

Article 7 EEOs & Recent EU and global experience

Energy Community EE Meeting, Vienna

11 March 2016

Eoin Lees

The Regulatory Assistance Project

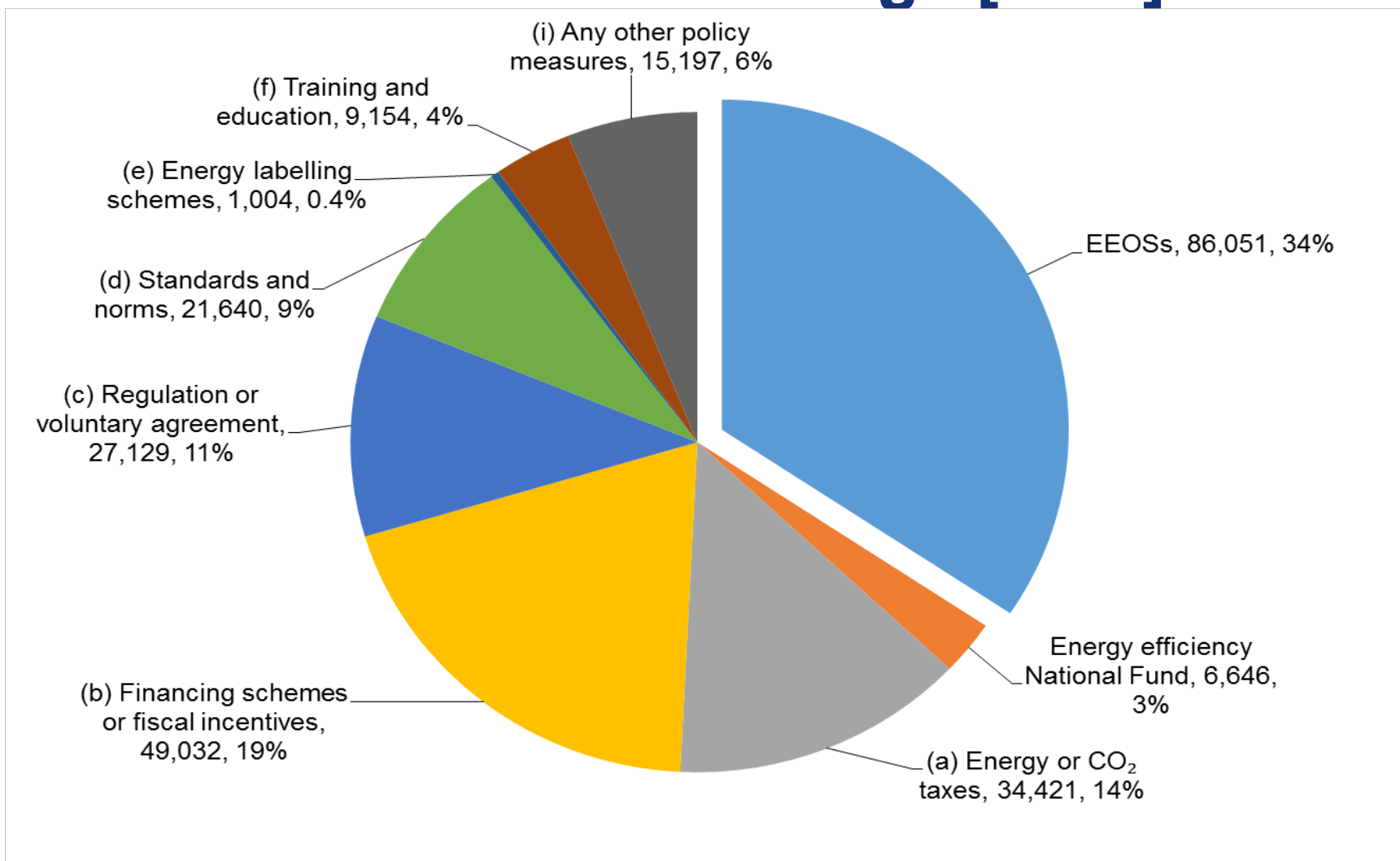
rue de la Science 23
B - 1040 Brussels
Belgium

Phone: +32 2-894-9300
web: www.raponline.org

Contents

- Importance of EU EEOs in meeting the EED target
- The confusing nomenclature EEO, WC, EEPS etc.
- Basic principles
- Recent EU and global experience of EEOs
- Who pays for EEOs?
- Multiple benefits of EEOs
- Perhaps the trickiest concepts for MSs in EED for claiming energy savings – additionality, materiality, rebound effect (not achieving energy savings expected) and free riders
- Complex - *but see RAP's "Toolkit for EEOs" download at <http://www.raponline.org/document/download/id/8029>*

EEOs most important policy instrument in terms of EED savings [ktoe]



The Confusing Nomenclature

EEOs = Energy Efficiency Obligations

WCs = White Certificates (sometimes openly tradable)

ESOs = Energy Supplier Obligations

EEPS = Energy Efficiency Performance Standards

And many other names!

Vary dramatically in delivery detail, but all underpinned by “ some part of an energy company or legal entity has an obligation to save end use energy through energy efficiency measures; backed by penalties or financial incentives”

IEA estimate Globally over \$13 billion/year on EEOs

Why EEOs on Energy Companies?

- EEOs place responsibility for EE on the actors in the sector directly connected to the provision of energy
- Consumers need help to invest – (audits, advice, financing, incentives, etc.) Energy companies can overcome many of the barriers to EE by working directly with consumers or supporting those who do.
- Energy companies can be a stable source of revenues: avoiding ups and downs of annual public funding and providing incentives for efficient delivery.
- Energy companies also have key roles in other parts of an EE policy package –consumer education, smart metering, tariff reform, lowering peak demand & distribution planning.

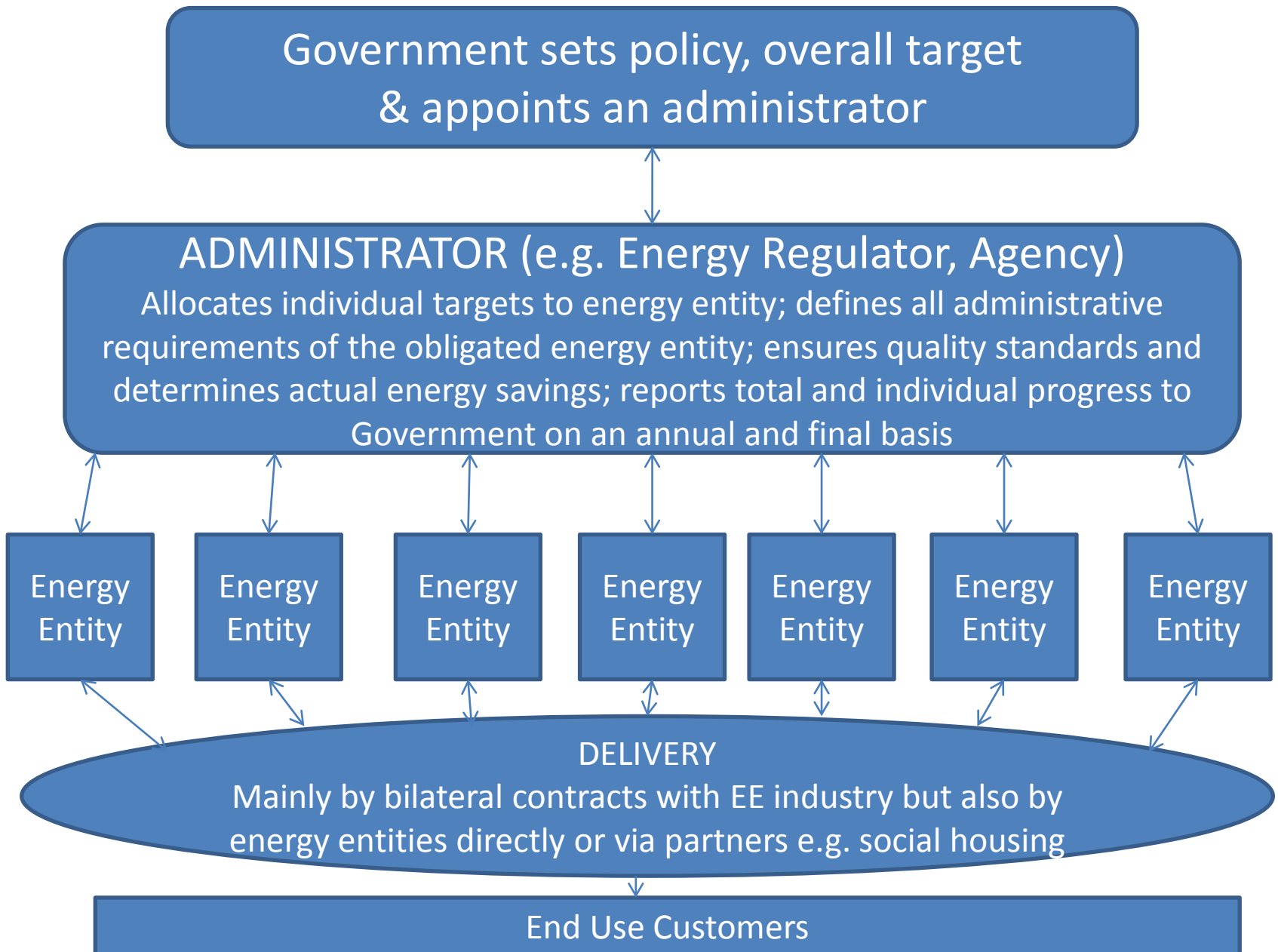
How do EU EE Obligations Work?

- Energy retailer/distributor has obligation to save energy in customers' premises/homes; target related to “volume” of energy supplied/distributed + financial penalties if fail to meet savings target
- Projects with large energy users can “afford” to have energy saving measures monitored for actual savings achieved (common approach for industrial processes)
- For small energy users – need simple approach to keep M&V costs down – use “approved” measures with well established energy saving values (known as deemed or ex ante savings)
- Monitoring and verification is a “measure count” + random audit of submitted claims for energy savings

Range of successful approaches globally

1. Obligation on **regulated distribution utility**
Italy; Denmark; Flanders; most USA states; Ontario
2. Obligation on **competitive energy retailers**
UK, France, Ireland, Austria; 4 Australian states
3. Obligation funded by levy on distribution companies but a) placed on **government agency** *Oregon*
or b) **tendered for a single** (non-energy provider) **entity** *Vermont* (overseen by energy regulator)
4. Obligation on energy company, but delivered through **direct contracting between third parties and end-use consumers** e.g. **Texas**

Typical administrative procedure for EU EEOs



What Costs are Involved?

- Cost of energy efficiency measures (energy company subsidies, end customers, landlords, charities, manufacturers etc.)
- Cost of energy company marketing, sales, reporting, planning etc. (in GB estimate ~16% of their direct costs in 2007; 5% in 2012)
- Auditing & verifying of energy saving projects and if target met (in GB carried out by Ofgem (energy regulator) and <1% of energy supplier costs)
- Government sets target typically every 3 years + research into energy savings (in GB <<Ofgem costs)

How are these Costs Passed Through?

- If obligation on energy retailer in liberalised market, then EEOs are “a cost of business” like other environmental requirements and passed onto end customers; competitive incentive for low delivery costs
- If obligation on regulated part of energy company (e.g. distributor or if retail price is still regulated), then costs are in regulated tariff charged to end customers
- In effect, the “polluter pays” principle applies
- However, multiple energy saving benefits exceed the costs to consumers (typically 1 to 4% of energy bills)

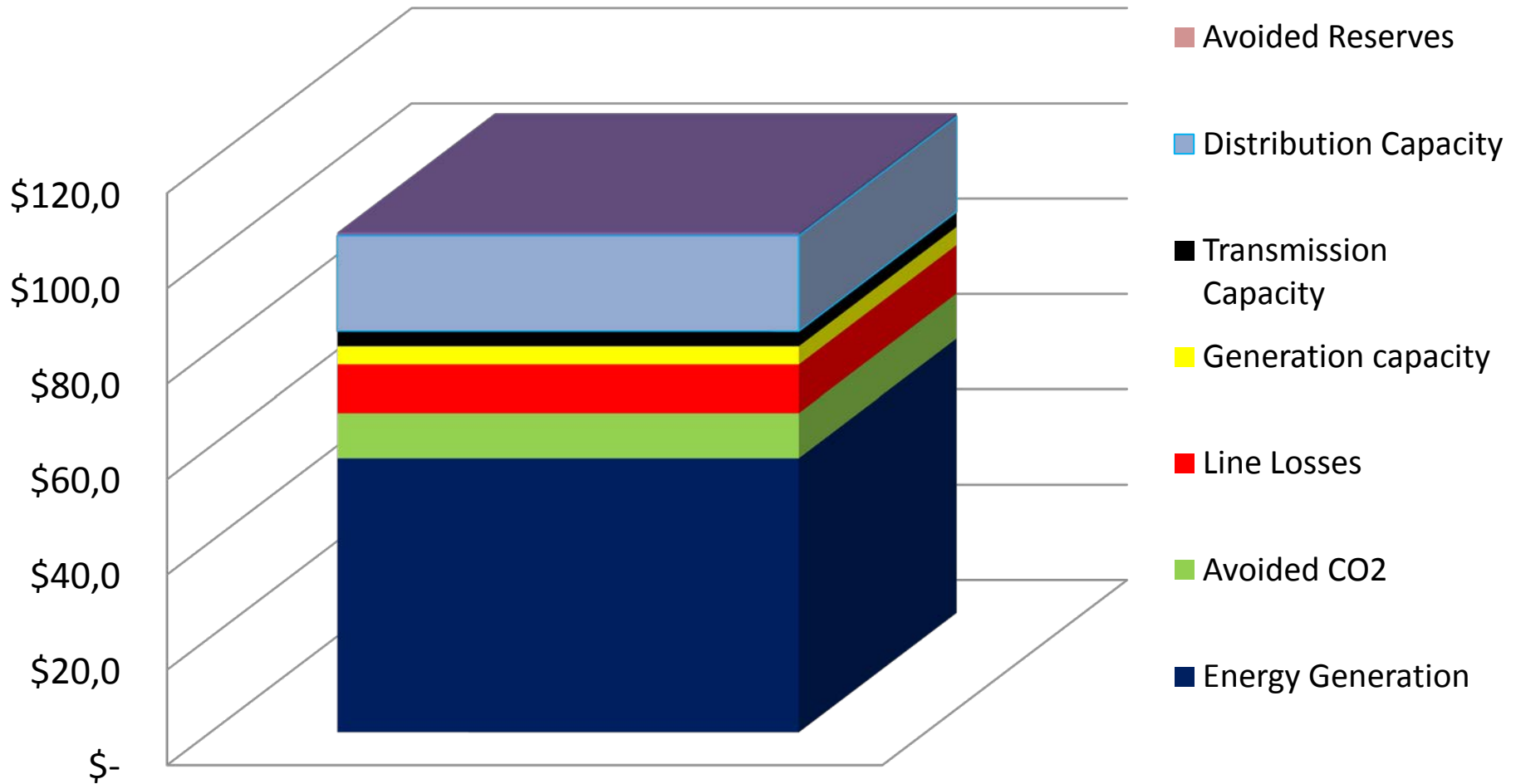
How are the EEOs delivered?

- Mainly by bilateral contracts between obligated energy company and an energy efficiency market actor e.g. insulation company, retailer of appliances, manufacturers, HVAC installers etc.
- In Italian & French White Certificate schemes, accredited parties (not just the obliged energy companies) can generate WCs and these can be subsequently traded
- Only in Italy has there been significant generation & trading of WCs generated by non obligated parties; even in Italy bilateral contracts have dominated
- Common for obligated parties to be able to trade WCs between themselves

Globally, EEOs are highly cost effective

- **USA state EEOs** save electricity for 3-4 US cents/kWh compared to 6-9 cents per kWh for generation cost alone
- **EU experience:** saving residential electricity or gas, costs less than 25% of the cost of that fuel to the consumer; costs of EE measures falls with economies of scale
- **PLUS: EE can save** on transmission and distribution upgrades, lower reserve margins and line losses, has no emissions, improves reliability, lowers peak loads
- **“Merit Order Effect”:** In competitive power markets, lower demand also **lowers clearing prices for all consumers** – not just consumers who save energy
- In some US cases, these non end-use benefits can justify the entire cost of the EE program

Multiple benefits expressed as levelised USD/MWh for Vermont EEO



Multiple Benefits of Vermont EEO

The levelised EEO cost on Vermont bills is USD 39/MWh

Benefit to energy provision chain	Results USD/MWh	Benefit all customers
Avoided Generation Energy Costs	57.5	No
Avoided Existing Environmental Regulations Costs (not CO ₂)	small	Yes
Avoided CO ₂ emission costs at \$20 (~€15) per ton	9.4	Yes
Avoided Line Losses	10.2	Yes
Avoided Generation Capacity Costs	3.8	Yes
Avoided Transmission Capacity Costs	3.2	Yes
Avoided Distribution Capacity Costs	20.0	Yes
Minimising Reserve Requirements	0.7	Yes
Reduced Cost of Renewable Resource Obligation	0 (not % target)	Yes
Reduced credit and collection costs	Not studied	Yes
Improved corporate relations	Not studied	
Sub-total of all energy provider multiple benefits	>104.8	45%

Summary of Multiple EEO benefits

- Most significant are avoided energy generation costs, distribution upgrade deferment and line losses (typically summing to around 80% of total electricity provision chain benefits)
- Not included in Vermont analysis are Health benefits; avoided marginal costs of meeting % renewable generation targets; price reduction in wholesale electricity markets; for low income customers lower energy costs reduces credit and collection costs
- See IEA report “Capturing the Multiple Benefits of Energy Efficiency” 2014

[https://www.iea.org/bookshop/475-Capturing the Multiple Benefits of Energy Efficiency](https://www.iea.org/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency)

- In liberalised markets, benefits still exist but are separated in the chain
- Horizon 2020 recently launched a study to quantify such benefits from EU EE policies

<http://wupperinst.org/en/info/details/wi/a/s/ad/2911/>

EED requirements on energy savings for all EE policies

- **Additionality** (above EU minimum requirements)
- **Materiality** (“meaningful” involvement in project)
- **Free riders**(those that would have done the EE investment in the absence of the EEO)
- Installation does **not realise the expected energy savings**
- **Rebound effect**
 - Direct - increased amenity/comfort
 - Macroeconomic

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 for the part above the EU minimum.

Additionality in EED (Ecodesign & EPBD)

- Simplest is Ecodesign 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 until the next MS's building regulations
- 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, UK*)
- 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 (see RAP Toolkit for EEOs for more details)

Why energy savings do not always materialise: economic, technical & discounting Free Riders

- Rebound effect
 - Direct - increased amenity/comfort
 - Macroeconomic
- EE installation does not realise the expected energy savings
- Free riders:
 - How to establish baselines
 - Minimising free riders by EEO design
 - *See RAP Toolkit for EEOs for more details*

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
- 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

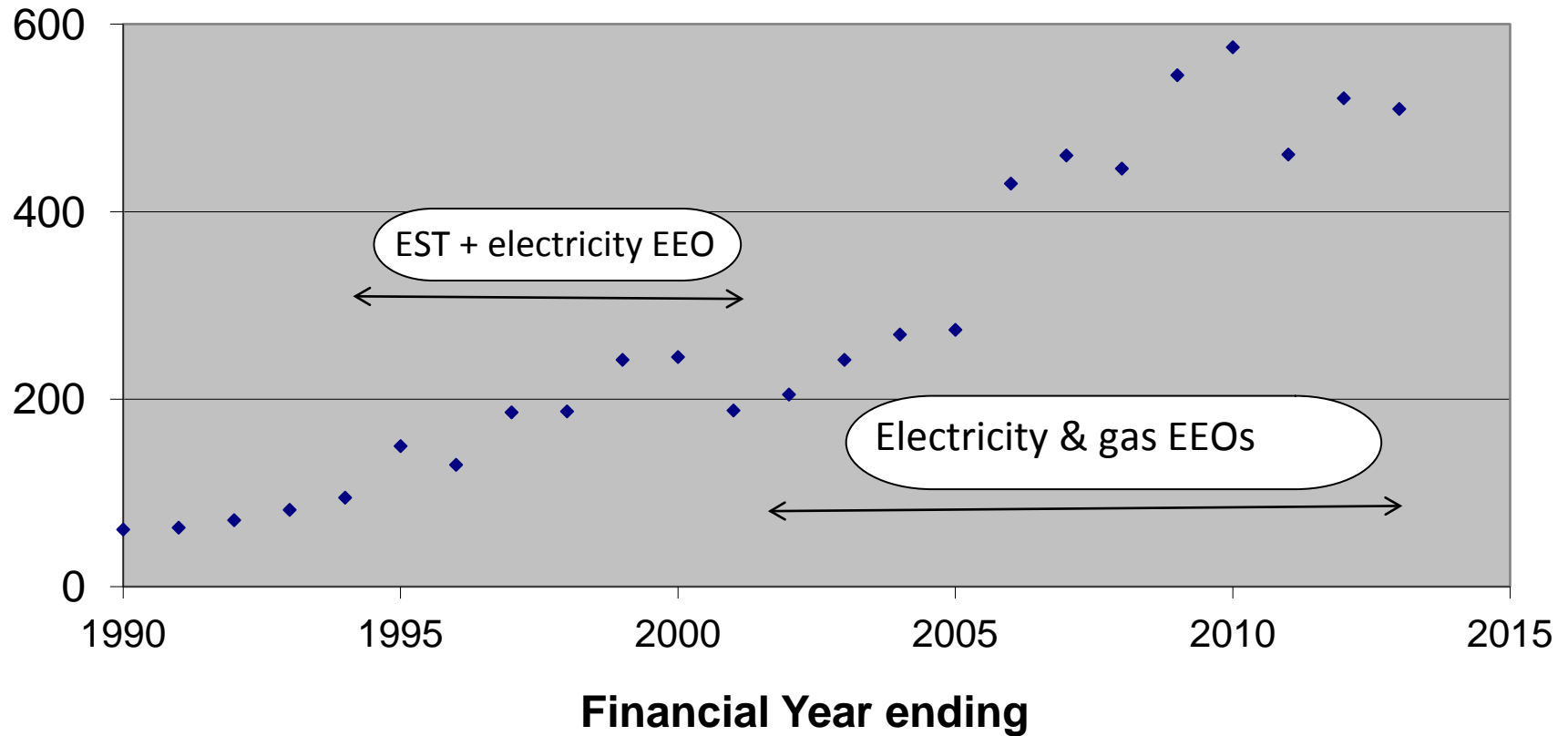
- EE measures only achieve expected energy savings if installed correctly and used optimally
- EED stresses quality and M&V of EE installations
- How meet? - only use accredited installers; sample their workmanship as part of the M&V of the EEO; ensure end users understand how to use EE measure
- Technical factors include access problems & poor installation
- Covered in EED by Annex V.2(g)
- Best practice is to lower the deemed energy savings for this measure in the light of experience

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 - see *RAP Toolkit for EEOs for more details*

Importance of GB EEOs for Insulation

Thousands of Cavity Wall Installations per year



How do You Establish Baselines?

- Government or energy agency do not always know the baselines for their key EE measures
- But trade associations will know annual sales of their members; usually happy to provide 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

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 ~ 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/RAPeceeESOreportApril20121.pdf>

- *Also chapter 8 in “Toolkit for Energy efficiency Obligations”*

About the Regulatory Assistance Project (RAP)

RAP is a global NGO providing technical and policy assistance to government officials and agency staff on energy and environmental issues. **RAP senior staff are former regulators, government officials or senior energy policy advisors**, and RAP's work is **funded exclusively by foundations and government agencies**.

RAP has worked in more than 20 nations and 50 provinces and states. RAP's European offices are headquartered in Brussels, with a small office in Berlin and senior associates in UK and Poland.