

**Voltage Power
Optimisation**

**ESTA Bradford Event
28th April 2010**

A 2020 Vision for Energy Efficiency in the UK



Presented by: Barry Taylor



The challenges

Financial

- Volatile electricity prices
- Increasing prices over time
- Effect of recession

Legislative



- Trading Schemes (EU)
- Climate Agreements
- CRC Energy Efficiency Scheme

Environmental

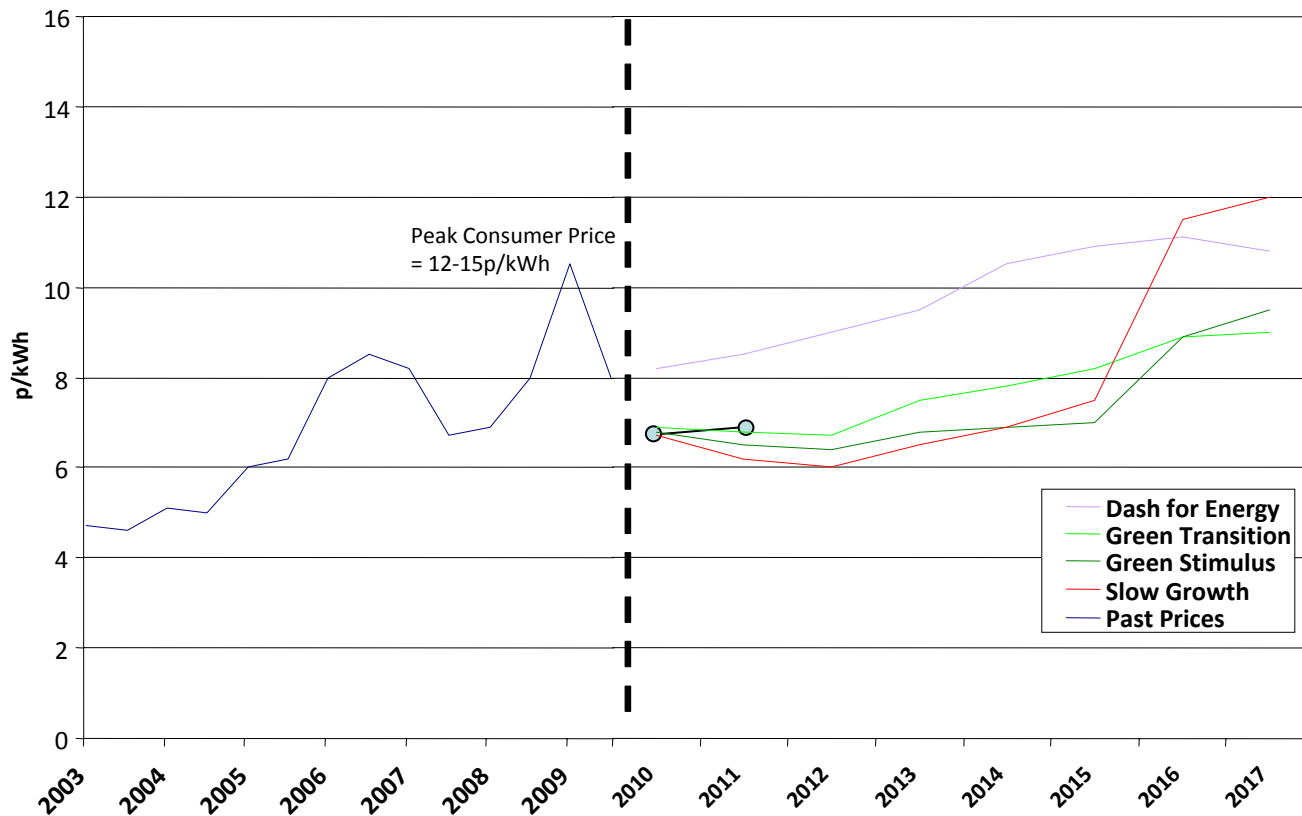


- Copenhagen failed, now up to us
- Corporate responsibility
- UK's carbon target: 34% by 2020
- London's target: 60% by 2025

Technical

- The Energy Gap – 2014
- Effects of poor power quality
- Higher voltage than required

Electricity Prices – Historic and Future



Underlying wholesale prices from “Ofgem Electricity and Gas Market Supply Report”, Doc reference 23/10, 22 February 2010, page 22, Fig 4.3 (Annual Forward Contract).

Underlying wholesale prices obtained from “Ofgem Project Discovery Energy Market”, Doc Reference 122/09, Scenario, 9 October 2009, page 51, Fig 3.19.

Some of the groups who responded to the Project Discovery Price Scenarios saying they thought forward price predictions were too low:

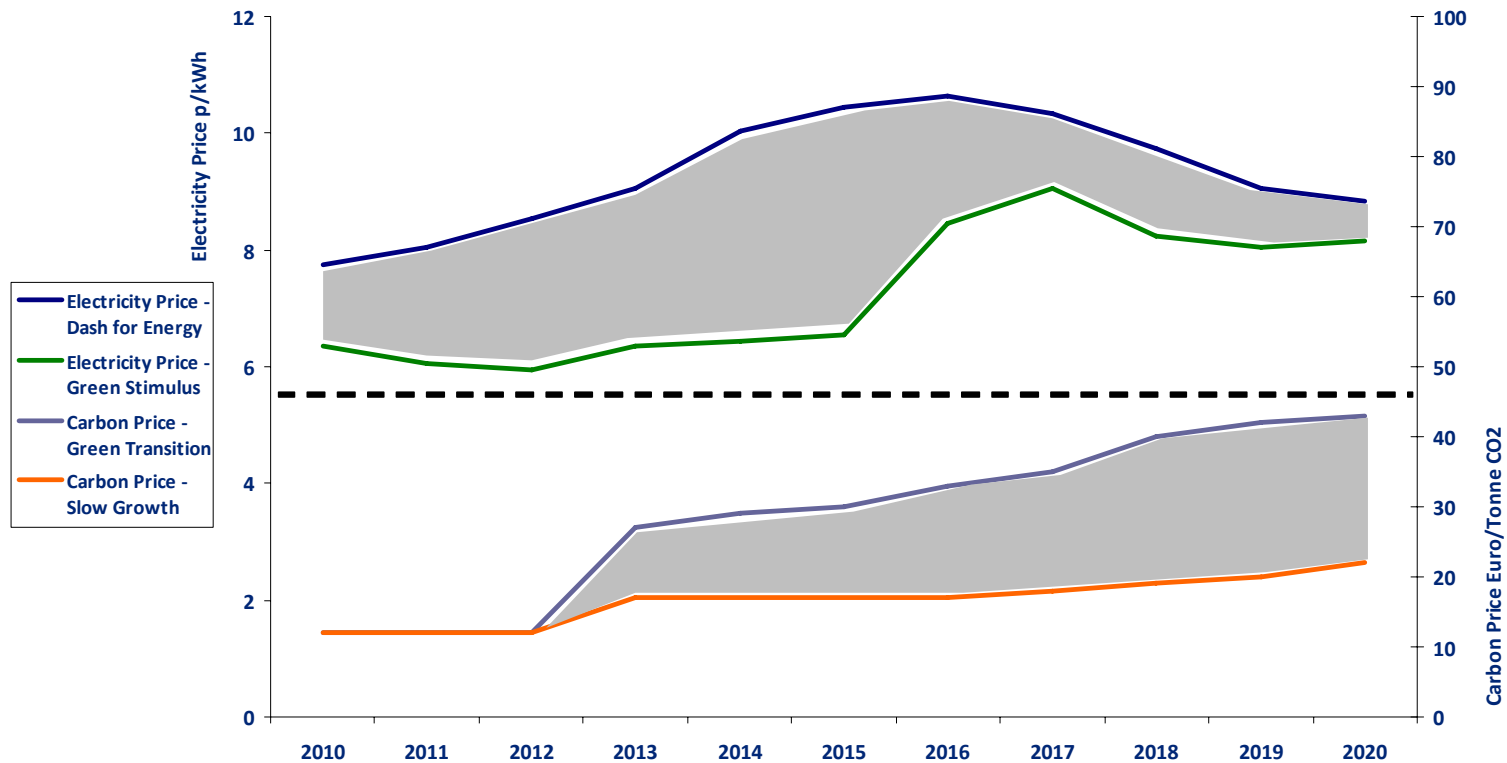
- Which
- Centrica
- EDF
- EON
- SSE



Delivery charges assumed to be 3p/kWh ○ Based on wholesale prices April 2010

Forward Electricity and Carbon Prices

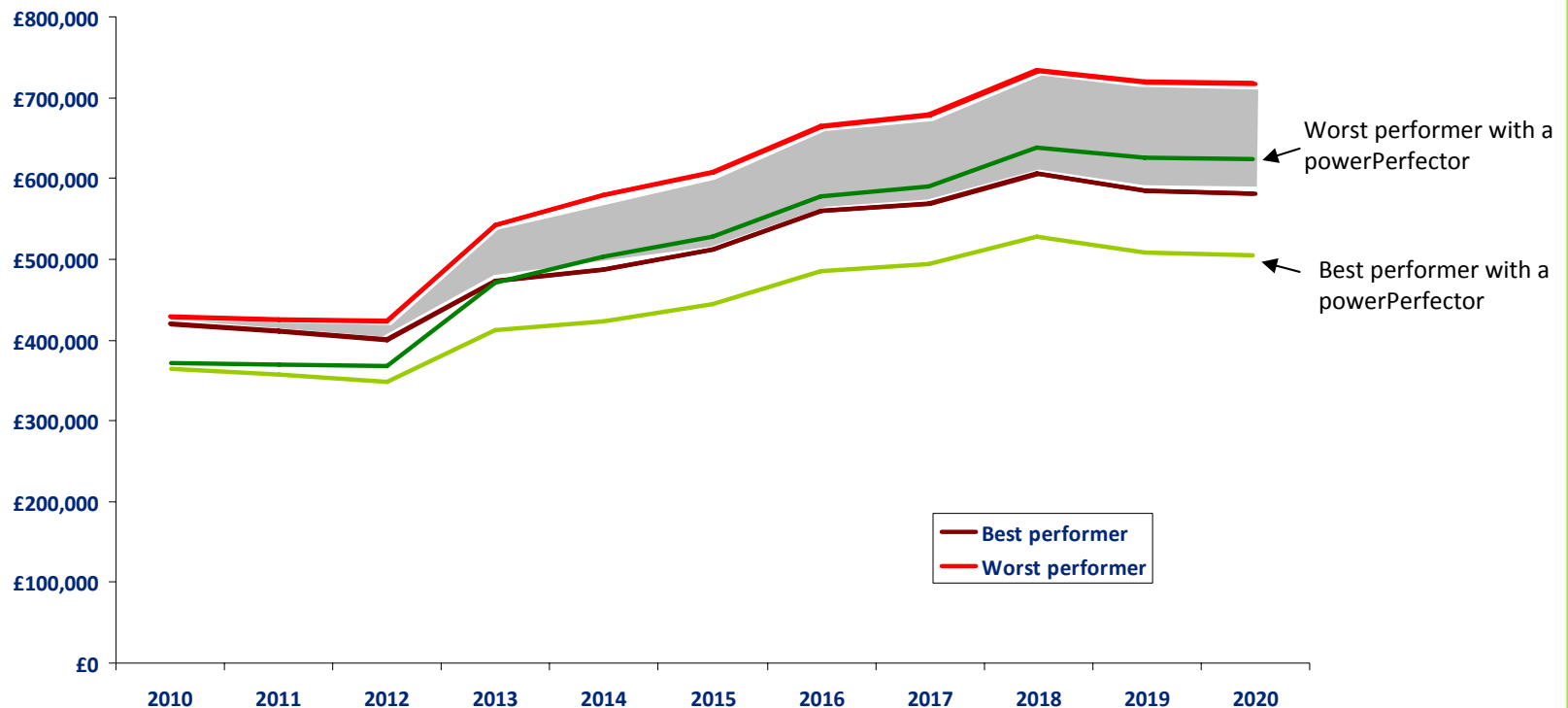
Electricity and Carbon Prices, 2010-2020



Delivery charges for electricity assumed to be 3p/kWh

Forward Price of 6,000MWh for best and worst performers in CRC league table

Electrical and Carbon Cost of 6,000MWh 2010 - 2020



Assumptions:

1. Delivery charges = 3p/kWh
2. Electricity and Carbon follow "Green Transition" price scenario
3. Euro – Pound exchange rate = 1:1



The Greatest Makeover, ever?

Aim

To prove the viability of energy efficiency retrofit projects to dramatically increase building energy efficiency and reduce its overall carbon output with sensible payback periods and enhanced profitability.

Initiatives

Evaluated more than 60 to get to 17 viable projects and 8 that will be installed; Windows, Radiator Insulation, Lighting, HVAC, Control System, Energy Management Systems

Costs and Benefits

Estimated project cost of \$20 million, annual energy savings of \$4.4 million, energy and cost reduction of 39%.
All this from a retrofit project!

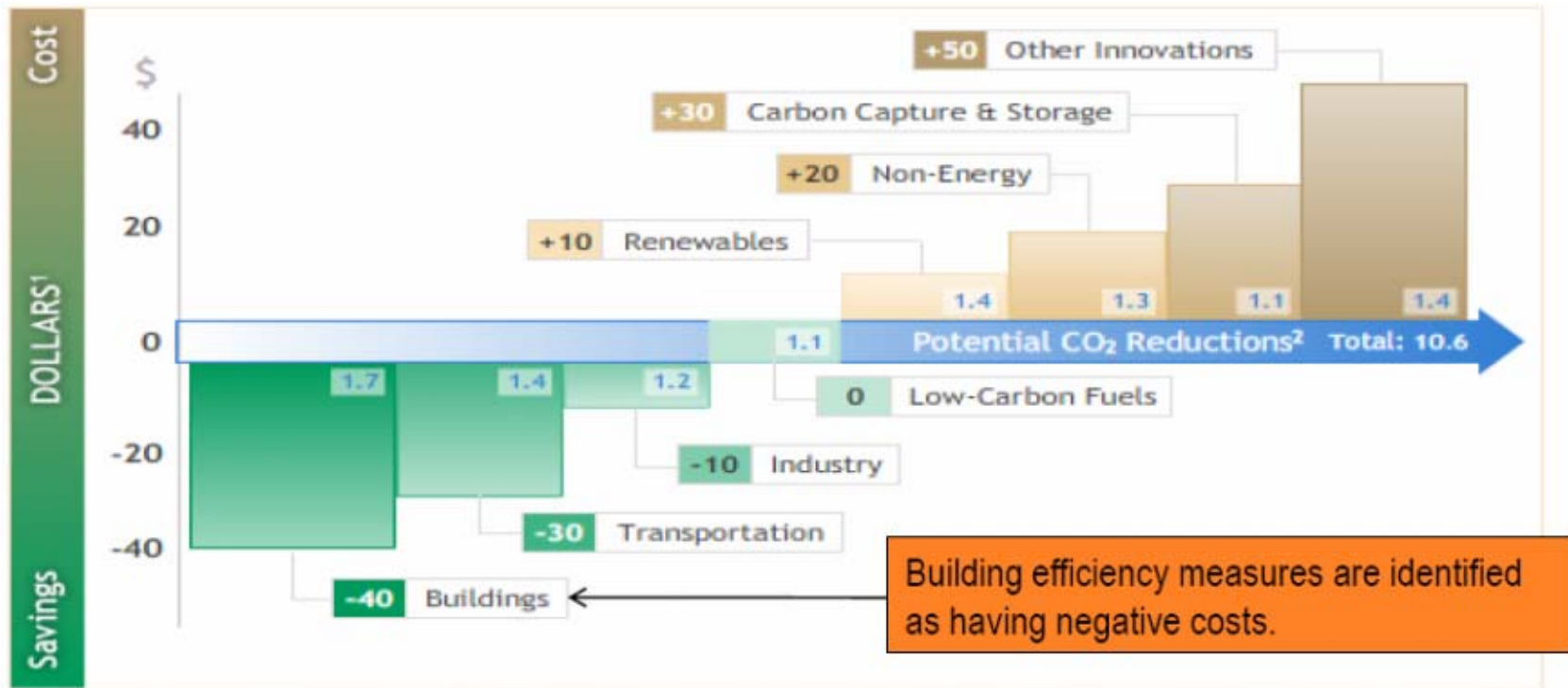
What of the UK?

London Development Agency is progressing the Building Energy Efficiency Programme which is based on framework agreement to deliver guaranteed savings that will become self-funding after initial investment.



Why Building Efficiency? The U.S. experience...

Cutting U.S. Global Warming Pollution 80% by 2050: Cost & Payoff by Sector



Source: Natural Resources Defense Council, cited by Clinton Climate Initiative
<http://www.nrdc.org/globalwarming/blueprint/default.asp>



powerPerfector for energy efficiency



Jonathon
Porritt

“When it comes to saving money and reducing emissions of CO₂, some things are easy and some things are hard. PowerPerfector fits in the easy category, and the only question companies have to answer is this: **why won't this technology help my company – right now?**”



“The Green Holy Grail...
Save the planet and save
money at the same time.”

Rohit Jaggi
FT.com



33rd fastest-growing company
in the UK

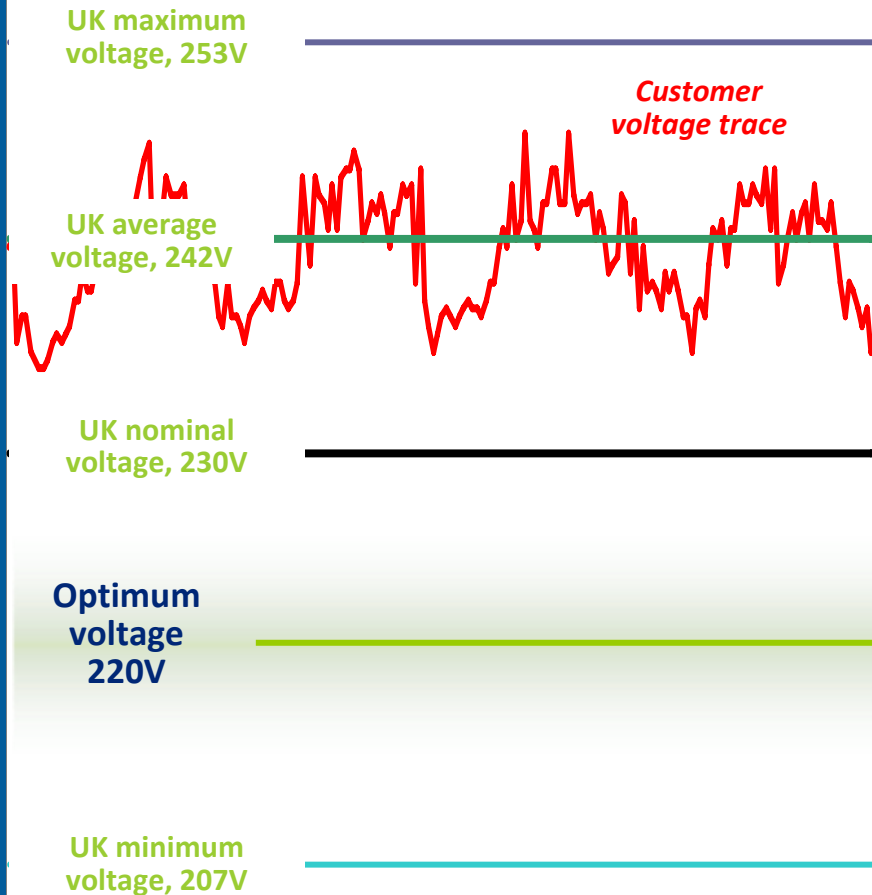
**Fastest-growing energy
efficiency company**



**Best Innovation in Energy
Management Award**



Over voltage...



Transients

- Spikes are on the increase and can be devastating

Harmonics

- Disrupt sensitive electronic equipment and reduce efficiency of HV transformers

3-phase imbalance

- Reduces motor efficiency and leads to triplen harmonics

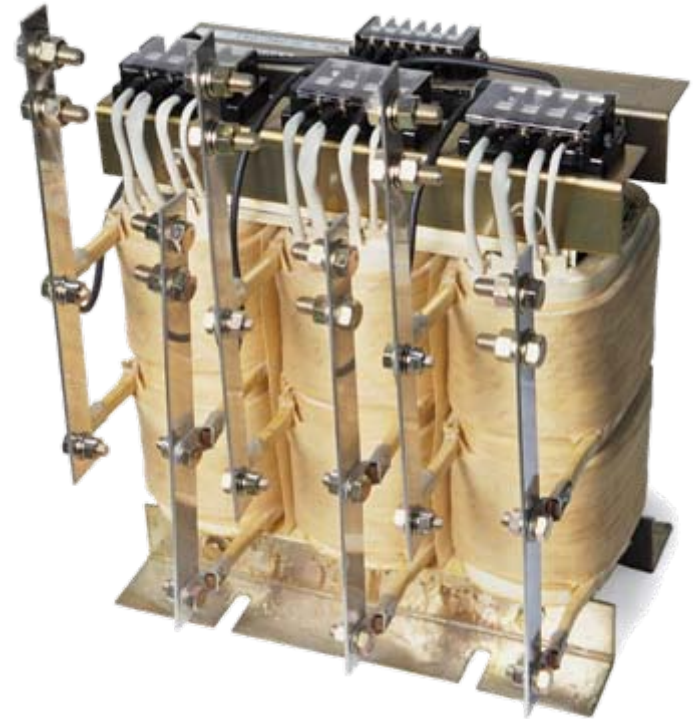
Power factor

- Poor power factor is a result of high reactive power, and can result in additional penalty charges

Poor Power Quality

Technical benefits

- Assists in balancing the 3-phase voltage
- Suppresses harmonics
- Protects your site from voltage spikes up to 25kV
- Protects infrastructure from poor power quality
- No forced cooling or ongoing temperature monitoring
- Extends life of electrical equipment
- Reduces onsite maintenance costs
- Increases capacity on circuit breakers



Financial benefits

- Reduces electricity consumption by 10%-20%
- Reduces electricity costs by 10-20%
- Reduces carbon footprint by 10%-20%
- Simple payback between 1 and 4 years
- Return on investment between 25% and 100%
- 15-year equipment guarantee
- 30 to 50 year lifespan
- Reduced maintenance costs
- **Savings Guaranteed**





Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Installed at more than...

250 private companies, including;

- Retail
- Hospitality
- Financial services
- Manufacturing
- Offices and data centres

101 councils (includes 23 schools)

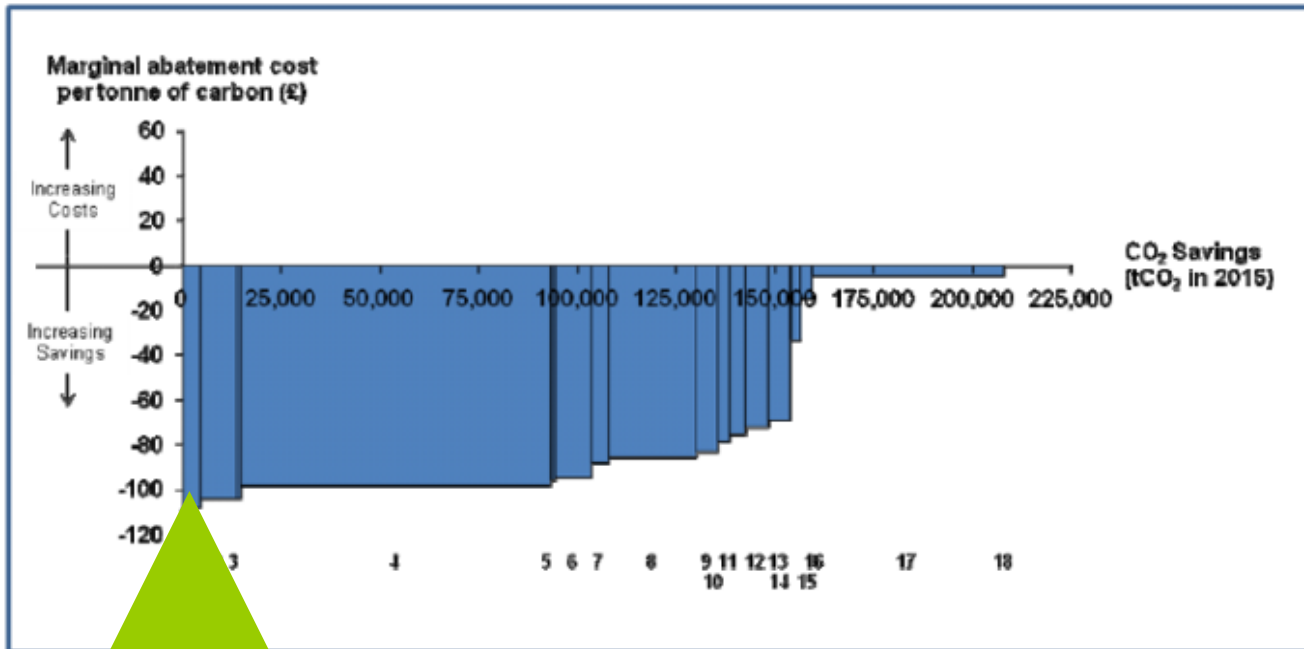
45 HE / FE facilities (all types)

13 government agencies



How does VPO rank?

MAC Curve for Small/Medium Acute Trusts Category



- **Voltage Power Optimisation** ranked within 'number 1' (-108 £/tCO₂)
- This is ahead of other options including:
 - Reduce heating by one degree Celsius
 - Improve the efficiency of chillers
 - CHP installation
 - Variable speed drives
 - Improve lighting controls
 - Building management system optimisation
 - Energy efficient lighting
 - Roof/wall insulation
 - Wind/biomass boiler/solar hot water



power
Perfector

energy saving like no other