



**RAP**

Energy solutions  
for a changing world

# **BMF Workshop on Energy Efficiency and the Heat Market**

## **Market-based Incentive Measures – Lessons from Abroad**

**Eoin Lees**  
**Senior Advisor RAP Europe**

**The Regulatory Assistance Project**

48 Rue de Stassart  
Building C, BE-1050  
Brussels, Belgium

Phone: +32 2-894-9300  
web: [www.raponline.org](http://www.raponline.org)

# Contents -1

- Cover efficient space & water heating (buildings)
- Not cover loan schemes – KfW previous speaker; “Pay As You Save” variations in USA and UK (Green Deal)
- International experience of energy efficiency obligations (EEOs) on energy providers
- Minimum performance requirements on boilers
- Renewable Heat Incentive & Energy Efficiency Feed-in Tariffs (FiTs)

# Contents - EEOs

- Why energy companies/providers can help overcome some of the barriers to energy efficiency (EE)?
- Summary of key principles for Energy Efficiency Obligations (EEOs) on energy companies (aka White Certificate Schemes)
- Snapshot of EU & recent developments
- Global lessons learned

# White Certificates/EE Obligations

- Growing global interest—RAP estimate >\$12billion/year
- North America (24 USA States >70% electricity load), South America (Brazil, Chile, Uruguay), Australia (3 largest states), South Africa, China (industrial EEO) and 7 MSs in EU
- Started in vertically integrated electricity utilities, expanded to gas utilities,
- Work in liberalised markets; now on oil & LPG companies providing heating fuels & district heating
- EU EED proposes as a key policy mechanism – impact assessment says that ~ half of EE savings to 2020 could come from this delivery route

# Why EEOs on Energy Providers?

- 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 providers can overcome barriers, work directly with consumers, or support those who do.
- Energy providers can be a stable source of revenues: avoiding ups and downs of annual public funding and providing incentives for efficient delivery.
- Energy providers also have key roles in other parts of an EE policy package – codes and standards, consumer education, smart metering and tariff reform.

# EE Obligations/White Certificates

- Renewable Energy/CO2 Certificates exist because of Government intervention in the market place
- White Certificates are no different – need an energy efficiency obligation
- All significant EU activities on energy efficiency with energy providers & small energy users are linked to an obligation on some part of the energy company to save energy in their customers premises/homes
- Open trading of White Certificates can allow for any party (not just obligated energy provider) to obtain (verified) certificate of energy saving which can be traded on the open market

# 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
- 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

# What Costs are Involved & Who Pays?

- Cost of energy efficiency measures (energy provider subsidies, end customers, landlords, charities, manufacturers etc.)
- Cost of energy provider marketing, sales, reporting, planning etc. (in GB estimate ~18% of their direct costs)
- 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 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
- 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, energy saving benefits alone far exceed the costs to consumers (typically 1 to 5% of energy bills)

# How are they delivered?

- Mainly by bilateral contracts between obligated energy provider and an energy efficiency market actor e.g. insulation company, retailer of appliances, manufacturers, heating installers
- However, in GB energy companies are establishing heating companies, insulation subsidiaries & microgen (RE); similar developments in Italy
- In Italian & French White Certificate schemes, accredited parties (not just the obliged energy companies) can earn WCs and these can be subsequently traded
- Only in Italy has there been significant generation & trading of WCs generated by non obligated parties

# EEOs in the EU (2011)

Country	Obligated Company	Eligible Customers	Administrator
Belgium - Flanders	electricity distributors	Residential & non energy intensive industry and service	Flemish Government
France	Energy retailers + importers of road transport fuels	All (including transport) except EU ETS	Government
Italy	electricity & gas distributors	All including transport	Regulator (AEEG)
GB	electricity & gas retailers	Residential only	Regulator (Ofgem)
Denmark	electricity, gas, oil & heat distributors	All except transport	Danish Energy Authority

# EEOs in the EU (2011)

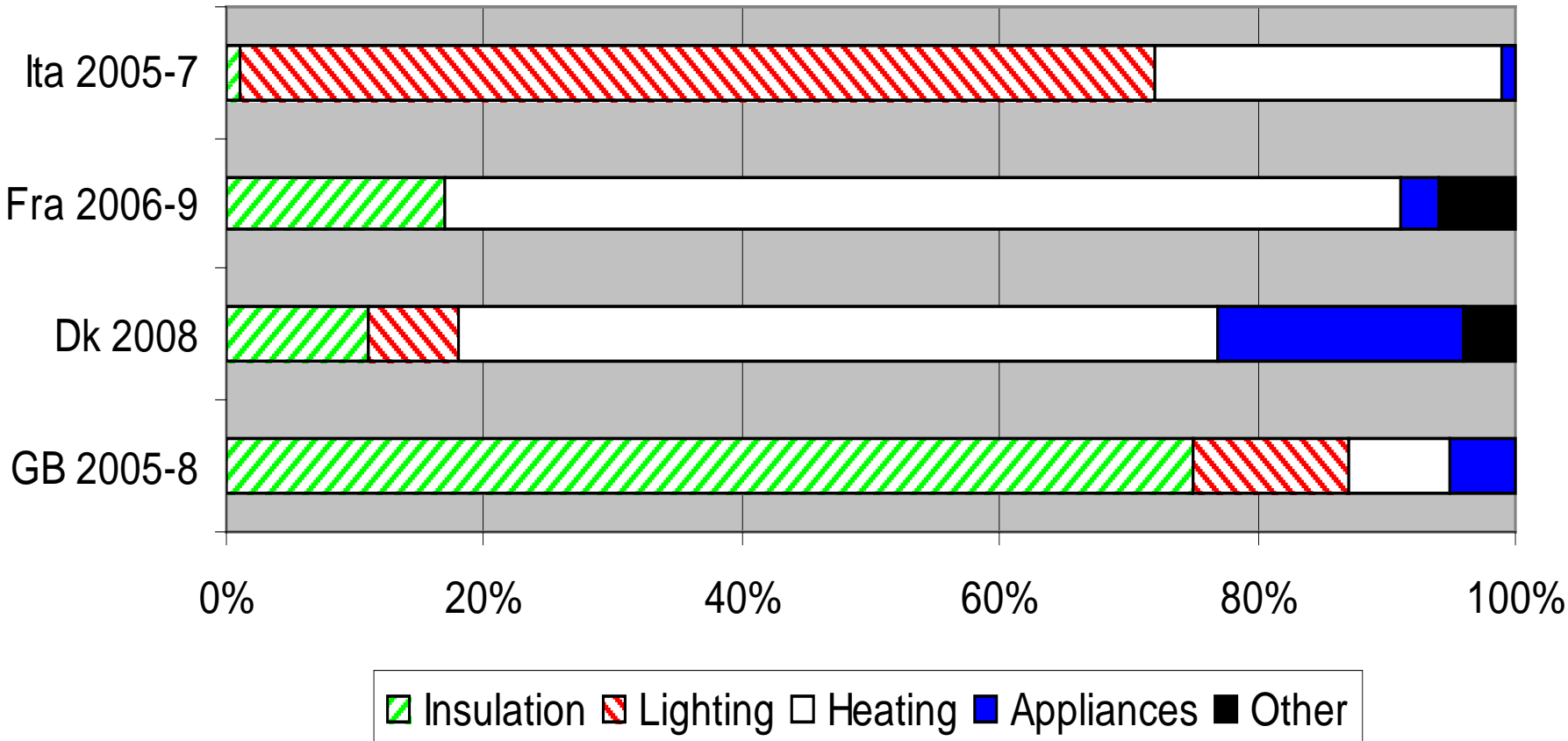
Country	Nature of saving target	Current size of target	Estimated annual spend by companies €M {€/person}
Belgium – Flanders	1 <sup>st</sup> year primary energy	0.6 TWh annual	60 {14}
France	lifetime delivered energy	345 TWh over 3 years to end 2013	340 {5}
Italy	cumulative 5 year primary energy	5.3 Mtoe in 2011	530 {9}
GB	lifetime CO2	293 MtCO2 in 4.75 years to end 2012	1440 {24}
Denmark	1 <sup>st</sup> year delivered energy	6.1 PJ annual	100 {18}

# Most Activity is in Residential Sector

<b>Country</b>	<b>Period</b>	<b>% energy savings from residential sector</b>
Belgium - Flanders	2008	58% (mandated)
Denmark	2008	42%
France	2006-9	87%
Italy	2005-8	83%
UK	2005-8	100% (mandated)

# EU Residential Energy Savings by End-use

## Residential Energy Savings by End-use



# Latest EU Countries to Adopt EEOs

- Ireland introduced EEO this year on all energy retailers (stationary end uses) & importers of road transport fuels;
- Polish parliament passed legislation to introduce WC on energy retailers; covers electricity, natural gas and heat providers. Expected impact on energy prices in the region of 1.5 – 2%.
- Also alternatives where energy distributors are levied to raise funds for EE; administered by energy regulator (Portugal); administered by regional Governments in Spain

# Typical Annual Installations in EEOs

Country and period	EE Measure	No of measures/year
France (2006-9)	Roof insulation	950,000
	Efficient boilers	110,000
Italy (2005-7)	CFLs	7,000,000
	Low flow showerheads	3,150,000
GB (2005-8)	Wall insulation	500,000
	Efficient cold appliances	1,250,000



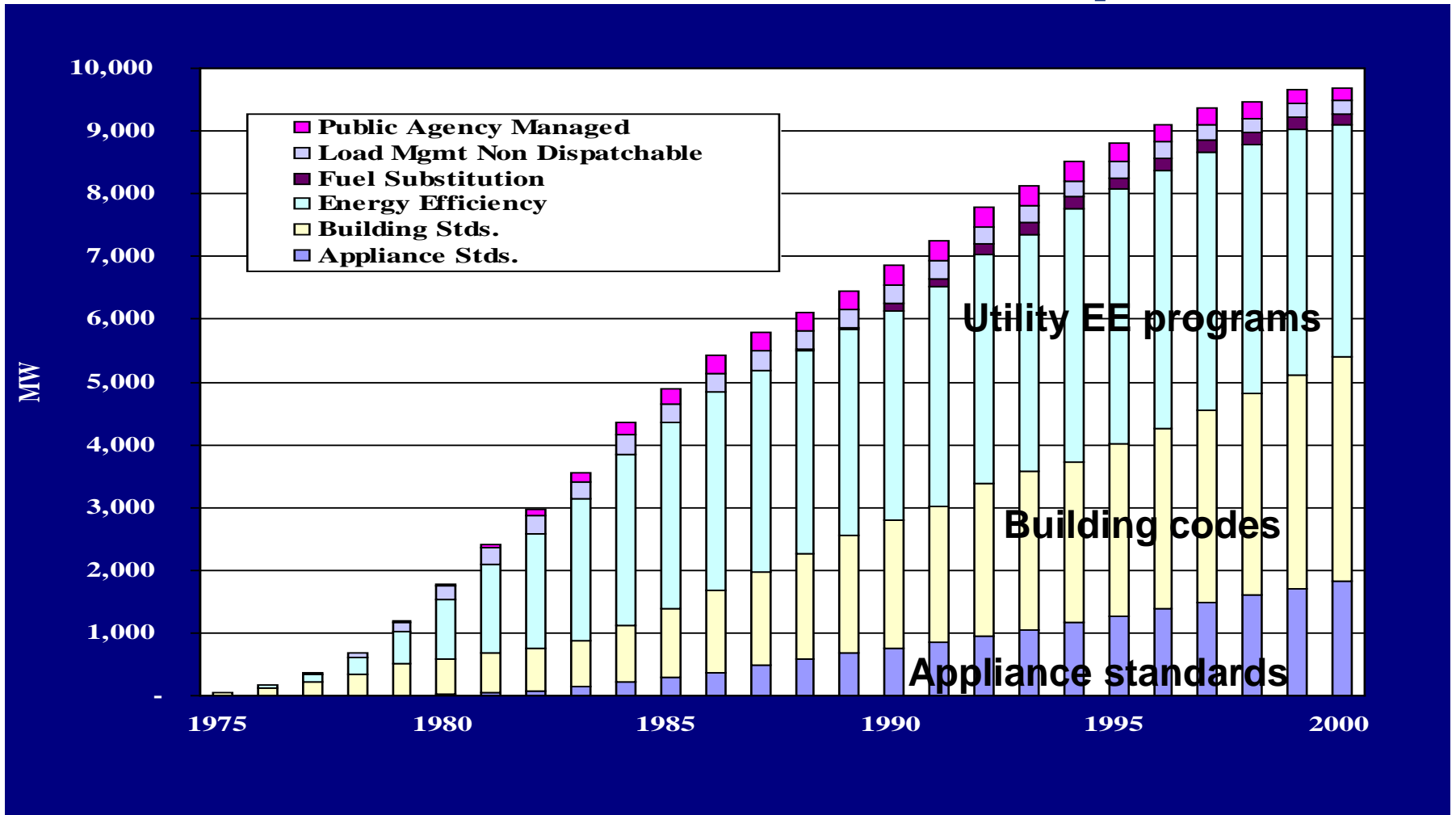
# Observations on EEOs in the EU

- Different targets, different end use sectors covered, different obliged actors - reflect local status of energy market, EE history of the energy providers, climate, energy saving opportunities, culture etc.
- Goals set fairly low, and been achieved at costs below policy makers' expectations; energy providers now spending ~€2.5 billion/year; in ~50 operational years experience of EU EEOs, no energy company failed to meet it's overall energy saving target
- Function in both liberalised energy markets and also where they target monopolistic segments

# 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 USA cases, these non end-use benefits can justify the entire cost of the EE program

# EEOs are in addition to other policies



California energy efficiency investments lowered demand by 25% over 25 years

# Range of successful approaches globally

1. Obligation on **regulated distribution utility**  
*Italy; Denmark; Flanders; most USA states; Ontario*
2. Obligation on **competitive retail suppliers**  
*Great Britain, France, Ireland; 3 Australian states*
3. Obligation funded by levy on distribution companies but placed on **government agency** *Oregon*
4. Obligation funded by levy on distribution companies but **tendered for a single** (non-energy provider) **entity** *Vermont* or **open to all market** actors *Portugal*
5. **Performance Contracting** with 3<sup>rd</sup> parties (other than the obligated entities) *Texas, New Jersey*

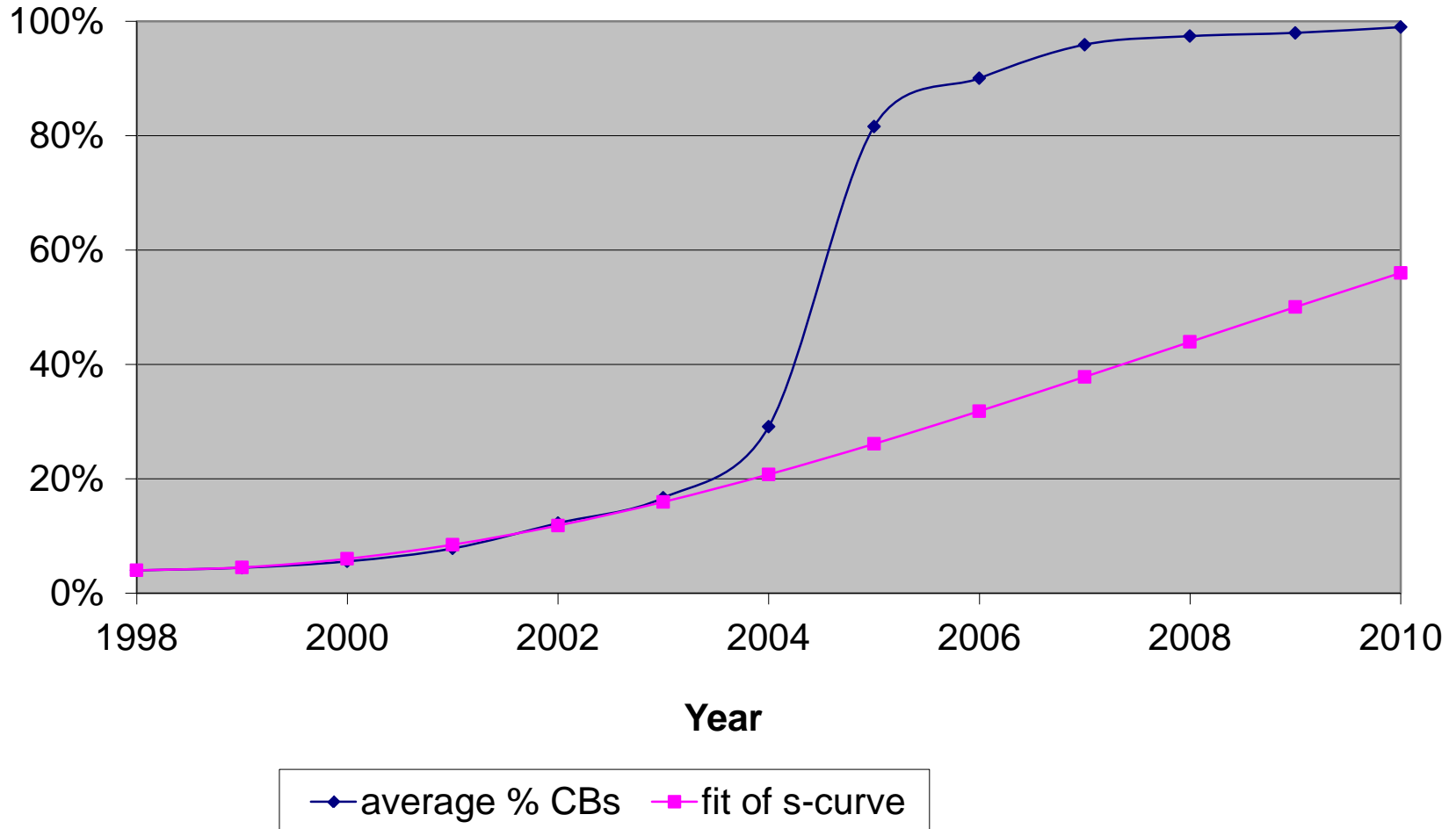
# Key principles for successful EEOs

- A clear obligation backed by penalties for failure/incentives
- Sustained funding to encourage EE industry and energy providers
- Rigorous monitoring and verification system in place before EEO begins
- Quality controls on EE measures & randomly checked
- EEO design should suit local culture & end use sector(s) targeted and be integral part of the approach to meet national EE goals; need harmonised methodology of **Determining Energy Savings** <http://www.raponline.org>
- EEOs work interactively with other policies (building codes, energy labeling & standards, etc.) to drive incremental energy savings over time

# GB example of EEOs & boiler regulation

- EE gas boilers (condensing boilers) had chequered history in GB; early products (1980s) were poor – gave rise to bad “urban myths”
- Various Government cash back promotions were helpful, but by end 1999 only 4% of boilers sold were condensing
- From 2000, EEO on gas retailers introduced & retrofit CBs were a popular promotion – drove price differential down
- By mid-2004, penetration reached 29% (of ~1.5 million per year) and gave the Government confidence to regulate from April 2005, that all **retrofit** boilers installed in England and Wales had to be condensing unless there were “exceptional circumstances” e.g. plumbing problems that entailed expensive flue installations

# GB Market Penetration of gas condensing boilers



# UK Renewable Heat Incentive (RHI)

- Financial incentives for small scale renewable heat generation to help the UK reduce CO2 emissions and meet 2020 EU renewable energy targets
- Renewable heat technologies such as heat pumps, biomass boilers and solar thermal panels in non-residential and residential applications
- Currently (short-term) one-off payments towards residential capital costs (monitoring required) to learn more about what people think of these technologies and how they perform in a variety of conditions;
- RHI intended to be like a Feed in Tariff (FiT) starting in summer 2013 ( Budget £808 million over 3 years)



# Residential Grants modest

## HOW MUCH ARE THE CURRENT PREMIUM PAYMENT GRANTS WORTH?

### ALL HOUSES

£300 – solar thermal

### HOUSES NOT HEATED BY GAS FROM THE GRID

£950 – biomass boiler

£850 – air source heat pump –

£1250 – ground source or water source heat pump

Government challenge – how to keep future residential RHI payments within DECC annual expenditure limits

# RHI Tariff rates (non-residential)

Tariff	Thermal Size	Rate (pence/kWh)	Comment
Biomass	3 Ranges < 200kW; in between; ≥ 1MW	Between 8.3 and 1.0	Depends on size and biomass nature
Small heat pumps	< 100 kW	4.7	Only ground sourced and water based heat pumps
Large heat pumps	≥ 100 kW	3.4	
Solar thermal	< 200kW	8.9	
Bio-methane	<200 kW	7.1	All scales for biogas but not landfill gas

Ofgem require heat metering and pay quarterly in arrears; tariffs increased from 1 April 2012 in line with inflation; 20 installations (5.25 MW total) in the 4 months to 31 March 2012; dominated by solid biomass boilers; retail gas ~4p/kWh

# Another market mechanisms for EE?

- Global evidence that people like electricity FiTs – how about introducing an Energy Efficiency FiT (EE FiT)?
- Pay for energy saved as well as for energy generated
- RAP produced a White Paper on policy considerations for introducing an EE FiT

<http://www.raponline.org/search/site/?q=Energy%20Efficiency%20Feed-in-Tariffs>

- No jurisdiction has introduced an EE FiT yet
- Lots of design issues to consider, many common to the design mechanisms for successful EEOs