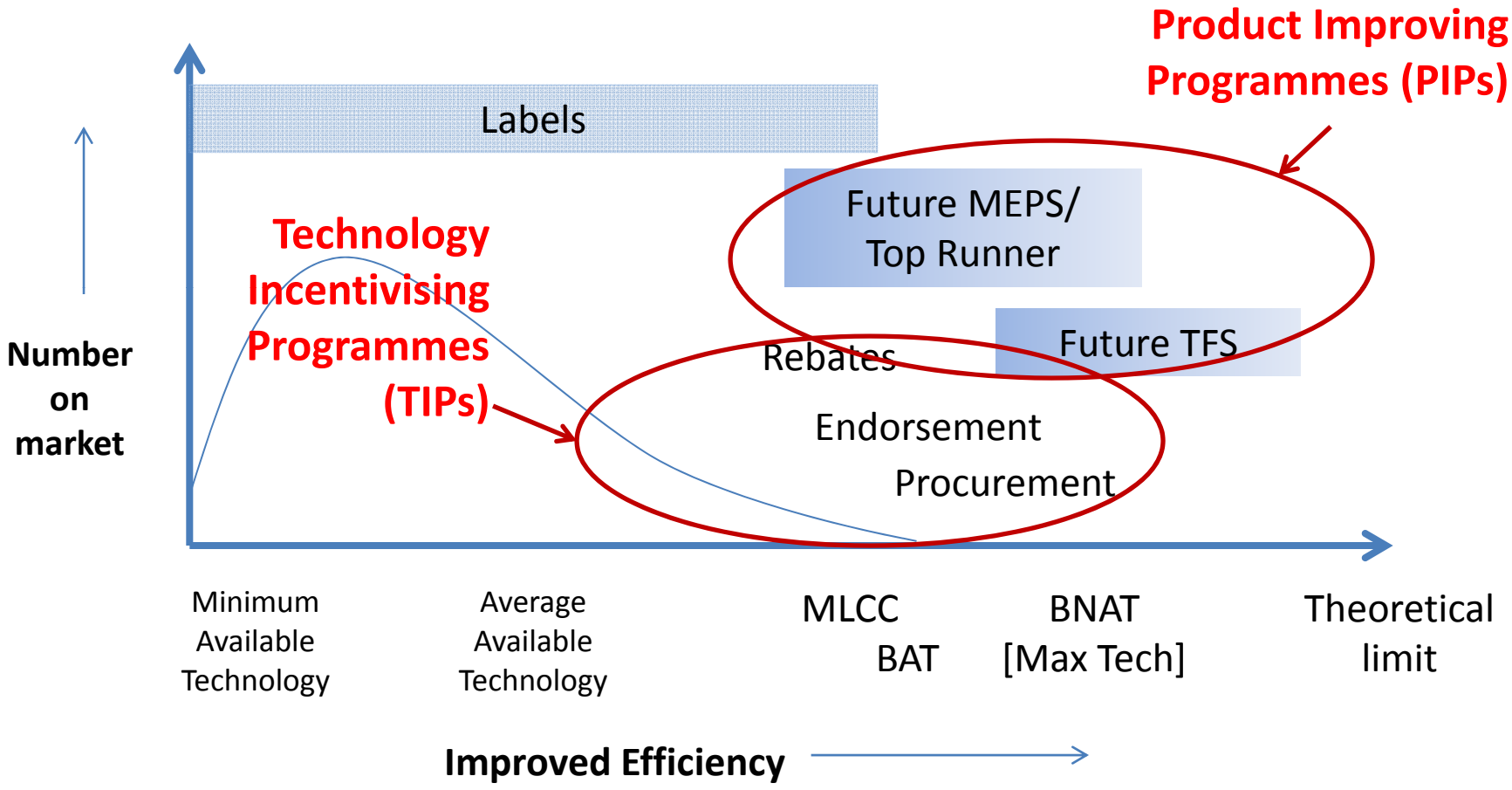


Policy-driven innovation (skip)

- Product Technology Incentivising Programmes (TIPs) – which monitor equipment innovation and use a range of support mechanisms (eg grants, awards and endorsement labels);

- Product Improving Programmes (PIPs) – which allow governments to align future energy performance standards (MEPS) through examining the most cost effective levels for their country now, and into the future, from amongst the different options in the standards-setting spectrum.

Technology-Forcing Standards (skip)

Requirements on new appliances/products/service:

- Where efficiency performance levels are currently:
  - Not on the market at present,
  - Considered too costly at present,
- Which require:
  - Innovation,
  - broad diffusion,
- Which importantly, are delivered via regulation.

Policy measure classification framework

(to be developed under IEA 4E project)

		Format of measure		
		Supportive	***Voluntary***	***Mandatory***
Type of measure	***Information***	Making basic information available	Voluntary energy label	Mandatory energy labels
	Financial	Subsidies for pre-competitive research	Rebate programme by utility	Taxes
	Product conformity	Public research centres	Voluntary agreement by manufacturers	Minimum efficiency requirements

Working classification definition: IEA 4E project, standard definitions

Background – Australia MEPS (the bar)

Australia, long history of using MEPS for appliances, since 1999

MCE given a mandate to E3:

- Australia should match the best regulatory practice, but with a suitable time-lag to allow local industry to adapt to policy; and
- to consider regulating products even in circumstances where a cost is imposed upon the community, provided such action may offset even more expensive mitigation action sometime in the future.

Source: E3 (2008) Achievements report

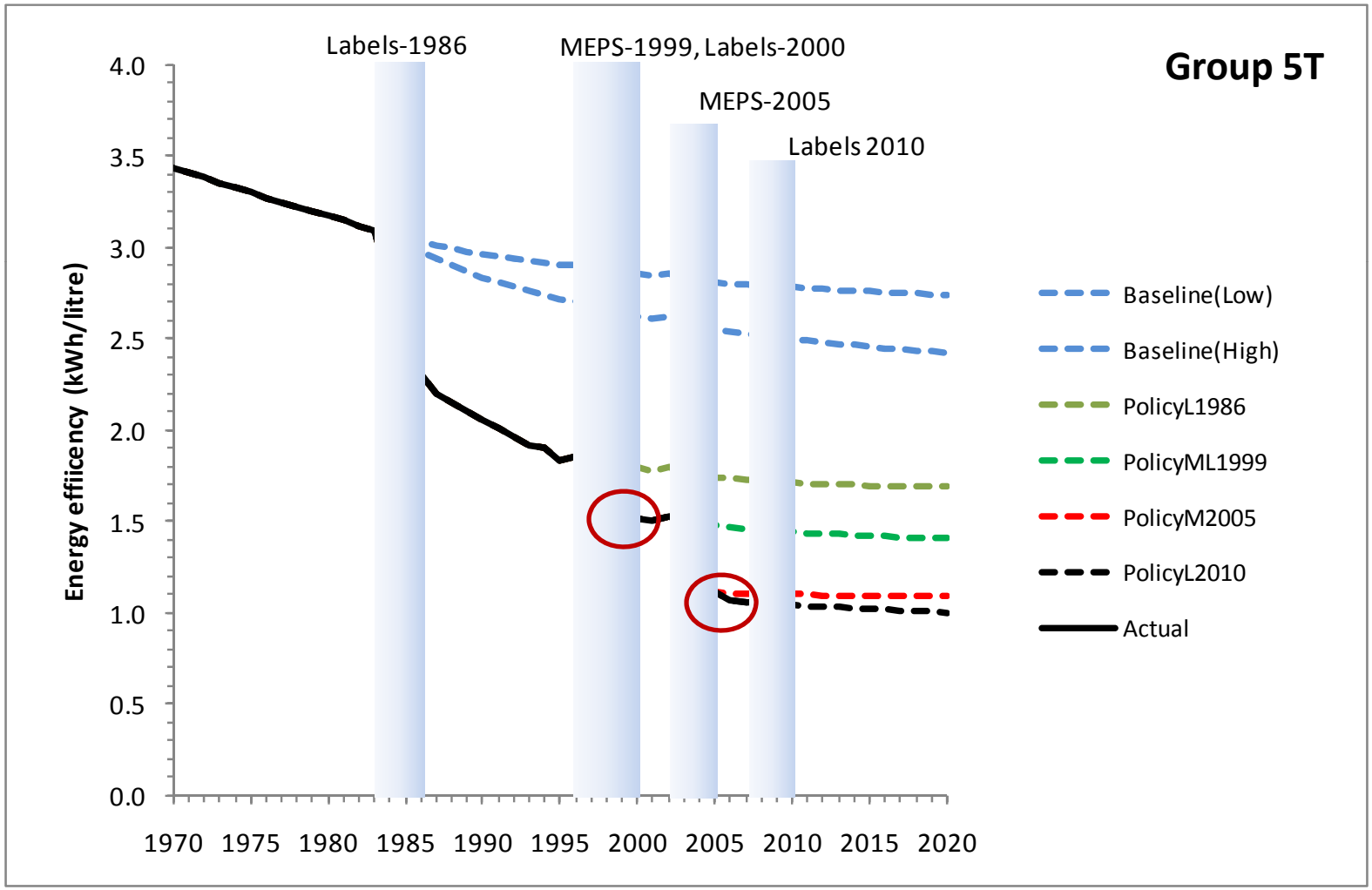
- Pros – relatively easy and low-cost, includes externalities
- Cons – policy lag, potentially sub-optimal MEPS set (bar too low?)

Success of MEPS!

Past MEPS have been effective:

- EU MEPS/ecodesign requirements
- US refrigerators, removed entire range of products from market over a few years.
- Similarly Australia, evaluation proved MEPS a very successful policy measure.

Impact of regulations on Australian Refrigerator Efficiency

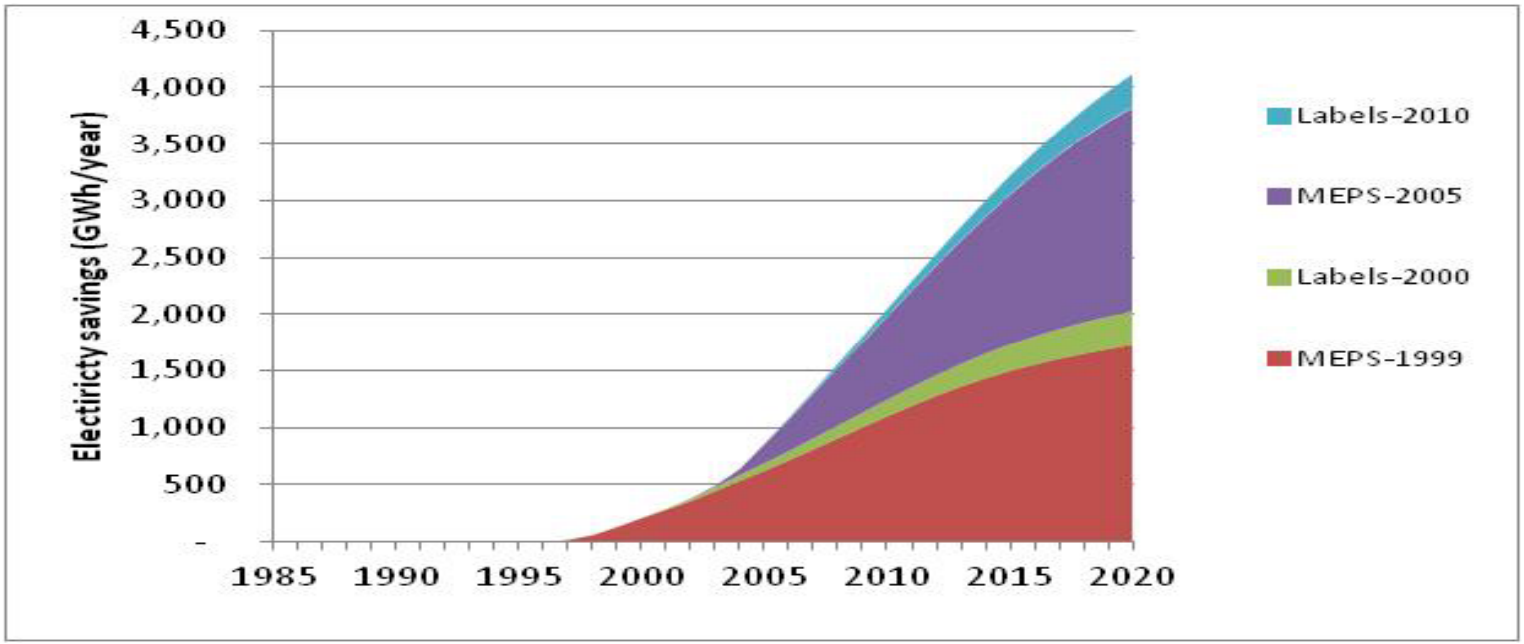


Source: Lane and Harrington (2011)

MEPS work!

Australia refrigeration example:

- Significant energy savings (2TWh in 2010, rising)
- Consumer energy savings, carbon reduction
- Falling purchase price, no reduction in consumer choice



Source: Lane and Harrington (2011)

Can we ‘raise the bar’?

MEPS have been successful, but…

…how much more stringent could the mandatory MEPS level be made?

Generic pros/cons of more stringent MEPS or TFS (skip)

Pros

- Sends clear long term signal to the market
- Which should mean industry can deliver closer to optimal solutions of high efficiency technology
- Requires (essentially mandates) industry investment in energy efficiency - innovation requirement

Cons/risks

- Risk of missing savings opportunity if targets not met (or industry doesn't try)
- Longer lead time, may mean lost time if targets are not met
- Risk of low regulator credibility (if targets set too high, or don't enforce)
- Product range may be reduced (eg GLS lamps, top loading washing machines)
- Lack of access to capital to innovate (mitigate: provide/support R&D funding)
- Leakage/reduced competitiveness to non-regulated regions

When to use? (Success requirements) (skip)

- At least one ‘known’ pathway for future technology/efficiency development
- Much lower (life cycle) cost expected
- Measurement metrics sufficiently developed and robust
- No leakage:
  - Sufficiently wide scope of regulation
  - Implemented across a large (market) trading block(s)

MLCC as basis for MEPS

Target values based on engineering analysis (MLCC), minimising the life cycle cost (LCC) to consumer model:

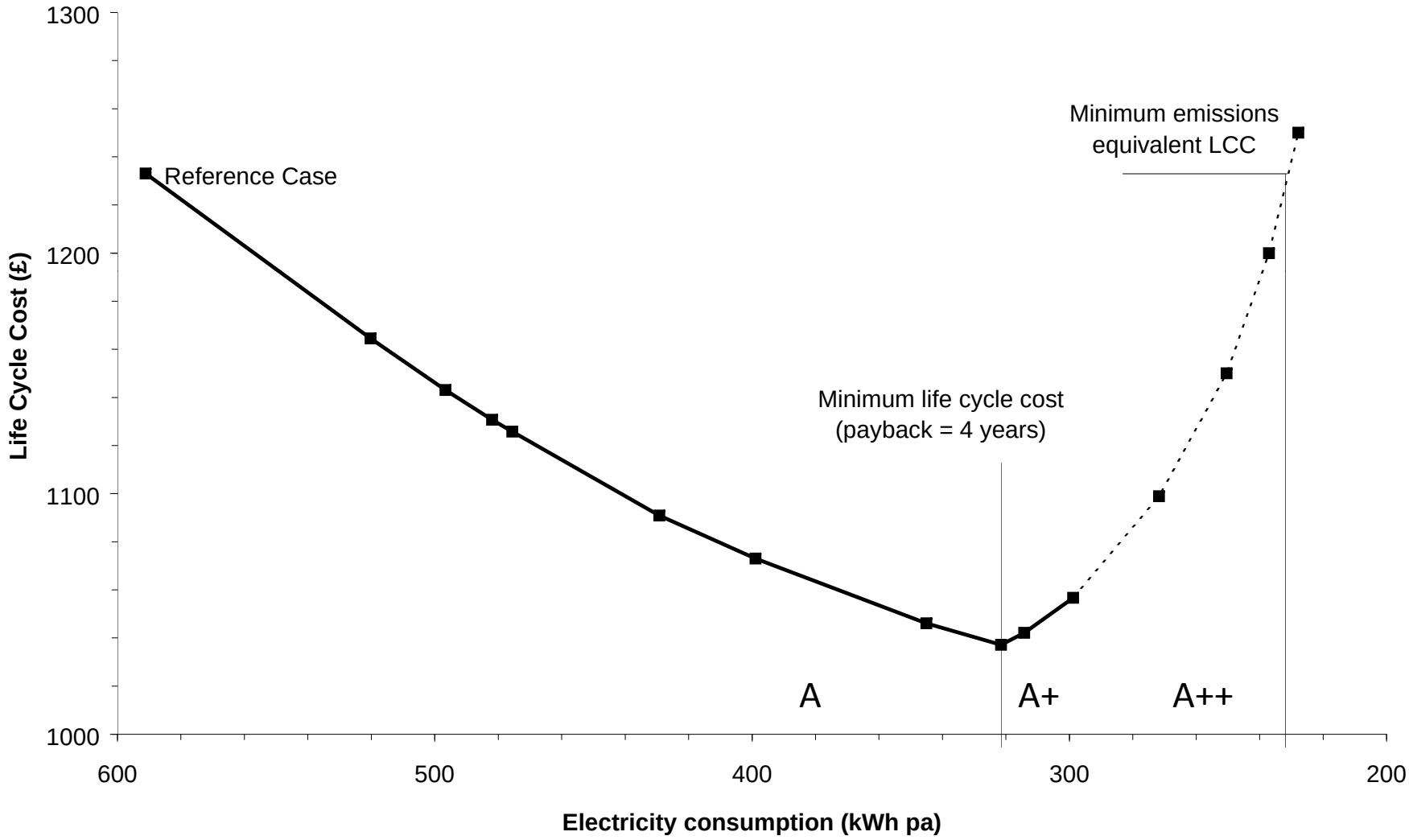
$$LCC = PC + OC + MC + DC$$

Where:

- PC = purchase cost
- OC = operating cost
- MC = maintenance cost
- DC = decommissioning cost

National impact assessment (NIA) models are used to determine overall impact, over time.

MEPS – based on MLCC (EU example)



Suggestions for more stringent/effective MEPS

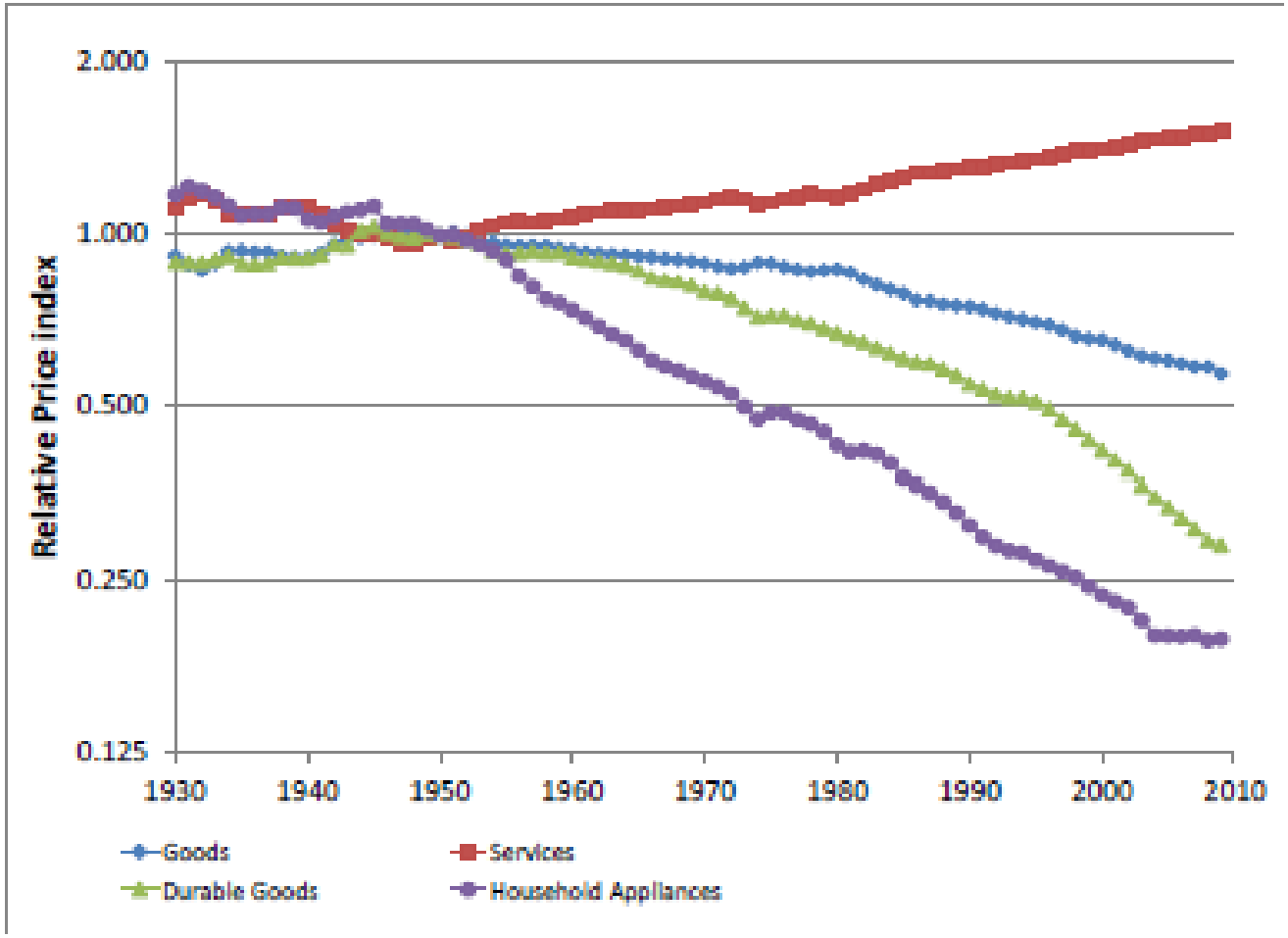
- Use Equivalent life cycle cost (beyond MLCC)
  - Larger savings
  - Reduce rebound concern
  - More savings possible at next iteration of MEPS
- Include external/other costs/benefits in LCC calculation
  - Such as carbon cost, air quality benefits
  - **Include likely costs reductions due to 'learning'**
  - These are increasingly included in NIA (not yet LCC)
- Reduce/remove technology (sub)classification
  - Eg different performance requirements for side-by-side and top-bottom mounted fridge freezers. Reduce technology separation (eg plasma, LCD).

Lane and Brocklehurst (2012)

Including learning rates in MEPS target value (MLCC)

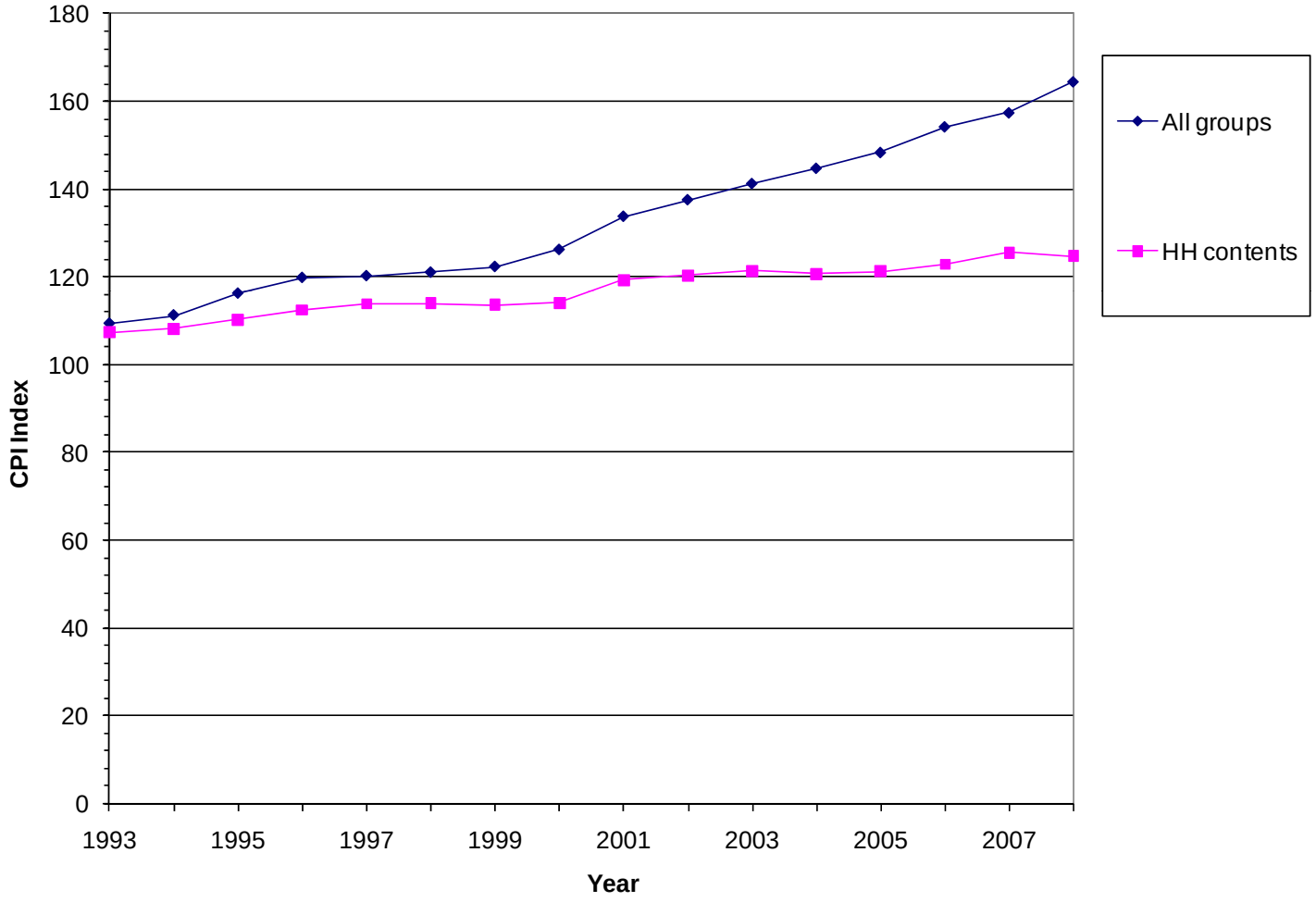
- Brussels ‘Innovation’ workshop, January 2013
  - US will use now use these in their LCC analysis, not just the NIA models
  - EU could use
- Example follows

Historic declining cost of appliances



Van Buskirk (2013) quoting US Bureau of Economic Analysis

Australia CPI: relatively decreasing cost of household goods



Lane and Harrington (2010) quoting ABS6401

‘Learning’ rates – cost reduction

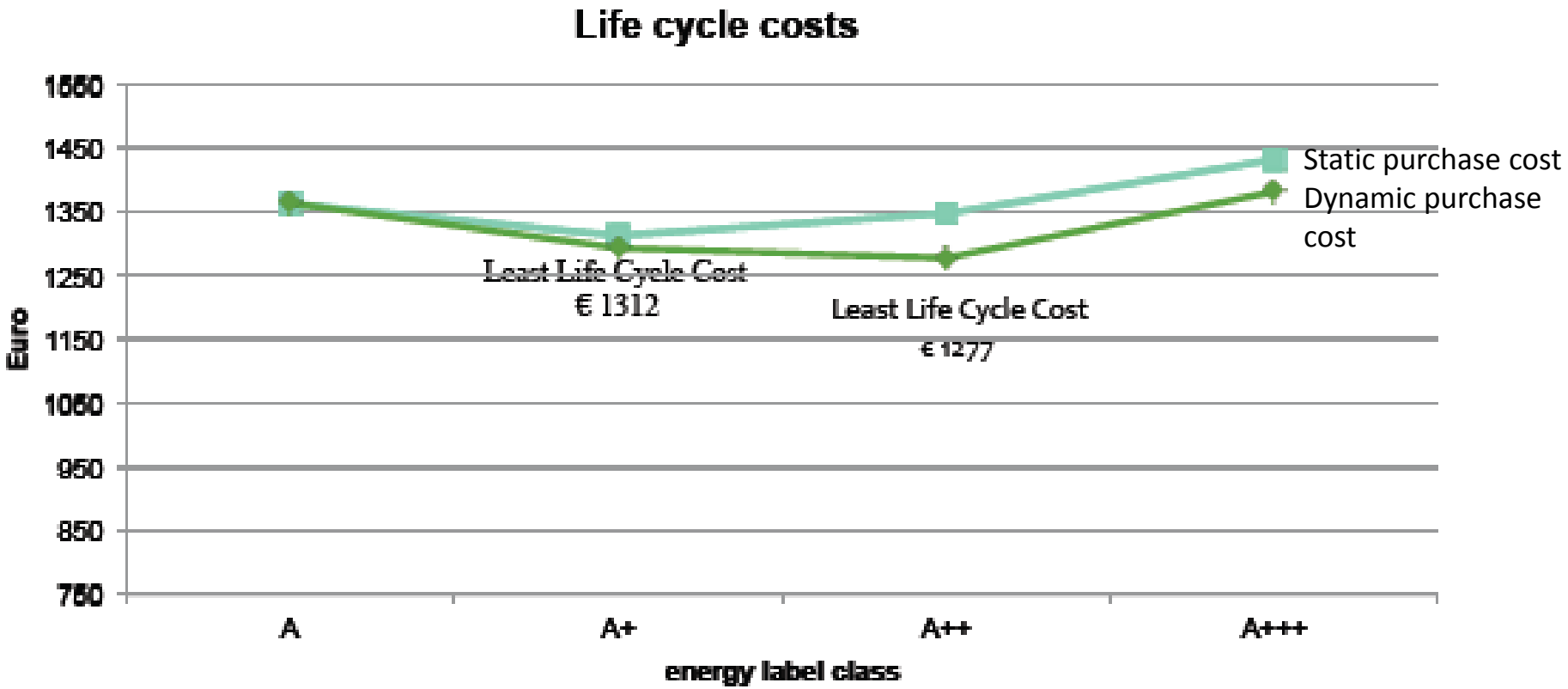
- Usually a function of elapsed time or volume of production
- Some sources available from literature for appliances
- Different for different appliances (eg CE larger)

Product	Average learning rate
Laundry drier	14 %
Refrigerator	9 %
Freezer	13 %
Television (CRT)	12 %
Television (LCD)	29 %

Table source: Siderius (2013)

Impact of including reducing cost: EU refrigerators example

Dynamic cost would have meant EC 2014 MEPS at A++ rather than A+



Source: Siderius (2013)

MEPS within a market transformation strategy

Consider MEPS (target levels) within an integrated market transformation approach, use PIPs (incentivising) to support and enhance future TIPs (mandatory).

- Use other policy measure to identify next technology level (eg competitions, prizes)
- Other policy measures to develop market, and bring down costs (eg rebates, government contracts)

These are more expensive options.

Market Transformation (skip)

Strategic integration of multiple policy measures:

- mandatory energy labels for the entire market, which provides additional information to consumers (address information gap issue);
- endorsement labels can also be used to help consumers identify the best products;
- 'dis-endorsement' labels can also be considered (though rarely used) to help identify the worst products;
- incentives for consumers to purchase the most efficient products (usually via rebates, but could be through other mechanisms, such as obligations on energy suppliers to install efficiency measures);
- incentives for the supply chain to source more efficient products (eg through procurement contracts);'
- mandatory energy performance standards are used to remove the worst products from the market though can be used to set mandatory levels at least life cycle cost to consumers (perhaps already proven by more expensive measures to bring forward technology).

Summary thoughts - what can Australia do to raise the bar?

1. Include likely reductions in cost of appliances in determining cost-effective MEPS levels
2. Use other incentivising measures to prove longer term targets - demonstrate technologies are feasible (interaction between different regulators)
3. Reduce sub-classifications of products (eg side-by-side refrigerators)
4. Co-ordinate timing with other regions (reduce policy lag)

Thank you!

Contact:

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TFS project report:

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Available at: http://www.eceee.org/eceee_events/seminar-ecodesign-and-innovation

IEA 4E TFS project report:

Lane, K and Brocklehurst, F (2012) Technology forcing standards. Report for IEA 4E, available at: www.iea-4e.org

Other

Lane, K and Harrington , L (2010) Evaluation of energy efficiency policy measures for household refrigeration in Australia: an assessment of energy savings since 1986. E3 report no 2010/10. December 2010. Available at http://www.energyrating.gov.au/resources/program-publications/?viewPublicationID=2150

TFS - Example and comparison

Variable affecting TFS	Clean Air act 1970 (catalytic)	DoT 1969 airbag decision
Technology cost	$200-250	$235 (GM)
Asymmetric information	EPA erases advantage	GM reveals information
Regulatory mandate	Legislative (congress)	Regulatory (agency)
Raise rivals' costs		Yes
Non-compliance	EPA 'winks' at Chrysler	?
Liability concerns	recalls	Yes

TFS strongly regulatory approach apparently more effective than the DoT approach via NHTSA

Clean Air Act (1970) requires emission reduction: new **catalytic converter**
Dept of Transport **airbag** decision – drawn out, ineffective

Source: Gerard and Lave (2007)

Other policies reviewed

Non-appliance related:

- USA SOx emissions reduction via cap and trade
- Renewable energy (portfolio) standards
- Montreal Protocol, ban ozone depleting substances
- UK Climate Change Agreements
- Zero emission vehicles in California
- English Building regulations (zero Carbon by 2016)

Not explicitly TFS but appliance related:

- US MEPS -Energy Conservation Standards
- EU MEPS - Ecodesign directive
- Japan Top Runner
- Low-efficiency incandescent lamp phase out

Existing '*TFS-like' approaches* for appliances/equipment

Minimum Energy Performance Standards (MEPS) (EU, USA)

- Based on engineering analysis (expensive to do properly)
- Based on currently known technology (or near term)
- Tend to overestimate costs, underestimate potential
- [diffusion, rather than significant innovation]

Top Runner (Japan)

- Future targets based on statistical analysis of the current market (the best in each category)
- Allows for market average compliance, difficult to check

TFS for appliances

Requirements

- Based on energy service, not technology prescriptive
- Could consider company-level or product-level requirement
- Need to allow extra time to meet (more stringent)targets

Requirement specification metric - similar to existing MEPS?

- For refrigerators related to EEI
- For televisions related to W/cm^2 (or better EEI, to avoid size issue)
- Though reducing/removing 'technology categories' (ie different requirements for different products)

Service:

- Eg keeping home warm, rather than boiler efficiency (at full load)
- Water heating – energy for hot water used.
- Innovation can be stifled by testing procedure

Generic issues for setting TFS (or other stringent targets)

Information asymmetry:

- What levels? Industry tends to knows more than regulators. Push-back.
- Mitigate by:
  - Developing expertise through contracts, panels
  - Use competition (within region, foreign vs domestic)
  - Information from component suppliers

Political will:

- TFS intrinsically bold (difficult/impossible to prove cost-effective savings, apriori)
- Mitigate by:
  - Extension of existing (eg MEPS) arrangements?
  - Trade-off between pure TFS and integration with other MT policies (and using as TFS levels as aspiration longer term targets)

Delay risk

- Trade-off between stricter target/longer lead time and reduced target with shorter lead time.