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The economics of market reform: Assessing the likely commercial and regulatory impact of EMR

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E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Outline

- Context of UK Energy Policy
- Proposed Reforms
- Household Impact
- EMR risks &possible unintended consequences
- Conclusions

CONTEXT

The objectives of UK energy policy

- The impossible trinity:
  - –Competitiveness
  - –Energy Security
  - –Decarbonisation

- The other ones:
  - –Elimination of (energy) poverty
  - –Renewables??
  - –Green jobs/economy/technology???

European Energy Policy Context

- 20-20-20 Targets for 2020:
- 20% reduction in CO2e (hard target)
- 20% renewable energy (indicative target)
- 20% reduction in energy intensity (aspirational target)

- Completion of Electricity and Gas markets (3rd Energy Package)

- Energy Security Directive, Energy Services Directive etc…

- Reality of patchy implementation

UK Decarbonisation targets

- UK in 2009 GHGs: -25.7% relative to 1990
- Kyoto Target: -12.5% by 2020

- 2008 Climate Change Act
  - 80% reduction by 2050 (-34% 2020, -50% 2027)
  - Climate Change Committee
  - Five Year Carbon budgeting
  - First report: complete decarbonisation of electricity by 2030

UK Renewables Targets

- UK committed (in draft) to 15% target for renewables contribution to total final energy consumption in 2020 (3.0% in 2009).

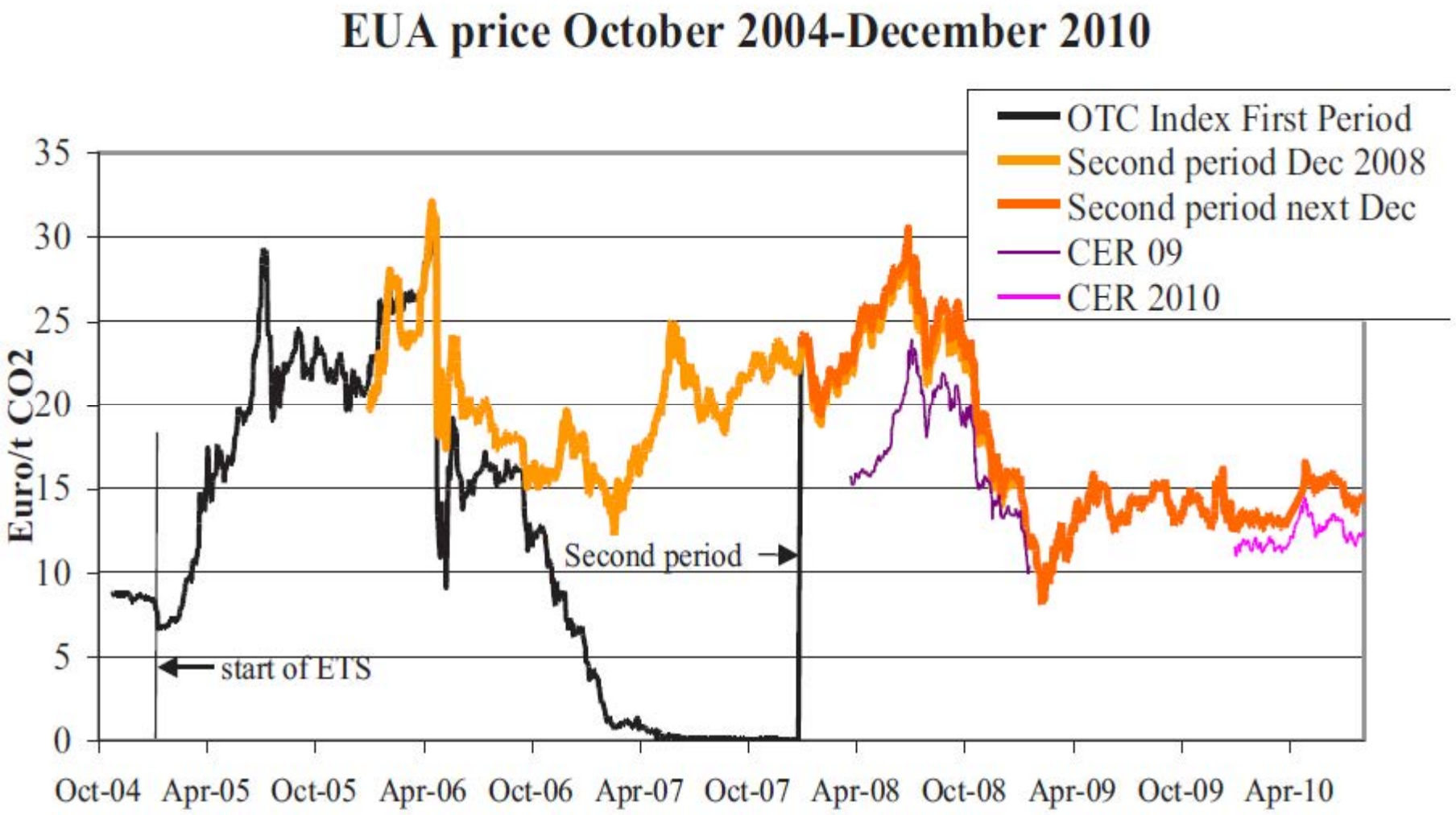
- Currently support regime only envisages 15.4% renewables in electricity by 2015-16 (7.3% in 2010).

- 2010 target: 10% electricity from renewables.

Three economic principles

- Carbon externality needs to be priced
- Subsidies where exists learning effect
- Net *and* gross cost effects significant

Current carbon prices are volatile...



Source: David Newbery

Renewables expensive and difficult…

	Target renewable share in GB	% Delivery in UK	Nominal Buyout Price £/MWh	Total Cost £m
2002-03	3.0	59%	30.00	282.0
2003-04	4.3	56%	30.51	415.8
2004-05	4.9	69%	31.59	497.9
2005-06	5.5	76%	32.33	583.0
2006-07	6.7	68%	33.24	719.0
2007-08	7.9	64%	34.30	876.4
2008-09	9.1	65%	35.36	1036.2
2009-10	9.7	71%	37.19	1108.6
2010-11	10.4		+ inflation thereafter	
2011-12	11.4			
2012-13	12.4			
2013-14	13.4			
2014-15	14.4			
2015-16	15.4			Estimated: ~1753m (2008-09 prices) assuming no demand growth

Are policies working?

- Lack of high and stable enough carbon price:
  - Inhibits demand response.
  - Has delayed nuclear investment (if truly efficient).
  - Has led to more coal and less gas being burnt (and more CO2).
  - Has slowed development of bio-fuels (land fill gas and co-firing) and prolonged their subsidy.
- As a result:
  - Mature low carbon technologies have not emerged strongly.
  - Large reliance has been placed on subsidies to less developed technologies.
  - General policy uncertainty has delayed investment and unnecessarily raised issues of 'will the lights go out'.

PROPOSED REFORMS

(i) Low Carbon Generation

The reform proposes the setting up of a system of contracts for differences (CFDs) whereby the government would contract with low-carbon generators to supply electricity at fixed prices for a prolonged period. These contracts would pay the generators the difference between the average wholesale price of electricity and the contract price.

(ii) Carbon Pricing

The reform proposes the introduction of a carbon price support (CPS) based on the existing climate change levy (CCL). This would involve increasing the rate and coverage of the climate change levy to effectively increase the price of carbon emissions from the electricity sector in the UK above that in the rest of the EU.

(In 2011 budget £30/tonne by 2020)

(iii) Emissions Performance Standard

Coal fired generation has average CO2 emissions of around 915g/kWh; a modern gas-fired power plant about 405g/kWh. The reform proposes an emissions performance standard (EPS) for all new power plants of either 600g/kWh or 450g/kWh, designed to rule out the building of new coal-fired power plants without carbon capture and storage (CCS) technology fitted.

(iv) Capacity Payments

The reform proposes the introduction of a capacity mechanism (CM) to contract for the necessary amount of capacity to maintain security of supply. This would involve the introduction of payments to generators for maintaining availability, supplementing the market for units of electrical energy that exists at the moment. This deals with predicted low capacity margins by 2018.

Proposed Reforms (Pollitt, 2011)

- Capacity Markets ?
- Emissions Performance Standard ???
- Carbon Price Support YYY
- Low Carbon CFDs Y??

- Bill impacts:
  - Households: +33% by 2030
  - Businesses: +62% by 2030
  - Wholesale prices: +80% by 2024

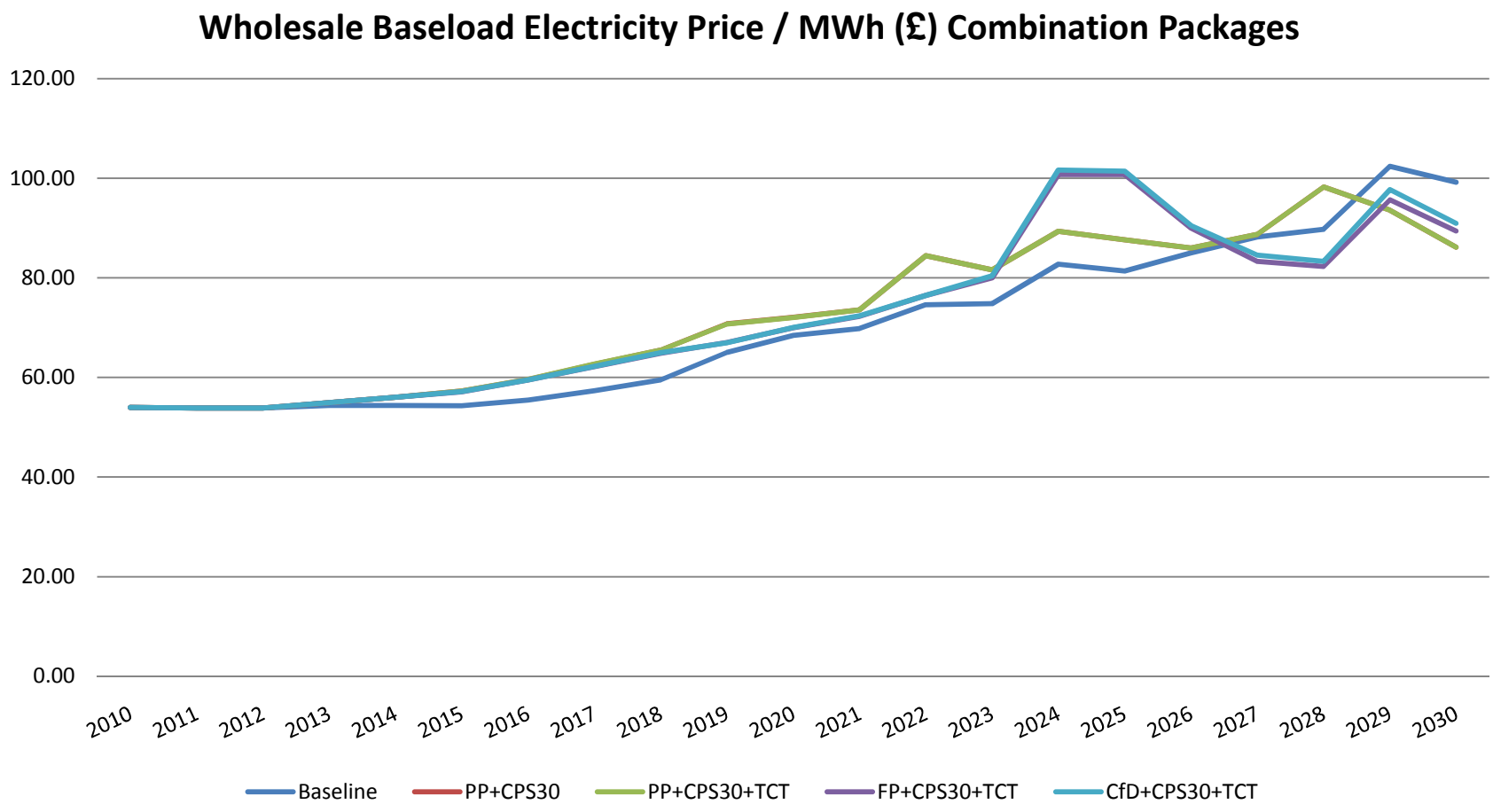
HOUSEHOLD IMPACT

Household Bills

- DECC assume reduced household consumption from 2010 to 2030 (10% decrease)
  - This is the direct result of current and planned government policies.
  - No impact of different EMR scenarios.

- The Consumer bill goes up, but not as much as the wholesale prices
  - Wholesale electricity prices increase by 69% from 2010 to 2020 under the preferred package.
  - Consumer Electricity Bill increases 33% by 2030 under preferred package.
  - Bill is 1% higher than in Baseline in 2020, but 7% lower in 2030
  - However, baseline assumes ambitious adjustments in RO bands to meet increased Renewable Obligation...

Household Bills – Wholesale price



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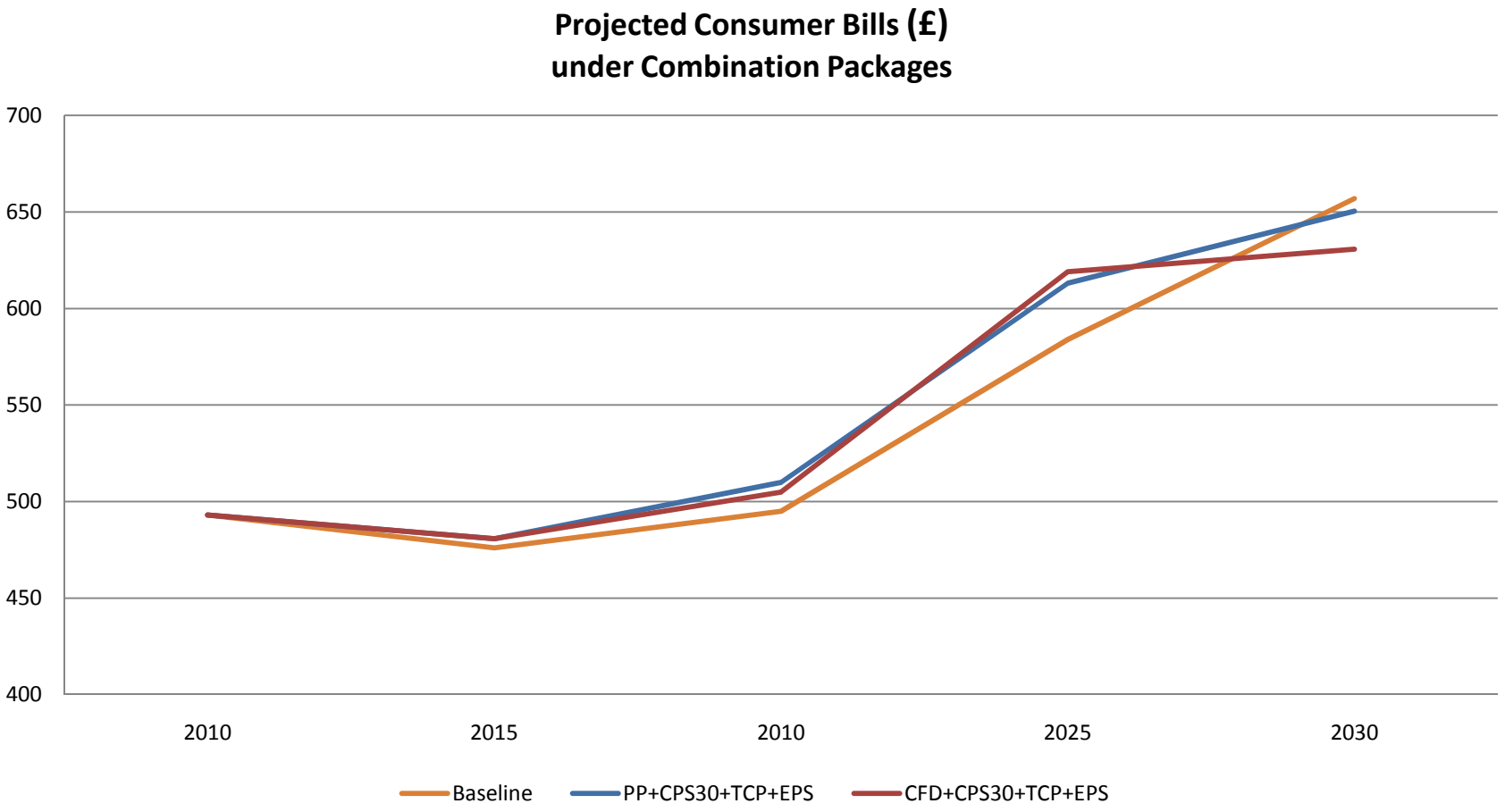
Household Bills – Total



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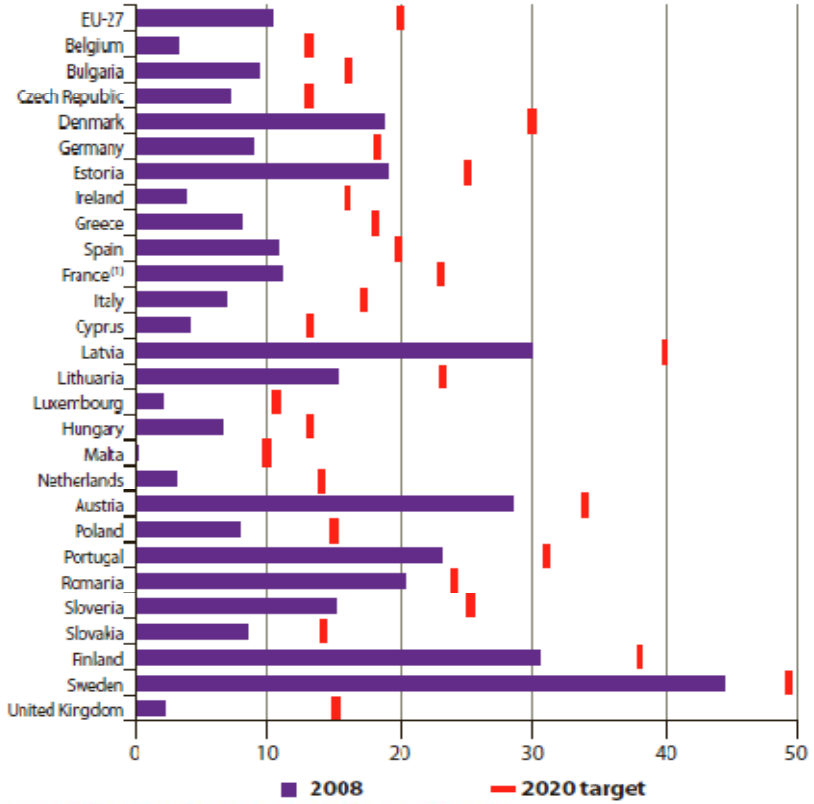
What Consumers Will Get...

- Lead Package (CFD+CPS30 +EPS+TCM)

a. Welfare Impact	*-ve*
b. Distributional Analysis	*-ve*
c. Indirect Impact	*Not analysed*
d. Renewables	*35% by 2030*
e. Decarbonisation	*No at EU level*
f. Energy Security	*-ve NPV*
g. Cost of Capital and Risk	*Goes down?*

More renewables?: UK poor but...

- Directive 2009/28/EC sets individual renewable targets for all member states, according to their current share of renewables, renewable potential and economic performance (overall EU target is 20% renewables by 2020)

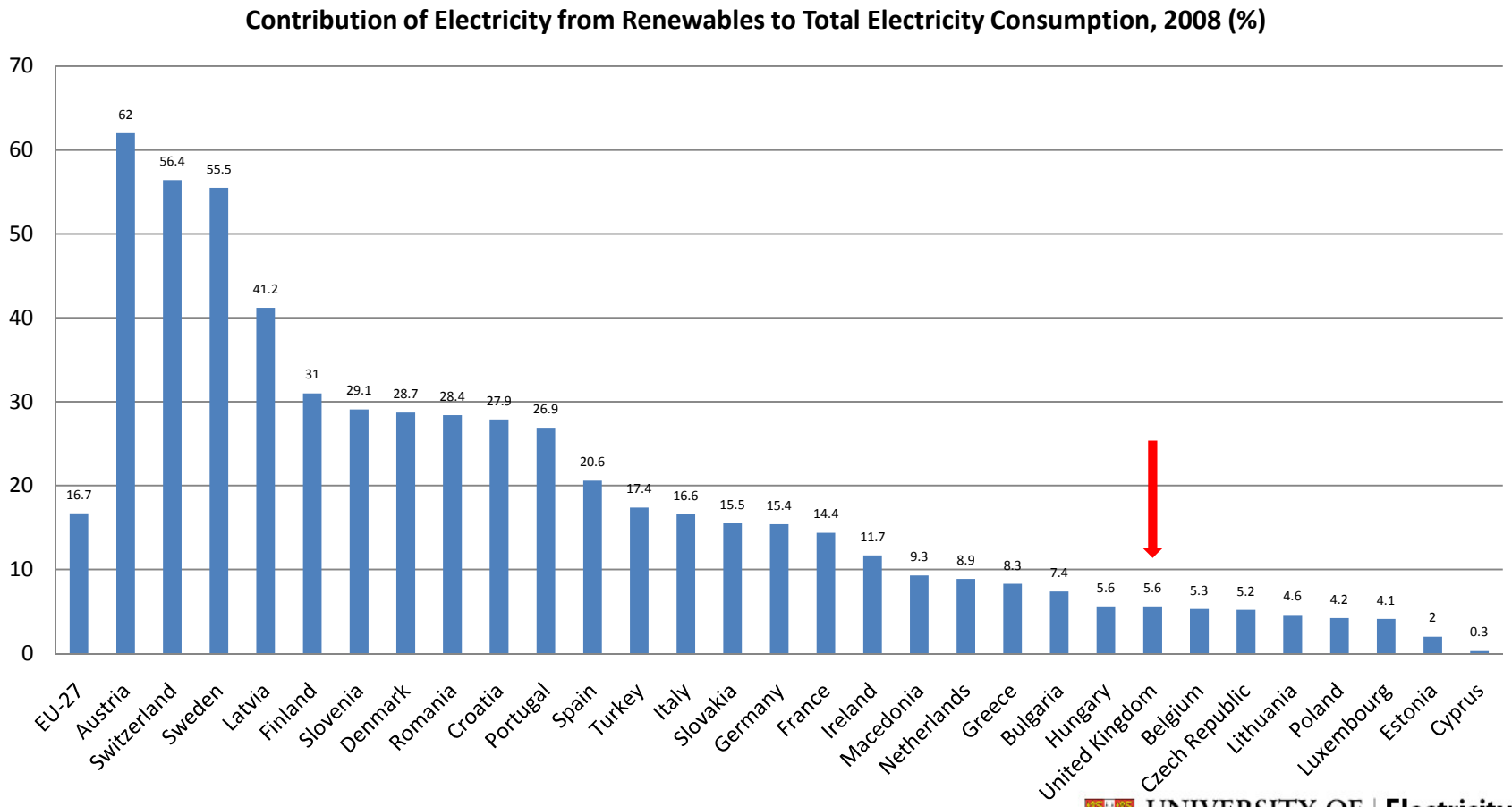


(1) "France métropolitaine", excluding the four overseas departments (French Guyana, Guadeloupe, Martinique and Réunion).

Source: Eurostat (Europe 2020 indicators — online data code: t2020_31)

More renewables?: credible?

- In terms of share of renewables in electricity, the UK has comparatively lower starting point in the EU.



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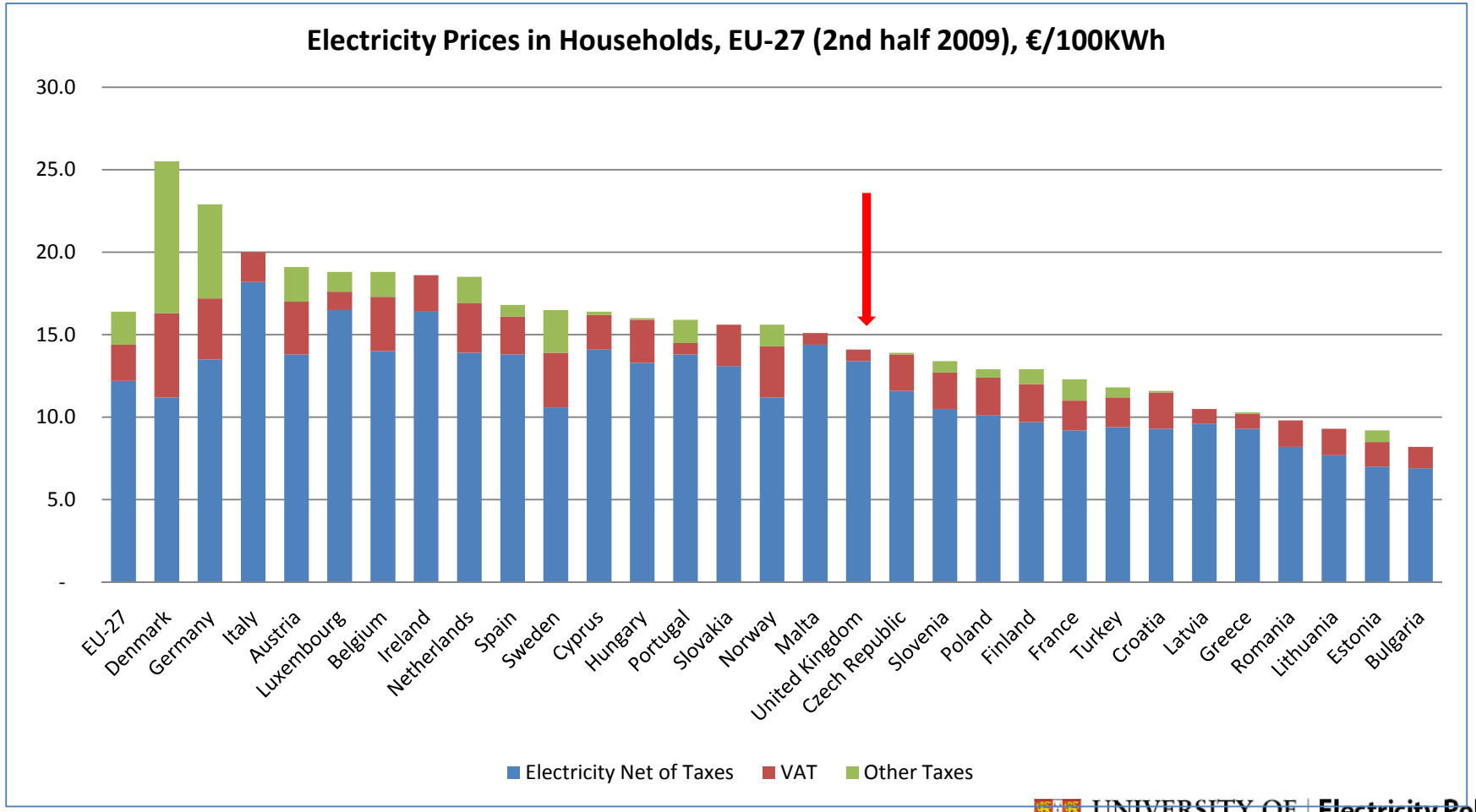
Higher prices?: highest before tax?



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EMR RISKS & POSSIBLE UNINTENDED CONSEQUENCES

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Sources of potential risks I

- **Carbon Price support:**
  - Longevity, adequate level & credibility
  - Distributional impacts on investors and consumers
  - Interaction with EU ETS – risk of simply shifting emission around (Fisher and Preonas, 2010; Fankhauser et al. 2011)

- **Feed in Tariff:**
  - Impact on consumers depends on decarbonisation target & design choice
  - Inherent risk to set optimal level due to information asymmetry & unknowns – if FIT are too low, risk of undersupply; if too high, risk of windfall profits and hence unnecessarily high prices for consumers
  - Empirical evidence shows that FIT have not been adjusted on time to account for technological developments (Meyer, 2003)
    - Eg.: Spanish FIT and unexpected decrease in PV panels prices (15 billion of Euros deficit + majors cuts in FIT levels of 30-45%)
    - Also: French FIT, German FIT
  - Difficulty to set relative prices for different technologies – ex. current UK ROCs banding

Sources of potential risks II

- **Targeted Emission Performance Standard:**
  - Risks of adverse impacts on capacity margins and security of supply with high levels of intermittent generation, need for back-up
  - Serious doubts on the impact, given presence of CPS; exceptions to avoid risks on security of supply - superfluous; investors' preference for gas

- **Capacity mechanism:**
  - Estimates of optimal level of security are very uncertain and depend on value of lost load – values used in the EMR are £10,000-30,000/MWh (versus £4,000-£18,000/MWh found in some studies)
  - Risk of unnecessarily high costs due to: high VOLL; rushing investment when technologies have not benefited from learning process; risks of favouring certain technologies for political reasons
  - Risk of perverse outcome: e.g. US capacity mechanism

Other specific potential risks

- **Complexity, redundancy, uncertainty & timing**
  - Ex.: EPS (redundant & superfluous) & tCM (unnecessary at this stage/premature action is costly) (UKERC, 2010)
  - Investors want transparency, longevity and certainty (Deutsche Bank, 2009)
  - Risks for investors' confidence; potential barrier for new entry
  - Risks of "stacking on" multiple instruments – & trigger additional tangible and less tangible costs (Fankhauser et al. 2011)

- **Importance of non-cost barriers:**
  - Ex. planning issues, consumers' support, grid access & charging, capacity & supply chain, T&D (ECORYS, 2008; IEA, 2008; Pollitt, 2010).
  - Risks due to lack of attention to local planning problems, constraints and societal preferences
  - Striking recent examples:
    - recent UK renewable support policies (NFFO, 195 projects in GB "queue")
    - Supply chain issues and PV modules in France and Germany
    - T&D & connection costs for wind generation in Germany

Other specific potential risks

- **Specific technology risks:**
  - Economics of certain technologies are uncertain – e.g. MIT 2009 study on nuclear costs has doubled its estimates compared to 2003 study
  - Recent escalating costs due to higher commodity prices
  - One of the most illustrative case is nuclear power, where history clearly shows that estimated costs are less than outturn costs:
    - E.g. Olkiluoto in Finland:
      - reported contract price in 2004 was 3 billion of Euros. Today it is estimated at 5 billion.
      - 3 years of delays (today)
      - Design of the deal in fact makes consumers' bear the risk (Schneider et al. 2009)
    - E.g. Flamanville in France:
      - Cost estimated at 3.3 billion Euros in 2006, 4 billion in 2008, 4.5 billion in 2009

CONCLUSIONS

Conclusions on EMR

- **Policy impacts significant, but largely fail SCBA test:**

  Bills rise substantially, large welfare transfers to companies, risks transferred to consumers, no impact on global carbon emissions, but more renewables in UK.

- **Policy consistency not addressed:**

  UK energy policy complexity increased, scope for policy failure underplayed, international carbon strategy undermined.

- **Individual policy design not same as a consistent strategy:**

  Two of four elements redundant, some movement towards comprehensive set of carbon taxes, RES support not rationalised, energy security socialised, need for optimal commodity tax policy not fully addressed.

- **Macro-economic impact not analysed.**

Conclusions on sensible policy

- High & stable (or credibly rising) carbon prices
  - *But there is no substitute for EU action here.*
- A learning benefit-based renewables policy
  - *The scale of UK ambition must be reduced.*
- A fact-based electricity security policy
  - *Deep, liquid markets remain the best form of security.*
- Better public engagement on costs of policy
  - *Decarbonisation and renewables costs cannot be hidden.*
- Need to remember heat and transport
  - *Excessive policy focus on electricity risky.*

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