

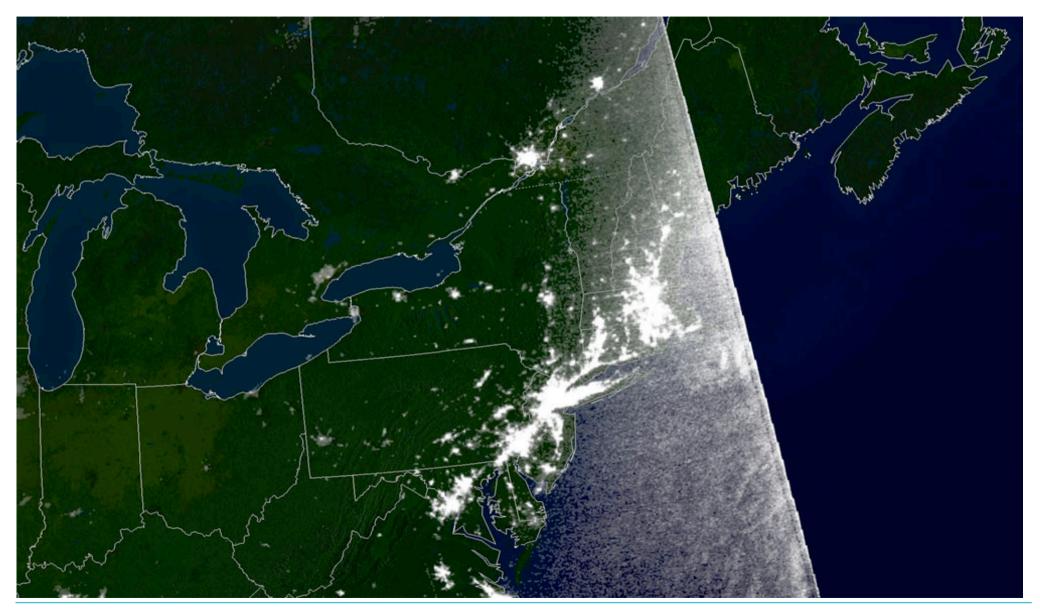
Twelve Months On: Blacking out through Reforming the Unreformable?

John Hancock ISCR - Monday 23 August 2004





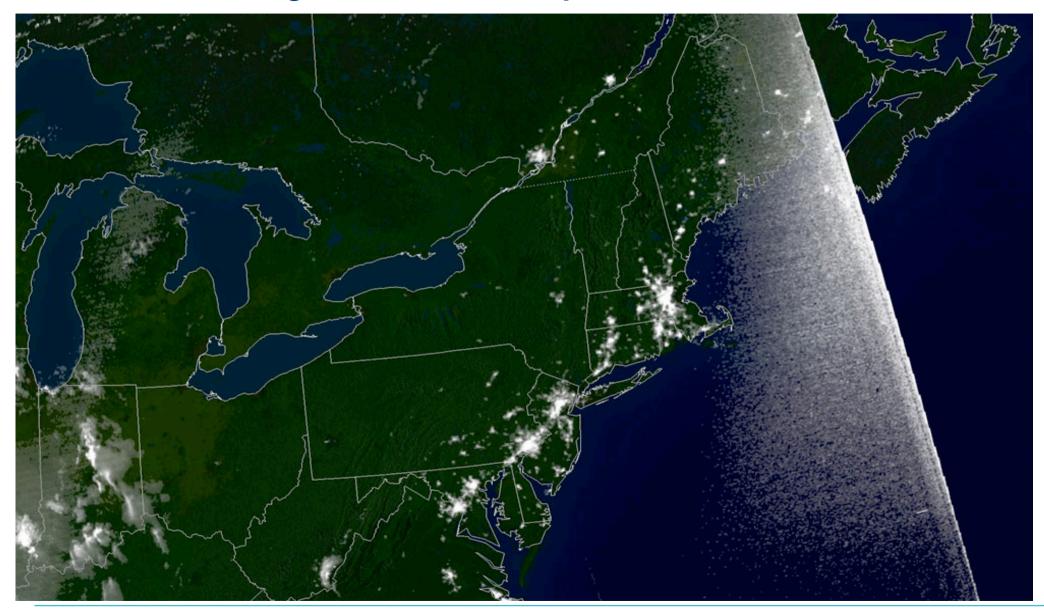
Northeast US Aug. 13, 2003, at 9:21 p.m. EDT.







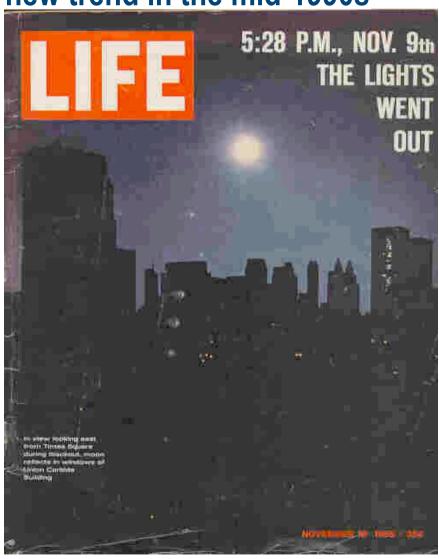
Northeast US Aug. 14, 2003, at 9:03 p.m. EDT







The US was a blackout pioneer in the 1960s. New Zealand initiated a new trend in the mid-1990s



- February to April 1998 Auckland CBD without power for 52 days.
- Winter 2000/2001 rolling brownouts in California due to energy shortages and market manipulation resulting from failed deregulation.
- August 14 2003, wide-area power failure in the northeast of the USA as well as in parts of Canada, affecting 50 million people
- August 28 2003, power failures in London won worldwide headlines such as "Power cut cripples London" but in fact only affected 0.5 million people.
- September 23 2003, a power failure affected 4 or 5 million people in Denmark and southern Sweden.
- September 27-28 2003, a power failure affected all of Italy except Sardinia, cutting service to 57 million people





Capgemini's Global Utility Survey Programme

Survey context

- Reaction to blackouts and high-prices in Summer of 2003 reawakened concerns about deregulation and its challenges and benefits
- Some of reaction reflected unrealistic expectations deregulation is not by itself a complete energy policy or indeed a guarantee of success - but beyond headlines, there are still important questions to consider
- Utilities are once again under pressure significant pressure to deliver benefits and meet expectations, both now and over the longer-term

"Deregulation: meeting the delivery and sustainability challenges?"

- Survey designed to explore exactly these challenges how to improve current delivery, whilst also addressing longer-term sustainability issues
- Results based on unique combination of survey responses and thinking by Capgemini's global team of utility experts
- Given diversity of geographies covered, no surprises at mix of views uncovered but results still provide a number of clear insights on these headline challenges

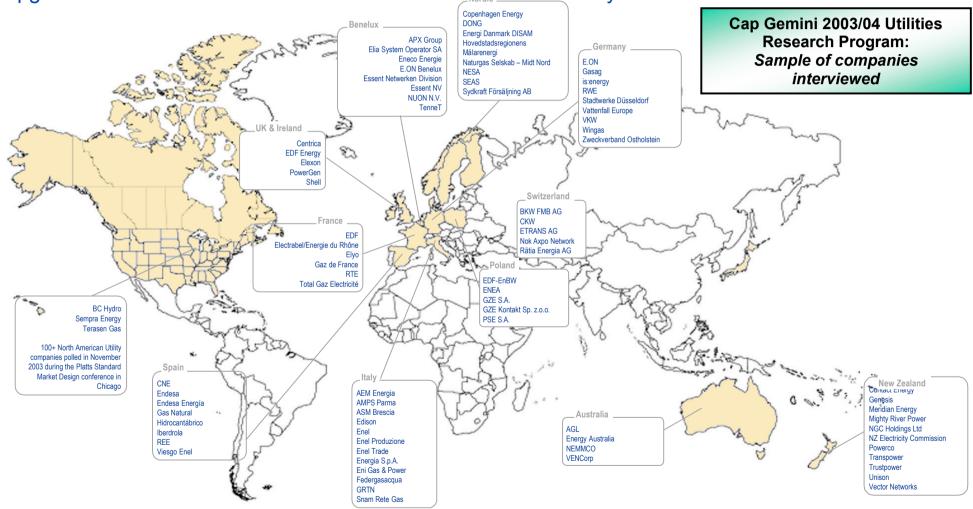




The results are based on over 130 live interviews

 We would like to thank each of our interviewees for their participation, and for sharing their open and honest views with us.

Capgemini's team conducted over 130 interviews with senior utility executives across 16 countries

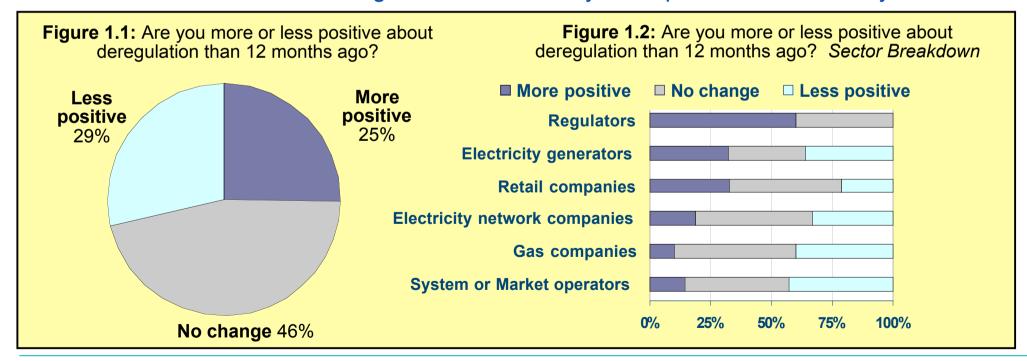






Overall Industry Mood – surprisingly strong

- Given events prior to survey and all the adverse publicity, results surprisingly strong almost half of responses "no change" and "less" and "more" positives almost balanced
- Supporting comments on "less positive" on price expectations not being met (i.e. falls are not automatic), frustration at pace of change and increased regulation
- Comments on "more positive" on evidence that wholesale markets starting to work and progress with retail competition
- Notable sector difference regulators substantially more positive than industry!

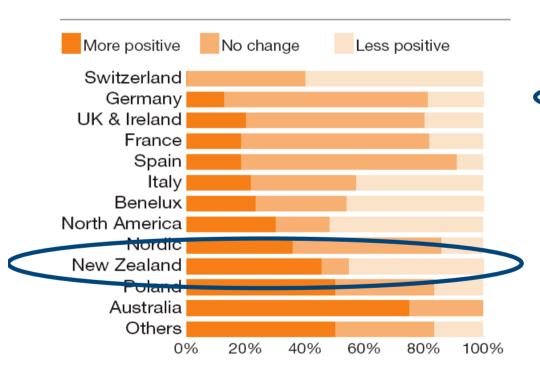




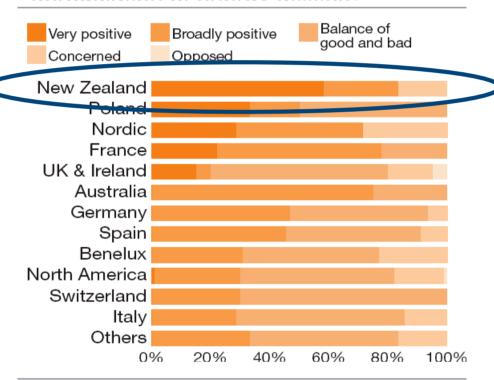


Views on deregulation in New Zealand are more polarised and more positive than anywhere else in the World!

 Are you more or less positive about deregulation than 12 months ago?



 Given both recent developments and your own experiences, how would you summarise your feelings about the deregulation of energy utilities?

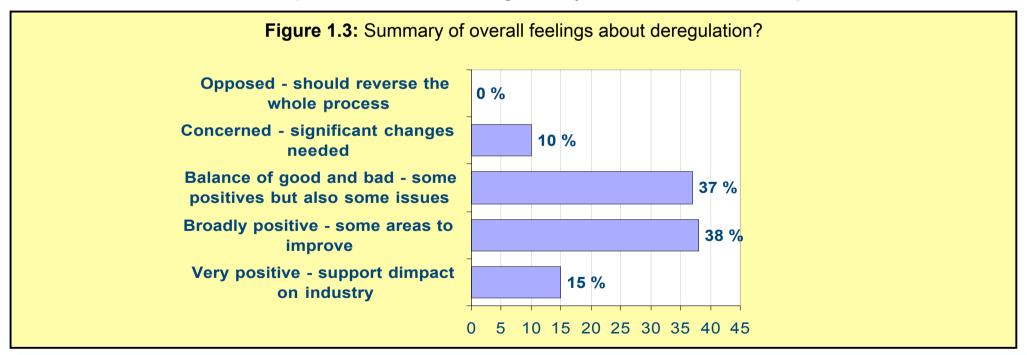






Globally though, views on deregulation are positive

- Media coverage might have suggested that whole process of deregulation should be reversed – but no sign of this in results
- Just over one-third of responses balance of good and bad, but over 50% of responses were either "broadly" or "very" positive - only 10% suggested that significant re-work was needed
- Regulators again more positive that industry half of results very positive!
- Country breakdowns show interesting mix polarised views in New Zealand and Nordic; France more optimistic than average, Italy and Benelux less optimistic

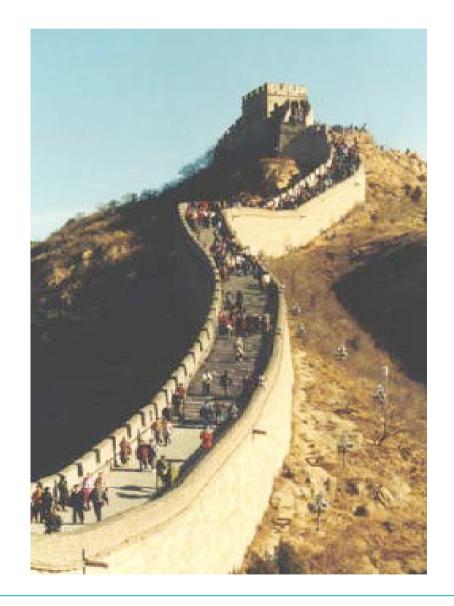






Centrally-controlled electricity industries deliver security through new build

- Economic growth in Asia strong in 2003 and predicted to grow in 2004
- Emphasis, notably in China and Thailand, on the need to ensure the construction of additional capacity.
- China has responded to this problem in a number of ways including:
 - A crash programme of new generation and transmission construction
 - Increases in prices for industrial and commercial customers
 - Restrictions on power consumption in some of the worst affected provinces.
- Separation of State Power's generation capacity from State Power's direct control will affect nearly half of China's existing generation capacity.
- Five new generation companies have ambitious plans to substantially expand their capacity by 2010, and some have listed shares on the Hongkong Stock Exchange.







Nordics are (always?) positive

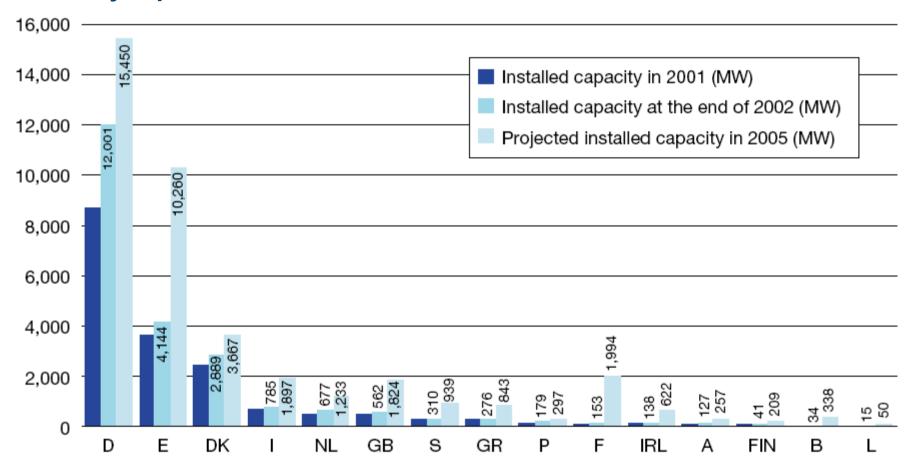


- High profile media stories following hydro shortages of winter 2002/3
 - Price rises
 - Creeping concerns emerging about supply-side price manipulation
 - Interconnection seems a real discipline on price
- Positive sentiment having survived a dry winter
 - New capacity is CCGT not hydro
 - Interconnection has genuinely relieved capacity shortages (at higher prices)
 - Sweden has decommissioned only 1 nuclear plant despite apparent referendum mandate
- Forward financial markets are liquid and intensively used
 - Reflects history
 - And fuel (storage) certainties





European windpower accounts for 74% of global capacity and is dominated by Germany, Spain and Denmark



Data sources: Wind Energy Barometer - February 2003 - EurObserver

Market exemptions and green purchasing obligations have proved a great catalyst for investment .. now concerns are being raised about impact on generation mix and capacity security





North America is less optimistic

- Power crisis leads to liberalisation and global investment in power generation and lines networks
 - Economist, Aug 21, 2003
- Gridlock exists in powerflows and board rooms
 - US Congressional Bills make reliability standards mandatory and enforceable
 - Respondents (and North American industry) deeply divided on potential for pan-Continental deregulation
- Revamped regulation is paradoxical
 - Call for increased investment
 - Lack of incentives mean investments must be funded by cost-cutting
- Substantial interest in new technologies as solution for supply security
 - 74% of respondents thought distributed generation would have a positive impact on network congestion and relieving needs for transmission upgrades
 - 39% thought that advanced meter reading would have greatest potential to transform sector
 - 27% thought clean coal technology would and 23% fuel cells







Florida Power & Light – A case study for advanced distribution

Sector	Number of accounts	Average monthly consumption (Kwh)
Residential	3,566,000	1,189
Commercial	435,000	7,663
Industrial	15,000	21,764

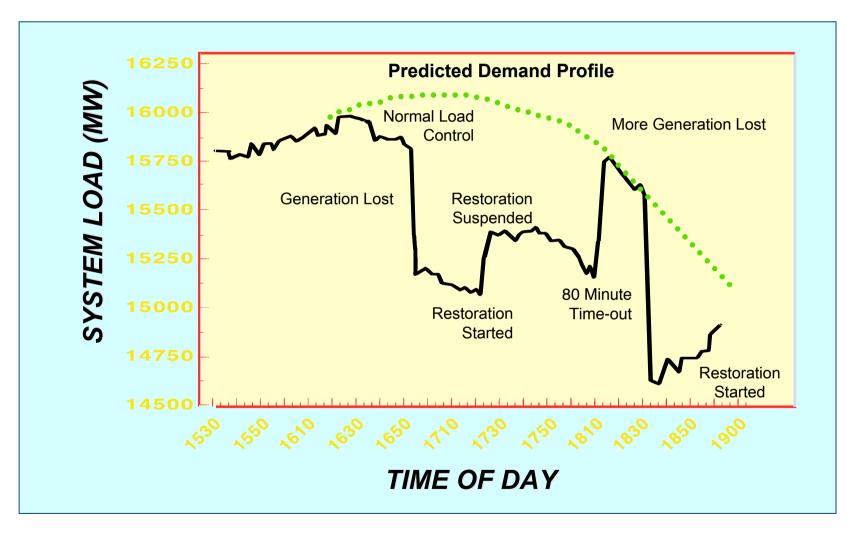
- Direct Control Bidirectional
- Powerline Communications System
- First units installed in 1987
- 710,000 Customers
- 815,000 Transponders
- 1,000 MW in normal operation
- 2,000 MW in an emergency
- 460 Substations equipped for On Call

Summer Peak - 19,668 Winter Peak - 20,190





August 1995 – 975 MW shed in 60 seconds.



2000 MW emergency demand-side response available almost instantaneously in 2004





"I still think that the abolition of capacity payments in the UK may prove to have been a mistake"



- Power crisis leads to moderate steps to improve industry co-ordination
 - Economist Aug 21, 2003
- "2003 year that supply side deficit became apparent
 - Will move from being self-sufficient for gas supply dependent on imports for 50% by 2010
 - Tightening of supply/demand balance resulting in a significant increase in gas commodity futures
 - Exploration of import development options
 - ☐ Additional interconnector pipeline capacity
 - ☐ New connection pipelines to North Sea
 - ☐ LNG import terminals
 - Interesting issue of third party access to new interconnectors and LNG under EU competition directive





Italy – Wholesale market starts (finally)



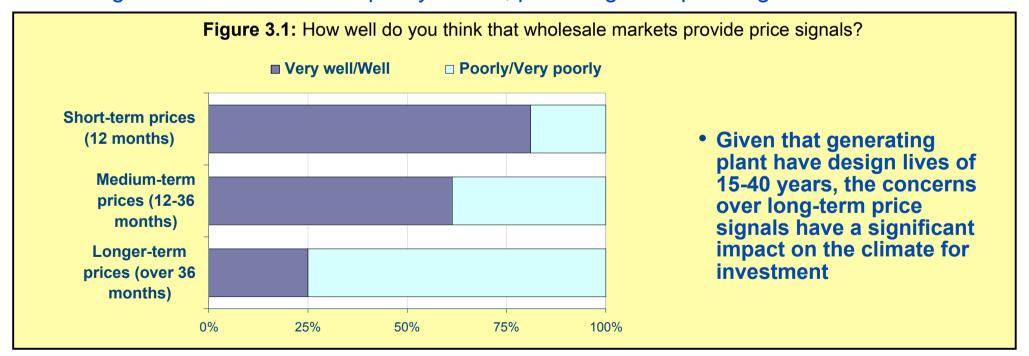
- Power crisis leads to liberalisation and re-investment in lines networks
 - Economist. Aug 21, 2003
- Interconnection with Greece halted due to environmental objections
- Wind power opposed for visual impact
- Wholesale market starts 2 years late in Q1 2004
 - No decision on VOLL
 - Single buyer for non-contestable customers
- Planned LNG terminals delayed by environmental consenting process
 - Commissioning dates extended to 2007
- Responsibility for 2003 outages still unclear
 - Swiss system operator blames Italians and vice-versa





Lack of clarity on responsibility for adequate generation

- Although blackouts in 2003 were "network" rather than "generation" events, seen as providing sharp reminder of importance of secure energy supplies to all economies
- 55% of responses from generators said it was NOT clear who has responsibility
- Supporting comments help explain concern, showing that issue not with market rules themselves, but rather with their practical application
- Three particular concerns shared responsibility is more complex; lack of leadership from government on broader policy issues; poor long-term price signals

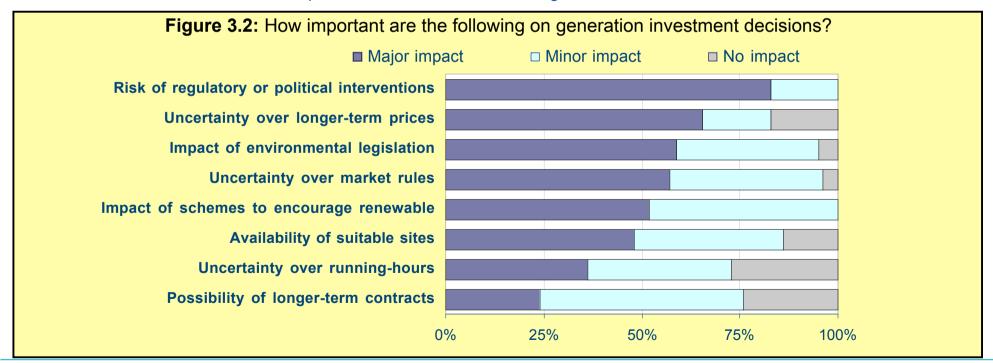






Investment climate for generation seen as complex and difficult

- Interviewees asked to assess the relative impact of a number of influences
- Some positives financing, wholesale market liquidity, availability of long-term power sales contracts and uncertainty over running-hours seen as having only a minor impact on investment decisions
- Less positively, three key-areas causing significant concern:
 - Over 80% of responses cited risks of regulatory or political interventions
 - Almost two-thirds cited uncertainty over long-term prices
 - Third area of concern over impact of various environmental agendas

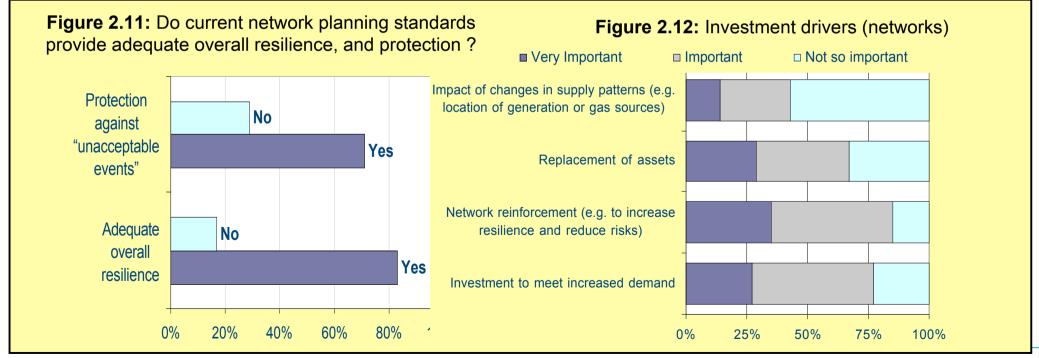






Networks view blackouts as providing a useful wake-up call

- Trigger events for blackouts seen as operational issues but useful in countering tendency for the networks to be completely forgotten
- Planning standards thought to specify adequate reliability and resilience by 80% but in Europe and US, concern on ability to achieve standards thru planning issues
- Regulatory risk again a major source of concern strong feeling that interventions act to make things worse, not better
- Also significant concern on need to reshape gas networks as result of changes to gas supply envelope in US and Europe

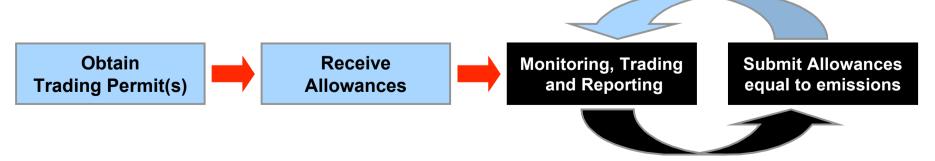






Environmental factors are becoming ever more important

- Growing impact on asset investment planning
 - Cost, time and uncertainties of environmental considerations impact on both generation and network investment planning
 - Impact on just on new investments, but also on current portfolios of generation CO₂ trading could re-shape plant merit orders or entire portfolios
- Green electricity / Distributed Generation
 - Renewables obligations on retailers seen as potentially very effective mechanisms but retailers concerned that obligations running too far ahead of available renewables
 - Network companies recognise potential impacts from renewables and distributed generation but uncertainty on timing/location of new schemes is concern
- Kyoto Protocol
 - Uncertainty over National Allocation Plans impacting on asset values
 - EU Emissions Trading Scheme (effective Jan. 2005) concern both on challenge to complete preparations and longer-term impacts on asset values







Security of supply – an increasing concern for electricity and gas

- This is the most critical concern for respondents in this year's survey for both electricity and gas players.
- Wholesale markets seen as functioning for short-term supply-demand planning with reasonable price signals ... but much greater concern about price signals for the longer time-horizons associated with asset investment planning.
- Respondents across the spectrum generators, upstream gas companies, network companies and retailers – see three specific areas as important:
 - **Responsibility and mechanics** –real lack of clarity on the responsibility for security of supply. For example, 55% of responses from generators said that it was not clear who had responsibility
 - **Regulatory risk** Over 80% of generators cited regulatory risk as a major concern, either because of uncertainty over market rules or through market interventions.
 - Price signals markets are considered to provide strong price signals for only up to around 12 months.
 Beyond this, markets too illiquid to provide either firm prices or firm markets to underpin large-scale investments

Political authorities are now aware - for example EU directive on security of supply - but not yet any clear vision on solutions.

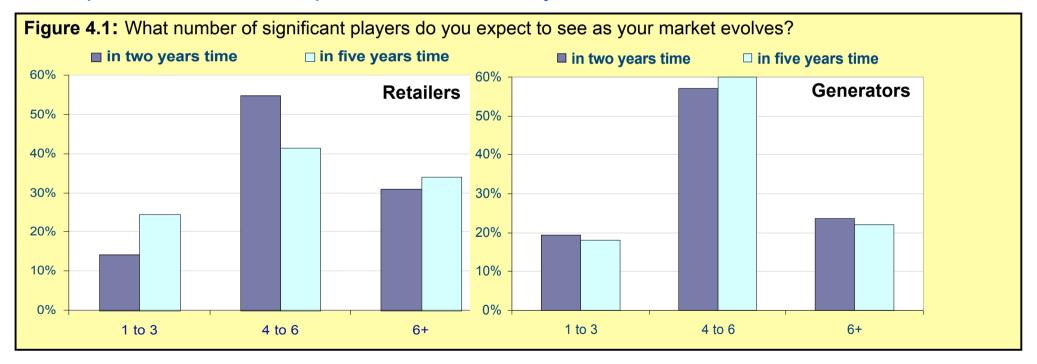
But whilst <u>none</u> of our 130 respondents has suggested reversing deregulation, security of supply is seen as fundamental issue that industry as a whole – networks, regulators, generators, and retailers – must address if the benefits of deregulation are to be sustained into the longer term.





Responses point to vertically integrated and oligopolistic industry structure

- Similar views expressed by both generators and retailers
- Concentration and vertical integration seen as logical responses to challenges around energy purchasing risk, and the advantages of retail incumbency
- Retail competition seen as incumbents game 85% of responses indicated less entry into retail than they expected
- "Atomistic" retail competition with multiple small players is viewed as a regulatory aspiration rather than a practical market reality







New Zealand responses were consistent with international themes

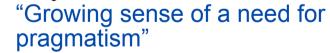
 Resource consenting problems mentioned in every interview

 Form and operation of carbon credits a major uncertainty for merchant generators

 Unanimous support for self- and lighthanded regulation

 Continued concerns about impact of regulatory uncertainty on investment (E&P, generation, pipes and wires)

Comments about access to fuel reflect island nature



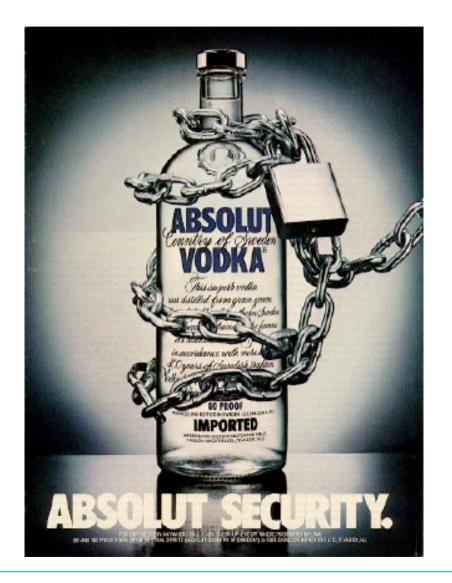
- Nodal vs Zonal prices
- FTR design
- Concerns still exist about quality of electricity settlement data





Capacity markets .. obvious solution .. no great clarity on the form of market and capacity "product" that should be used

- Marginal pricing solution is to pay VOLL when capacity constraint binds
 - Inconsistent with political threat of price caps
 - Even worse when "sophisticated" (VOLL x LOLP) .. problems of setting LOLP as well as VOLL
- Installed Capacity Markets (ICAPs) e.g. New England
 - Zero opportunity cost
 - Price collapses to zero during oversupply
 - Peaks as soon as capacity is constrained
 - Impractical once market is interconnected
- Short-run capacity markets offer a commitment to supply before price is discovered
 - Do not signal cost of building new capacity
 - Highly sensitive to VOLL and hence political and/or regulatory intervention
- Don't really provide a solution at all







New and improved capacity market designs

Resource Adequacy market

- Northeastern US
- ISO forecasts capacity shortfall during peak 1 year ahead
- Central auction for this capacity over several years
- Meant to provide a price signal what capacity is being built not when it's needed

Option theory – capacity on call

- Regulator sets capacity margin
- Central auction for capacity
- Option insures against price spikes
- Contract duration should be up to 40 years to work properly

Certainly no trivial exercise

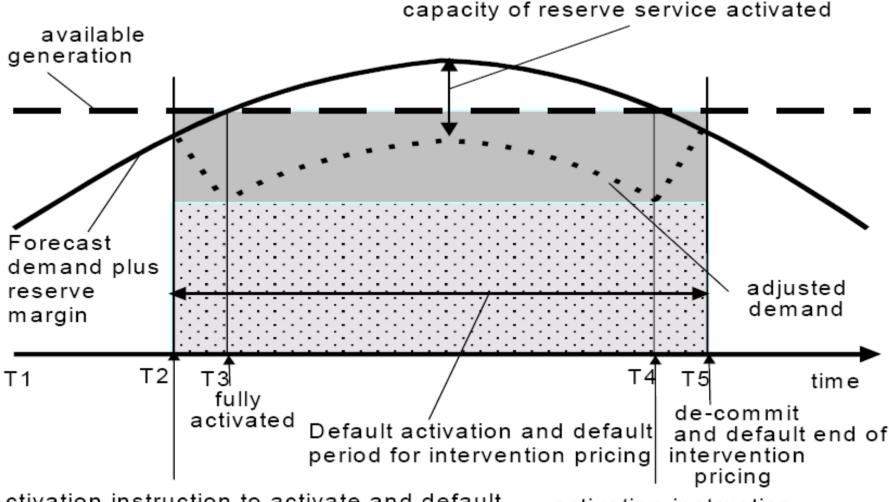
- Design parameters capacity margin, contract term etc
- Practicalities transmission constraints, demand forecasts, default obligations etc







Reserve trading – another perspective on the same idea?



Activation instruction to activate and default commencement of intervention pricing

activation instruction de-commit

NEM Reserve Trader - Activation of reserve services and intervention pricing





"To paraphrase the old quotation, there is no situation in a deregulated market which is so bad, that political or regulatory intervention cannot make things even worse"





Questions

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- CGNZ Ltd is the New Zealand affiliate of Capgemini one of the world's largest consultancies. Capgemini and its predecessors (including Ernst & Young) has helped Utilities worldwide adapt to the regulatory and competitive pressure created by deregulation and globalisation of the industry.
- Recent engagements include strategy, business definition and systems implementation for deregulating markets – establishing thirdparty access codes, wholesale gas and electricity markets and retail competition
- John is a member of Capgemini's Global Sector Unit for Energy & Utilities and heads our utilities practice in New Zealand. He has had wide exposure to the commercialisation and liberalisation of utility companies around the world and has advised governments, regulators and industry participants on utility deregulation in the UK, Australia and New Zealand.



