The Future of Electricity Regulation

Michael Pollitt
Plan

• Traditional model of electricity reform
• Drivers of change
• Premises for a new model of regulation
• Elements of a new model of regulation
• Lessons for Ofgem/Government/Companies
The Traditional Model

• Competition in wholesale market
• Competition in retail market
• Regulation of network services via RPI-X
• Additional incentives for quality of service and loss reduction

• Private ownership model
• Separate regulation of electricity and gas
The Traditional Model

- The Gas and Electricity Markets Authority mandate:

- *Principal objective* is to protect the interests of consumers, present and future, wherever appropriate by **promoting effective competition**.

- Must *have regard to*:
  - The need to secure that all reasonable demands for gas and electricity are met;
  - The need to secure that licence holders are able to finance their statutory activities.
  - The interests of vulnerable individuals are protected.

- Carry out the functions in the *manner best calculated to*:
  - Promote efficiency and economy of companies and end use
  - Protect the public from dangers of electricity and gas supply
  - Contribute to the achievement of sustainable development; and
  - Secure a diverse and viable long-term energy supply.

- Must *also have regard, to*:
  - The effect on the environment of gas supply and electricity production and use
  - The best regulatory practice; and
  - Certain statutory guidance on social and environmental matters issued by the Secretary of State.
Evidence on the effect of model

- Competition in wholesale markets:
- Competition in retail markets
- Regulation of network services via RPI-X
  - Domah and Pollitt (2001), Hattori et al. (2005)
- Additional incentives for quality of service and losses
  - Jamasb and Pollitt (2007), Yu et al. (2007)
Drivers of change

- Maturity of existing model:
  - Competitive wholesale market by 2001
  - Network efficiency gains by 2005
  - Increasing importance of add-ons:
    - Environmental: ROCs, DG
    - Quality of service incentives
    - Loss incentives
  - Retail competition nearing steady state:
    - % switched from incumbent in March 2006 – 44.9%
    - % switched from incumbent in March 2007 – 47.9%
Retail competition in steady state?

Figure 7.1: Market share of entrant suppliers (March 2007)

Source: Domestic gas suppliers and electricity distribution companies
Retail competition in steady state?

**Figure 7.2: Electricity regional market shares (March 2007)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Market Share of Incumbents</th>
<th>Market Share of Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Midlands</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Eastern Powergen</td>
<td>51</td>
<td>49</td>
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<tr>
<td>London Powergen</td>
<td>43</td>
<td>57</td>
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<td>Manweb Powergen</td>
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<td>48</td>
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<td>Midlands npower</td>
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<td>Northern npower</td>
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<td>Seeboard Powergen</td>
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<td>Southern SSE</td>
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<tr>
<td>Swalec SSE</td>
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<td>46</td>
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<tr>
<td>Sweb EDF Energy</td>
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<td>53</td>
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</tbody>
</table>

Source: Electricity Distribution companies by MPAN (meter point administration number)
Drivers of change

• Changing circumstances:
  – Investment needs rising (annualised):
    • Electricity distribution (+48%, 05-10 vs 00-05)
    • Electricity transmission (+79%, 00-05 vs 07-12)
    • Gas transmission (+23%, 02-05 vs 07-12)
    • Gas distribution (+30%, 02-07 vs 08-13)
  – Network tariffs driven by capex not opex
  – Network capex driven by non-economic generation
  – Rising prices provoking renewed interest:
    • Gas and Electricity average bill +£370 (March 03-Sept 06)
    • Average gas and electricity bill in March 07 c.£881
Drivers of change

• Climate change
  – Stern Review (2006) and implications
    • Climate change Act
    • Office of Climate Change
    • Zero emission homes by 2016 (170k p.a.)
  – Wind – unblocking required
  – Nuclear – implications for new entry
  – CCS – demonstration stage
  – Demand side – as yet untapped

  – Uncertainty created by policy needs to be managed
  – High prices necessary (Denmark vs UK)
Memo items

• Competition and ownership form are our servants in the electricity sector not our masters.

• Are we serious about the climate change induced targets we have set ourselves?
Premises of new regulatory model

• Insights of the liberalisation period should not be lost:
  – Competition reduces costs
  – Consumers do respond to prices (+quickly)
    • Switching (very active)
    • Demand reduction (-8% domestic gas demand 2004-06)
  – Incentive regulation works
  – Vertical integration of networks unnecessary
  – Private contracts sophisticated
  – Markets good at technology choices
Premises of new regulatory model

• Processes of regulation important
  – Ofgem targets:
    • market shares in generation
    • retail switching rates
    • size of X in RPI-X regulation of networks
  – Increasingly each of these has little meaning:
    • Market definition issues in generation and CC
    • Long term contracts in retail supply?
    • X should be the outcome of negotiation

– Price change an unreliable measure of welfare change
Premises of new regulatory model

• Climate change policy the key driver
  – Electricity is the lead sector in response
  – Followed by the efficiency of heat use
  – This is all about internalising an externality
  – Price alone unlikely to be sufficient/feasible
  – National and local initiatives will be large
  – Required regulatory interventions severe
Premises of new regulatory model

• Managing uncertainty key to successful regulation of sector
  – Some risks need to be eliminated
  – Some risks need to be managed
  – Some risks need to be transferred to private sector
  – Experimentation and phased approach

  – Reduces both the capital cost and its required rate of return, both of which will drive the total cost of CCP
Elements of new regulatory model

- New processes
- New models of competition
- Focus on issues raised by climate change
New Regulatory Processes

• Negotiated settlements need be at the heart of network investment decisions
  – Future uncertain
  – Markets good at handling risk in timely ways
  – Lessons from elsewhere:
    • Role for negotiation based on regulatory WACC (Littlechild on Canada)
    • Role for consumer advocate separate from regulator (Littlechild on Florida)
    • Transaction costs low even at distribution level (Littlechild on Argentina)
  – Lessons from UK
    • Gas distribution price review
    • CAA at Heathrow and Gatwick (and Stansted)
Constructive Engagement at the CAA

• Substantial progress at Heathrow and Gatwick
• Investment plans:
  – Incentives
  – Triggers for new investment
• Service quality:
  – Levels of service
  – Penalties and risk sharing
• Penalties agreed
• Companies slow to engage at start!
New models of competition

• Competition has been too narrowly defined in the past
  – Shift main responsibility to Competition Commission
  – Focus on vulnerable customers
  – Develop new models of competition
    • With demand side via Energy Service Cos (ESCOs)
    • With heat networks
    • Via long term contracts for local supply
    • Competitive tendering as standard in networks

  – Consider structural remedies such as ownership unbundling of distribution networks
Focus on climate change

- Consider effective internalisation of environmental externalities
- Focus on demand as being as important as supply
- Support new entrants as existing incumbents companies not sufficiently responding
- Engage with major local initiatives in London and elsewhere
- Plan for large scale trials

- Close holes in regulation
- Reorganise existing institutional responsibilities
Effective internalisation of externalities

- Will EU ETS deliver?
- Discount rate issues
- What support mechanisms will be required for socially worthwhile investments:
  - Nuclear power
  - Severn Barrier?
  - Large scale DG?
## Effective internalisation of externalities

Scenario: Two alternative investments; Carbon Reduction of Two Investments Identical

Context: Decentralised project

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<thead>
<tr>
<th>Costs</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Y5</th>
<th>Y6</th>
<th>Y7</th>
<th>Y8</th>
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| NPV 1, 10%     | £867.77 |
| NPV 2, 10%     | £866.11 |
| NPV 1, 2%      | £970.78 |
| NPV 2, 2%      | £1,179.78 |

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<td>NPV, 2%</td>
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- Extra Investment Cost of 10% discount rate: £209.00 22%
- Extra carbon price cost of 10% discount rate: £415.42 43%

This implies choice of investment changed, MSC of carbon much higher for high discount rates. Consumer pays for discount rate.
Demand is as important as supply

• Low hanging fruit exists
  – Low energy lightbulbs (2-3% of demand)
  – LED lighting (streetlights 0.7% of demand)
  – Daylight saving time
  – Higher prices to promote efficient use

• If demand side invests to save CO2 how can this be incentivised?

• Smart metering and demand side
Support new entrants

• Existing incumbents may not deliver
• Effective response requires:
  – Legitimacy in spending large amounts of money
  – Local initiatives
  – Energy Service Company approach

• Public sector traditionally important in rapid roll out of intrusive networks with initially poor financial returns
  – Role of public sector in heat networks
Engage with local initiatives

- What capacity has Ofgem to help local initiatives get off the ground?
- Local initiatives have capacity to engage local community at low cost
  - Example of Woking
  - London Energy Saving partnership
    - 60% CO2 reduction by 2025
    - 7 schemes involving local ESCOs
Plan large scale trials

• Most current initiatives are small
• Need large scale trials to prove that significant reductions in CO2 are possible
• These need to take place at the level of medium sized cities, for example:
  – Heat network
  – Smart metering
  – ESCO model
Institutional change

• Close holes in regulation:
  – No regulation of heat networks
  – No regulation of ESCOs
  – Local monopoly franchises may be problem

• Institutions competing with one another

• Some reorganisation seems sensible
Lessons

• For Ofgem:
  – New focus on process, models of competition and meeting climate change targets
  – Focus on climate change means:
    • Positive attitude
    • Introduction of econ clarity to government discussions
    • Focus on DSM and local initiatives

• For government:
  – Issue about Ofgem’s mandate
  – Need clarity on targets for E-sector (and for gas)
  – New forms of ownership need to be encouraged

• For companies:
  – Investment is rising (£+28bn to 2020 (Green et al, 2008))
  – Huge opportunities for both incumbents and new entrants