Progress on market reform: EMR, the I-SEM and the TEM

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Electricity Market Reform

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Disclaimer

Although I am an independent member of the SEM Committee these are my personal views and should not be interpreted as reflecting any current or future view of the SEM Committee.

I have been on the Panel of Technical Experts for the EMR but speak entirely in my own capacity.
Outline

• Progress with UK’s EMR
• Mismatches between TEM and SEM
  – energy-only market, simple bids to PXs vs complex bids vs centralised dispatch with capacity payments
• Active consultation on SEM market design
  – For the wholesale market
  – For capacity payments
  – to address high wind penetration

*Aim to deliver the Integrated SEM: I-SEM*
Progress with the EMR

• **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
Little recovery after backloading and tightening post 2020

EUA price October 2004-January 2014

Source: EEX
UK’s Carbon Price Floor - in Budget of 3/11

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

Source: EEX and DECC Consultation
Long-term contracts

- CO$_2$ price unpredictable, CPF not credible
- Need to attract new sources of finance
  - balance sheet of incumbents inadequate
- Market 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 review)
- may lead to tender auctions if levy control breached
  => *could then lead to better market-led outcome*
Conclusions on EMR

- **Low-C** generation needs long-term contracts needed as no credible futures markets for corrective carbon tax
- FiTs make sense for unreliable RES (wind etc) – need to avoid exposure to balancing etc.
- EMR hampered by existing RO scheme – will be more expensive than intended
- Should move to auctions asap

*Subsidies should come from general taxation*
Problems with the SEM

- Prices **high** because of high wholesale prices
  - inevitable in small peripheral system?
  => Need to insulate prices from RES charges
- Interconnectors **inefficiently** dispatched
  - will be resolved by market coupling in 2016
- Capacity payments **poorly targeted**
  - DG COMP hostile to poorly justified CPs
- N-S transmission links need **strengthening**
- Gen TUoS charges **not adequately spatially varied?**
  - Vary from £385 in NI to £535/MWmnth (£4.6-6.4/kWyr)
- High wind requires **DS3 reforms**
Build-up of final retail domestic price 2012

Source: Derived from the International Energy Agency publication, Energy Prices and Taxes
Advantages of current SEM

• Efficient dispatch:
  – unit commitment central dispatch lowers cost compared to self-commitment and energy-only trading
  – benefits larger in small systems
  – will increase as wind penetration rises

• BCoP mitigates market power:
  – remains a problem in near term at least
  – provides comfort for new entrants

• Capacity payments
  – necessary to mitigate political and regulatory uncertainty
  – problem is their efficient design and stability
Adapting to TEM

• Central issue is market coupling
  – DA bids/offers for interconnectors submitted to central auction office => prices in each zone
  – prices on PXs and use of ICs simultaneous
    => efficient use of ICs
  – price zones defined by congestion not borders

• To do: intra-day and balancing trades over ICs

What is it worth? How might it be done in SEM?
One-third of the time flows are perverse

Wholesale prices and percent economic imports

- SEM weekly av price
- UK RPD weekly av
- percent time flows economic
- 28-day MA of econ flows
### Annual benefits from coupling Moyle and EWIC (950/910MW imports, 580MW exports)

<table>
<thead>
<tr>
<th>Deadband (€/MWh)</th>
<th>Consumer Surplus (€ millions)</th>
<th>Producer Surplus (€ millions)</th>
<th>Total Potential Gain in Social Welfare (€ millions)</th>
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</thead>
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<td>12.1</td>
<td>40.7</td>
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<td>23.7</td>
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<tr>
<td>15</td>
<td>16.6</td>
<td>2.8</td>
<td>19.4</td>
</tr>
</tbody>
</table>

Note: **Deadband** is the remaining price difference below which traders are too risk averse to risk trading.

Source: SEM-11-023
Capacity payments

- GB will have capacity payments from 2018
  - in return for capping wholesale price at £6,000/MWh
  - VoLL taken as £17,000/MWh, LoLE = 3 hours
- Efficient trade over interconnectors requires efficient scarcity pricing
  \[ \text{LoLP} \times (\text{VoLL} - \text{SMP}) \]
  => reform SEM capacity payment to this?
- But SEM price cap of €1,000 far below this
SEM Capacity Payments 2012 and 2013

Average €7/MWh
Figure 5 – Capacity Payments in € per available MWh vs. ex-post margin, 2008, under the LOLP x (VOLL-SMP) benchmark design

Would have paid 218% of the available pot

Source: Poyry: Capacity Payment Mechanism Medium Term Review 2011
Scaled to pay the actual capacity pot in 2008
Day-ahead pricing

- SEM sets price on basis of ex-post dispatch
- DA markets set price on ex-ante bids
  - Intra-day markets will allow adjustments
- I-SEM design will need to adapt to his
- DA dispatch provides prices for DA trading
- Adjusted in light of wind, demand, outages
  => revised dispatch and intra-day/balancing prices (effectively ex post prices) for deviations from initial dispatch

Who chooses initial and revised dispatch?
Conclusions

- TEM improves use of interconnectors
  - realises value to SEM consumers who own ICs

- GB market changing
  - coupled on Continent, has CPF and CP from 2018
  - price cap to be raised to £6,000/MWh

=> could increase SEM exports when GB stressed

=> care designing SEM CPM

- Central dispatch probably more efficient

*If kept need to devise efficient intra-day trading*
Spare slides

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BCoP  Bidding Coide of Practice
CfD  Contract for difference
CP(M)  Capacity Payment (Mechanism)
CPF  carbon price floor
DA  Day ahead
EMR  (UK) Electricity Market Reform
ETS  Emissions Trading System
EUA  EU Allowance for 1 tonne CO₂
EWIC  East-West Interconnector
FiT  Feed-in tariff
IC  Interconnector
LCF  Levy Control Framework
LoLE  Loss of Load expectation (expected number of hours of LoL)
LoLP  Loss of Load Probability
RES  Renewable energy supply
RO(C)  Renewable Obligation (Certificate)
TEM  Target Electricity Market
TUoS  Transmission use of system (charge)
VOLL  Value of Lost Load
Price duration curves at 2013 prices

SMP+CP 2013
SMP+CP 2012
SMP 2013
SMP 2012
SMP+CP 2009
SMP 2009