Transmission Access and Investment

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Disclaimer

This presentation was delivered to an EPRG seminar at the University of Cambridge on Monday 12 May 2008. It is an overview of the issues surrounding transmission access arrangements in the UK and their economic implications. It does not contain direct advice to private or governmental organisations.

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Qs & As

Q: How to achieve 20% renewable energy by 2020?
A: Mainly Wind

Q: Where?
A: Mainly Scotland and Wales

Q: What are the barriers?
A: Queue waiting for grid access -11GW Scot, 9GW Wales

Q: Solution?
A: Consultation
• Connection implies firm rights to sell at national price
• TSO applies “security” standard to connections
• Modelling assumes operation at full capacity
• TNUoS based on investment cost and long-run constraints
Implications

• New generators can’t connect before reinforcements
• Transmission capacity for wind is above optimum
• Constrained generators compensated through BM
• Costs shared between all generators through BSUoS
• Generators’ location decision is distorted
Alternatives

• **Nodal prices**
  – Prices vary by node
  – Renewables connect quickly
  – Constraints reflected in price differences

• **Connect and manage**
  – No price differences across constrained lines
  – Renewables connect quickly
  – Constraints handled through BM
Alternatives (cont…)

• Traded connection rights
  – Prices of rights differ across constrained lines
  – Renewables buy rights and connect immediately
  – Constraints reflected in price of connection rights
Equivalence

- Allocative efficiency key - can distribute welfare gains
- Efficiency achieved by substitution of power sources
- All schemes allocatively equivalent in the short-run
- Secondary markets achieve first-best allocation
- Assume perfect competition and information
Equivalence (cont…)

• Distributional effects differ
• Connect and manage best for renewables
• Traded connection rights best for existing generators
• Long-run allocative efficiency may differ
• Connect and manage distorts location decision
• Discourage investment at export constrained node
Market Power

*Competition Act investigation launched into Scottish Power and Scottish & Southern*

Nodal prices

- Explored in Joskow and Tirole (2000) for financial rights
- Nodal prices affect profits from transmission rights
- Generators induce congestion to generate rent
- Rights of generators at export node reduce market power
Traded connection rights

- Withholding rights increases market power
- Equivalent to nodal prices with ‘use it or lose it’
- Value of rights equivalent to nodal price differences
- Assume liquid markets and no uncertainty
Market Power (cont…)

Connect and manage

• Scope for unrealistic bids under BM
• Competitive generators take advantage of constraints
• Generators with market power create constraints
• Connect and manage exasperates constraints
Imperfect information

- Trade rights minimum of half an hour ahead
- Uncertainty about value of rights
- Financial rights hedge electricity price risk
- Connection rights risky instrument for wind
- ‘Use it or lose it’ makes them risky
- Connection rights less valuable than financial rights
Conclusion

• Nodal prices most robust solution
• Financial rights compensate existing generators
• Connect and manage exposed to flaws in BM
• Liquid markets for connection rights not feasible
• Actual reform may be guided by political factors
• Final recommendations expected this month