RAP® Energy solutions for a changing world

Rebound Effects, Materiality, Additionality, & Free Riders EEO Toolkit Section 8

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- **Materiality** (“meaningful” involvement)
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- Installation does not realise the expected energy savings
- **Rebound effect**
  - Direct - increased amenity/comfort
  - Macroeconomic
- **Double Counting**

Additionality

- Not the classic economic definition
- "… only savings that go beyond the minimum requirements originating from EU legislation can count. This is relevant for individual actions that are a result of energy efficiency obligation scheme …", "… For products – the requirements established by implementing measures under the Ecodesign Directive …"
- By contrast, where the required energy performance is determined by national policy choices which are not a result of mandatory and applicable EU requirements, then for the individual actions that are a result of these policy measures the resulting energy savings can be attributed to these individual actions.

Additionality & EEOs

- Annex V of EED gives examples for all policies measures
- Especially relevant to EEOs are:
- For **products** – the requirements established by implementing measures under the Ecodesign Directive;
- For **new passenger cars and light commercial vehicles** – the emission performance standards established by Regulations 443/20099 and 510/201110
- Trickiest is national **Building Regulations** and Energy Performance in Buildings Directive (EPBD)

Additionality in EEOs & EPBD

- Simplest is Ecodesign and EPBD e.g. **new or replacement boilers** in October 2015 have EU minimum performance standards; this creates a baseline and implies can only count energy savings above this minimum level
- Similarly **heat pumps** in October 2015 & October 2017
- EPBD Articles 5 -7 cover **cost optimal requirements** when setting national building regulations for new and existing buildings – effective from 2013; national building regulations prior to 2013 can count to the cumulative EED target in the EED period
- Any EEO encouraging buildings beyond cost optimal national building regulations can count energy savings from this baseline e.g. nearly zero energy buildings

Materiality & EED - 1

- Annex V2(c): "the activities of the obligated, participating or entrusted party **must be demonstrably material to the achievement of the claimed savings**;"
- Guidance note on '**materiality test**' :
- Automatic rolling out of EU legislation, or autonomous improvements because of, for example, market forces or technological developments, cannot be taken into account. MS may not count actions that would have happened anyway (elements of free riders here)
- The activities of the parties that are implementing the policy measure must be 'material' to the carrying out of the action.

Materiality & EED - 2

- The term '**material**' means that the party in question must have contributed to the realisation of the specific individual action in question, and that the subsidy or involvement of the obligated, participating or entrusted party must not have had what is clearly only a minimal effect in the end user's decision to undertake the energy efficiency investment.
- The term '**demonstrably**' means that MS must be able to show that this is so. The activities of the national public sector parties that are implementing the policy measure must be 'material' to the carrying out of the action.
- Guidance example of **non material** is €1 from obligated party to EE product costing €400

How Prove Materiality?

- Simplest is that energy efficiency measure **should not have started or been approved prior to the involvement of the obligated party** *(Denmark)*
- Germany and Switzerland propose to demonstrate materiality by setting criteria before the support to the EE measure can be considered material
- Inevitably, there has to be a trade off between simplicity and accuracy
- Switzerland are a good example of this approach

Additionality and Danish EEO

- The savings may not be implemented before the contract is issued and vice versa
- A contract between the distributor and third party shall be issued before implementation of the energy savings
- Energy companies can only count savings where they are directly or indirectly involved which may be advice, energy audit, subsidies, etc.
- Agreements shall cover the whole chain from utility to end user before savings are implemented

Saving Tender Switzerland (ProKilowatt)

- Criteria fulfilled if no legal obligation to carry out measure; if project not yet realised and if pay back period > 5 years
- Subsidy maximum of 20% with payback of > 5 years.
- For companies with voluntary/negotiated target agreements or energy audits: EE measure not part of agreement or already in energy audit i.e. only additional activities can receive subsidies from ProKilowatt such as if the EE measure was recognised in agreement or audit as not being economic

Why Energy Savings do not Always Materialise

- Rebound effect
  - Direct – increased amenity/comfort
  - Macroeconomic
- Installation does not realise the expected energy savings
- Free riders:
  - How to establish baselines
  - Special case for fast moving consumer products
  - Minimising free riders by EEO design

Rebound Effect

- Where improved energy efficiency is used to access more energy services rather than energy reduction
- Direct rebound effect is when some of the benefits are taken by the end user in increased amenity/comfort
- Indirect & Macroeconomic effects where some of the financial savings from the energy efficiency measures are spent on other things which have an energy consumption associated with them
- Magnitude of the rebound effect is typically expressed as the percentage of potential savings taken back from the maximum efficiency improvement expected

Rebound Effect - Direct

- Direct rebound effect is when some of the benefits are taken by the end user in increased amenity/comfort e.g. higher indoor temperatures or higher production rates
- Some have positive impacts e.g. improved health, reduced energy poverty or improved productivity – part of multiple benefits of EE which are not included in EED
- Direct rebound effects are measurable & lie in range 10-30% households, 20-60% industry*
- Need to take into account when calculating the actual reductions in energy demand, reduced pollution, reduced fuel imports, or GHG emissions

* EU project ENV.G.4/FRA/2008/0112 April 2011

Rebound Effect - Macroeconomic

- Where improved energy efficiency is used to access more energy services rather than to achieve energy demand reduction
- Much literature – no agreement on size of rebound effect – difficult to measure
- Recent EU energy consumption has been in decline since 2005 i.e. before the recession; EE works!

Key points:

- Article 7 in EU EED does **not** discuss rebound effect; Annex V.1 covers **direct rebound** effect in the way energy saving values are determined

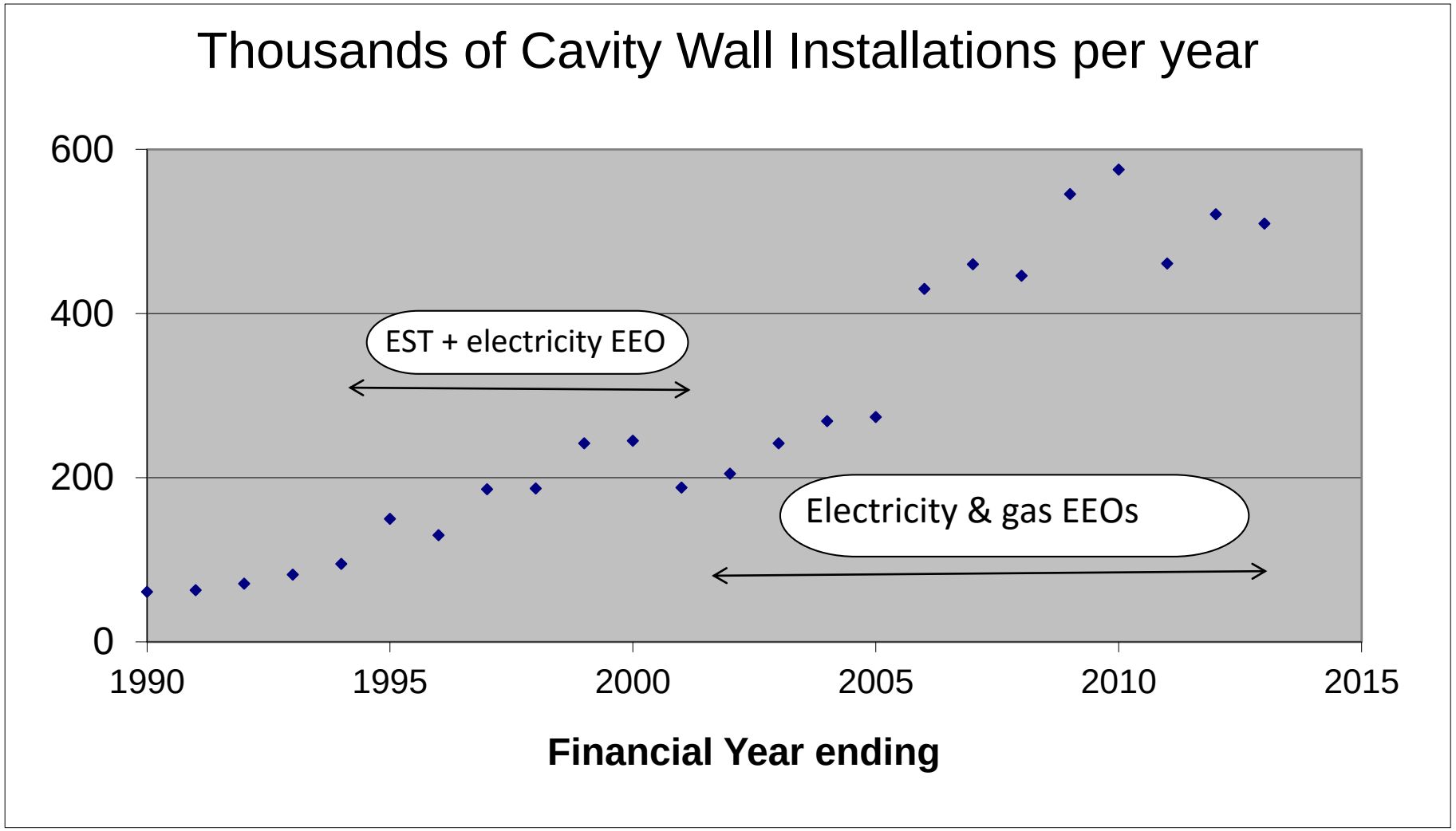
Installation Does Not Realise the Expected Energy Savings

- EE measures only achieve expected energy savings if installed correctly and used optimally
- EED stresses quality and M&V of EE installations
- How meet? - only use accredited installers; sample their workmanship as part of the M&V of the EEO; ensure end users understand how to use EE measure
- N.B. Applies to all EE measures installed by MSs to meet EED not just EEOs
- Covered in EED by Annex V.2(g)

How to Measure Free Riders

- Simplest definition – those that would have installed the measures anyway in the absence of the EEO
- EE policies aimed at retrofit/replacement market will contain free riders; only really determine the extent of free riders afterwards – evaluation important
- Use baselines of activity for EE measure prior to start of EEO
- Can ask participant end users whether they would have done the measure without the EEO – perception of question is important…..
- Use innovation theory of market penetration for new fast moving consumer products

Importance of GB EEOs for Insulation

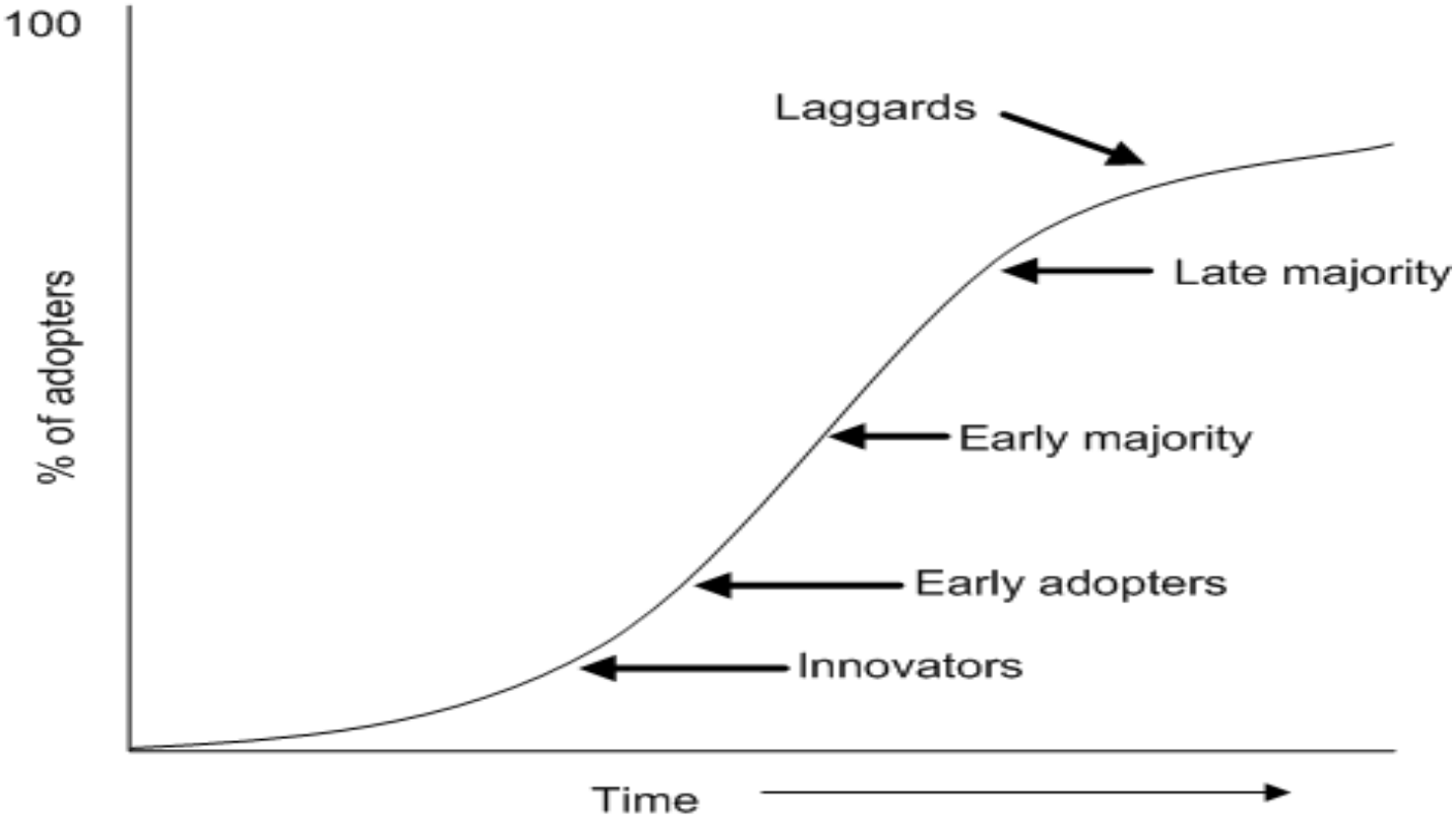


How do you establish baselines?

- Government or energy agency does not always know the baselines for their key EE measures
- But trade associations will know annual sales of their members; usually happy to provided total activity of their members on an unattributed basis
- N.B. Applies to all EE measures installed by MSs to meet EED not just EEOs

Using Sales Data on EE Products

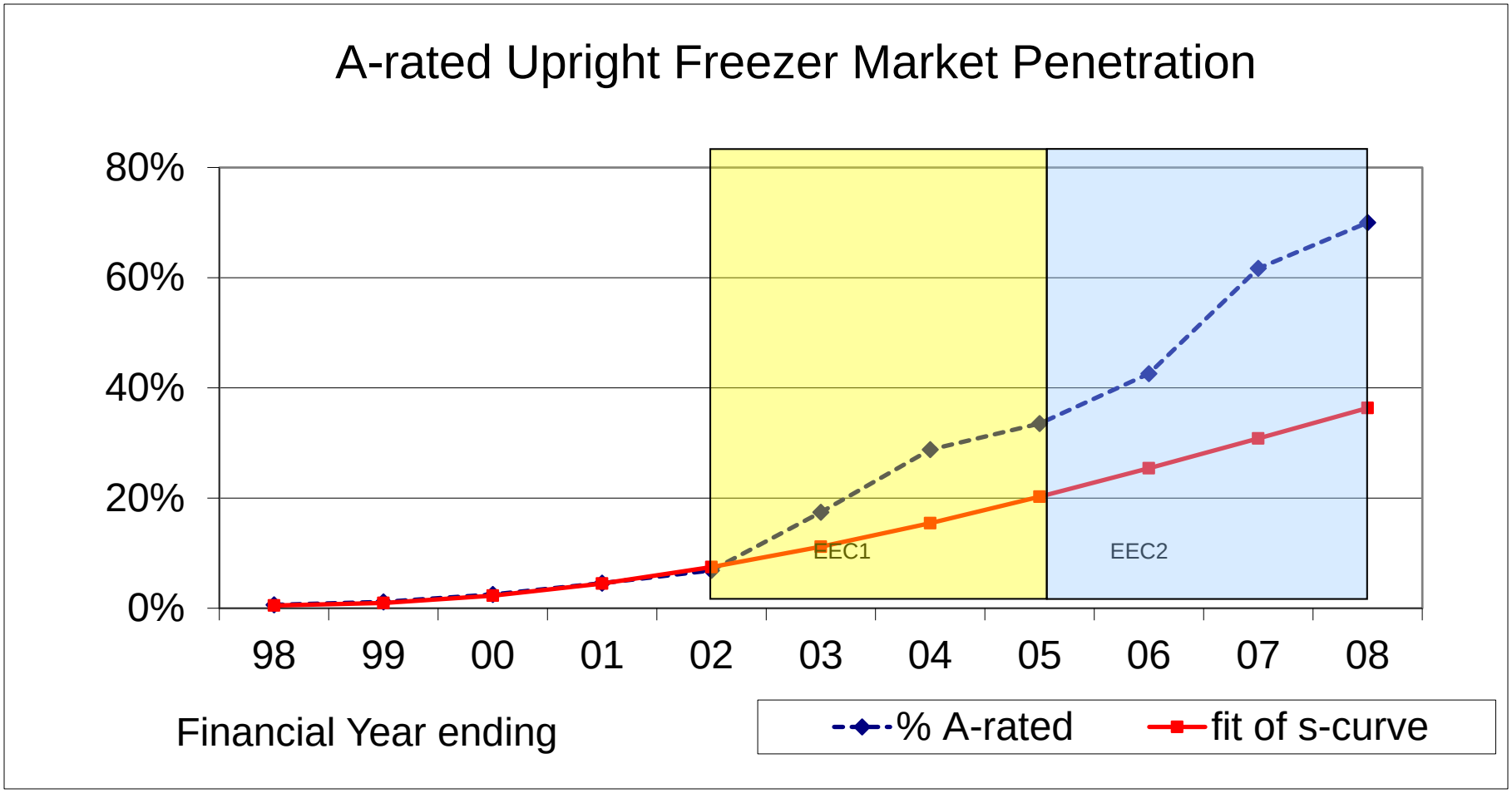
- Innovation follows a classic s-shaped curve in penetration of the innovative product as a % of the total market sales of similar products



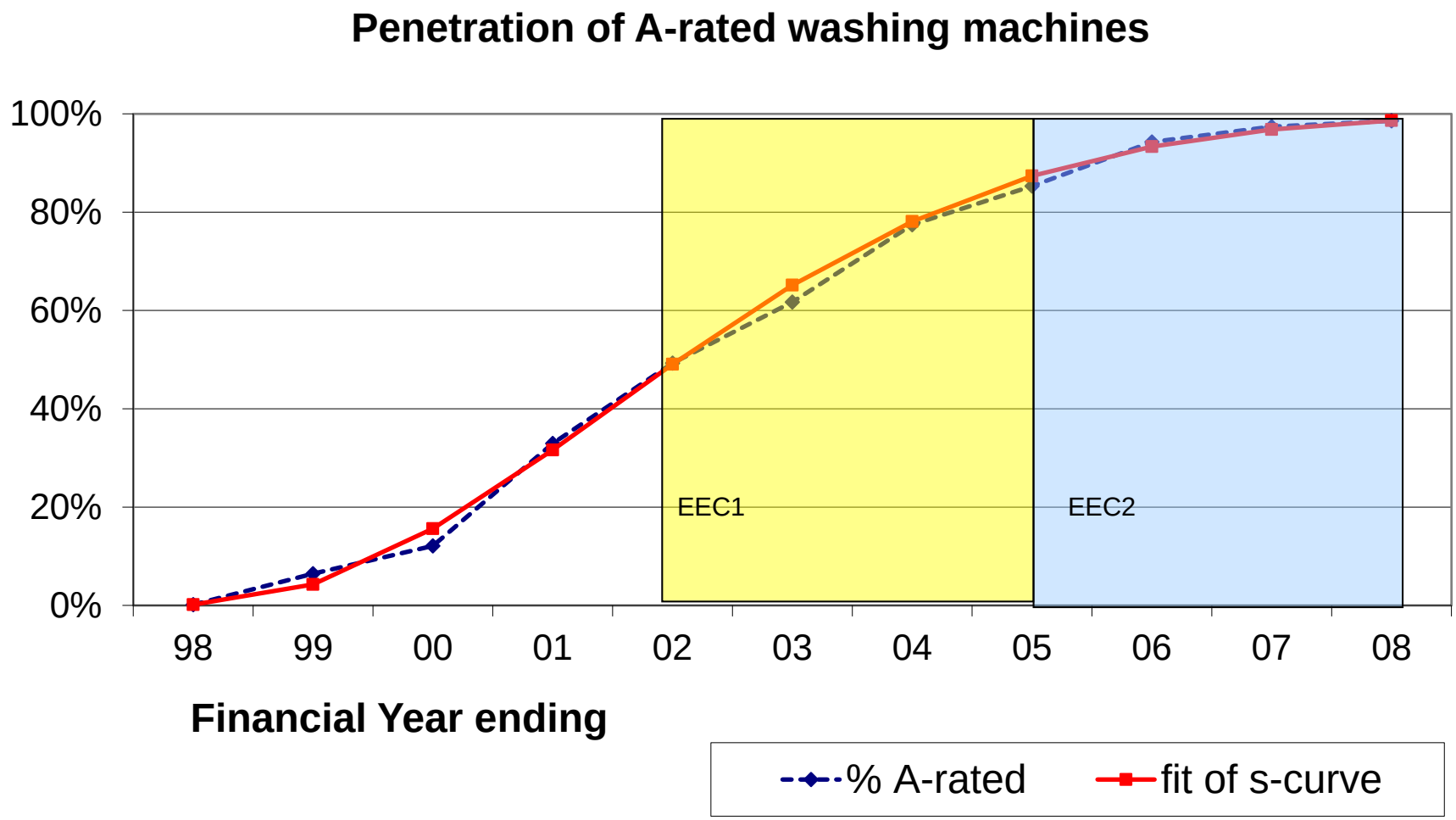
Using Sales Data on EE Products

- EEO should increase the rate of market penetration if it is having an impact
- Needs a source of annual market data for that product showing historic % penetration & total product sales – Government often has market transformation data e.g. GFK
- In UK examples that follow, EEO free riders ranged from 0 to 100%
- Lesson learned – don't support measures which already have significant market penetration and build in "sunset penetration figures" to stop support once significant penetration reached

A-rated Upright Freezer
(Source GFK data)



Washing Machines
(Source GFK data)



Minimising Free Riders by Design

- Common assumption in EEOs for low income households on means/income tested benefits is that they would not have been able to afford the measures and so no free riders
- GB wall insulation in the 1990s was less than 0.1 million/year when over 10 million homes needed it; doing “area blitzes” in conjunction with local authority clearly minimises free riders
- Reduce deemed energy savings for measure over time in line with its impact on the energy performance of the average market product

Final Thoughts on Rebound & Free Riders

- Every thing discussed in these slides applies equally to all EE policies – not just EEOs
- Only direct rebound effect needs to be considered for counting towards EED energy saving target & reducing CO2, other emissions etc.
- UK free riders in 2005-8 EEO were ~20% (mainly insulation)
- Chapters 7 & 8 of "Determining energy savings for Energy Efficiency Obligation schemes" (2012) cover many of these issues in more detail

http://www.eceee.org/RAPeceeeESOreportApril20121.pdf

Beware Double Counting

- "Member States shall ensure that when the impact of policy measures or individual actions overlaps, no double counting of energy savings is made."
- For EEOs, administration system ensures no energy saving measure is claimed by 2 obligated parties
- But if tax breaks and EEOs allowed together (e.g. France and Italy), then a national data base organised and/or held by government can ensure that different policy mechanisms don't claim the same energy savings twice

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power sector. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

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