How to calculate energy savings and costs of energy saving obligations in a harmonized way?

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Motivation:

- DIRECTIVE 2012/27/EU Of the European Parliament and of the council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC
  - One of the core measures :

Article 7-Energy efficiency obligation schemes; Each Member State shall set up an energy efficiency obligation scheme (1,5 % annual energy saving)

- Fundamental differences on design features and calculation methods between implementing countries (sectors, target definition, measures, compliance period etc…)

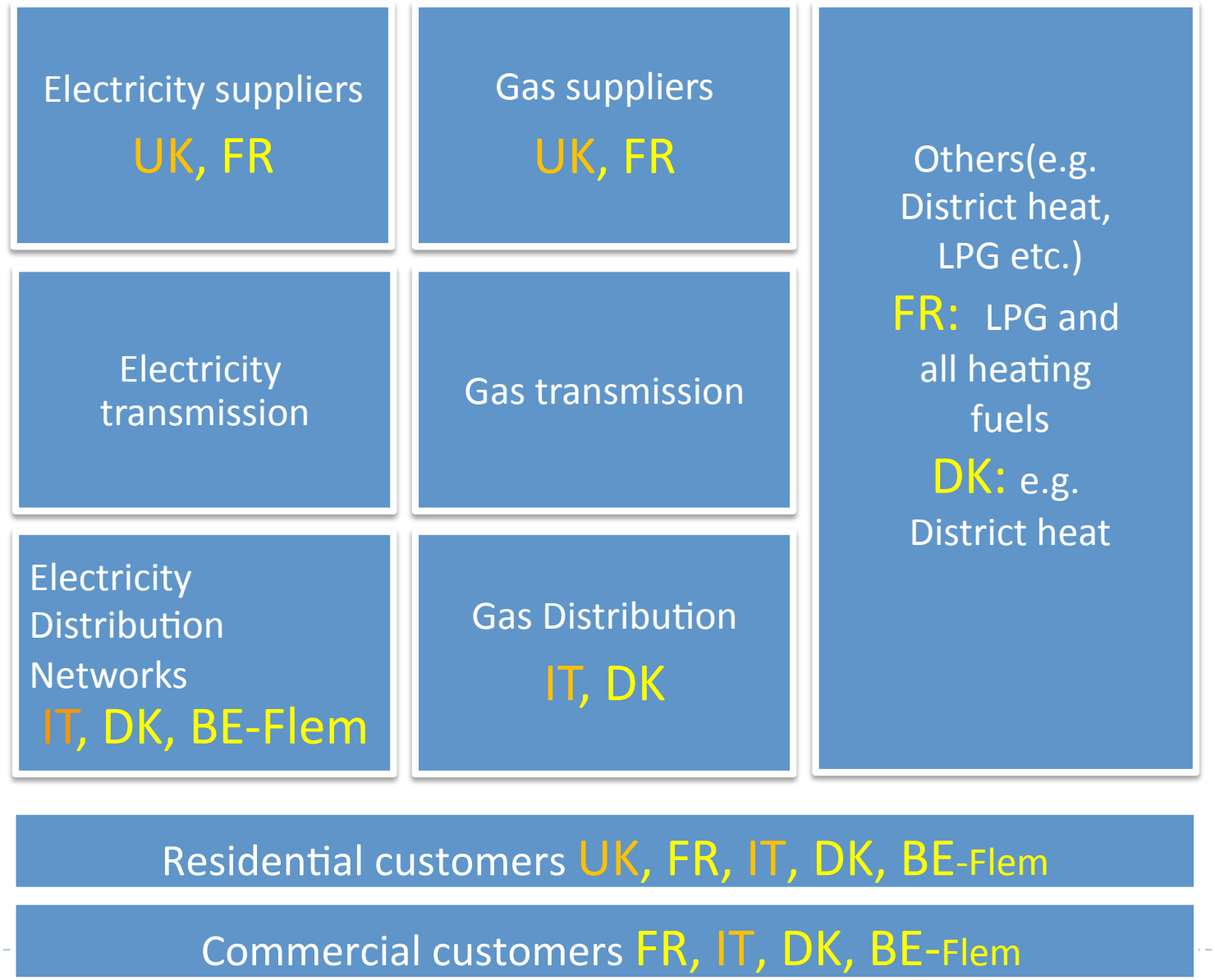
Core objectives

- Which differences are there between implemented schemes

(considering the UK-EEC2 and IT- TEE)

- How to calculate energy savings and specific costs of saving in a harmonized way?

Energy Saving Obligations in EU countries: obligated utilities and sector coverage by implementing country



(General) Characteristics of ESOs for utilities in UK-EEC2 and IT-TEE

	UK-EEC2 (1. April 2005 – 31. March 2008)	IT-TEE (January 2005 - December 2010)
Main delivery agents	Energy suppliers	ESCOs (Energy Service Companies)
Trading/actors	Only bilateral, between suppliers	Yes / white certificate market
Target set by	Regulator (Ofgem- Office of Gas and Electricity Markets)	Government
Administrator	Regulator (Ofgem)	Regulator (AEEG- Authority for electricity and gas)
Penalty	A fine up to 10% of the suppliers turnover (related to size of miss)	not explicitly defined (related to non -compliance)
Dominant measures in terms of saving	Cavity wall insulation (43%), HH Appliances, Heat boilers	Lighting (65%)

Characteristics of ESOs for utilities in UK-EEC2 and IT-TEE (target and calculation of saving)

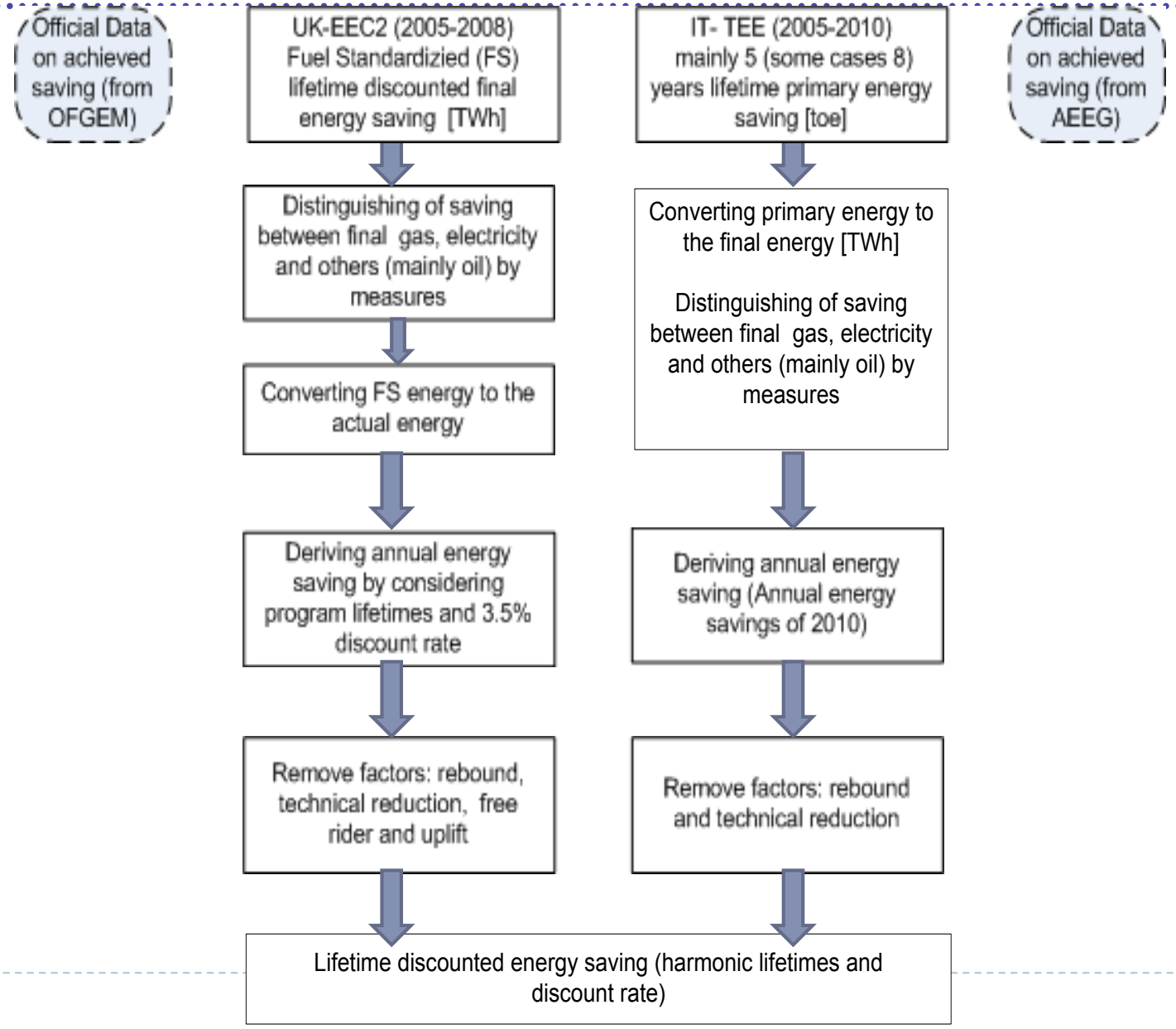
	UK-EEC2 (1. April 2005 – 31. March 2008)	IT-TEE (Januar 2005 - Dezember 2010)
Measurement unit of saving	Final energy 130,2 TWh („fuel standardised energy“)	Primary energy 11,1 Mtoe
Compliance period	3 Years	1 year (multi annual target period)
Target achievement	180 TWh	8 Mtoe
Current target	01.04. 2008- 31.12.2012: 293 MtCO2	Cumulative saving (2005-2012) 22, Mtoe
Lifetime of saving	Differ by measures (discounted physical lifetime)	5 years (8 years for building related measures)
Discount rate	3.5 %	no
Rebound / Additionality-baseline/ Free riders	Rebound: no- for the certification of saving (yes- for the ex-post evaluation of CO2 saving) Baseline/Additionality: yes free riders: no for the certification (yes for the ex-post evaluation of CO2 saving)	Rebound: no Baseline/Additionality: yes Free riders: no

Deriving net energy saving-Important parameters

Definition of saving:"Lifetime discounted final energy"

- Deriving of final energy (by energy sources; electricity, gas and others… *also important for calculation of costs*)
- Baseline/Additionality (inc. Free riders)
- Rebound und technical reduction factors
- Removing uplift factors
- Considering physical lifetime of measures and discount rate (3.5%)

Deriving net "annual energy saving"



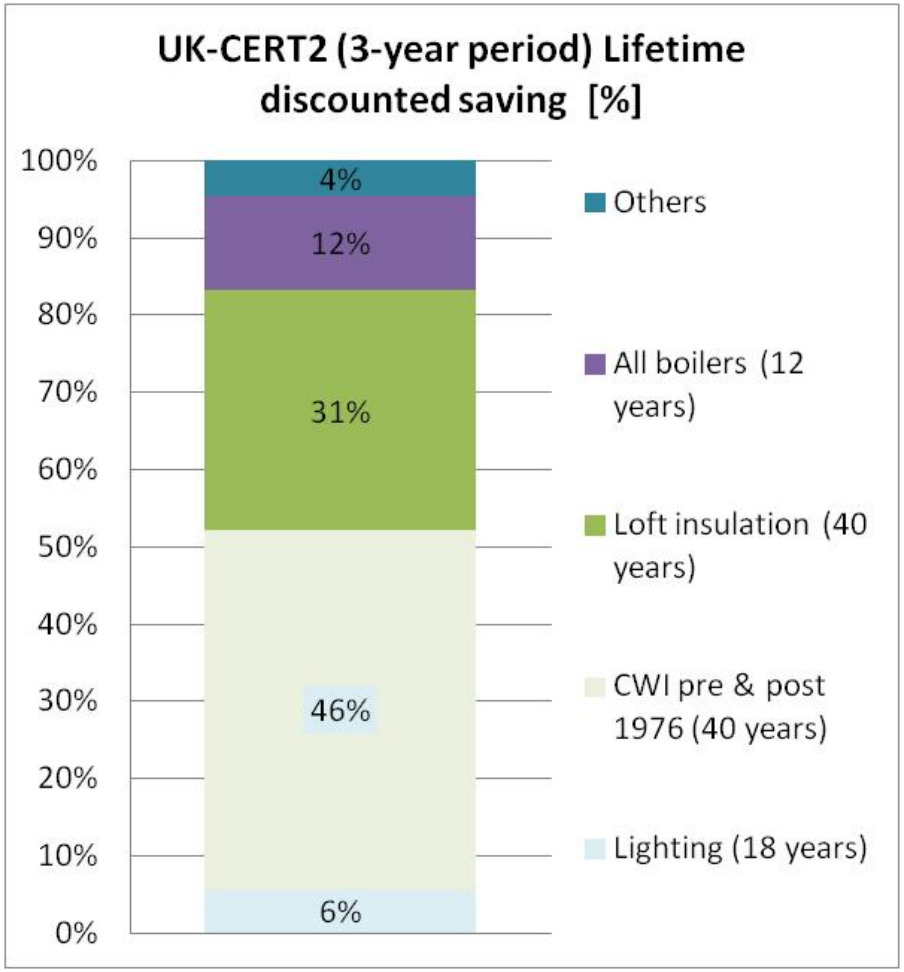
Results:
Annual (first year saving) net saving

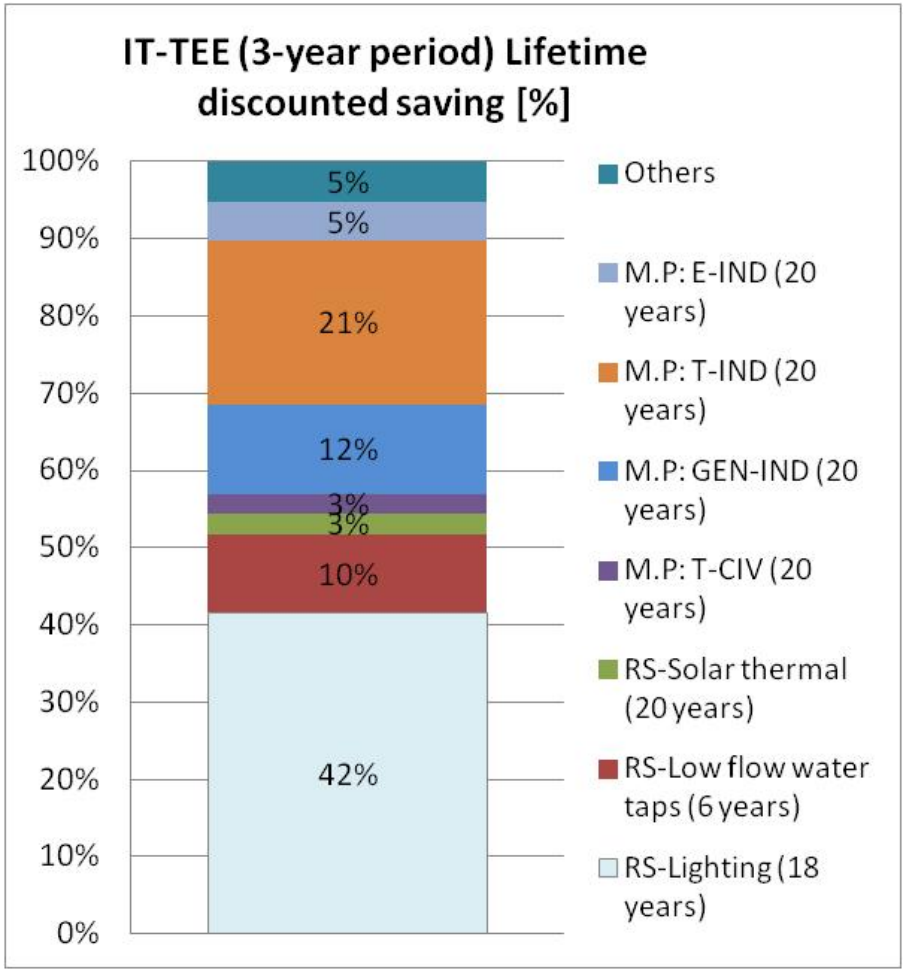
	Net annual electricity saving GWh/a	Net annual gas saving GWh/a	Net annual other fossil energy saving GWh/a	Total saving GWh/a (analysed period)	Total saving GWh/a (one year average)
UK-EEC2 (2005-2008)	1 631	6 338	473	8 442	2 814
IT-TEE (2005-2010)	9 869	7 542	1882	19 293	3 215

Some indicators on energy saving in both assessed schemes

	Population in 1000 (2009)	Annual net saving (one year) [GWh/yr]	Average yearly final energy consumption (2005-2008) [GWh]	Total annual saving (one year) per capita [kWh/cap]	Annual (one year) saving ratio in total final consumption [%]
UK-EEC2 (2005-2008)	61,792	2,814	1,798,425	46	0.16%
IT-TEE (2005-2010)	60,340	3,215	1,577,921	53	0.20%

Lifetime discounted saving (3- year period)



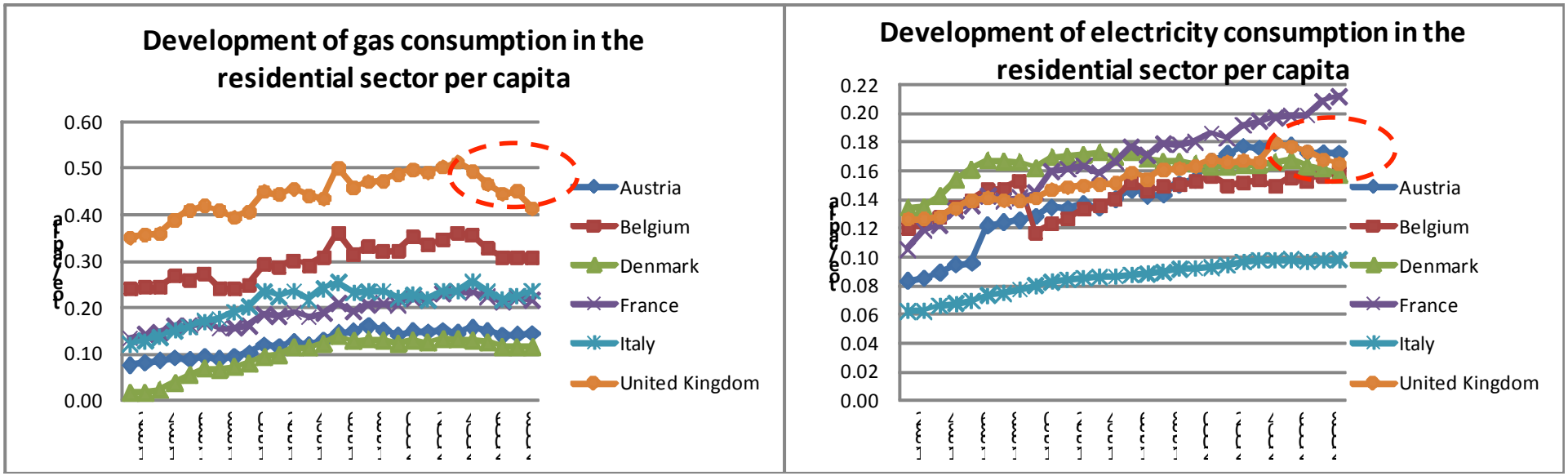


Lifetime discounted (3,5%) saving (2005-2008): 144 TWh

Lifetime discounted saving(2005-2010): 221 TWh (6 year period)

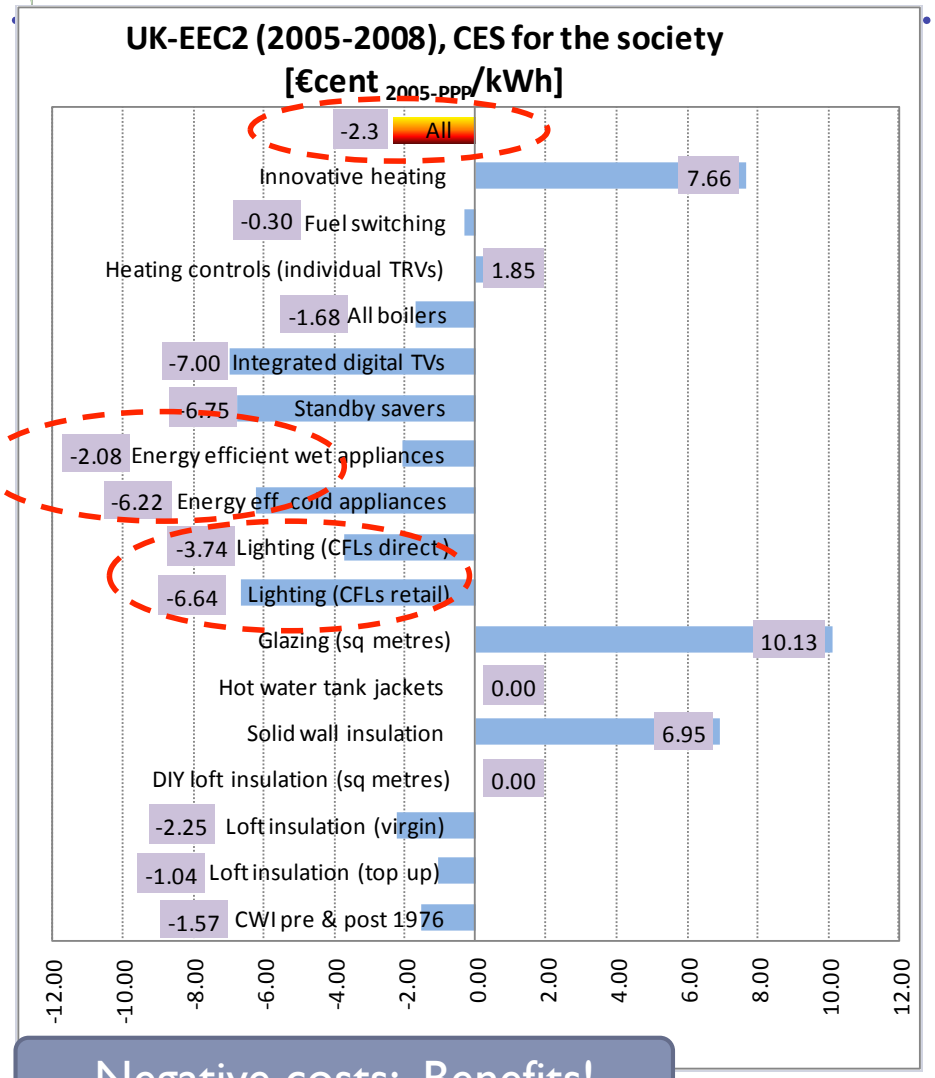
3-year period: 110,5 TWh

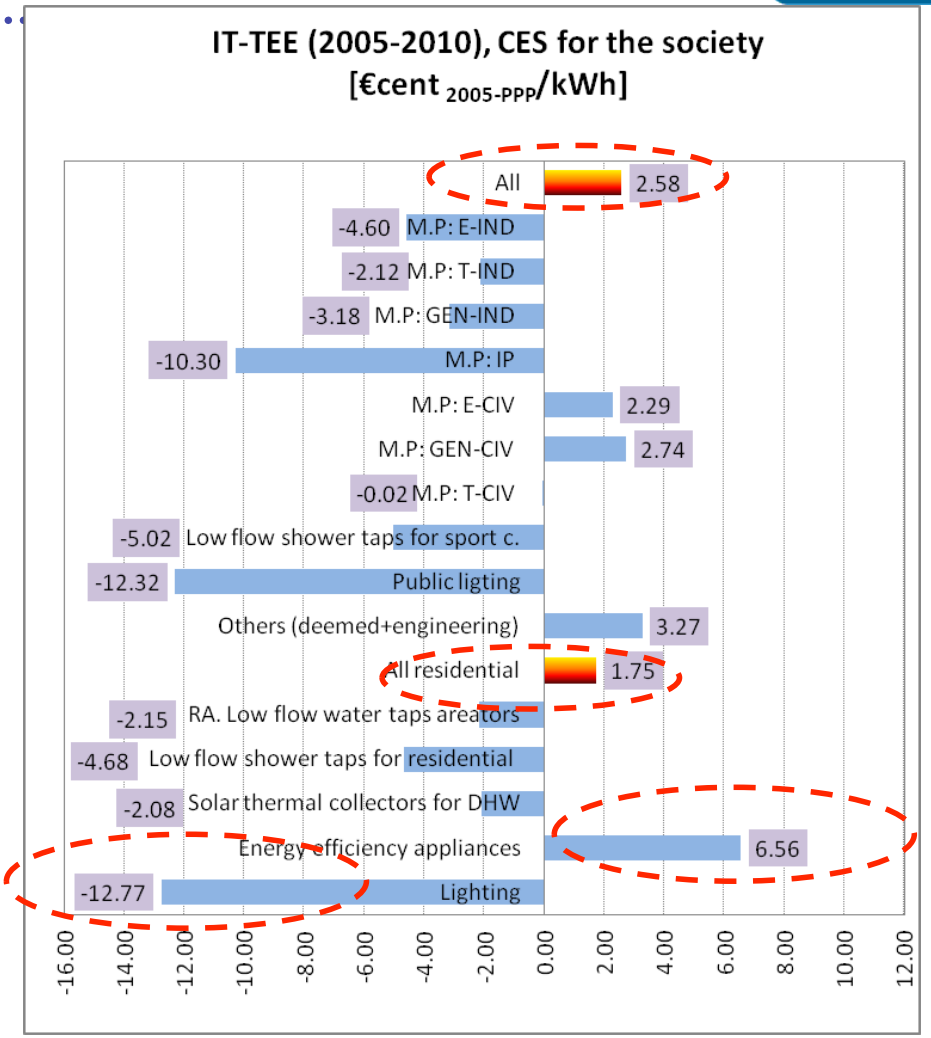
Development of energy indicators in the residential sector („per capita“)



Source of data : Odyssee-Datenbank

Specific cost of saving for the whole society





Negative costs: Benefits!

Considered all investment costs (subsidies, costs for utilities, costs for the consumers as well as third parties) $I_0 = I_{Consumers} + I_{Utility} + I_{Government} + I_{Third_Party}$

Conclusions

- A quantitative cross country analysis of ESO schemes in a harmonised way is possible
- A consistent methodology makes the comparison possible and allows to see where the differences are (e.g. significant cost differences for common measures)

Insights on difficulties and bottlenecks

- Quality of data in terms of savings and costs
- Country specific consideration of side effects (especially “rebound” and “free riders”)
- definition of “baseline” and “additionality” and additional costs (consistency is recommendable)
- Country specific information on fraction of reduced fuel specific final energy (electricity, gas etc.)



Thank you for your attention

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