Subsidies in the UK Electricity Sector until 2020

David Newbery

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Cambridge, 7th February 2014

http://www.eprg.group.cam.ac.uk
Outline

• **Energy Act** 18 December 2013 to address:
  – Security of supply and carbon/RES targets
  – problems with EU ETS
  – market failures

• To deliver **secure low-C in UK affordably**
  => capacity payments
  => **Carbon Price Floor**
  – de-risk investment => **Contracts** to lower cost of capital

• Problems with contract design
• Problems with finance
We are already locked in to high carbon emissions from past fuel choices

UK climate change policy

- 2027 legal target: 50% C reduction from 1990
- Zero-C generation faces more risk than fossil
  - electricity price set by gas or coal
- Renewables support is expensive
- return depends on electricity price
  - set by gas and carbon price
  - and scarcity of ROCs - rewards failure

need to de-risk zero C investment
Coal displaces gas as EUA price falls and gas price rises

Source: DECC DUKES
Little recovery after backloading and tightening post 2020

EUA price October 2004-January 2014

Source: EEX
Failures of ETS

- Current ETS sets quota of total EU emissions
- 20-20-20 Renewables Directive increases RES
- Global Financial Crash reduces demand
  
  \[
  \Rightarrow \text{increased RES does not reduce CO}_2 \\
  \Rightarrow \text{reduces carbon price} \\
  \Rightarrow \text{prejudices other low-C generation like nuclear}
  \]

- Risks undermining support for RES

**Solution:** fix carbon price instead of quota

**Persuade EU to create carbon price floor**
UK’s Carbon Price Floor - in Budget of 3/11

EUA price second period and CPF £(2012)/tonne

Source: EEX and DECC Consultation
Zero-carbon generation faces more risk than fossil generation.
Support to Wind under the ROC Scheme (real prices)

Windfall profits

Source: Ofgem and APX
Long-term contracts

- CO$_2$ price unpredictable, CPF not credible
- Need to attract new sources of finance
  - balance sheet of incumbents inadequate
- Electricity prices risky to new entrants in non-fossil gen
  - but attractive to incumbents with retail customers
    - hedges some of wholesale volatility

=> long-term contract-for-difference (CfD) enforceable in courts
CfD in *Energy Act 2013*

- Government announces strike prices and annual subsidy limit (Levy Control Framework)
  - uniform by technology (except Island wind), set 2014-17
  - runs *in parallel* with ROCs (pFiTs) to 2017
  => has to be made as attractive as ROCs
  => comparable rate of return (rather high for on-shore wind)
  => undermines logic of lowering cost by lowering risk
  => relies on locational grid signals (still under discussion)
- may lead to tender auctions if levy control breached
  => could then lead to better market-led outcome
LCF Spend for all Scenarios in 2020/21

Source: NG EMR Report
CfDs and state aids

• CfDs may be overgenerous (especially for nuclear)
• DG COMP’s State Aid guidelines designed to prevent market distortions
  – to be updated for energy 2014
• intervention justified by irreparable market failures
• Test of intervention: “is the aid measure proportional, namely could the same change in behaviour be obtained with less aid?”
• Are CfDs least cost? Are there better solutions?

*German feed-in tariffs look cheaper*

*Best GB solution - move to auctioning asap*
Better solution: Feed-in tariffs

- Pay fixed price per MWh for $n$ years (DE)
  - measure output for three years to estimate market revenue
  - $n$ set to cover excess cost relative to market revenue
    - lower in windy places extracts (share of) excess rent
  - requires good locational signals for transmission costs
  - SO responsible for dispatch, weather forecasting, etc.

- Auction for FiT to connect to specified grid points
  - TSO assess all extra costs (transmission, balancing etc.)
  - developers assess local RES resource, choose best site, specify price level, contract length, constrained off payment
  - SO select least cost to system; developer pays local connex
Supporting immature low-carbon

- CCS and wave/tidal stream at pre-deployment stage
  - arguably off-shore wind as well
- need demo plants to assess cost and more R&D
- What is the best form of support?
- Competition - as for CCS, with support for major risk
  => capital subsidy with large cost share
- arguably also appropriate for first nuclear plant
- Competition for R&D projects
  - need criteria to select and terminate
How should subsidies be funded?

• Reducing carbon, creating learning and knowledge are all **PUBLIC GOODS**

  => finance out of public funds, **not levies** on electricity

• current policies exempt some industries in some countries from such levies
  – legally discriminatory, violates State aids, DG COMP cross

  => Solution = ALL industry should be exempt from distortionary taxes => fall on final consumers (VAT)

*Make Energy policy consistent with good public finance*
Evolution of the share of RES-E levies in the electricity price for households in selected EU countries (2009-2012)
Medium industrial electricity prices 2012

Source: Eurostat, 500-2000 MWh
Criticisms of Market Reform

• “Contracts mark return to Single Buyer Model”
  – but all IPPs in 1990s had long-term PPAs
• “Bureaucrats, not markets choose investment”
  – but current RES support Govt designed after intense lobbying by incumbents
    => tenders, auctions to create competition
    => contracts should incentivise efficient operation
• “Wholesale price will be *distorted* by contracts”
  – fossil at margin until 2020+, problem is wind and low variable cost plant => capacity payments?
  – Problem from RES, not contracts
Conclusions

• **Low-C** generation needs long-term contracts needed as no credible futures markets for corrective carbon tax

• Near-market **renewables** needs extra support
  – long-term contracts hedge political risk
  – contract design needs improvement
  – auctioned contracts better if adequate competition

• **Immature technologies** need targeted competitively bid support

*Subsidies should come from general taxation*
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Acronyms

CCS  Carbon capture and storage
CfD  Contract for Difference - pays (charges) difference between strike price and reference market price
CPF  carbon price floor
ETS  Emissions Trading System
EUA  EU Allowance for 1 tonne CO₂
FiT  Feed-in tariff
pFiT Premium FiT
IPP  Independent Power Producer
PPA  Power Purchase Agreement
RES  Renewable Electricity Supply
ROC  Renewable Obligation Certificate
SO   System Operator
TSO  Transmission System Operator
Build-up of final retail domestic price 2012