

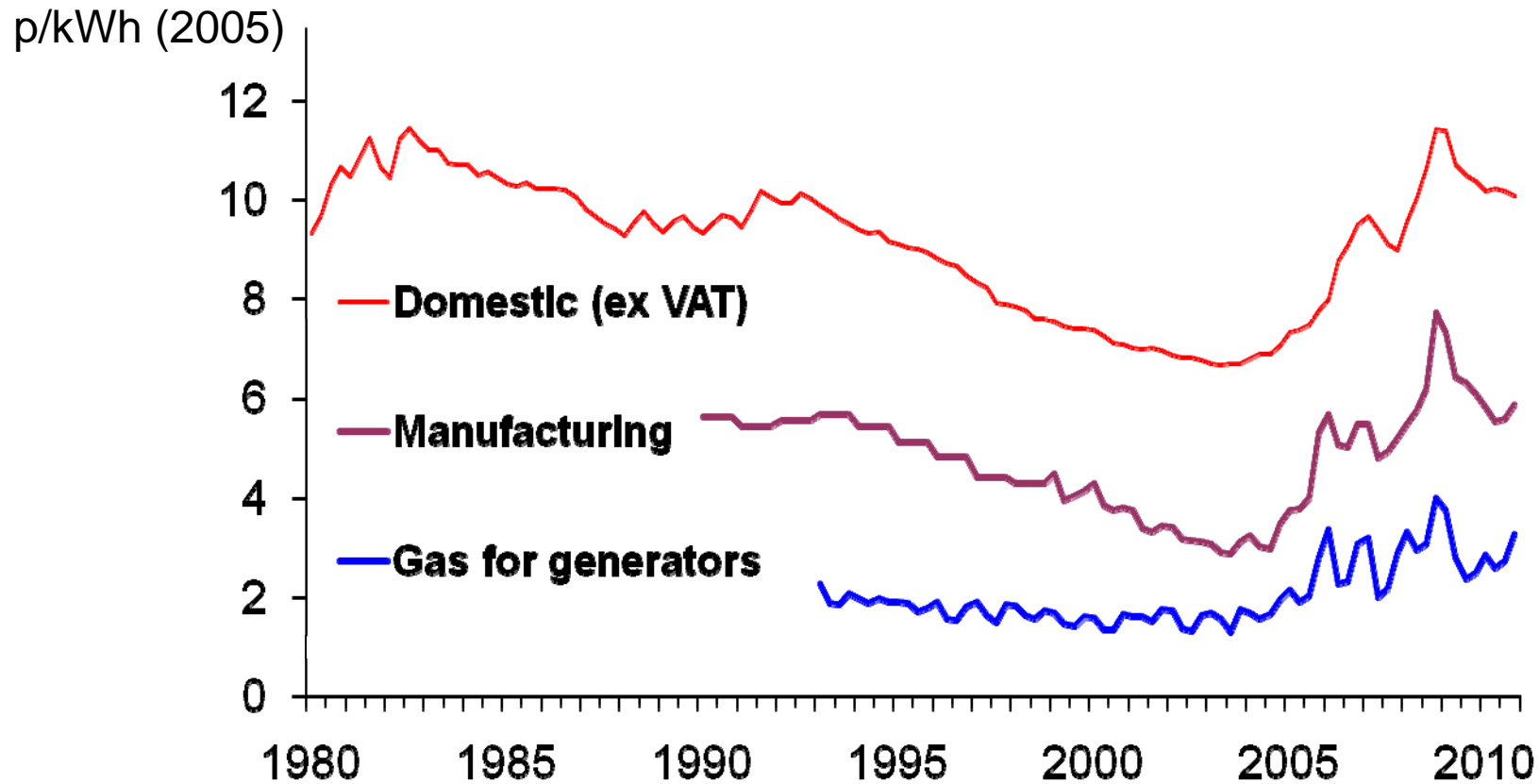


Customers and Networks: Energy Reforms in Great Britain

Richard Green

(from Sept 2011: Imperial College London)

UK Electricity Prices



Source:
DECC

Where are we coming from?

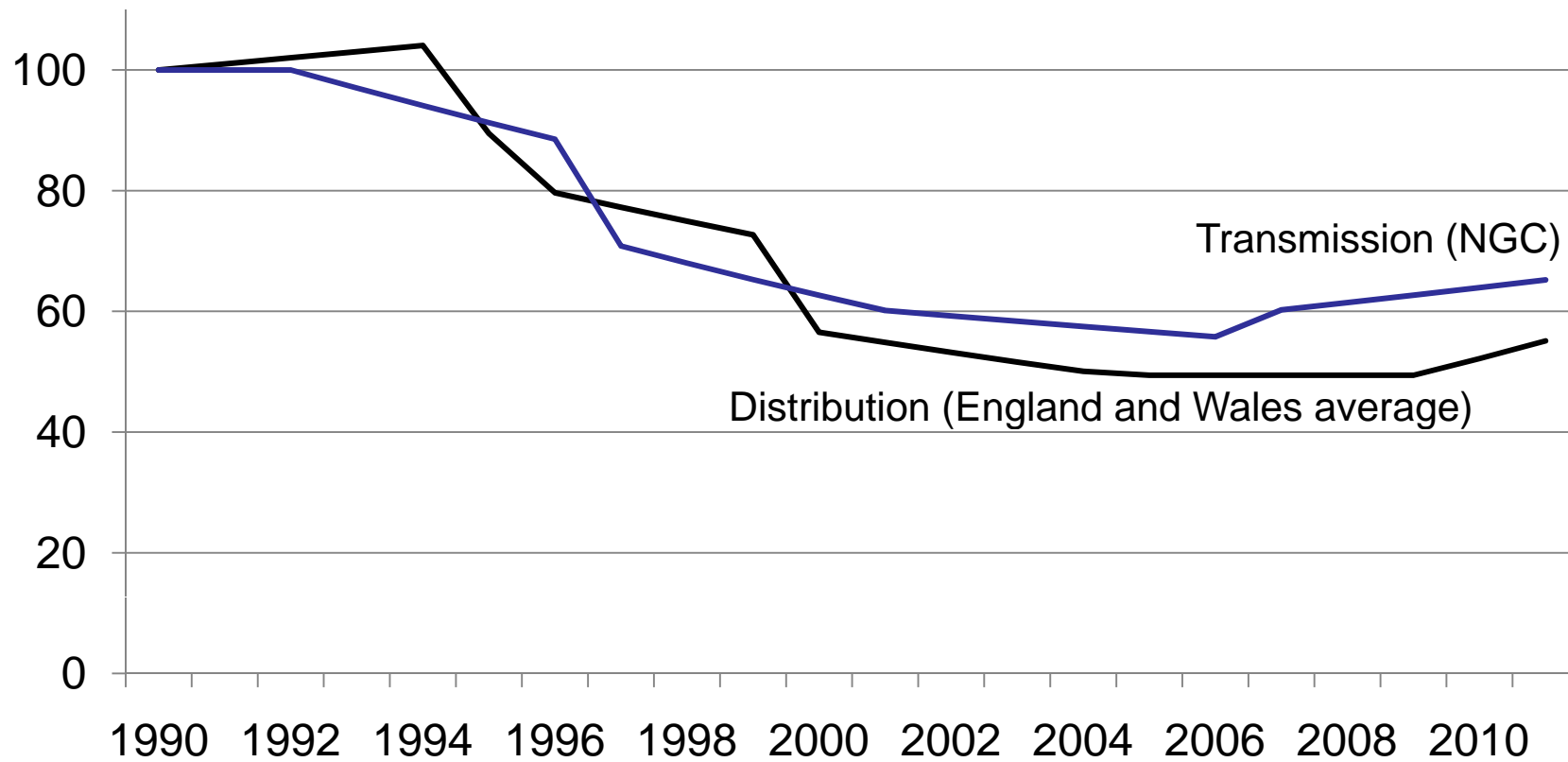
Not the USA!

- 1983: BT regulation should avoid the failings of US-style regulation
 - Cost-plus characteristics
 - Averch Johnson Effect
- Fix prices, not profits

RPI – X for electricity networks

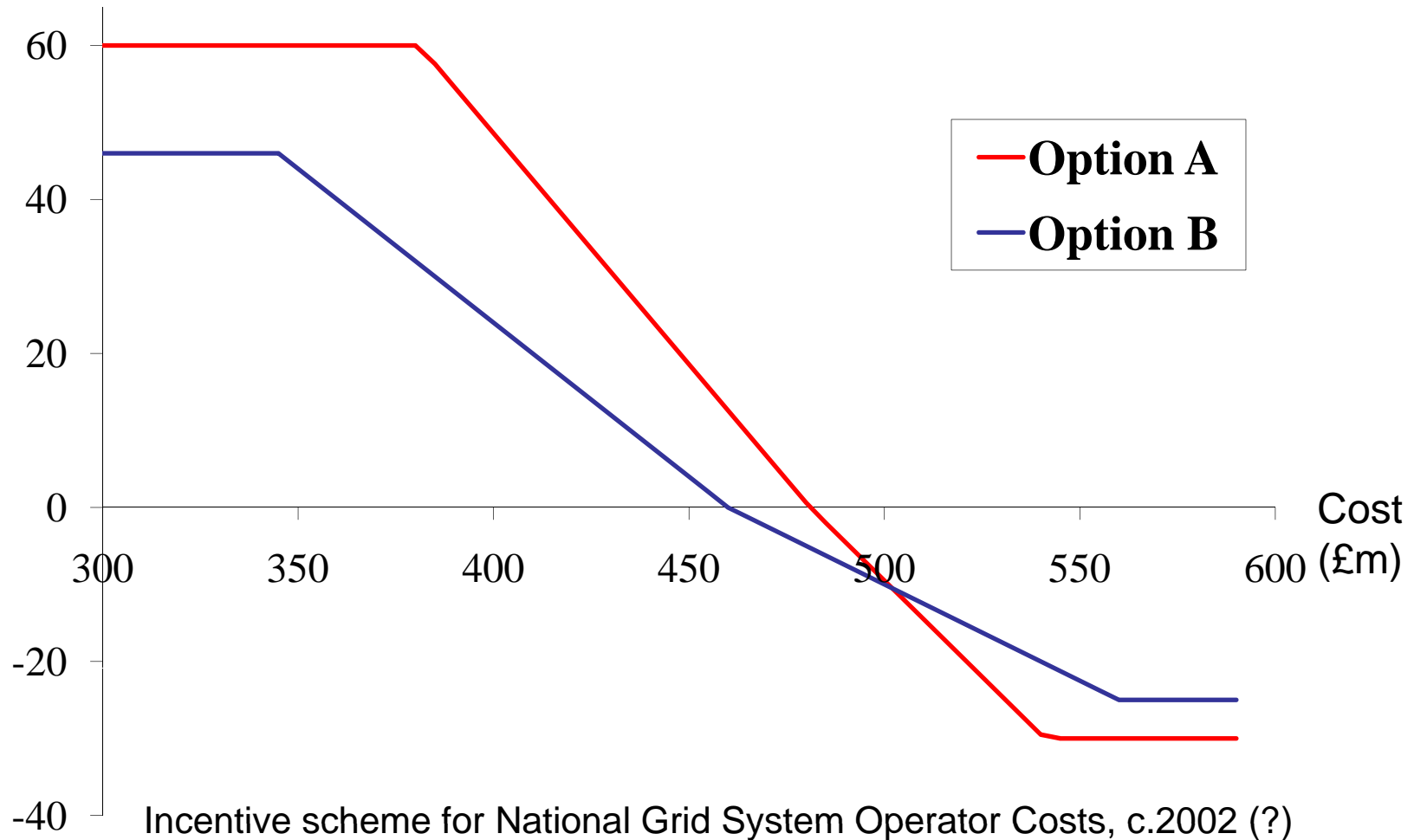
- 5-year price control periods
 - Occasional “reopeners” for major projects
- Distribution revenues linked to forecast customer numbers and units distributed
- Transmission revenues linked to forecast peak demand

Regulated prices, 1990=100

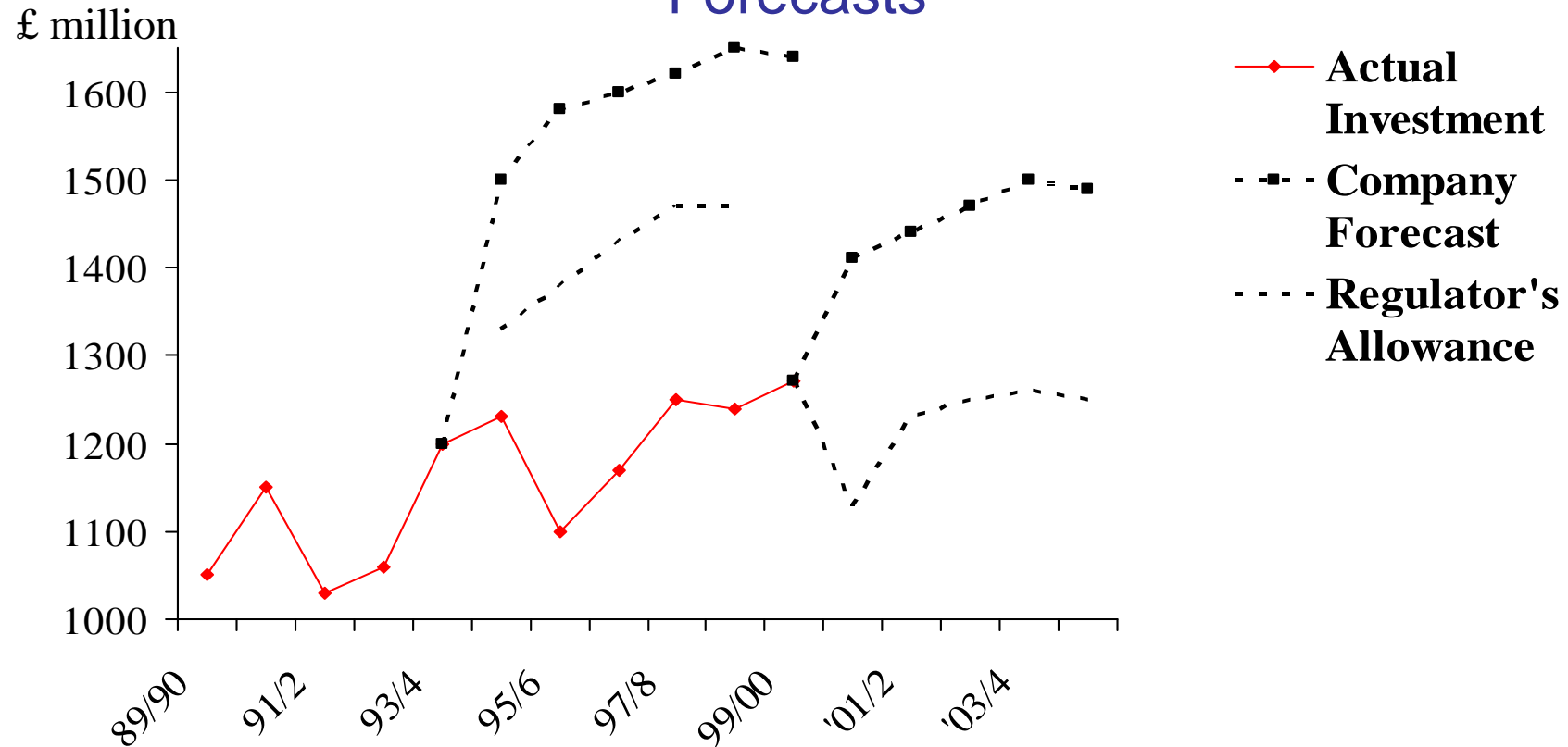


A menu of tariffs

Reward (£m)

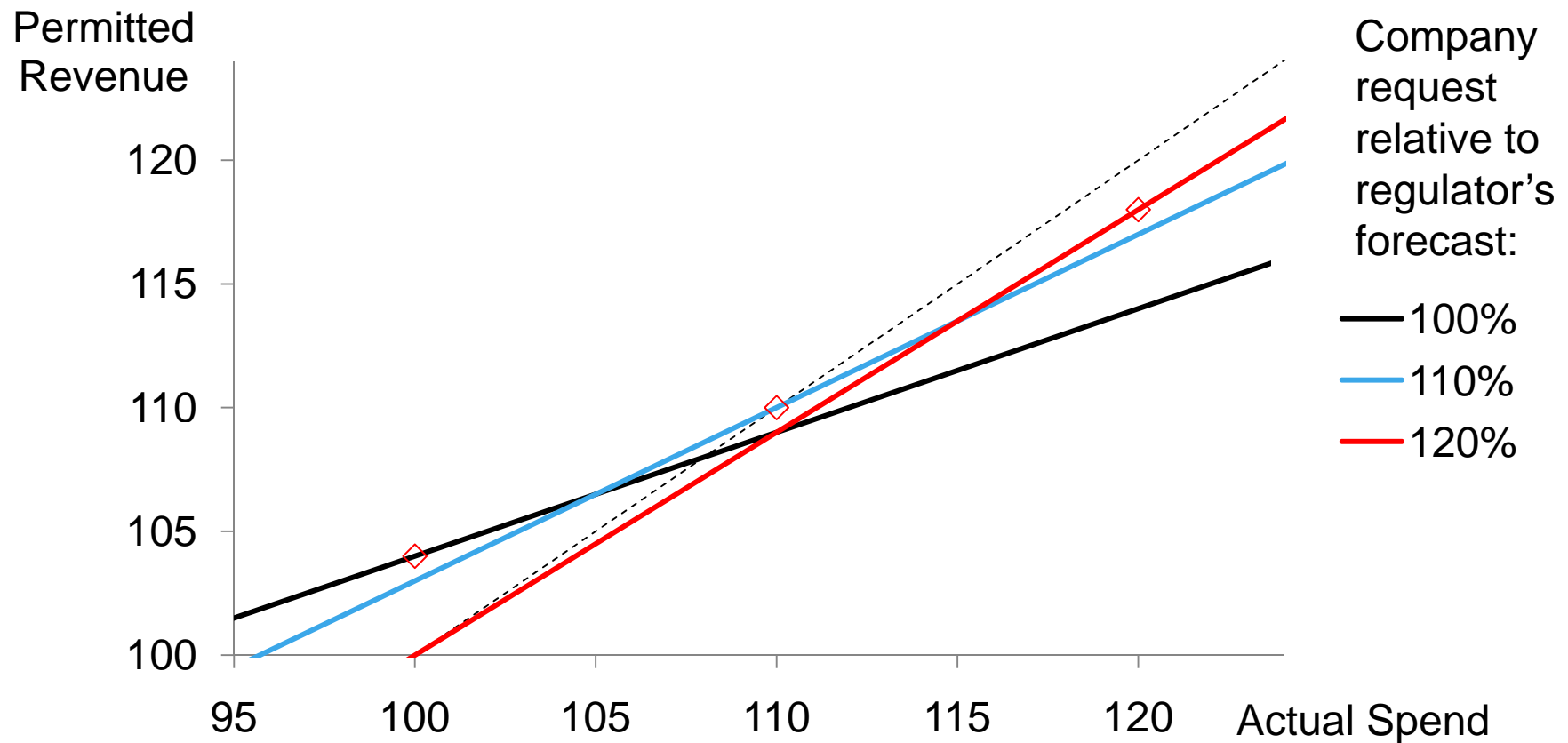


Electricity Distribution Investment Forecasts



Source: Offer, Distribution Price Control, May Consultation & Dec Proposals, 1999

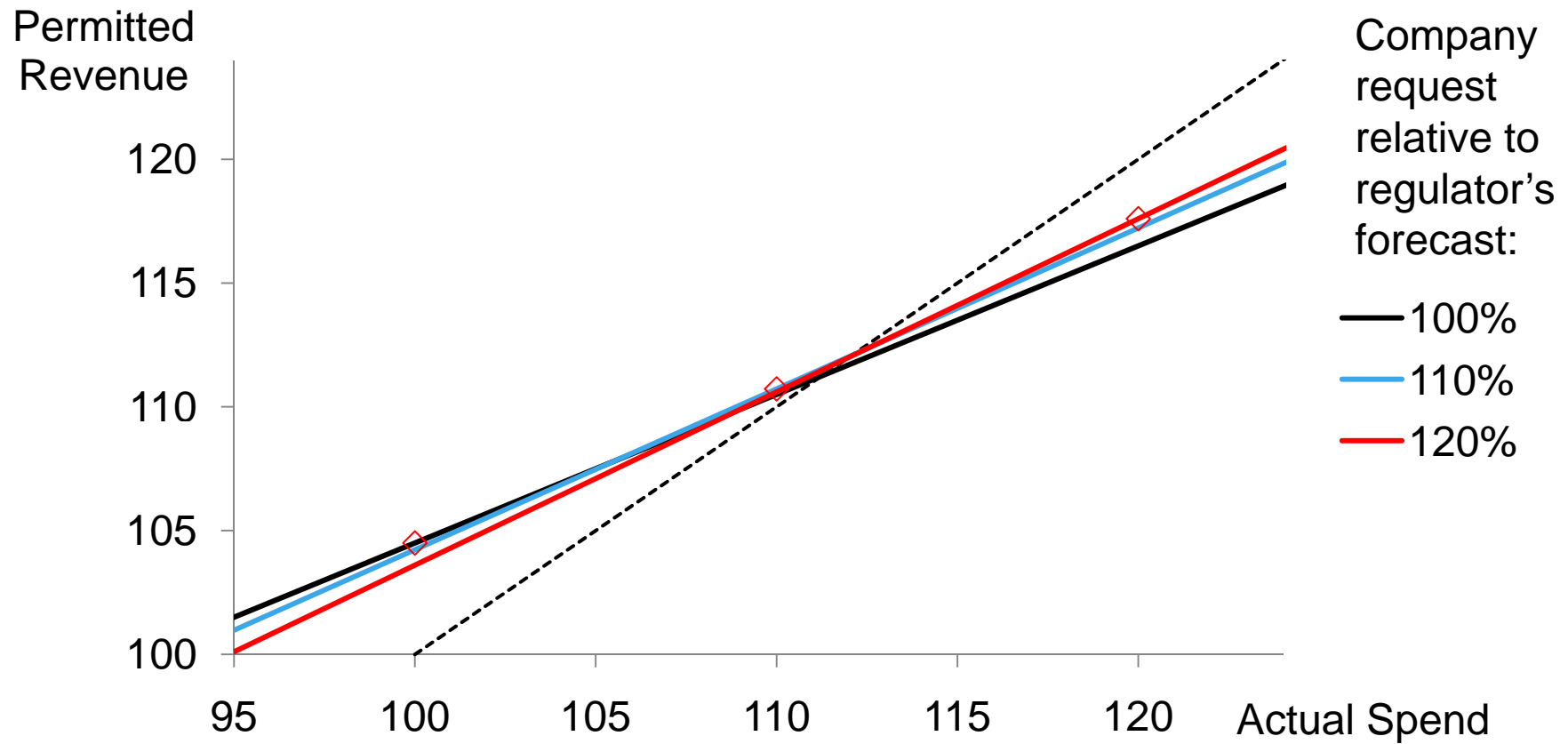
Information Quality Incentive



Thinking Networks



Information Quality Incentive



Thinking Networks

Future challenges

- Ageing infrastructure
- New generation sites
 - Wind in Scotland and offshore
 - Distributed generation
- The opportunity for a smarter grid
- Investment need: £32 bn by 2020
 - Current RAV £43 bn (all energy networks)

The Response: RIIO

Revenue = Incentives +
Innovation + Outputs

RIO building blocks

- 8-year price control periods
- Companies to deliver specified outputs
- Outputs can be adjusted mid-period
- No difference between Capex and Opex
 - Fixed proportion of total spend added to Regulatory Asset Value
- Cost of capital adjusted each year

Output-led

- Primary outputs:
 1. Customer satisfaction
 2. Safety
 3. Reliability and availability
 4. Conditions for connection
 5. Environmental impact
 6. Social obligations
- Secondary deliverables that provide options for the next control period can be added

Output criteria

- Material
- Controllable
- Measurable
- Comparable
- Applicable
- Compatible with promoting competition
- Legally compliant

Possible output measures

	Distribution	Transmission
Customer satisfaction	<ol style="list-style-type: none"> 1. Broad measures of satisfaction reflecting consumer and network user experience 2. Qualitative survey evidence 	
Safety	<ol style="list-style-type: none"> 1. Legal compliance with minimum requirements 2. Additional initiatives if in public interest 	
Reliability and availability	<ol style="list-style-type: none"> 1. Customer interruptions 2. Customer mins lost / Energy Not Supplied 	<ol style="list-style-type: none"> 1. Energy Not Supplied 2. Constraint measure
Conditions for connections	Time to connect <ol style="list-style-type: none"> 1. Generation 2. Demand 	Time to connect <ol style="list-style-type: none"> 1. Generation 2. Demand

Possible output measures

	Distribution	Transmission
Environmental Impact	<ol style="list-style-type: none"> 1. Carbon footprint of network including losses 2. Proportion of new low carbon generation 3. Other emissions 4. Visual impacts 5. Role in consumer energy efficiency 	<ol style="list-style-type: none"> 1. Carbon footprint of network including losses 2. Proportion of new low carbon generation 3. Other emissions 4. Visual impacts
Social Obligations	<ol style="list-style-type: none"> 1. Targets for vulnerable customers such as Public Service Obligations 	

Well-justified business plans

- Companies to develop plans
 - Focus on outputs
 - Consider the longer term
 - Consider alternative options
 - Link costs to outputs
- Ofgem will scrutinise or fast-track

Engaging stakeholders

- Civil Aviation Authority encouraged “constructive engagement” at airports
- Ofgem wants companies and itself to engage with stakeholders
- Stakeholders have the right to ask for a Competition Commission Review
 - If they have engaged and can pay the costs

Incentives for companies

- Information Quality Incentive for good forecasts
- Incentives & penalties on deliverables
- Gain-sharing incentive for efficiency
- Possible uncertainty mechanism for large unanticipated changes

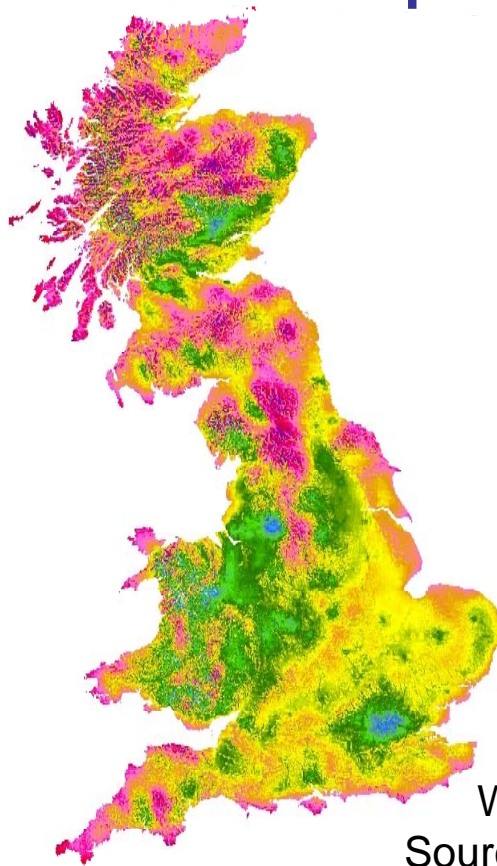
Evolution or Revolution?



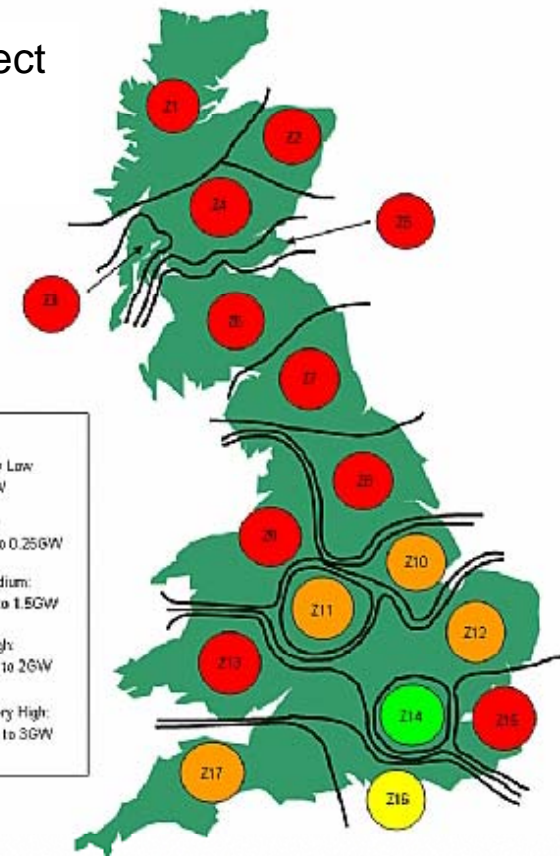
Moving the wind to the customers

Where should I build my power station?

Opportunities to connect power stations
Source: National Grid



Wind resource map
Source: GL Garrad Hassan





Transmission arrangements

- Charges based on long-run incremental cost, £/kW of generation capacity
- Various tries at charging for losses failed
- New plant had to join the GB queue:
“invest then connect”
- Policy is now “connect and manage”
(and socialise)

Who should pay for congestion?

- New generators in a constrained area?
 - Reduces profitability of entrants *for a given market price and level of renewable support*
- All the generators in a constrained area?
 - Better for entrants (see above); reduces incentive to avoid poor areas
- All ~~generators~~ customers

Project TransmiT

- Ofgem review of transmission charging etc.
- Facilitate timely move to low carbon electricity with value for money
- Connection policy – should users commit? Should the TSO compensate for delay?
- Charging – should this be on energy or capacity? Should there be more geographical differentiation?

Academic Reports

- Cambridge, US, Strathclyde/Birmingham
- Two reports favoured nodal pricing
- One noted its advantage of cost reflectivity but its lack of stakeholder support
 - Energy-based charges are good for stations with low load factors
 - EMR allows for compensating changes in support to low-carbon generators

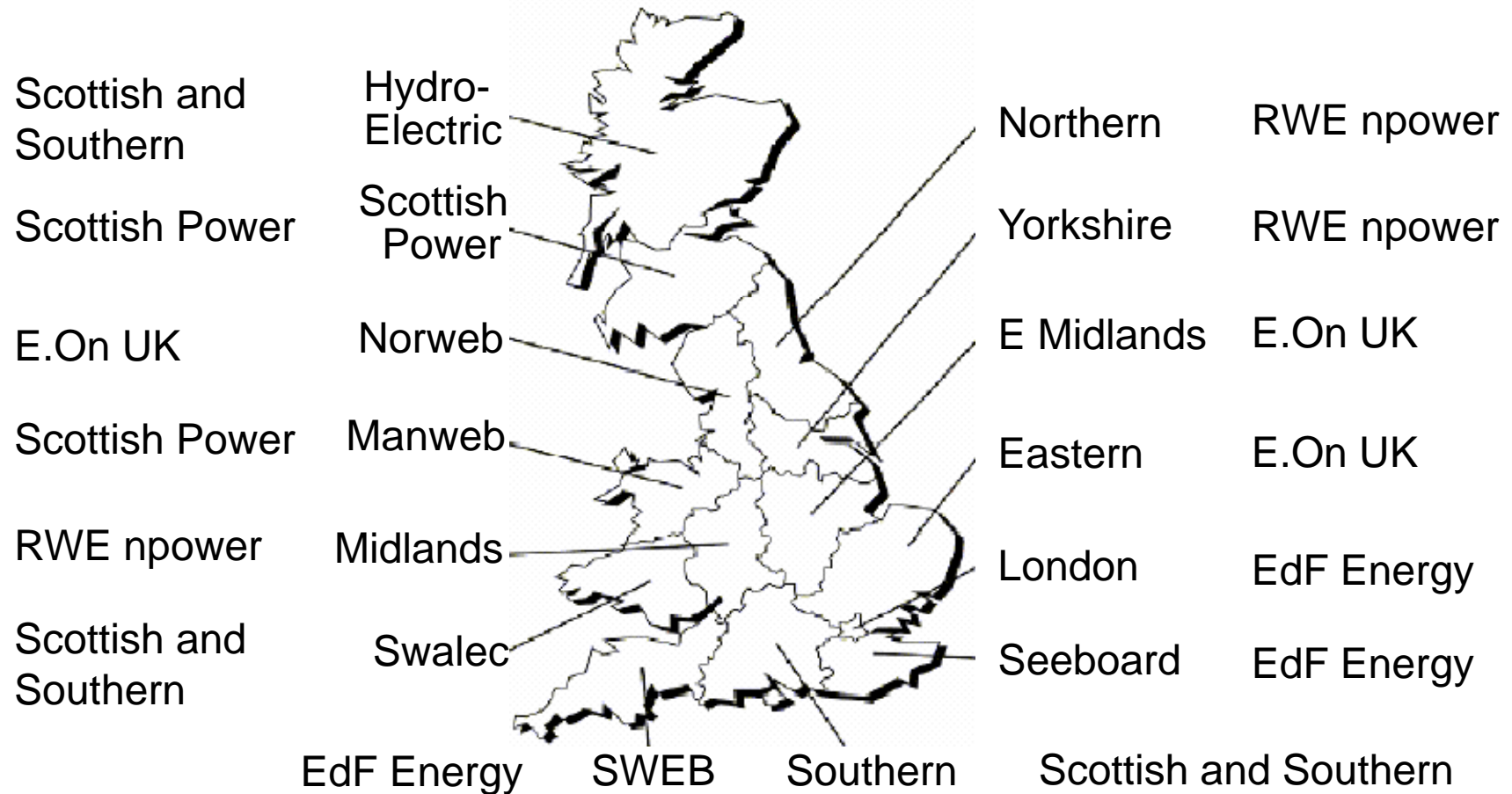


Ofgem's response



Retail market competition

Britain's electricity markets

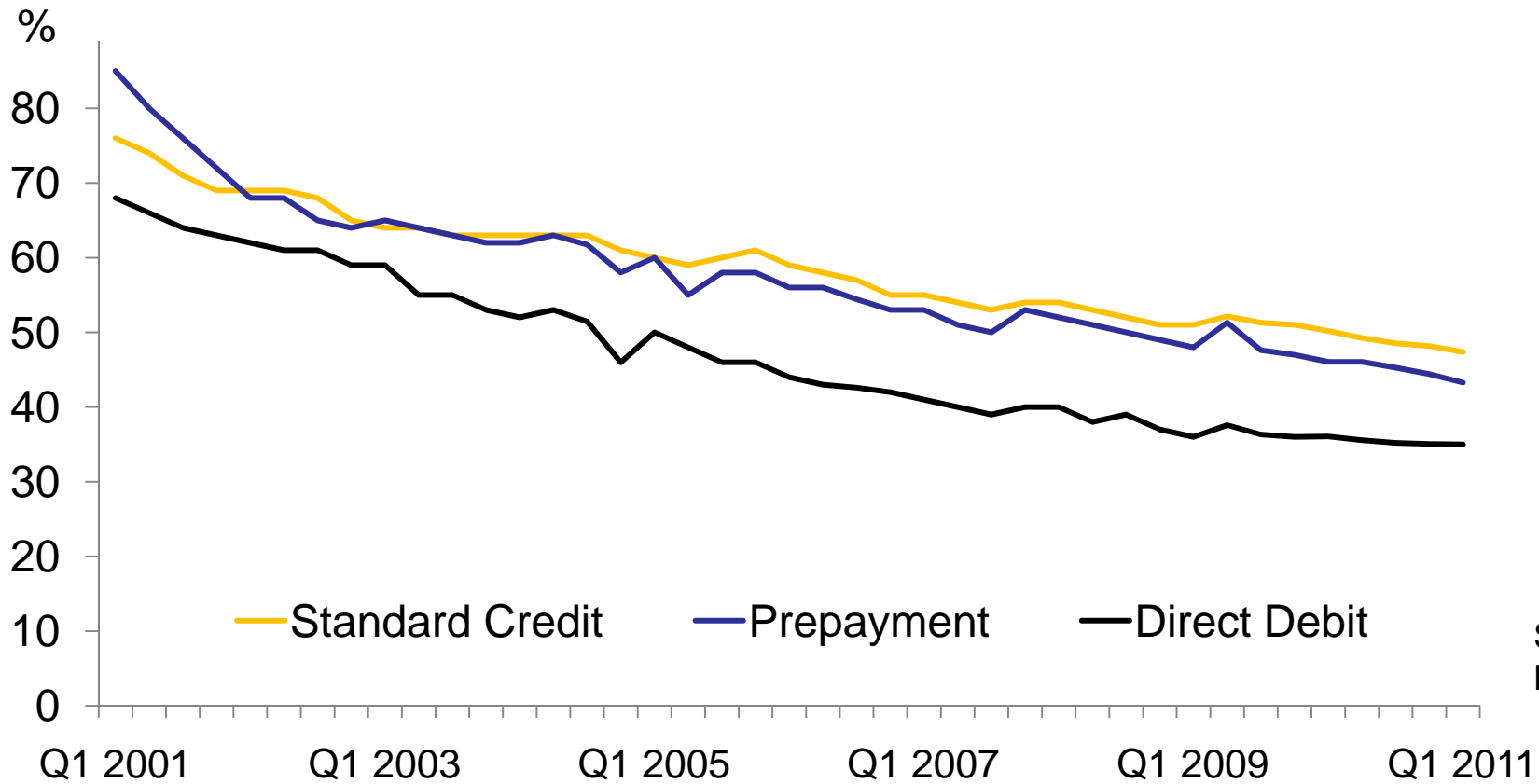


Thinking Networks

Retail Competition

- Large customers (1 MW) from 1990
- Medium customers (100 kW) from 1994
- “1998” happened in phases in 1998-99
 - Electricity regional incumbents could not compete until their own market was open
- Price caps set for 1998-2000 and 2000-02
- Price regulation lifted in 2002

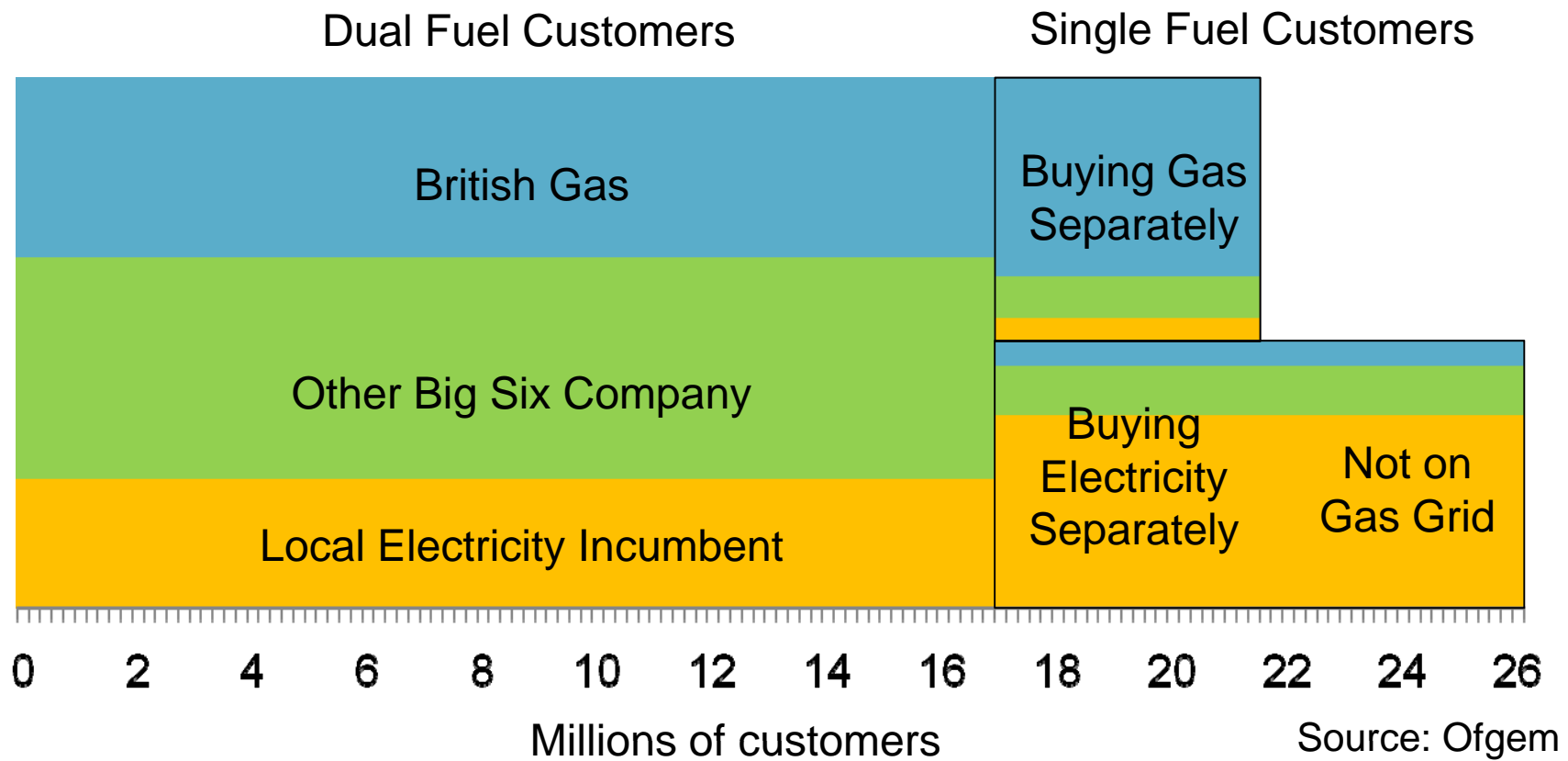
Incumbent market shares



Source:
DUKES

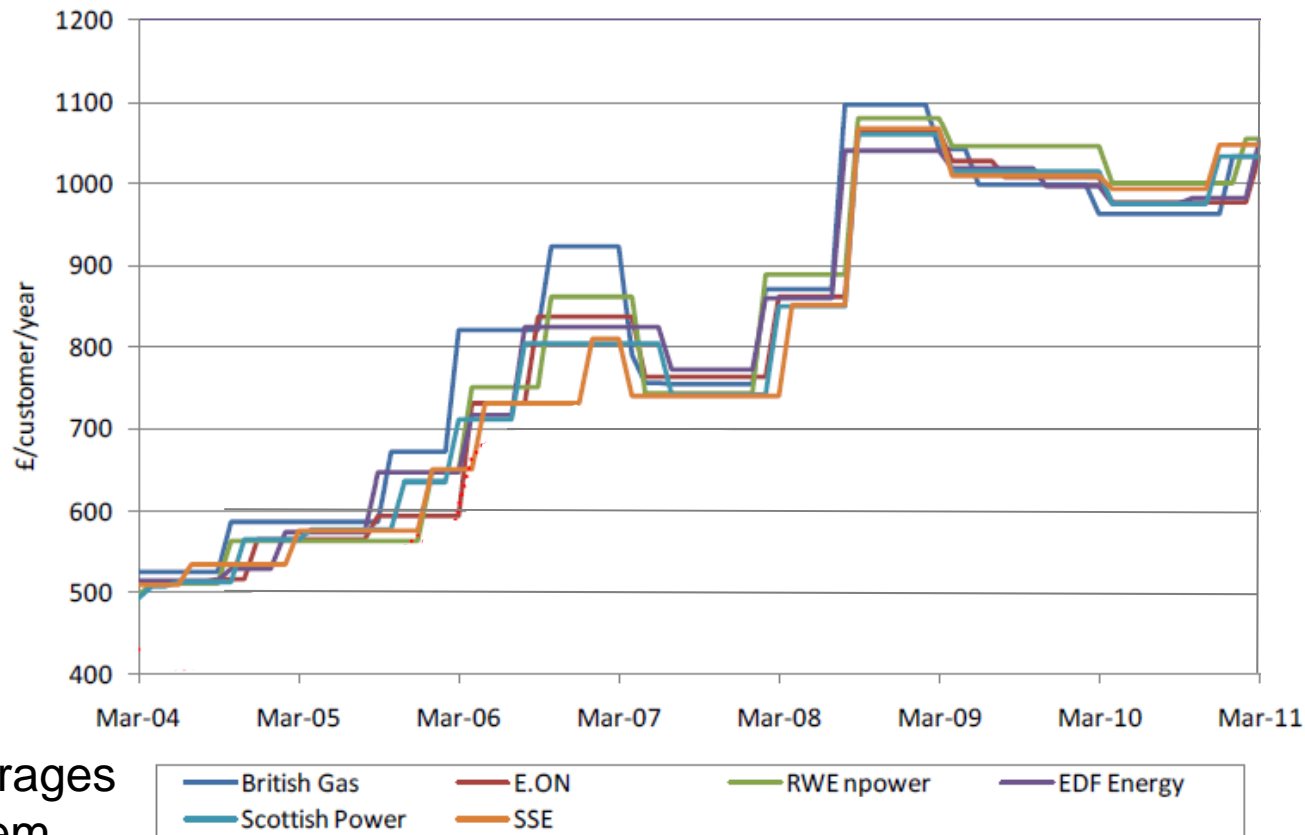
Domestic energy market shares

August 2010, Great Britain



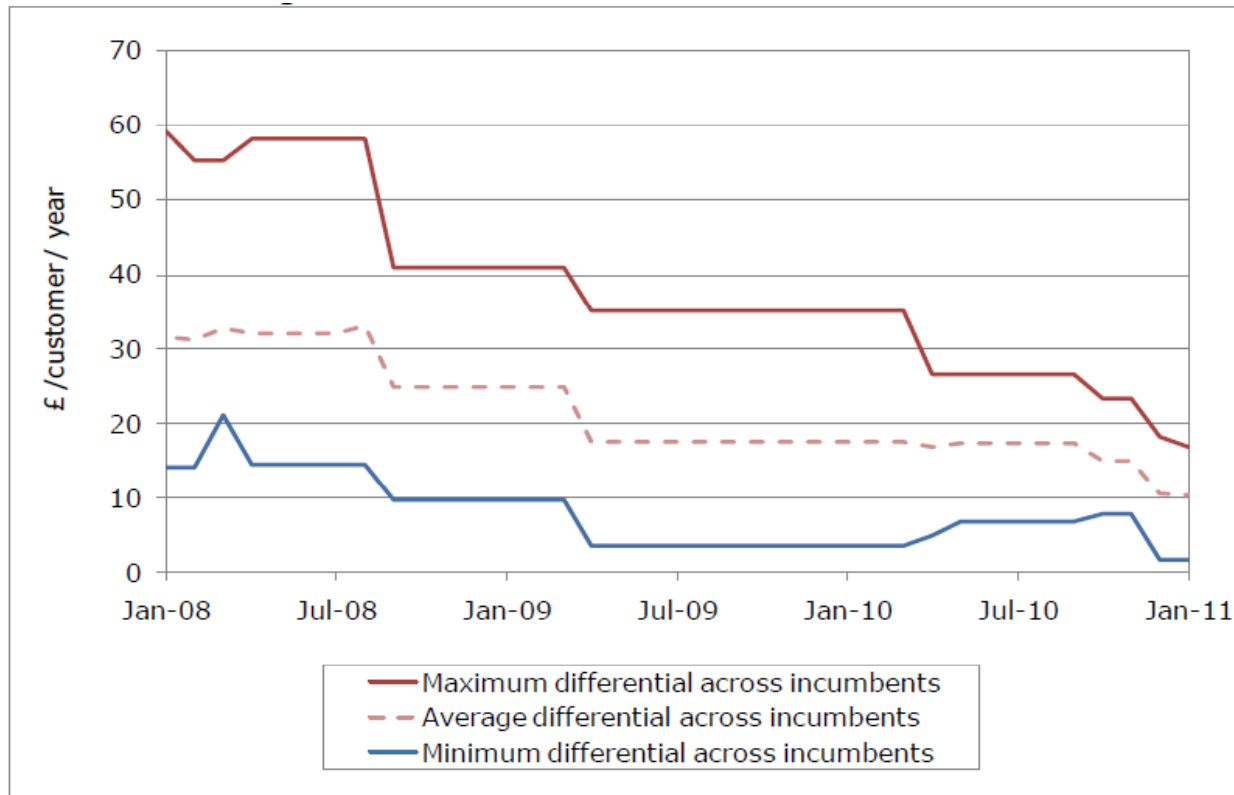
Thinking Networks

Dual Fuel bills



National Averages
Source: Ofgem

The cost of not switching



Differences between areas in which each company is an incumbent and those where it is an entrant, annual bill for credit electricity customers, corrected for network charges

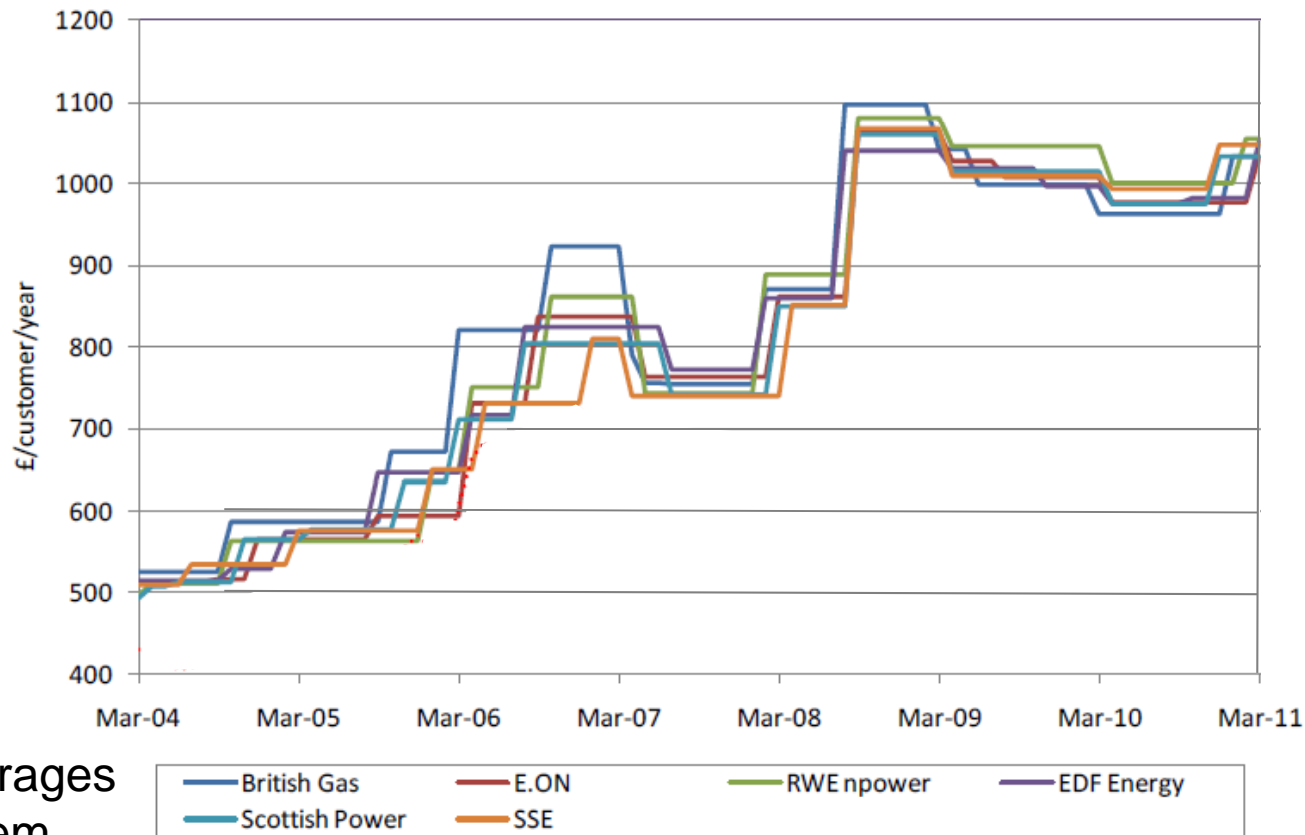
Source: Ofgem analysis on data from TheEnergyShop.com



The regulator's concerns

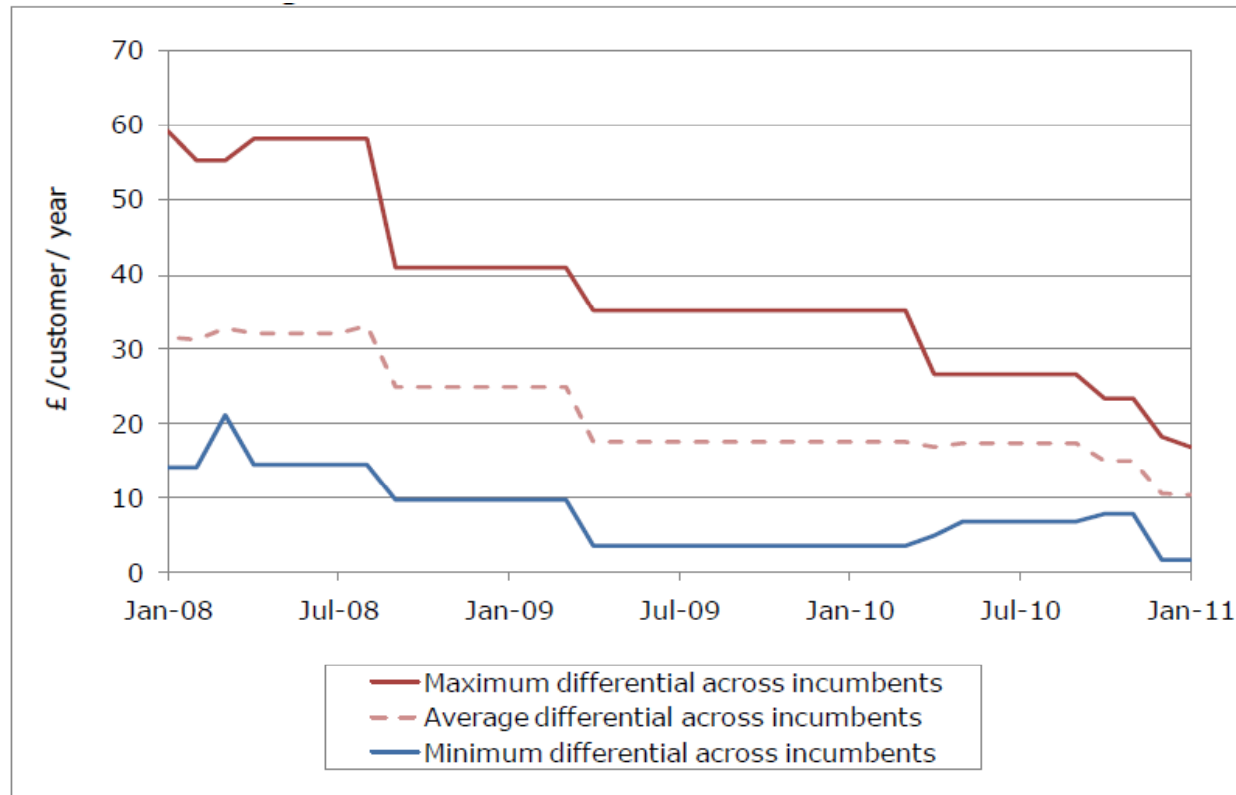
- Non-switching customers get a bad deal
 - Action to reduce price differentials
 - nb there are two ways to reduce $(A - B)$...

Dual Fuel bills



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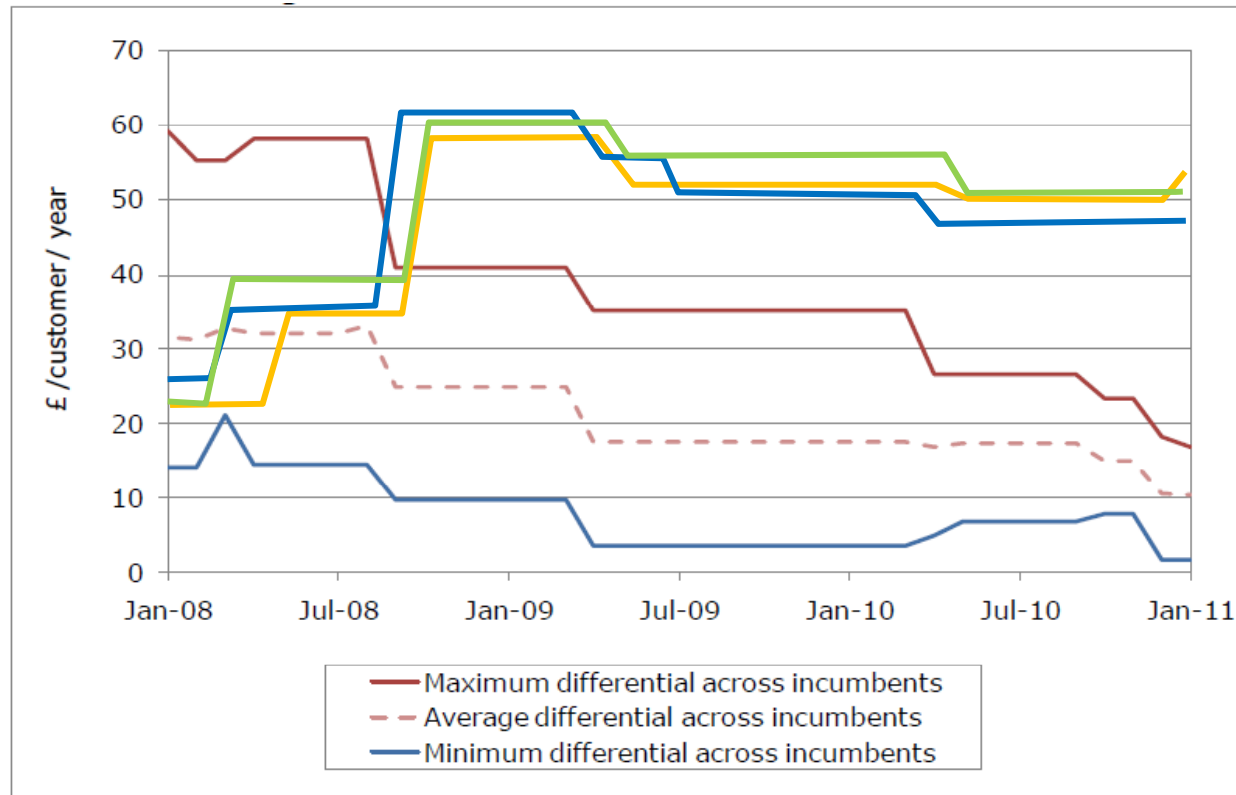
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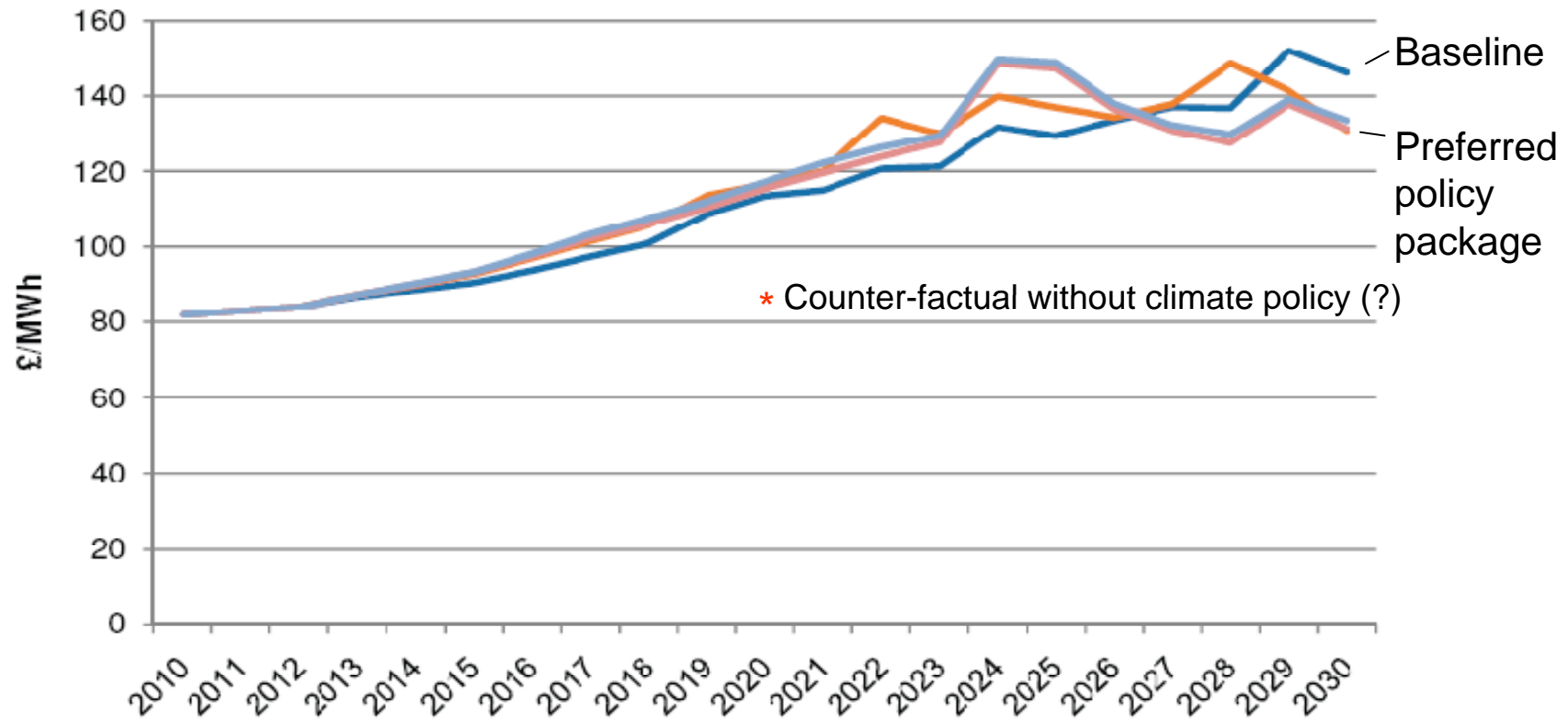
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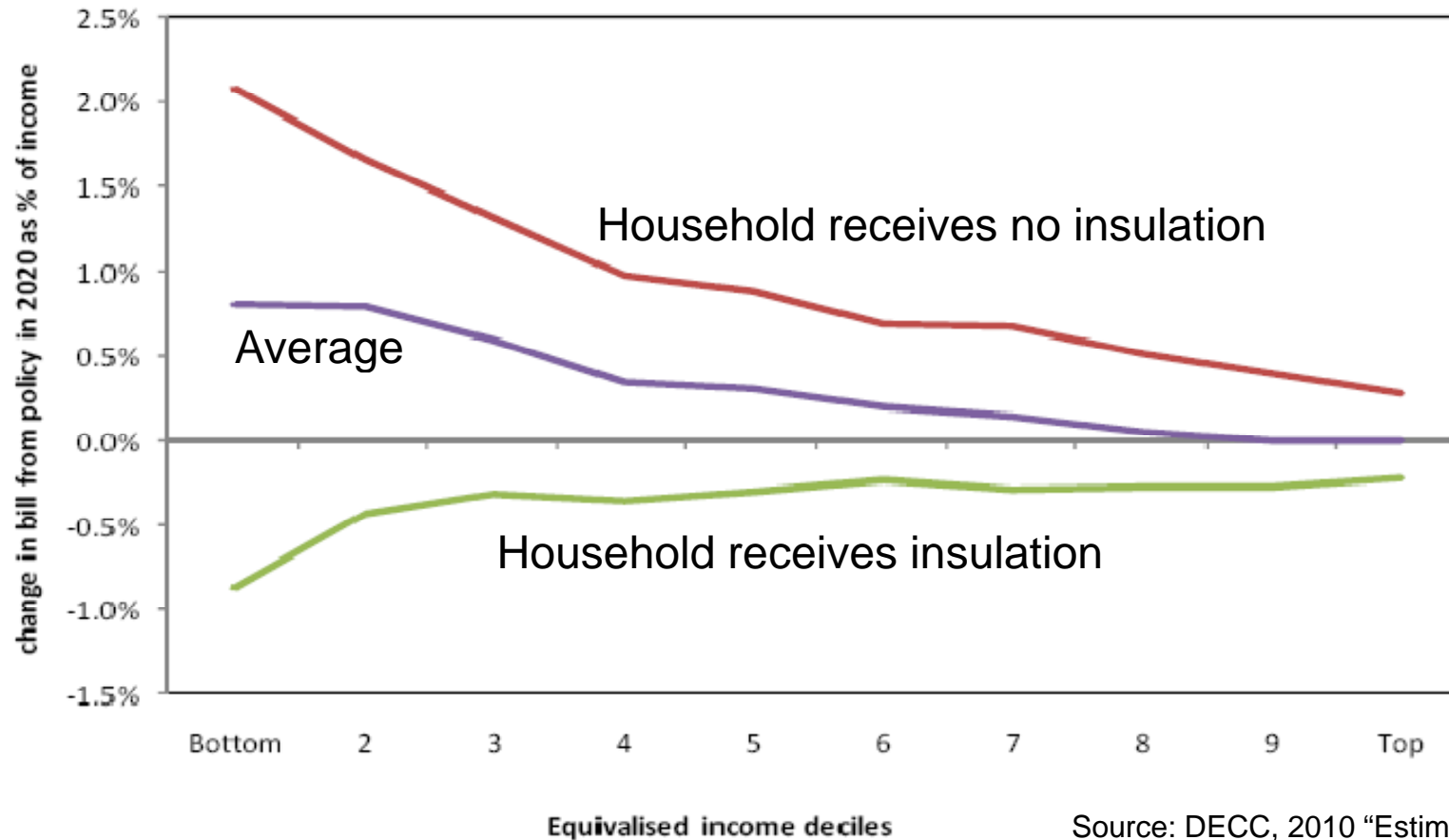
- Non-switching customers get a bad deal
 - Action to reduce price differentials
 - nb there are two ways to reduce $(A - B)$...
- Vertical integration reduces wholesale market volume and transparency
 - Proposing Mandatory Market Making and Mandatory Auctions by incumbents

Price predictions - DECC



“Time-weighted consumer electricity prices” Sources: DECC, EMR Consultation & “Estimated Impacts”, 2010

Impact on bills by income



Source: DECC, 2010 "Estimated Impacts of Energy and Climate Change Policies"

Energy efficiency policies

- Carbon Emissions Reduction Target
 - Obligation on energy suppliers, now targeted on insulation and low-income customers
- Community Energy Saving Programme
 - Energy saving measures in targeted areas installed on a street-by-street basis
- Warm Front grants from DECC
 - Insulation for low-income consumers



The Green Deal

- Investments in energy efficiency at no upfront cost to the customer
- Expected savings should exceed cost
- Repaid through future energy bills
- Energy Company Obligation
 - Additional support for consumers with low incomes or hard-to-treat homes