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Market Turmoil and Planning Grid Investment

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Lewis Evans

School of Economics and Finance, Victoria University

NZ Institute for the Study of Competition and Regulation

Outline

- Market Turbulence
- The Importance of Planned Grid Investment
  - The Grid Generator Game and leadership
  - Two-sided markets investment and funding the Grid
- Turbulence, planning and investment in the grid

Background I

Turmoil in real and financial markets

September 24

Lehman's crash costs Bank of New York Mellon $425 Pittsburgh Post-Gazette **..**

30 Oct 2008 (www.news.google.com)

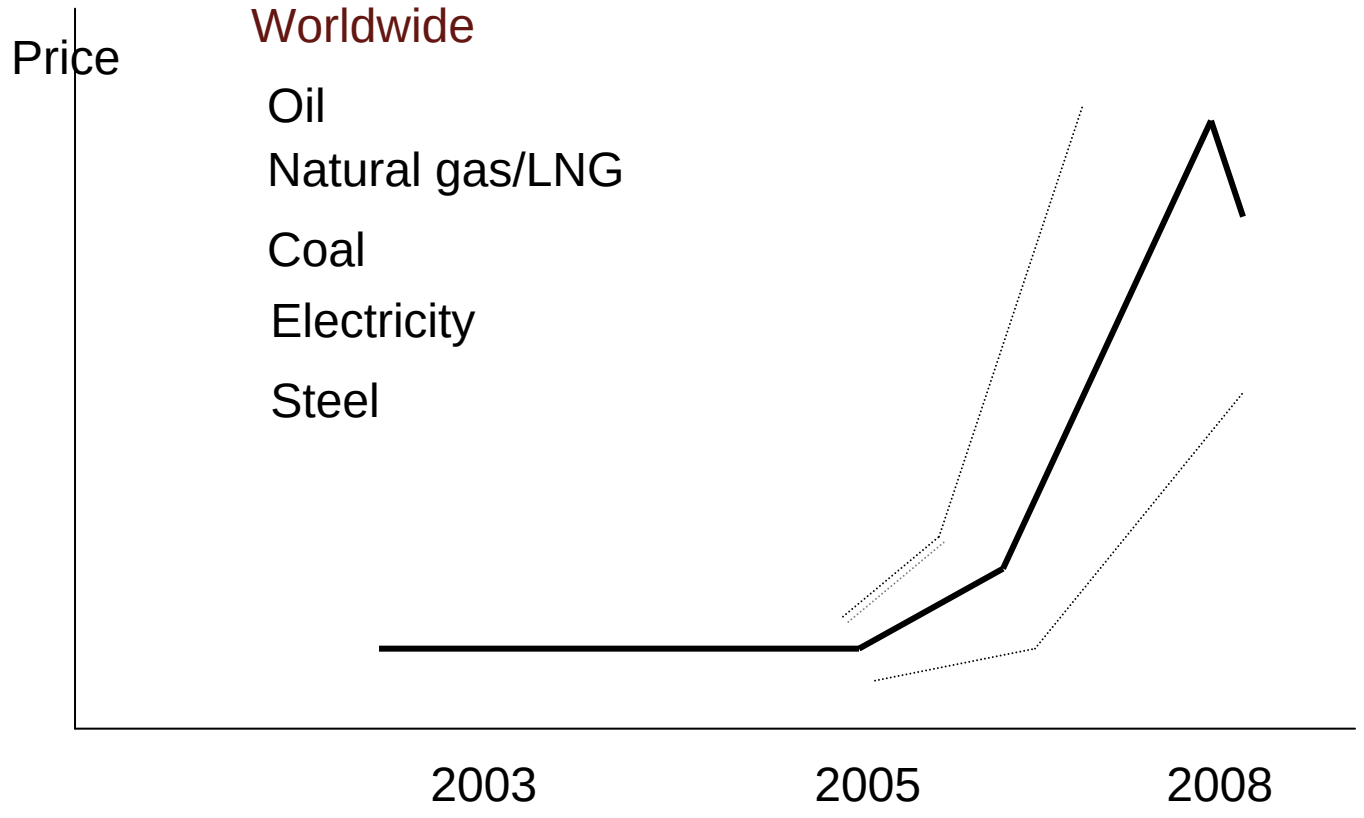
- **The Low Energy Price** Age is Over Despite the sharp dip in the **price** of a barrel in recent months, the low **energy price** age is over, said Nobuo Tanaka, the executive director of the IEA New York Times - 2671 related articles

- Plummeting oil **price** suggests worse is to come - Sydney Morning Herald (2592 related Articles)

- Crisis may delay US climate, **energy** policy - AFP (12 related Articles)

Background II

Source EIA



Background III

Sources

- Demand:

  EIU percent contribution to economic growth 2006-2020: China 26.7, United States 15.9, India 12.2 ….

- Supply Constraints: are they real?
  - higher cost fossil fuels and alternatives;
  - environmental constraints
    - 30 Oct: Crisis may delay US climate, **energy** policy - AFP (12 related Articles)

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Background IV

Issues for Grid Investment

- Volatility/Risk in Demand
  - Level of demand: although the trend is up
  - Location,
  - Technology/fuel supply

- Volatility/Risk in Supply
  - Network costs (technology/fuel supply)
  - Environmental Policy constraints
  - Financial

The Basics of the Grid

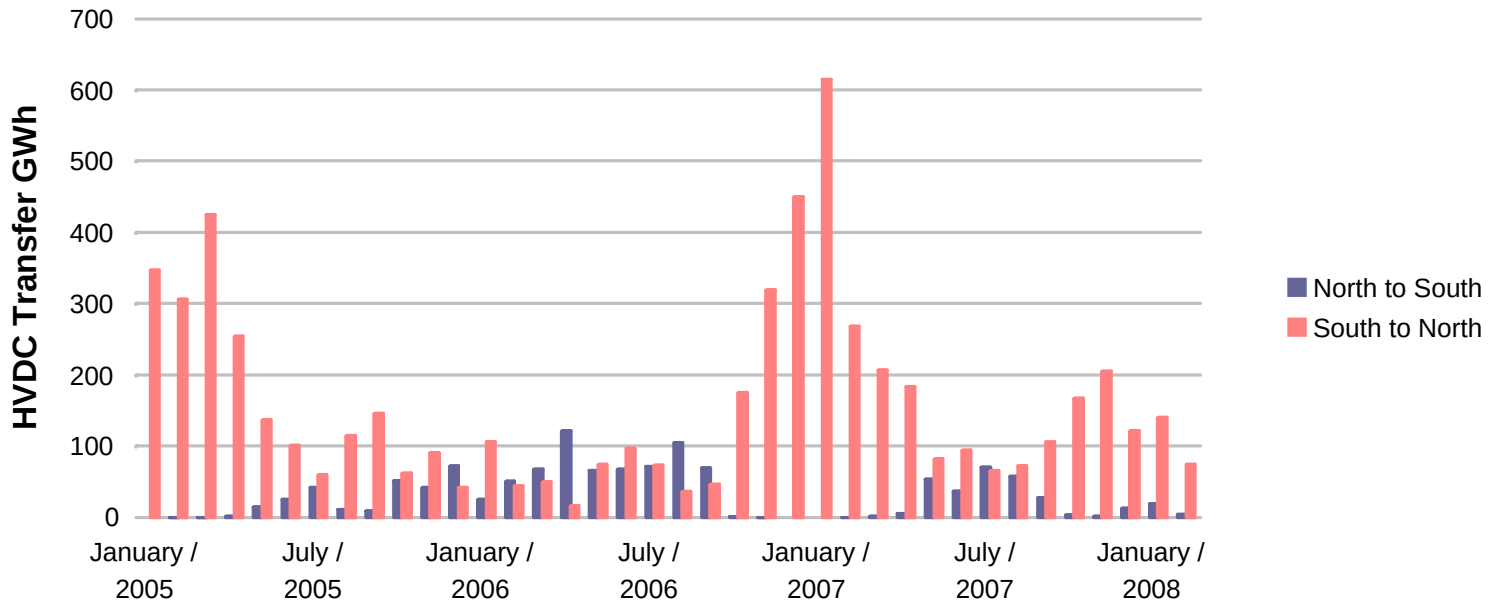
- Has the **function** of
  - transporting (large amounts of) electricity
  - Being a platform for loads and generators to transact

- Has the **characteristics** of
  - Very large long-lived investments that are sunk
  - Uncertainty represented by changes of demand and generation in aggregate and at locations
  - Poorly defined property rights rendering external effects

- In most jurisdictions the grid is regarded as a **natural monopoly** although it has competition from
  - Generation locating next to populations
  - Gas pipelines & discoveries

Externality Example: Connectivity

South to North or North to South
2005 - 2008



The Grid-Generator Game

- While the grid does not generate electricity it
  - Affects costs by affecting energy losses and congestion
  - Affects the availability of energy to any location by capacity provided for transport
  - Provides generator options to utilise a range of fuel sources

- The Grid and Generation are both
  - Substitutes for each other
  - Complements with each other

  leading to strategic uncertainty

- There is thus a game about whether to expand the grid, transport of other fuels, and/or invest in generation at particular locations. These may all (more or less) be sources of competition at a location

Regulation By A Standalone Body Changes The Game: improves planning prospects

- The grid becomes a regulatory sanctioned leader in the game: one that anticipates other players' strategies that in turn anticipate the grid's strategies
- It has the effect of changing the game, arguably, to one of commitment to grid plans that reduces strategic uncertainty and risk leading to a more coordinated outcome of the grid-generator game, albeit one where the grid is the first mover.
- Transparent planning and commitment assists the efficiency of the game
- It suggests a single regulatory authority: NZ has three regulatory mechanisms: the EC and the CC and an efficiency objective for the grid owner,

The Role of One Market

- At least between 1996 and 2004 there was “one market” to a close approximation (Evans, Guthrie and Videbeck)

- Facilitates coordination/substitution of fuels with particular characteristics via a national electricity market

- One market means that
  - Load pockets are circumscribed in extent and over time
  - Contracts across nodes can be “confidently” priced and entered into; and
  - Some reliance can be placed on reserves across the country (national market)

One Market and Market Power

- One market mitigates market power:
  - forward contracts and vertical integration reduce dependence on the spot market;
  - contracts across nodes reduce dependence on the spot market
  - reducing load pockets reduces market power in the spot and contract markets
- With one national market competition is determined by the diversity and number of suppliers and the responsiveness of demanders

One Market

- The possibility of “one” market enhanced by “generous” investment in the grid
- The grid is a platform for transactions: consider investing in and pricing the platform when there are external effects:

Pricing for Static Efficiency

Static efficiency is determined by decisions taken given plant in place

In the short term a fixed charge for the access to the grid is a lump sum tax and will not materially affect behaviour

Static efficiency is determined by the efficiency of the spot market pricing, dispatch of energy and reserves: that minimise losses

Statically efficient prices are those of an efficient spot market

Dynamic Efficiency

Dynamic efficiency is affected if the timing, amount, or location of investment are affected: it is really important for a socially efficient electricity market

The effect of grid charges (prices) on plant (demand and supply) may well affect plant/entrant location decisions where the “fuel” benefit of location is not strong

Prices would also be inefficient if they incentivised overt delays in investment the grid or plant

Pricing Variable or Fixed

The optimal charge for large sunk assets is typically under static efficiency a two part tariff approximating the cost structure: dynamically it may not be: particularly where the fixed cost is harder to identify with the user than variable cost

Lump-sum charges are not dynamically efficient where costly actions can be taken for avoidance

Variable (postage stamp) charges while not statically efficient may well be dynamically efficient as the user pays: again identification with actual “use” is a problem in a network (pool), and there is an issue about paying for capacity vs energy

Transaction Platform Economics and the Grid

Transaction platforms facilitate transactions between buyers and sellers

In the case

- of no indirect interaction in demand it doesn't matter much whether the transaction cost is paid by the buyer or seller: it is cost based (e.g. a universal postage stamp charge) (one sided markets)

- where there is interaction in demand tangential/external to the basic transaction the charge will be affected by demand and may efficiently differ between agents transacting. (two sided markets)

Demanders External Effects: a) Fast-start reserve: does reserve pricing capture this (dynamic efficiency require configuration of the grid to be optimal)

b) competition: a benefit to consumers

Grid Investment and Volatility

- The increased volatility on a range factors will raise the value of waiting, particularly given the sunk nature of grid investment.
- The value of waiting will be higher for an unregulated monopoly but the same as competition for a firm regulated to be dynamically efficient :both will be affected by increases in volatility
- Transparent consultative grid planning will assist reducing (particularly strategic) uncertainty and help create options.
- A grid of healthy capacity - one market - is in consumers' interest (particularly) and will affect desirable pricing of the grid

I wish you fruitful consultation and planning

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