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OF COMPETITION AND REGULATION INC.**

Is Vertical Integration the Natural State of Affairs in Electricity?

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Overview

- Background
- Terminology and Context
- Analytical framework:
 - Why contract?
 - When is ownership (i.e. integration) to be preferred
- Contracting problems in electricity systems
- Advantages of vertical integration
- Policy implications
- Questions for the Commerce Commission/Wolak study



Background

- Based on invited paper – *Comparison of Long-Term Contracts and Vertical Integration in Decentralised Electricity Markets* – presented at Larsen-EUI workshop on “Efficiency, Competition and Long Term Contracts in Electricity Markets”, European University Institute, Florence, in January
- Paper available from ISCR website, and also published as part of EUI’s RSCAS Working Paper series (2009/16) – soon to be republished as a chapter in *Long Term Contracts in Electricity Markets: New Track for Competition Development*, Glachant and Finon (eds.)
- Follows on from Hogan and Meade (2007) – *Vertical Integration and Market Power in Electricity Markets* – which predicts (static, game-theoretic model):
 - Integrated firms are less likely to push up wholesale prices than non-integrated firms, and have no incentive to do so if wholesale and retail shares are balanced
 - Better retail prices arise under integration for any retail market structure
- Latest paper addresses dynamic issues, and goes some way towards addressing questions posed in response to Hogan and Meade:
 - Doesn’t integration thin contract markets and force retail entrants to build generation?
 - Isn’t integration therefore bad for retail competition, all other things being equal?
- It also provided material for an article with Bronwyn Howell on the lessons from electricity for telecommunications (submitted for special edition of *Telecommunications Policy*) – also on ISCR website



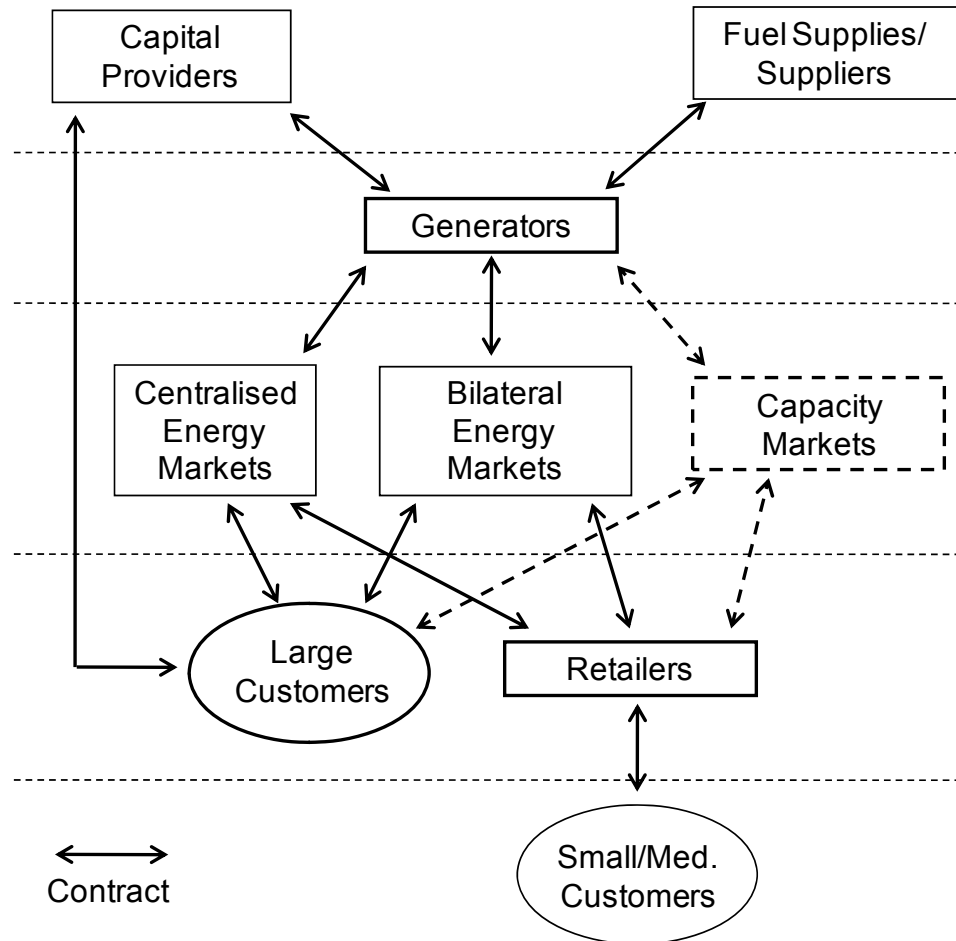
Terminology

- Long-term contracts (LTCs) are any contracts for electricity supply of longer duration than spot energy supply – we call the use of such contracts “contracting”
- Vertical integration (VI):
 - Arises when electricity generators or their customers (i.e. energy retailers, industrial firms) or fuel suppliers own each other to some degree
 - Is assumed precluded between competitive and monopoly/network (i.e. grid, lines) activities
- Decentralised (liberalised) electricity markets are those relying on competition rather than “design”, with pricing and investment decisions made by private parties



Context

Stylised decentralised electricity system – assumed role of contracts (no VI):



A Problem:

Cascading hold-up risks arise if parties at one level can breach or renegotiate contracts with parties higher up

→ Results in sub-optimal investment at each level

Context – cont'd

- Reformers initially focused on:
 - Constraining generator market power and promoting retail competition
 - Shifting investment risks from consumers/taxpayers to investors
- LTC markets and retail entry have not emerged as expected, and generation investment has suffered from retailer defaults and falling investor confidence
- Now reformers are increasingly concerned with supply security and hence encouraging investment:
 - “Missing money” problem in some decentralised markets
 - “Hold-up” problems – customers renege on contracts when prices change, leaving counterparties (e.g. generators) with stranded long-term investments
 - Bankruptcies and “inadequate” investment (with associated political “twitchiness” about keeping the lights on)
- VI is emerging other than by design – makes regulators suspicious about thinning contracts markets, entry deterrence, over-pricing ...



Why contract? (vs Spot trading)

- In general:
 - To reduce transaction costs from repeated spot contracting
 - To manage input and output price and quantity risks – e.g. securing supply at a predictable price/margin (especially where such risks are correlated)
 - As a commitment device (albeit imperfect), e.g.:
 - To manage investment risk – e.g. to better align demand with investment horizons, reducing hold-up risks for long-lived assets
 - To constrain market power – where parties have counter-veiling power (e.g. large customers, retailers)
- In decentralised electricity systems – as above, plus:
 - To smooth the transition to competitive electricity markets
 - To facilitate competitive retail entry
 - To offload legacy contracts previously entered into by liberalising states (e.g. with large industrials)



Why integrate? (vs Contracting)

- When the costs/risks of market contracting exceed those of ownership → optimally, ownership should fall to the firm patrons (i.e. suppliers, customers, etc) that enjoy the lowest sum of such costs – does liberalisation even allow this ...?
- Relevant costs of ownership include:
 - Agency costs – arising when ownership and control are separated
 - Costs of collective decision-making
 - Costs of risk bearing (diversification/capital access)
- Relevant costs of market contracting include:
 - Transaction costs
 - Contractual incompleteness and bounded rationality – especially when forecasting future supply and demand is hard
 - Hold-up costs
 - Market power costs (if they cannot be contracted away) – especially if parties have asymmetric information
 - Regulatory risks – these differ by owner



Contracting problems in electricity

- Need for continuous real-time balance presents highly volatile demand and wholesale prices → worsened with uncertain plant and fuel availability, unpredictable weather, inelastic demand, ...
- Hold-up risks, e.g. due to:
 - Differing generator and customer investment/contracting horizons, driven by risk of competitive predation in customer output markets:
 - Retailers – tend to prefer short-term only
 - Industrial customers – sometimes prefer longer contracts
 - “Hit and run” retail entry, given relatively low entry costs
 - Liberalisation itself, and regulation (especially of LTCs!)
 - Degree of diversification – i.e. plant/fuel/customers for generators; generators/load profiles for customers



Contracting problems – cont'd

- Other contracting problems include:
 - Adverse selection risks – due to market power, asymmetric information and bounded rationality
 - Contract market illiquidity – due to non-storability and locational pricing, and asynchronous energy/ transmission auctions (complicating arbitrage), or from VI, or from non-integrated “hit and run” hold-up risks, ...
 - Outages, fuel risk and load profiles – *force majeure* clauses vs call options, base vs peak preferences, cyclical loads
 - Relative risk aversion – affects contracting appetite of generators and customers
 - Initial conditions – e.g. excess capacity, vesting contracts, pre-existing LTCs (e.g. with industrials)



Benefits of vertical integration

- Contrary to common fears, evidence and theory point to VI not just improving investment and risk management, but also reducing wholesale market power and supporting retail competition
- VI provides a natural and self sustaining hedge against wholesale price and quantity risks, as well as market power and asymmetric information costs – VI (mostly) internalises these risks and costs to the firm
- VI reduces regulatory risk – rationale for and ability to regulate wholesale prices is reduced, as such prices are marginalised, and other relevant variables (e.g. generation costs) are not observable
- VI enables better matching of load profile and supply security preferences (e.g. cogeneration by industrials, or peaking investment by retailers)
- By thinning contracts markets, integration:
 - Reduces the risk of retail entry (tying entry to owning generation as well), fundamentally reducing hold-up risks!
 - Enhances scale differences between integrated firms and retail entrants, reducing integrated firms' exposure to predation

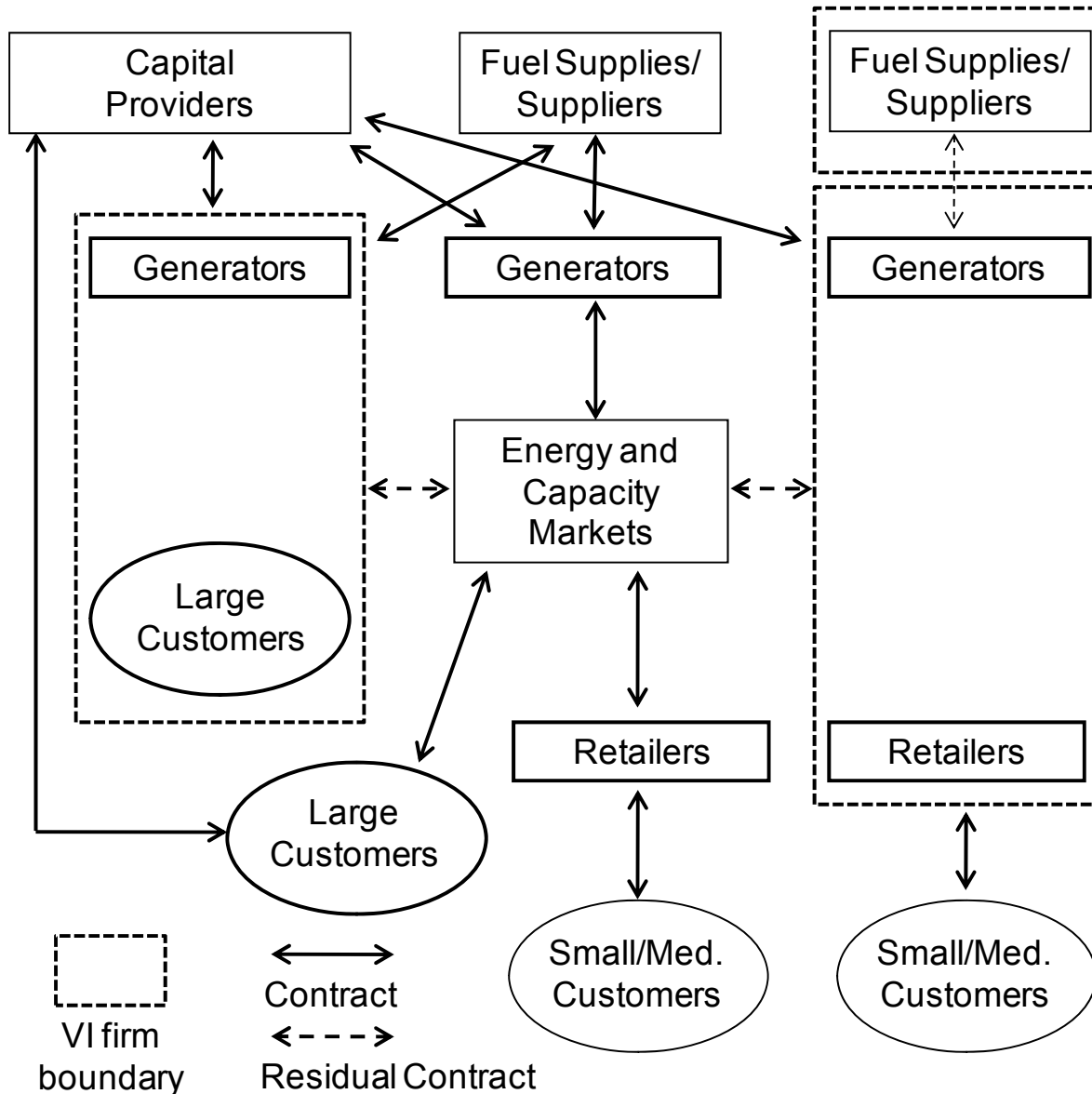


Benefits of VI – cont'd

- Wait a minute – isn't that last point upside down?
- Not if retail entry in a VI system comes from above, not below:
 - Generators can expand generation capacity relatively easily (compared with a non-integrated retail entrant)
 - This then enables them to expand their retail presence (organically or by acquisition) – i.e. to compete!
- The argument that VI is bad for retail competition presumes that retail entry starts with non-integrated firms
- Also, the presumption that a healthy retail sector requires cut-throat competition neglects dynamic considerations (i.e. investment):
 - Can atomistic retail competition sustain long-lived generation investments and deliver supply security?
 - Can oligopolistic VI better meet both retail competition and supply security objectives?



Benefits of VI – cont'd



Ownership costs:

- Favour upstream VI by large customers
- Favour downstream integration by large generators, or more targeted upstream VI by retailers



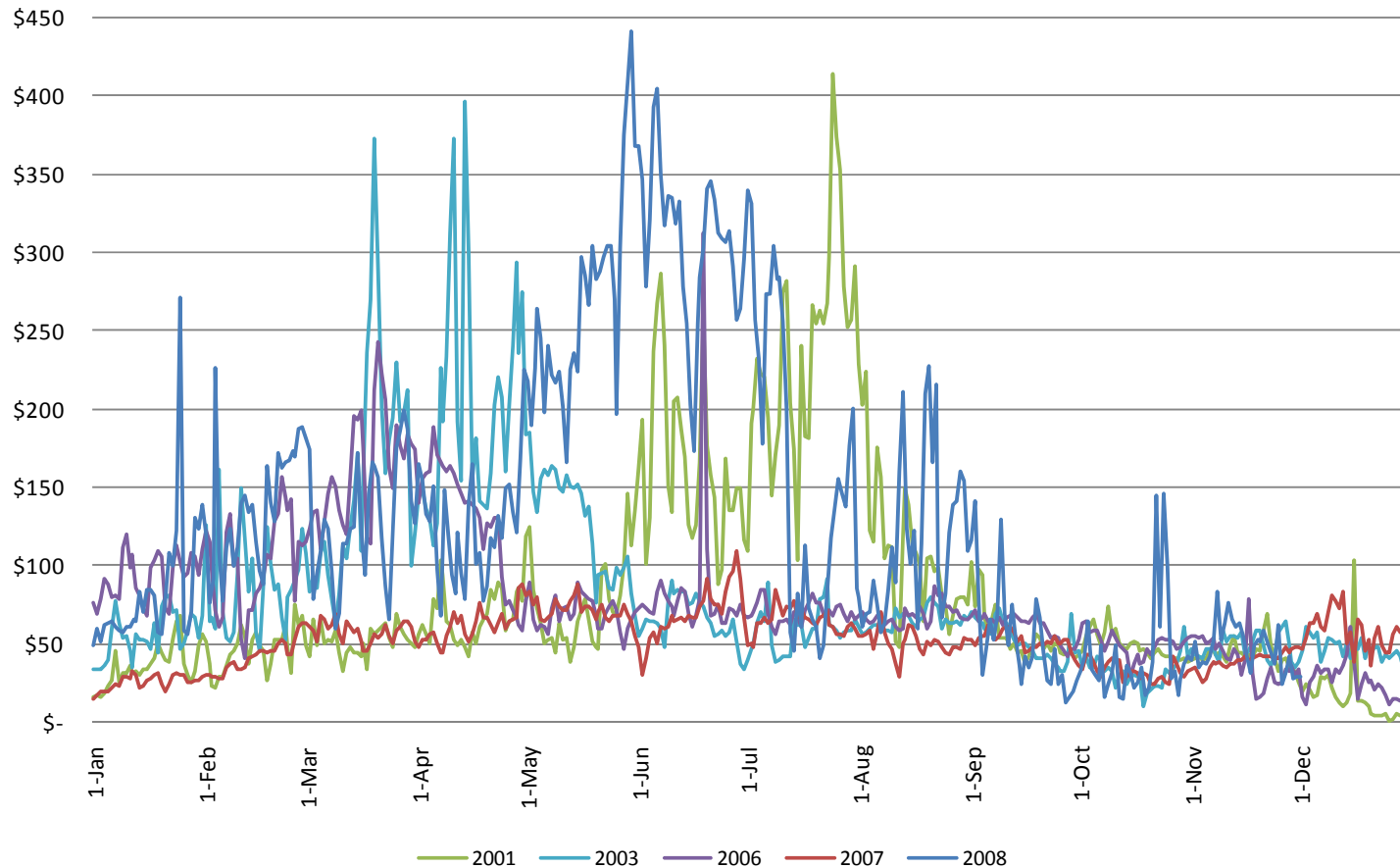
Benefits of VI – cont'd

- A possible virtue of transmission constraints in systems with nodal pricing:
 - Price separation without effective congestion hedges complicates contracting, and deters retail entry and hence reduces retail hold-up risks
 - However, for integrated firms with capacity above and below constraints customers can still achieve hedged supply (and constraints can also be gamed to deter predation)
- A possible virtue of hydro-exposed systems – e.g. New Zealand (65% hydro, low storage, volatile inflows) – wholesale price surges in “dry years” are long-lived:
 - Complicates contracting, but of marginal impact on integrated firms
 - Means price caps are less viable, and helps to resolve the missing money problem
- Claim: VI is better able than contracting to sustain any given level of retail competition, given its advantages in terms of supporting investment, managing risks and mitigating generator market power



Benefits of VI – cont'd

Haywards Daily Average Wholesale Price (NZ\$/MWh)
"Dry Years" versus 2007 "Normal" Year



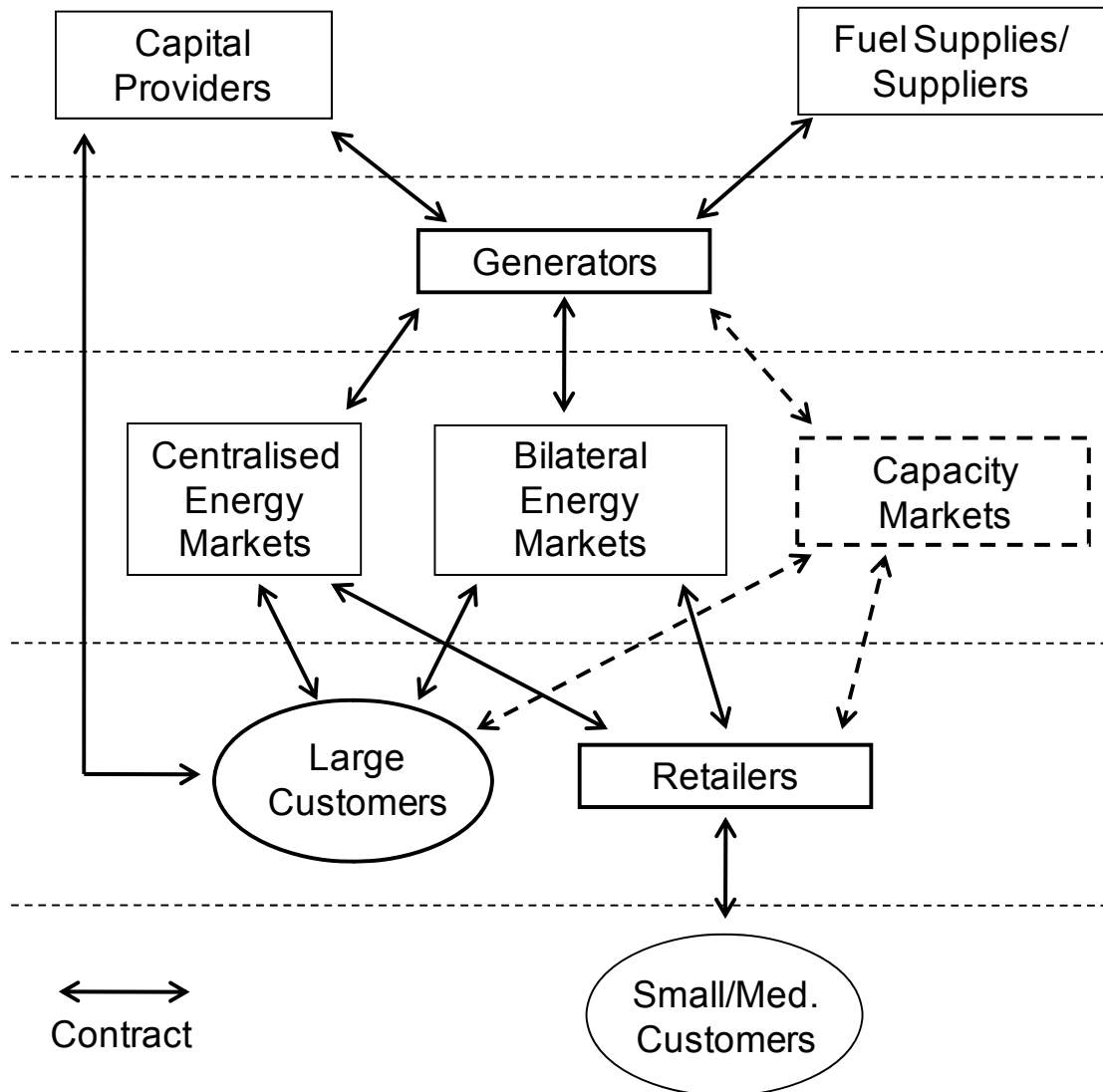
Source: Data courtesy of M-Co

Note: NZ\$50 ≈ €20



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Summarising



Rationales for up/down VI:

- Market power
- Hold-up risk
- Regulatory risk
- Fuel security (price or quantity)

Rationales for upstream VI by large customers or retailers:

- Market power
- Hold-up risk
- Regulatory risk
- Asymmetric information
- Supply security (price or quantity)
- Risk allocation/management

Rationales for downstream VI by generators:

- Buyer market power
- Hold-up risk
- Regulatory risk
- Demand security (price or quantity)
- Risk allocation/management

Policy implications

- VI is often seen as anti-competitive, and undermining contract markets → this presumes you are committed to contracting and that VI is precluded
- On closer examination some of the “problems” of VI are non-existent, shared with contracting, or are natural solutions to shortcomings in LTCs (which LTCs often arise by design rather than by evolution)
- VI, LTCs and spot trading should be seen as natural complements
- Some authors propose regulating for contracts to remedy contracting deficiencies, but this possibly imposes an inefficient approach instead of permitting efficient VI to evolve
- Other authors propose the retention/reinstatement of franchise areas to remove hold-up risk from “excessive” retail competition, but this:
 - Presumes contracting is required, and that VI cannot resolve the problem
 - May be necessary absent VI, or other system features constraining competition (e.g. grid constraints) or assisting investment (e.g. no price caps and sustained scarcity rents as in hydro-exposed systems) – but is extreme
 - Could similarly be proposed for industrial customer output markets to reduce hold-up risks, but that would be very extreme!



Policy implications – cont'd

- These proposals do, however, highlight the need to re-evaluate the optimal degree of retail competition ($< \infty!$) – given a system's characteristics – and also the optimal approach to achieving that competition
- Such a re-evaluation needs to weigh short-term consumer protection against long-term consumer welfare (i.e. investment, not just entry)
- This is a tricky political calculus, fundamentally affecting the prospect of successful liberalisation, and requiring a departure from the often-cited motivation of reform (i.e. to introduce competition)
- Alternatives such as capacity requirements or capacity mechanisms suffer the weaknesses that they are intended to remedy (and others)
- A more tolerant approach to integration, sober assessment of the role of contracting, and pragmatic approach to retail competition is likely to provide a natural and self-sustaining approach to supporting both investment and competition in decentralised systems



Questions for the CC/Wolak Study

- Some obvious methodology questions, e.g.:
 - Pricing water in dry winters
 - Impact of industry structure on wholesale *and retail* prices
- Policy questions – if wholesale market power is found to have been exercised:
 - Is it excessive given available fuel types, grid topology and production technologies?
 - Is it intrinsic, or a consequence of market design/regulation?
 - Does it adversely affect end-user prices – in principle/practise?
 - Should we introduce price caps, and if so, capacity markets too?
 - Should we impose separation, and if so, decree contracting too?
 - If we do anything to help industrial customers, does that help or harm retail ones (or those industrial customers)?
 - Is separation with contracting better or worse than VI:
 - For retail or industrial competition? – static and dynamic efficiency
 - For investment and supply security? – dynamic efficiency
 - How should pricing and security goals be measured and weighed in any welfare-based policy analysis?



Thank You – Any Questions?



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