

Energy Efficiency Policy vs. Carbon Taxes in the Residential sector – A Comparison of the Irish Case

Louise Dunne, Lisa Ryan and Frank Convery
University College Dublin Ireland



Residential Sector in Ireland responsible for 27% of energy related CO₂

- Irish Policies and features
- Fiscal crisis
- Revenue, environmental effects, equity of the policy mix
- Conclusions

Irish Policies in Residential Sector

- Carbon Tax (addresses market failure)
- Building Regulations
- Smart Metering
- Government Programmes, subsidies, grants (address some of information gap)

Context - Ireland's Fiscal Crisis

- Between 1990 and 2007, Ireland was the fastest growing economy in Europe
- After Lehman Brother collapsed in the US, the government put in place a guarantee arrangement in Irish banks
- A combination of shrinking government income and this guarantee resulted in the country seeking financial support from EU, ECB and IMF (the Troika).
- Economy contracted sharply after 2007

Irish Carbon Tax

- The tax applied to CO₂ emissions from the non-traded sectors (NETS).
- The rate started at €15 per tonne of carbon dioxide in 2010 and 2011; increased to €20 on different fuels.
- Exemptions for agriculture

Other policies and regulations in Residential Sector

- Building Regulations – 2002, 2008, 2011
- Building Energy Rating - Since 2007 for new houses and 2009 for existing houses, a house owner must provide a BER to prospective buyers or tenants when a home is offered for sale or rent -an objective measurement of the energy efficiency of a building
- Energy labelling on household electrical goods
- Smart Metering - National Smart Metering Programme Phase 1 commenced in late 2007. The trial included over 5,000 domestic electricity consumers

Grants and Subsidies pre carbon tax

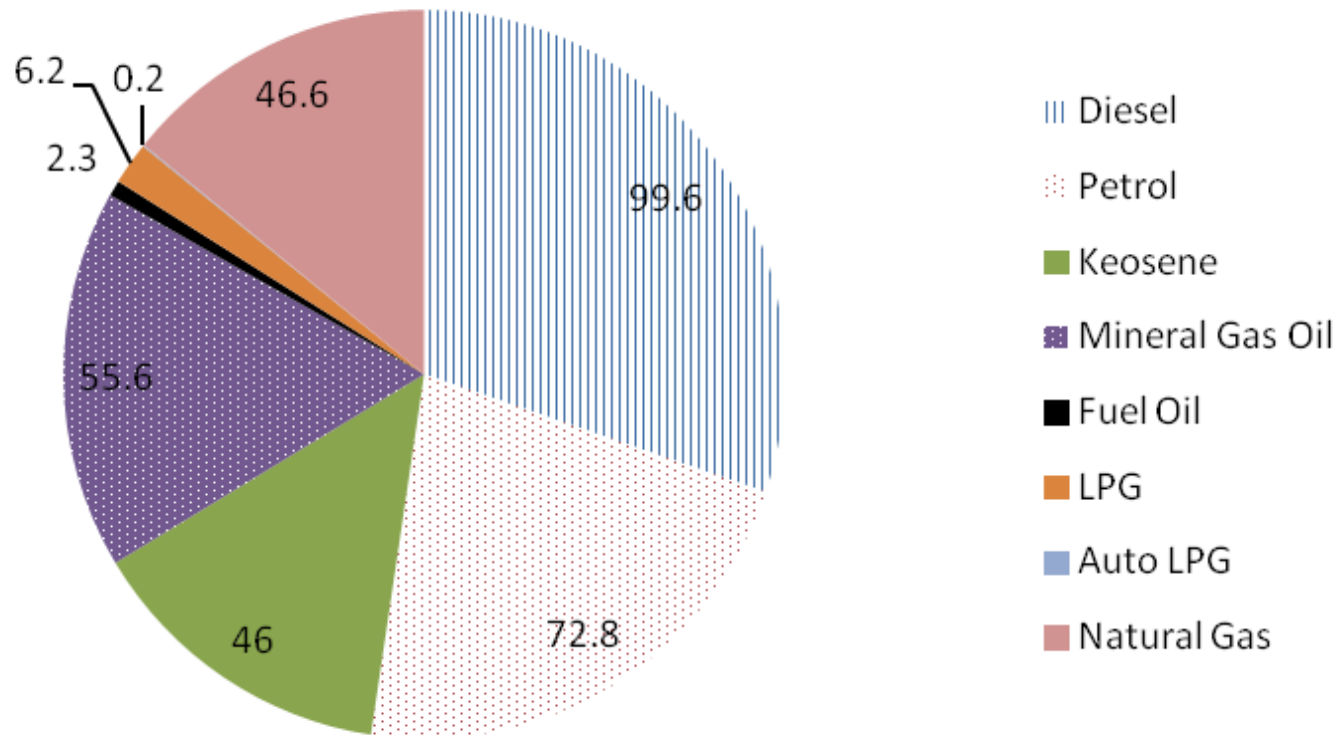
- Warmer Homes scheme (fuel poverty)
- Home Energy Savings Scheme (retrofit grant)
- National Fuel Allowance Scheme, which provides a payment to help with the cost of home heating to those dependent on long-term social welfare .

Grants and Subsidies post carbon tax

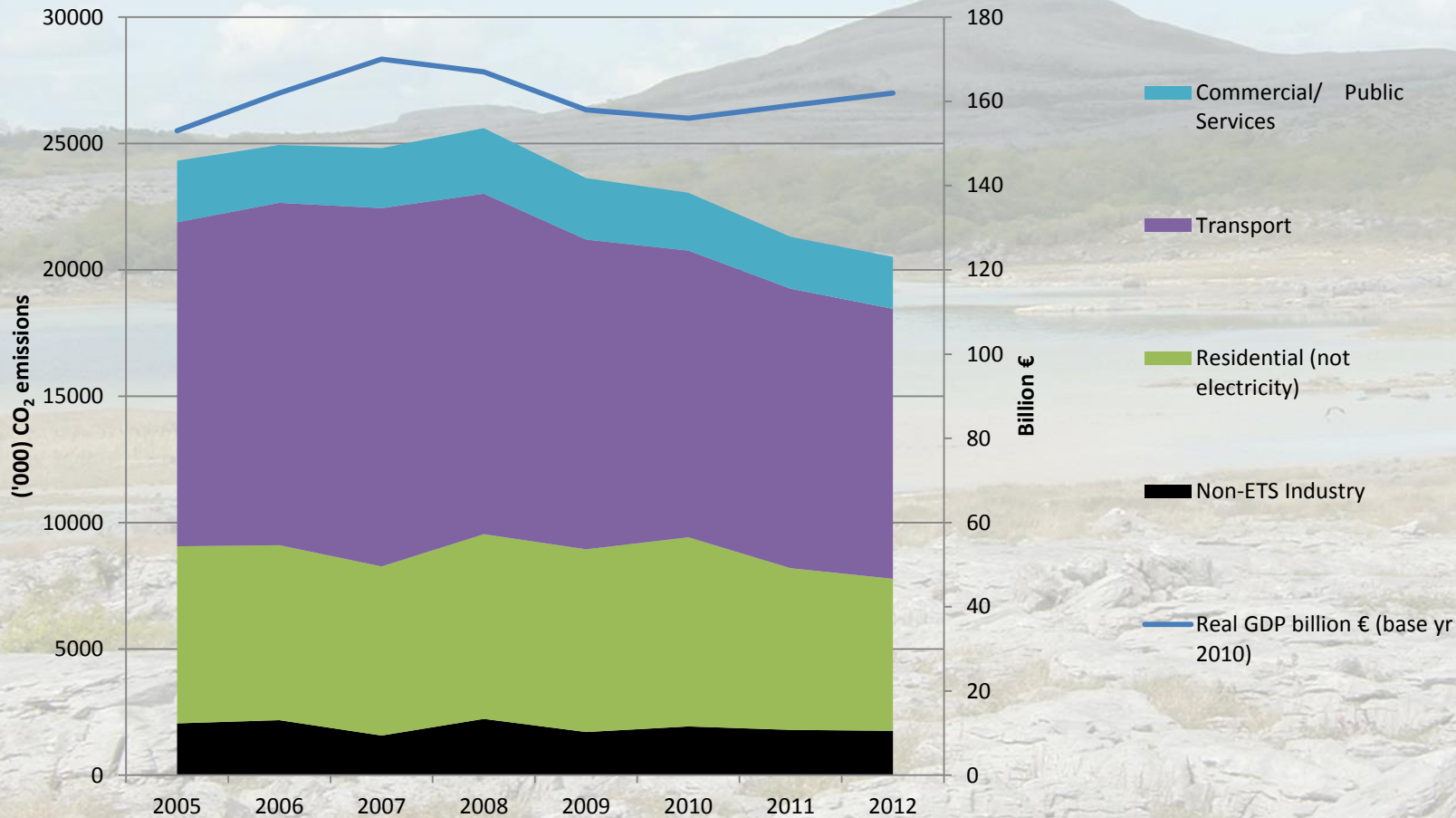
- Better Energy Homes Scheme,
- Warmer Home Scheme
- Greener Home Scheme

In the 5 year period from 2006 to 2011, the above schemes supported energy efficiency upgrading of over 200,000 dwellings, representing over 12% of the housing stock in 2011. It is estimated that these schemes saved over 900 GWh (77 ktoe) in 2011, achieving annual savings to the value of €56 million on energy costs for householder

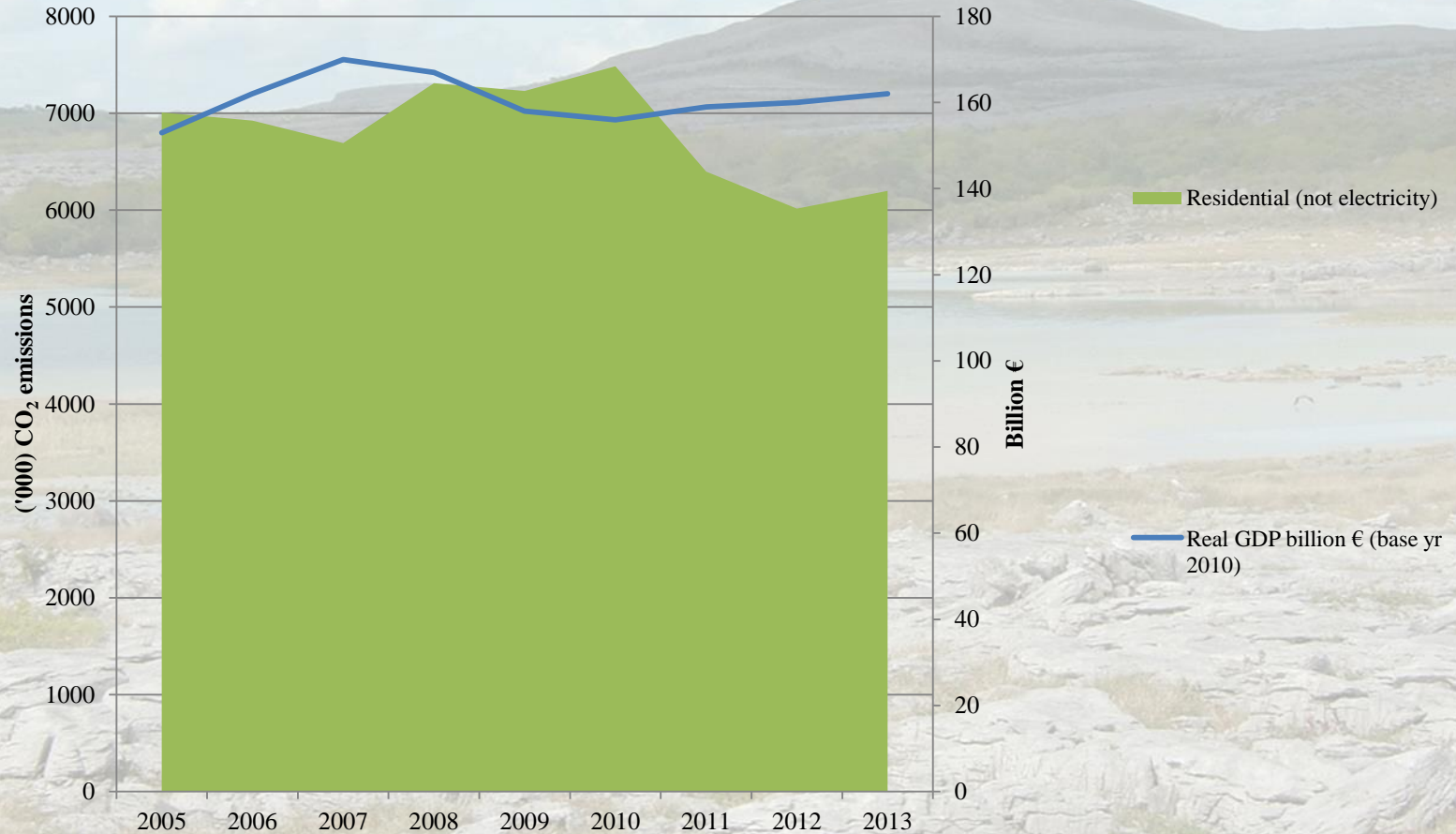
Carbon Tax revenue by fuel (EUR million, 2011)



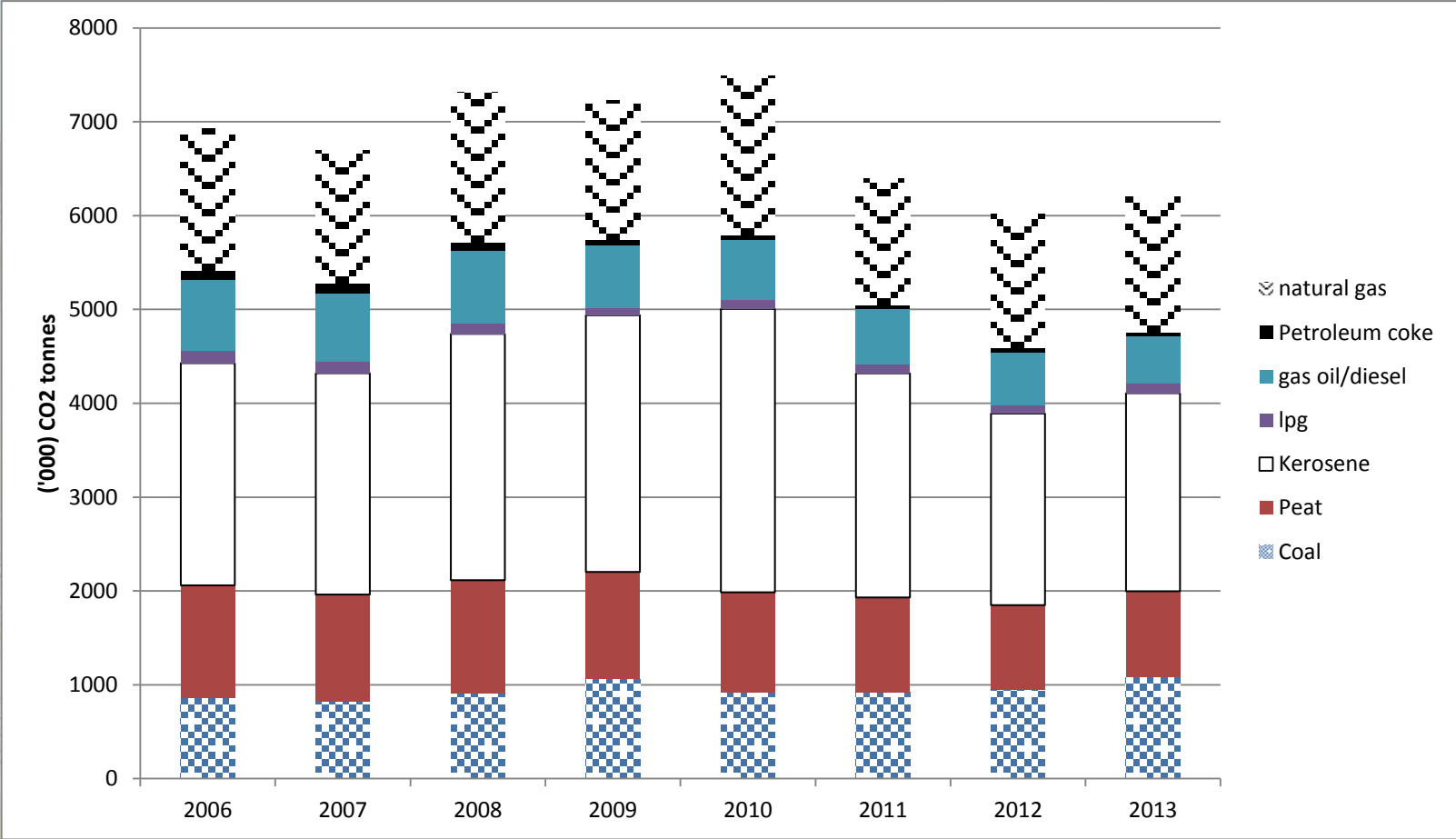
Emissions vs. GDP (all sectors)



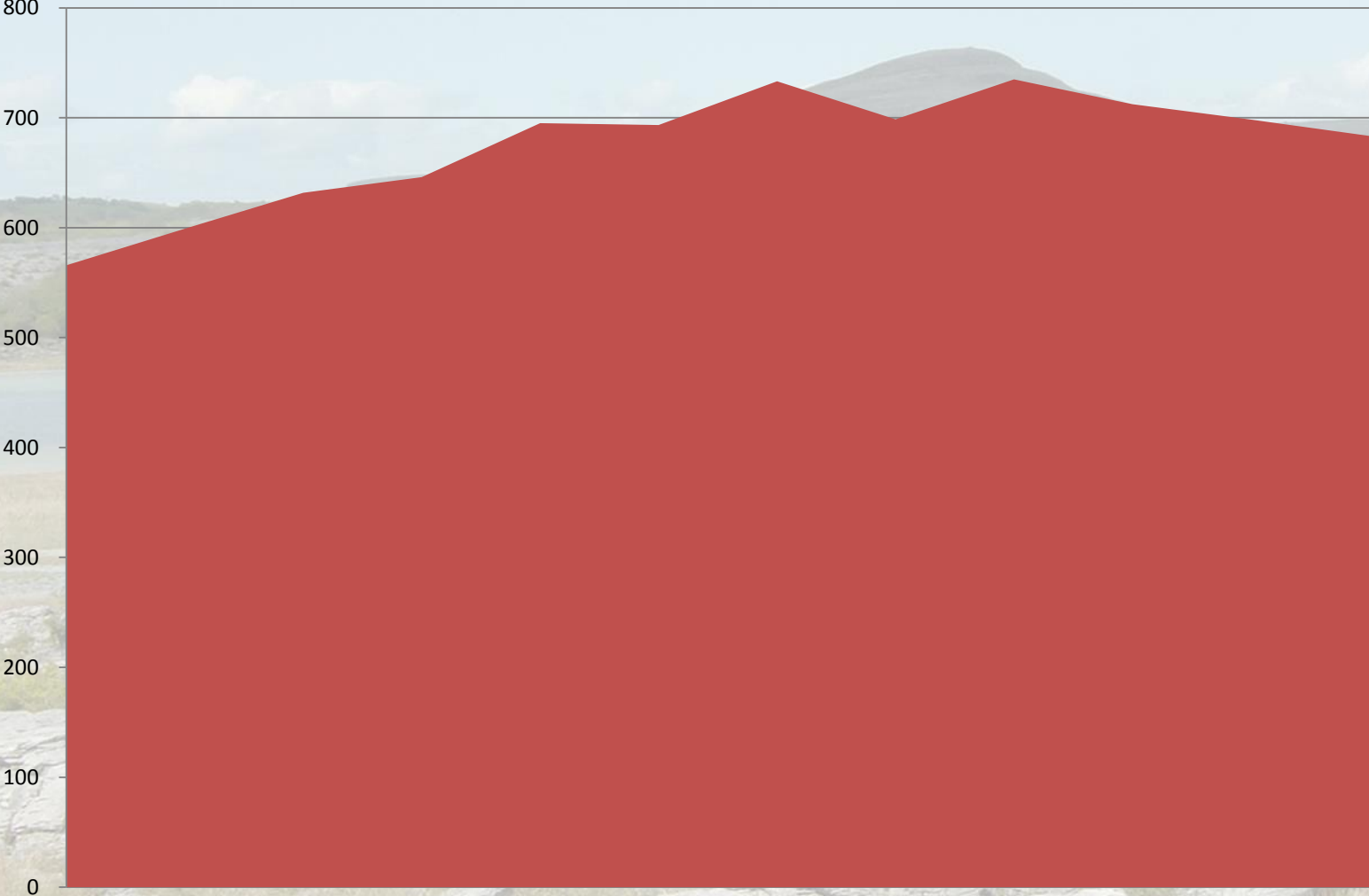
Residential Sector Emissions



Residential CO₂ emissions per fuel type per year, not including electricity (1 000 tonnes of CO₂)



Residential Electricity usage (ktoe) 2002-2013



Trends in Residential Emissions

- During the period 1990-2011, the number of households in the State increased by 64%, from approximately 1.0 million to 1.65 million.
- CO₂ emissions from the residential sector (not including electricity) went up slightly in 2010 and down by 6% in 2011, and 6% in 2012, but up 3% during 2013. When corrected for weather, energy consumption per household was 4.4% lower in 2011 than in 2010.
- Average weather corrected energy-related CO₂ emissions per dwelling fell by 24% since 2006.
- Household energy usage per square metre in Ireland was 20% below the UK average and 9% below the EU-27. 61% from direct fuel use (remainder electricity)

Price effect

Estimated impact on fuel prices of the carbon tax EUR 20 per tonne CO₂,

Sources: Irish Statute Book. Finance Acts, 2010, 2011, 2012; SEAI (2012c).

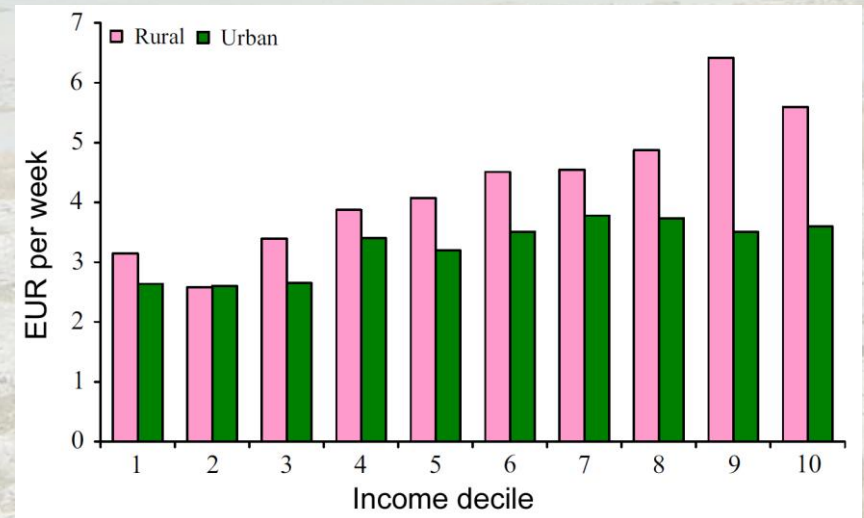
Fuel Type	Unit	Pre-tax price in December 2012, EUR	Carbon tax increase (including VAT) EUR	% change in price
Petrol	Litre	1.503	0.056	3.7%
Auto-diesel	Litre	1.454	0.065	4.5%
Kerosene	1 000 litres	880	57.54	6.5%
Marked Gas Oil	1 000 litres	920	62.45	6.8%
LPG	1 000 litres	900	37.30	4.1%
Natural Gas	107 kilocalories GCV	0.068	0.004	5.9%
Coal/Peat	Tonne	365	59.80	16%
Peat	Bale	3.9	0.52	13%

Competitiveness

- Given that taxes had to be raised somehow, it seems plausible that the negative economic impact in terms of jobs and employment would have been more severe if, instead of the carbon tax, income taxes had been raised further, albeit by only 2.5%.
- OECD (2009) concludes as follows: “Corporate taxes are found to be the most harmful for growth, followed by personal income taxes, and then consumption taxes. Recurrent taxes on immovable property appear to have the least impact. A revenue-neutral growth oriented tax reform would, therefore, be to shift part of the revenue base from income taxes to less distortive taxes such as recurrent taxes on immovable property or consumption.”

Equity

- In 2005, it was estimated that 15% of Irish households spent over 10% of their income on energy and this was expected to rise to 19% of households in 2010 (due to energy prices rising faster than incomes) (Tol et al., 2008). Fuel poverty risk
- A carbon tax was expected to be regressive
- Estimated impact of a EUR 20 per tonne CO₂ carbon tax per income decile:



Options for addressing Equity issues

- Prior to the introduction of the carbon tax in 2010 there were a number of schemes in place to tackle fuel and energy poverty of low-income householders. Can give options to those who have limited flexibility to adjust to higher prices.
- According to the budget statement “The yield from the Carbon Tax will be used to boost energy efficiency, to support rural transport and to alleviate fuel poverty. The Carbon Tax will also allow us to maintain or reduce payroll taxes”
- The key priority will be to fund sustainable energy programmes for which €98m will be available – including €50 million from the proceeds of the Carbon Tax”
- As anticipated, costs for fuel-related assistance in Ireland indeed increased since the introduction of the tax and the Department of Social Protection took action to reduce it. The duration of the scheme as it applies in 2013 has since been cut from 32 to 26 weeks. At present, the rate is EUR 20 per week, or EUR 520 in total. Only one Fuel Allowance is paid to a household.

Effects of various schemes

- At least 12% of the 2011 housing stock had energy efficiency upgrades carried out since 2006, including through grant support schemes. It is estimated that such schemes saved over 900 GWh (77ktoe) in year 2011, equating to annual cost savings of over €55 million for the householder.
- As of end of December 2012, €147 million has been paid in grant support towards 346,000 upgrade measures in 136,000 homes. Energy savings of greater than 21% per dwelling have been verified for a sample of the upgraded homes. There is also a noted continued downward trend in the typical cost of works, particularly in the case of wall insulation.
- Average spend per household fell by 2.3% between 2006 and 2011, even though the weighted average fuel price increase in that period was 37%.

Conclusions


- Residential CO₂ emissions going down generally.
- Some of this due to recession
- Fiscal crisis does indeed create opportunity for carbon tax; and the more severe, the better
- The revenue can play a valuable role *at the margin* in meeting obligations for tax increases
- There is a trade-off between scope and effective rate of tax
- There is a need to revisit the analytics of recycling and the double dividend
- Gov't schemes and payments in conjunction with tax can reduce the equity issues caused by the tax.
- The imperative to raise income and reduce debt limits the extent to which equity issues can be addressed
- It is difficult in the short run to draw conclusions about environmental effectiveness and disentangle effects of various instruments

Conclusions

- Where the alternative is to raise taxes on labour, a carbon tax on non-ETS in general will not damage competitiveness.
- More efficient dwellings (BER ratings) get higher prices by buyers and to a lesser extent, renters
- Smart metering could reduce electricity by 3%.
- Upgrade of housing can reduce heating bills by 21%
- Carbon tax still in infancy but has high profile and sends price signal to non-ETS sector.
- Impact of a tax biggest in the long run and if more countries adopt (more R&D).
- Tax important as it signal's Ireland's commitment to international climate policy. Gives important signal to households, encourages uptake of other grants
- Subsidies and grants are high-cost ways to reduce emissions but may address energy efficiency gap in ways the tax can't.

Finally

- Agreement with IEA findings (2011): Carbon tax in residential sector a pre-requisite for least cost emissions reduction, but can't overcome all the barriers. Need carefully designed efficiency policy for each sector. Carbon tax alone does not address imperfect information and behavioural failures in the residential sector.

A landscape photograph showing a wide, calm lake in the middle ground. The foreground is dominated by a rocky, grey terrain with sparse, dry grass. In the background, a large, rounded mountain rises against a pale blue sky with scattered white clouds. The overall scene is serene and natural.

Thanks to GCET and Aarhus University