



Investment in new power generation in New South Wales:
Comments by Public Service International Research Unit, University of Greenwich,
London

by

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June 2007

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1. Introduction

The primary rationale for the global trend to restructure electricity supply industries is the promise that electricity generation and retail can be transformed from monopolies to competitive markets. The network parts of the industry, the high voltage transmission network (that takes power from power plants to centres of demand) and the distribution network (the low voltage system that takes power to final consumers) would remain regulated monopolies. However, it is the generation market that is the key element. Generation generally accounts for about half the consumer price for electricity so changes in the price paid for generation can have, while retail represents only a few percent of price.

The beguiling vision is that a large number of generating companies would have to compete every 30 minutes of every day to sell their power with only the most efficient companies surviving. For consumers, this competition was not only expected to reduce prices, it was also expected to mean that they would not bear the risk of investment in new generating capacity. If private companies made bad decisions on new power plants or spent too much building the plants, it would not be consumers that had to pay the bill, as it had been in the past, it would be the shareholders of the company. As argued later, this shift of risk from consumers to companies has significant implications for the costs incurred by generators because their cost of borrowing will be increased and these extra costs will inevitably fall on consumers. This will occur regardless of whether the companies are publicly or privately owned.

If a competitive wholesale market cannot be created, there is little rationale for changing the tried and tested old method of supplying power via a regulated monopoly.

This short paper summarises many of the points made in an earlier paper produced in 2005 by PSIRU in response to a consultation on the New South Wales government's 'Energy Directions' green paper. This paper is included as an Appendix.

2. What is the risk?

This utopian view of a competitive market set out above neglects the fact that competition is not a 'free lunch'. Risk exists and has to be paid for and, realistically, this cost will inevitably fall on consumers. These issues were explored in detail in a critique of the 2005 New South Wales Government Energy Directions Green Paper¹ (see Appendix). As argued in that paper, investing in a power plant is a major risk however the electricity industry is organised, indeed, introducing competition increases the risk. This risk cannot be made to magically disappear by use of market mechanisms.

Essentially, there is a 'Catch 22' with investment in new power stations in a competitive generating market. If the wholesale market is genuinely competitive, in other words, the price received by a generator and the volume of power sold, is set by a half-hourly market where a large number of generators compete, investing in a new power plant will be extremely (intolerably?) risky. If such a plant can be financed, the risk premium on the cost of borrowing will be high

A large new power plant costs in the order of several billion Australian dollars. If banks are willing to finance it the real cost of capital is likely to be in excess of 15 per cent per year. This compares to perhaps 5-7 per cent if electricity generation is a regulated monopoly where a generator has a reasonable assurance they will be able to recover the costs they incur from consumers. So while it might be attractive to believe that in the new competitive electricity industry model, consumers will no longer bear the investment risk, it is far from clear that they will financially be any better off. The high cost of capital will be passed on to consumers and may well more than counterbalance any benefits of cost discipline that a market would impose on competing generators.

Investing in power plants has always been, and always will be risky. There is ample scope in such large, technologically challenging projects for things to go wrong in the construction phase, and unexpected changes in fuel prices could leave even a well-managed facility uneconomic. Creating a market adds to this risk. An efficient market will rely on price signals to stimulate investment and, in most real markets, this leads to cycles of over- and under-investment. When prices are high, all potential investors see the opportunity and invest, often building more than is needed because there is no mechanism to ensure that only just enough plant is built. Over-capacity leads to a collapse of prices, the higher cost producers go bankrupt

¹ S Thomas (2005) New South Wales Government Energy Directions Green Paper: Comments by Public Service International Research Unit, University of Greenwich, London. <http://www.psiru.org/publicationsindex.asp>

and leave the market and investment dries up. Again, because the price signals will impinge on all generators and there is no mechanism to prevent too many generators leaving the market and the surplus of capacity could quickly turn into a shortage. In 2002, in Britain, such a cycle resulted in 40 per cent of Britain's electricity generation being in the hands of bankrupt companies. The consortium of banks that had lent money to build this plant ended up as the second largest owner of generation in Britain (with more than 10GW), and consumers had to pay billions of pounds to rescue the nuclear power generator, British Energy.

One consequence of such cycles is that the consumer price of electricity will become very volatile. The demand elasticity of electricity is very low. In other words, consumers have little scope to reduce their demand and will pay high prices to prevent the lights going out when there is a shortage of capacity. Equally, when there is a surplus of capacity, generators, who generally have high fixed costs and may have take-or-pay fuel contracts, may well be forced to bid prices well below their full costs simply to cover their avoidable costs, which could be very low.

3. How to deal with the risk

If there is competition, there is risk and investment will be problematic but if there is investment, it will only be possible if the investors are largely insulated from the risk. This problem is one that architects of the liberalised electricity industry structure are reluctant to acknowledge because, essentially, it would mean admitting that the liberalised model cannot work as designed. In practice, there seem to be two ways in which policy-makers have attempted to ensure that there is sufficient investment in new generation without publicly acknowledging that the new model has evolved into a travesty of what it was meant to be.

The first is to tolerate or even create a highly concentrated generation market so that generation is effectively an oligopoly of a handful of companies. These companies will be able to force prices up to levels that will make them handsome profits. Such companies will be adept at maintaining an appearance of competition to prevent regulatory action. The size and market power of these companies will mean new entrants will be discouraged from entering the market because they will fear that the 'oligopoly' will use their market power to force them out of the market.

The second is to tolerate (re-)integration of generation and retail. An integrated generator/retailer will be able to bypass the market in a voluntary (net pool) market, the form of market most countries have adopted. They will simply use their own generation to supply their retail consumers and will offer little or no power to the wholesale market. If this form of integration dominates, the voluntary market will have no liquidity. Prices will be volatile and too erratic for buyers and sellers to rely on. These price signals will certainly not be reliable enough to use as an investment signal.

In a compulsory market (gross pool) such as has been used in Australia, there are other ways of avoiding market risk. In some countries, hedging contracts, known as 'contracts for differences', are allowed, which mean that buyers and sellers pay the contract price whatever the market price is, so the companies will be unaffected by the level of the market price. Even where contracts for differences are not allowed, an integrated generator/retailer will still be indifferent to the market price. If the pool price is high, the increased income from generation will compensate for lower income from retail and vice versa.

Competition in generation will simply be a façade that the companies maintain. But the only form of competition the companies feel will be from the retail market and this relies on consumers ruthlessly and regularly switching retail supplier to impose competitive discipline on their suppliers. While this might be realistic for electric-intensive industry, which can afford to employ specialists to get the cheapest deal for their power, it is unrealistic for small consumers. There is no evidence that small consumers are willing to switch regularly. Nor is there any evidence that those that do switch are able to select the cheapest deal. Research from the UK shows that about 80 per cent of small consumers that switched had not switched to the cheapest supplier².

From the policy-makers' point of view if not that of consumers, this integration of generation and retail is an attractive compromise. The companies appear to be competing and they also have an incentive to ensure there is enough generating capacity to supply their own consumers. This means that one of the factors that contributed to the California energy crisis in 2000/2001 is avoided. In California, because generators were strictly separated from retailers, the generators had no responsibility to consumers. Their only objective was

² Waddams, C, Wilson, C (2005) 'Irrationality in Consumers' Switching Decisions: When More Firms May Mean Less Benefit' CCP Working Paper 05-4.

to maximise profits to their shareholders and profits were highest when there is a capacity shortage. So in this situation, there was a positive disincentive to invest and an incentive to game the market, for example, by withholding capacity from the market.

But the competition in a market dominated by integrated generator/retailers is largely illusory, especially where there are only a handful of integrated companies.

4. Retail companies

The logic of the liberalised model is therefore that the retail electricity companies should be independent of the other sectors of the electricity industry. They should be independent of the network companies (distribution and transmission) to ensure impartial access to the networks for competing retailers. They should also be independent of the generators to ensure that the wholesale market is the main price-setting arena for wholesale purchases, providing reliable price signals based on costs actually incurred.

However, a stand-alone electricity retail company is a very strange creature. It has negligible physical assets, with the loyalty/inertia of its consumers its main asset and it sells an entirely standard product so it cannot protect its market share from price competition by product differentiation. If markets are working efficiently, consumers will continually switch supplier to the cheapest company and prices will be driven down to the avoidable cost. Such prices will be too low to justify new investment and the businesses of both the retailers and the generators will be unsustainable. So for the liberalised model to work, retailers should be independent, but if they are, the electricity sector will collapse because new investment will never be justifiable. Indeed, as noted above, in a de-integrated market; there will be a strong disincentive to invest.

This makes a retail business very valuable to a generator, as it reduces dramatically the exposure of the generators to market risk. When the integrated distributor/retailer companies were privatised in the UK in 1990, the assumed value of the retail businesses was zero, because of their lack of assets and the riskiness of the businesses. However, by 1998-2000, the British government had reversed its previous position opposing integration of generation and retail. It was also requiring distribution/retail companies to unbundle legally (the two businesses had to be in separate companies albeit the two companies could be owned by the same parent company).

This led to a dramatic increase in the value of retail businesses and between 1998 and 2001, the 12 retail businesses of England and Wales all fell into the hands of generation companies. Many of the retail companies were sold to a different company to the company owning the network in the region the company was based, with the retail part of the business now attracting a higher price than the distribution part. A typical selling price for a retail-only business was about £250/consumer (about A\$600/consumer). So a retail company with one million consumers would be valued at A\$600m. Given that a typical residential electricity bill in the UK is about £300/year of which the retail element is only 5-10 per cent (<£30), it is clear that the retailers were not being bought on the basis of potential profits from electricity retail. They were being bought because of the strategic and financial advantage they gave to a generation company. In short, retail companies were attractive to generators because owning them allowed them to defeat the objectives of wholesale electricity competition.

5. What will it take to get new generation built?

At the height of the Enron mania, there was speculation that the market would be dominated by 'merchant' plants that would survive simply by trading in wholesale markets. The collapse of Enron and the failure of utilities to make money outside their home market quickly destroyed this illusion. Now, in competitive electricity markets, generation plant is built only by integrated generator/retailers, which can use their retail market to off-set the investment risk. And plant is built by Independent Power Producers in markets where long-term Power Purchase Agreements (PPAs) are available that effectively take them out of the market. Where new generation is ordered without subsidy, the technology/fuel choice is almost always coal or gas. Gas is particularly attractive in markets where gas is available because of the low construction cost, the short construction time and the high-level of guarantees (on performance, construction cost and construction time) that suppliers will offer. Coal is an option where cheap, reliable coal supplies are available although its environmental impact through acid and greenhouse gases makes it much more problematic to site.

Renewables and nuclear power will only be chosen if there are extensive underpinning guarantees available, for example, on price and volume of sales. For nuclear, additional guarantees on regulatory costs, construction cost, and fuel cycle costs would also probably be needed for nuclear plants to be ordered. So a

government that wants to achieve reductions in environmental impacts is likely to have to offer terms to new generators that insulate them from the market.

In terms of who might build plants, the field is limited and unless the plant is fully insulated from the market, financiers will judge the risk to be high and will add a substantial risk premium to the cost of capital. This will inevitably be passed on to consumers. The lowest cost of capital is likely to be if the developers are publicly-owned companies because of their high credit rating.

6. Conclusions

Policy-makers are reluctant to admit that their utopian vision of a competitive wholesale market in which generators would be competing every half hour of every day to sell their power is unachievable. They are therefore allowing compromises to the competitive model, such as integration of generation and retail and corporate concentration in markets, which maintain a façade of competition but in reality lead to an under-regulated oligopoly.

If the risk of investing in new generation by public authorities is so high that it would endanger the credit rating of New South Wales, that tells us that the model is wrong. Simply shifting the responsibility to private companies, perhaps through some 'bribe' to allow them to own retail companies is a poor 'fix' and will be at the expense of consumers. It will be a bad result if consumers have to pay a far higher than necessary price for their electricity simply to retain the credit rating of the state.

Appendix

New South Wales Government Energy Directions Green Paper: Comments by Public Service International Research Unit, University of Greenwich, London

7. Executive Summary

One of the key aims set out in the New South Wales government's Green Paper on energy is to reduce the risk to the New South Wales government of its involvement in the electricity industry while retaining ownership of the existing assets. It hopes to do this through operating the existing assets through Public Private Partnerships (PPPs) and relying mainly on the private sector to build new power plants.

The New South Wales government's earlier reforms to the electricity industry added to the already large risk inherent in the electricity industry by attempting to introduce competition. In a monopoly industry, this risk is borne directly by consumers. If anything goes wrong, the extra cost is passed on in the form of higher tariffs. Competition introduces additional risks – if there is no additional risk, there is no competition.

One of the promises of the Green Paper is that risk can be transferred from consumers to the shareholders of private companies. This is a highly misleading claim. The cost of risk will ultimately fall on consumers, and if the risk is in some way dealt with by the private sector, the overall cost borne by consumers will tend to be higher because the private sector will require a 'fee' for dealing with the risk as well as the actual risk cost.

Introducing competition and requiring the private sector to deal with risk is therefore only justified if some or all of the following conditions are met:

- The costs of competition are outweighed by the benefits;
- The private sector is more efficient than the public sector at implementing policies that reduce risk and that these efficiency benefits more than pay for the private sector's fee for dealing with risk; and
- The form in which consumers experience the risk through the private sector is more palatable than if the risk was borne directly.

The Green Paper's proposals on industry restructuring are founded on two misguided objectives: that it is desirable to shift the risk of the electricity industry from government to the private sector; and that the value of government owned businesses should be preserved. These objectives are only worthwhile if they improve the electricity service that the citizens of New South Wales receive.

While the government might prefer, all things being equal, not to bear risk, if the result of the government bearing the risk rather than the private sector is lower electricity costs, government must face up to its responsibility of doing what is best for the public and if this requires that government bear risk, so be it.

The value of the government's businesses is only of interest if the government proposes to sell them. If it is not going to privatise them, their value is irrelevant. It is possible that measures that would maintain the value of these businesses may be detrimental to the New South Wales public, if, for example, the price of electricity is forced up, or the reliability of electricity supplies is adversely affected.

The government's thinking on Private Public Partnerships is muddled. For a PPP to be justified, the IMF set down four conditions:

- The superiority of a private option has to be demonstrated, not assumed;
- The PPP has to demonstrate that there are sufficient efficiency gains from involving the private sector, to offset the higher borrowing costs that the private sector will inevitably face;
- Governments should not use PPPs simply to reduce government borrowing; and
- The value of risk transfers to the private sector should not be over-estimated and the potential cost of government guarantees should not be under-estimated.

The government has not provided evidence on any of these four issues.

The government makes proposals on five specific issues on industry restructuring:

- **Allowing vertical integration of generation and retail.** Vertical integration of generation and retail will reduce the risk to both the retail and generation businesses, but at the expense of competitive pressures, largely by making the wholesale market irrelevant. It will make it difficult for new generation and retail companies to enter the market leaving it dangerously close to an oligopoly;

- **Private sector involvement in retail businesses.** This recommendation suggests the private sector should take much of the risk of retailing. However, it provides no evidence that the private sector would be more efficient than the public sector at dealing with risk;
- **Review of distribution network boundaries.** The existing distribution-retail companies would be split up, the retail businesses being absorbed into a single government-owned integrated generation-retail company and the three distribution businesses possibly being reduced to two companies, one covering rural and the other urban consumers. The risks of integration of retail and generation were noted above, while there would need to be strong supporting evidence to show that the cost of re-organising the distribution network would be justified by the benefits.
- **Contracts for state-owned generators.** It is proposed that state-owned generators would be allowed to sign longer contracts with retailers than the current 3-5 years. Such contracts would have little commercial value unless the retailers' market shares could be accurately forecast for, say, 10 years. This would only be possible if retail competition was sham.
- **The role of the state in the development of new power plants.** The government owned generators would develop generation options to the point at which construction would start. These options would then be sold on to a private developer or developed as a joint venture with the public sector building the plant and the private sector providing the power purchase agreement. There would seem to be little if any transfer of risk to the private sector and there is no analysis to show that the cost of the private sector bearing this risk is justified by the savings.
- **Security of supply.** The Green Paper states that the government will develop a strategy that will cover the eventuality that the private sector does not invest in sufficient new generating capacity. Any mechanisms that will reduce the risk that liberalisation will lead to reduced security of supply are inevitably at the expense of competition. The risk is that the liberalised model will evolve into one that has little real competition and does not provide security of supply.

8. Introduction

One of the main policy concerns in the Green Paper and with other recent policy papers from the New South Wales government³ has been controlling the level of risk the public sector was exposed to in the electricity sector. Much of the analysis has been muddled and has failed to specify how the risks would be controlled and whether there would be net benefits to the public.

Risk is not new for the electricity industry. Investment in a new power station has always been extremely risky. For example, if the cost of the fuel used increases sharply, or if the cost of construction exceeds the forecast cost, the cost of power from the power plant could be dramatically higher than forecast. However, in a monopoly electricity industry, the risk has often not been recognised because it is nearly always borne by consumers and the risk for an individual power station is diluted because it is generally part of a diversified portfolio of stations. In the USA, privately-owned electric utilities were always known as blue chip stocks because of this assurance – the so-called ‘regulatory bargain’ – that costs would be covered by the rates the utilities were allowed to charge. One of the most attractive promises of privatisation and liberalisation (breaking up the monopolies and introducing competition) of electricity industries is that risk will be transferred away from consumers to the private investors. However, it should be remembered that the other side of the regulatory bargain was that in return for being guaranteed a fair return on their investment, the utility guaranteed a reliable and affordable electricity supply. Clearly in any market driven system, such a bargain cannot apply and consideration needs to be given as to how a competitive system will provide the same level of security as the old monopoly system.

A useful starting point in a discussion of risk in the electricity industry is the analogy of household property insurance. It is sensible for householders to take out property insurance because there is a risk of rare, but potentially financially ruinous events. Involving the private sector tends to increase rather than decrease the overall cost of dealing with the risk, but insurance is worthwhile because it avoids ruinous risk by spreading the cost of rare high-cost events over a large number of individuals. Two important points to note are:

- Involving the private sector does not mean that the public does not have to pay the cost of that risk. The cost is still ultimately passed on to the public but in a different form, in the insurance example, an insurance premium;
- A judgement needs to be taken whether the additional cost of the private sector assuming the risk is justified by the benefits, for example, by ensuring that ruinous consequences do not land on an individual or if the private sector’s involvement will reduce the scale of the risk.

It is this latter possibility that is most relevant here. In short, it is claimed that the private sector will be more efficient than the public sector at implementing policies that reduce the scale of the risk. For example, the fuel procurement policies of the private sector may be more efficient than those of the public sector. However, the changes to the New South Wales electricity industry do not just involve a change from reliance on the public sector to the private sector for investment. They also involve the introduction of competitive mechanisms in both the retail and the wholesale parts of the business. Competition inevitably introduces new risks to the sector – if there is no additional risk, there is no competition.

9. Public private partnerships

Much of the rationale behind the proposals is based on the theoretical case for Public Private Partnerships (PPPs), for example, on p 48, it talks about ‘the importance of greater private sector participation in electricity retailing in New South Wales, as a means of reducing its risk exposure and as a means of providing incentives for private investment in generation’.

This kind of general appeal to the supposed benefits of private sector participation is typical of much discussion of PPPs. The definition of a PPP varies, but usually means an arrangement whereby a private company raises the finance for capital investment, and operates the plant under a contract with the government which allows the company to cover the costs of its finance and its operation, and make a profit. PPPs thus replace public sector investment and operation, and are then expected to be better because of the assumed superiority of the private sector. In practice, governments often seek to use PPPs because they are a way of reducing government borrowing and therefore keeping within borrowing limits. In order to satisfy accountants that the investment finance is truly a liability for the private sector, they are expected to show

³ Office of Financial Management (2004) ‘A risk management proposal for New South Wales’ electricity businesses’ New South Wales Treasury, New South Wales.

that the private sector carries the risk. However, policy decisions should be based on a precise evaluation of the various elements involved. The basic issues are set out in a recent paper by the IMF.⁴

First, the IMF insists that the superiority of a private option has to be demonstrated, not assumed,: *“When considering the PPP option, the government has to compare the cost of public investment and government provision of services with the cost of services provided by a PPP”*⁵

Second, the IMF notes that governments can borrow money more cheaply than the private sector, so the PPP option starts with a significant disadvantage; *“private sector borrowing generally costs more than government borrowing. This being the case, when PPPs result in private borrowing being substituted for government borrowing, financing costs will in most cases rise ...”*⁶ So the PPP has to demonstrate that there are significant efficiency gains from involving the private sector, in order to offset the borrowing costs. A report by the European Union in 2003 made the same point: *“The rationale for the use of PPP schemes is rather that of microeconomic efficiency.”*⁷

Third, the evidence does not support a general assumption of superior private sector efficiency, as the IMF is aware: *“Much of the case for PPPs rests on the relative efficiency of the private sector. While there is an extensive literature on this subject, the theory is ambiguous and the empirical evidence is mixed.”*⁸ Superior efficiency has to be proved in each case, not assumed.

Fourth, governments should not use PPPs simply because the private sector investment appears to reduce government borrowing, regardless of whether PPPs are a more effective solution. The European Union has also warned against this danger: *“there is the risk that the recourse to PPPs is increasingly motivated instead by the purpose of putting capital spending outside government budgets, in order to bypass budgetary constraints. If this is the case, then it may happen that PPPs are carried out even when they are more costly than purely public investment.”* (summary of part III, p.102)⁹

Fifth, the IMF warns against unrealistic treatment of risks and guarantees - exaggerating the value of risk transfers, and of providing guarantees which are not properly accounted for as future contingent liabilities: *“it is also possible that the government overprices risk and overcompensates the private sector for taking it on, which would raise the cost of PPPs relative to direct public investment”*¹⁰ *“....resort to guarantees to secure private financing can expose the government to hidden and often higher costs than traditional public financing....”* (PPPs para 40).

10. Risk in the electricity industry

In order to analyse the government’s proposals, it is useful to identify the main commercial risks involved in investment in generation and retail. These can be divided into those that apply however the sector is organised and those that are created by the introduction of competition to the sector. For a more detailed discussion of risk in the electricity sector, see Annex 1. Security of supply is often taken for granted in traditional electricity structures, but it cannot be assumed in a reformed industry. The risk here falls clearly on consumers much more than on companies.

10.1. Intrinsic risks in power station investment

10.1.1. Construction cost overrun

Power plants of all types are extremely capital intensive and a 1000MW plant could cost from A\$500-5000m depending on the technology chosen. An argument in favour of privatisation and liberalisation is that

⁴ International Monetary Fund Public-Private Partnerships March 12, 2004 para 38

<http://www.imf.org/external/np/fad/2004/pifp/eng/031204.htm>

⁵ IMF PPPs, para 22

⁶ IMF PPPs, para 22

⁷ European Economy No 3 / 2003 Issn 0379-0991 European Commission Directorate-General For Economic And Financial Affairs. Public finances in EMU 2003

http://europa.eu.int/comm/economy_finance/publications/european_economy/2003/ee303en.pdf

⁸ IMF PPPs, para 25

⁹ European Economy No 3 / 2003 Issn 0379-0991 European Commission Directorate-General For Economic And Financial Affairs. Public finances in EMU 2003

http://europa.eu.int/comm/economy_finance/publications/european_economy/2003/ee303en.pdf

¹⁰ International Monetary Fund Public-Private Partnerships March 12, 2004 p.14

<http://www.imf.org/external/np/fad/2004/pifp/eng/031204.htm>

traditional utilities do not have a strong enough incentive to control costs because the management know the costs can almost invariably be passed on to consumers. If the additional costs were passed on to shareholders, management would be under much stronger pressure to control costs. The effect of competition on the construction of new power plants is to raise the cost of capital, perhaps doubling it. Because the investment in a new power station is not guaranteed to be repaid to investors, those providing the finance charge a higher rate of interest to reflect the risk they might lose their money. This dramatically alters the balance in favour of low capital cost options (for example, gas-fired stations) and against high capital cost options (for example, nuclear plants and, to a lesser extent, coal-fired plants).

10.1.2. Fuel cost inflation

Paying for fuel is the major cost in a fossil-fuel (coal, oil or gas) plant. Fuel prices are volatile and impossible to forecast accurately even in the short term so there is a significant risk that decisions on fuel procurement will prove to be uneconomic. The promise of liberalisation is that plant owners will be more motivated to ensure fuel costs are kept low than a monopoly company because of the risk to their business of over-paying for fuel.

10.1.3. Plant unreliability

Particularly for complex plant, such as nuclear plants and advanced coal-fired technologies, plant performance may be significantly worse than forecast. This will mean that the power expected from the plant will have to be replaced with power from another plant not then operating. Inevitably, this will be more expensive power. The argument for liberalisation is that in a competitive market, if a plant cannot produce, its owners receive no income, whereas in a monopoly industry, the owners replace the broken down plant with another from their portfolio of plants and pass on the extra costs to consumers.

10.2. New risks created by competition

There are two main additional risks to companies created by introducing competition: wholesale market risk and retail market risk. For consumers, there is also an increased risk to security of supply.

10.2.1. Wholesale and retail market risk

A wholesale electricity market that meets the criteria for perfect market is not possible and the inevitable imperfections lead to additional risks. In an ideal liberalised scheme, all power should be traded in a spot market or Power Pool. All plant owners would submit a 'bid' to the Pool for each half hour of each day and the plants with the lowest bids would be chosen. Plant owners would be under intense pressure every hour of every day to minimise their costs so that they could bid low enough to be operated yet still make a profit. In practice, the ideal wholesale market with generators competing every 30 minutes has never been achieved probably because such a scheme would make investment in new power plants intolerably risky. How would it be possible to justify investment in a new power plant costing a billion dollars if there was no way to know how much power would be sold and at what price?

In a monopoly electricity business, the retail part of the industry (purchasing power, meter-reading and billing) represents a small and simple activity. Typically it accounts for no more than 5 per cent of the cost of supplying a consumer and the risks involved are minimal and are borne entirely by consumers. However, in a fully competitive market, retail is transformed into a highly risky business. Unlike most retail businesses, electricity is entirely a standard product. This means that retailers should not be able to rely on 'brand name' or 'product differentiation' to protect their market share if their price is not the lowest. It is not possible in a network industry like electricity to buy a 'better' or a 'more prestigious' kWh of electricity. Consumers will only be interested in price and should, in theory, switch regularly to the cheapest supplier. Under economic theory, this should mean that prices will be forced down to short run marginal cost levels, levels too low to allow replacement of old assets and for new assets to be built to meet demand growth.

Retail businesses are not as risky in practice as theory would suggest: consumers do not ruthlessly switch retailers frequently; they often cannot make the appropriate price comparison; the savings available do not justify their time; and they believe that buying from a trusted supplier will give them a better service. This means that electricity markets do not become ruinously competitive *because* the market is not working as a theoretically ideal market should. Nevertheless, the characteristics of the retail sector - minimal physical assets, inability to protect market share with brand name, product differentiation - mean that retail is far too risky to be viable as a long-term stand-alone business. Consumers would also not have much confidence in an industry where their retail supplier frequently went bankrupt.

The traditional home for a monopoly electricity retail business is integrated with the corresponding distribution ('wires') business. In a liberalised market, this is regarded as undesirable on two grounds. First, there is a risk that an integrated distribution-retail company will use its ownership of the monopoly network to unfair advantage, for example, by cross-subsidising the competitive retail activity from the monopoly activity, or by denying competitors access to the network. As a result, the European Commission now requires a full legal separation between distribution and retail. Second, in a fully competitive market, there should not be a company for which there is a natural 'home supplier'. The forced separation of distribution and retail and the fact that retail is probably not viable as a stand-alone business leaves the retail business in a vulnerable position.

10.2.2. Dealing with wholesale and retail risk

Two main ways have been used to reduce the wholesale and retail market risks: hedging contracts and integration of generation and retail. Of course, any reduction in risk inevitably means a reduction in the intensity of competition.

Hedging contracts between generators and retailers allow generators to bypass the Pool so that the price paid or received is entirely independent of the Pool price. However, for a hedging contract to be credible, a retailer would have to be able to forecast its market share reasonably accurately for the duration of the contract. This is clearly not possible if there is a genuinely competitive retail market because market shares would vary according to competitive advantage. If a retailer goes bankrupt perhaps due to errors in market share forecasts, any contracts it has with generators become worthless. Hedging contracts have generally only been a short-term measure and most liberalised electricity systems have moved towards integration of generation and retail. The enforced break-up of traditional distribution-retail companies leaves retail businesses very vulnerable to take over.

In theory, integration is wrong, because if retail and generation are integrated, the wholesale market will be bypassed. Companies will generate to supply their own consumers directly and the wholesale market will be too little used to provide useful price signals. From a competition point of view, this is a very dangerous situation because the barriers to entry for new generators or retailers become very high. Who would a new generation company sell its power to if all the retailers had their own generating capacity? And who would a new retail company buy its power from if all the generators sold their output to their own retail businesses.

Integration means that the wholesale market is not the main arena for competition. Competition can only be through consumers regularly and systematically switching to the cheapest supplier. While large consumers who have the resources, incentive and muscle to exploit the market to the maximum will probably not suffer from this, it is a very different story for small consumers. In most countries with retail competition, fewer than 5 per cent of consumers switch each year and retailers can generally assume most consumers are not price sensitive. This is a recipe for exploitation of residential consumers.

A retail business is a very valuable asset for a generation business because of the protection against the spot market it provides and because of the ability it gives to pass excess costs on to small consumers. Typically, in Britain, where a separation between retail and distribution was enforced a retail only business would be worth about £250 per consumers. All 14 retail businesses in Britain are now in the hands of just five integrated companies.

10.2.3. The risks and dangers of integration of generation and retail

Vertical integration does not entirely remove commercial risk. Texas Utilities (TXU) was a part integrated generator-retailer in the Britain with about 4 million consumers and about 5000MW of power plants. It bought the balance of its power from an Independent Power Producer, the Drax power station (owned by a subsidiary of the US company AES). By 2002, TXU had lost market share and was over-contracted for power, which it had to dump on the spot market at a loss. TXU collapsed and was taken over by the German company E.ON and AES had to write off their entire investment in a power plant it had paid £2bn for only a year before.

The danger to competition of integration of retail and generation was also illustrated in Britain in 2002. At that time, about 40 per cent of British generation was owned by companies with no retail business. The spot price collapsed, falling by about 40 per cent. Given that spot sales and contracts indexed to the spot price make up a tiny proportion of all wholesale trades, this fall in the spot price did not necessarily reflect any change in the price at which most electricity was bought and sold. For the integrated companies, this collapse of the spot price caused no problems. The retail price they charged small consumers did not change so their

income was not affected. However, for the independent power producers (IPPs), who often had to sell into the spot market or on spot related terms, the impact was catastrophic and by the end of 2002, essentially all IPPs were financially distressed. Since then, the nuclear company has had to be bailed out by the government at high cost to taxpayers and most of the rest of the power plants owned by IPPs have been bought by the integrated companies at distress prices.

While there is no evidence that the integrated companies engineered the spot price collapse, it clearly suited them. With the IPPs out of the market, the industry was effectively closed to new entry. All the integrated companies in Britain can make good profits and have no incentive to compete hard against each other.

The policy of forcing the separation of retail and distribution has some logic, but it leaves the retail activity in a position where it will almost inevitably fall into the hands of generators, a solution potentially far more damaging to competition than allowing integration of distribution and retail.

10.3. Security of supply

The 'regulatory bargain' required monopoly utilities to provide a secure supply of electricity and in return they were guaranteed to be reimbursed the cost of the investments necessary to provide this. Advocates of competition seldom question whether the excellent record of monopoly systems in providing a secure supply of electricity can be maintained in a liberalised market. In a liberalised market the 'bargain' cannot apply and the assumption is that market signals will stimulate the necessary investment in generation. This seems implausible. Power stations may take eight years from start of planning to first power production. Market signals in electricity are inevitably volatile and difficult to interpret. The price changes every 30 minutes and is highly dependent on weather, time of day, and day of the week. For anyone to base an investment of, say, a billion dollars on such arbitrary signals seems unlikely.

For most commodities, prices follow 'hog cycles'. There is a shortage of production capacity; prices rise; all investors see the signals and respond by investing; there is over-investment because there is no planning process to match supply and demand; the price collapses; the highest cost producers are forced out of the market etc. Such cycles are acceptable for many products especially those easily stored and for which there are ready substitutes. If the price rises, stocks can be drawn down and substitutes used until the price reaches acceptable proportions. Electricity is also almost the only product for which the system will collapse if only a small proportion of demand cannot be met. It has very high barriers to entry and producers profit from a shortage. For other products, entry is often easy, for example, if there is a shortage of a food commodity, it is generally easy for farmers to start producing the commodity, bringing down prices. With electricity, there will be very few companies other than the existing ones willing to take the risk of building a power station. So it makes commercial sense for generators not to build new plant to avoid shortages because they will make more money (and incur less risk) if they do not.

These factors have always been understood, but were overlooked by those determined in their belief that electricity can be bought and sold just like any other normal commodity. There is now an increasing acknowledgement that market forces will not produce supply security. For example, the European Commission is introducing a Supply Security Directive (COM(2003) 740 final)¹¹ that will re-introduce many elements of planning to the sector. These measures are inevitably at the expense of competition. For example, there is a process by which government identifies a prospective shortage of capacity and commissions a company to build the necessary capacity. In return for winning the tender, the company commissioned will require a long-term contract for the purchase of the power, taking them out of the market. The European Commission acknowledges there is this risk ('wait for the tender') and that, in the end, all capacity would probably be built under this mechanism rather than in response to market signals. Why would any company build a plant speculatively to compete in the market when it can compete for a tender and get a long-term contract for the power the plant will produce?

While the government tender scheme outlined above might not be desirable from a competition point of view, it does appear to deal with the security of supply issue. However, this is an illusion for two reasons. First, in a free market, there is free entry and exit. In Britain, there was massive investment in new generation after privatisation, but this was more than matched by plant retirements so there was no net increase in capacity. If we assume a situation whereby the government foresees a capacity shortage and commissions the

¹¹ European Commission. Proposal for a Directive of the European Parliament and of the Council concerning measures to safeguard security of electricity supply and infrastructure investment. COM(2003) 740 final 2003/0301 (COD), Brussels.

construction of a new plant, an existing company with a portfolio of power plants might decide that the extra capacity will make one of their plants uneconomic and they will retire it, leaving no net increase in capacity. If the government is to prevent companies retiring plants the companies claim are not economic, that would require significant powers and would further remove any competitive element to the market.

Second, in practice, in a free market, companies are reluctant to make irreversible commitments to build new plants and often have a portfolio of options from which they can activate elements depending on market conditions. Thus in Britain, in 2004, companies had announced power plant projects totalling a capacity of 40,000MW (maximum demand is about 50,000MW) all of which could be online by 2010. Clearly much of this capacity will not be built, but how can any planning authority predict what the proportion built will actually be? If it is 10 per cent, there could be a capacity shortage, if it is 25 per cent, there could be a capacity surplus. Power plant commissioning dates are commercially highly sensitive pieces of information that companies are unwilling to divulge. A significant size new power station will depress spot prices so there is money to be made from knowing when plants will come online. The idea of a planning 'backstop' that can step in to prevent capacity shortages is therefore misguided.

11. The New South Wales' government proposals¹²

The New South Wales government lists two main objectives its policy is meant to achieve: preserving the value of the government's investment in the electricity sector; and promotion of private sector investment in energy infrastructure. The government also commits to retain the existing assets in public ownership. The first objective seems sensible but should not be an overriding consideration. The overall welfare of the New South Wales people should be the ultimate objective and if this is best served by losing some of the value of the assets, this may be a worthwhile price. The commitment on public ownership is welcome for the infrastructure part of the business. Increasingly, governments are deciding that, whatever else is done to the electricity sector, the infrastructure should be fully under public control. This reflects the key role of the network in ensuring security of supply: an electricity system is much more likely to survive the breakdown of a power plant than it is the failure of a transmission line. However, the promise as far as the generation plants goes, is rather empty. If the public sector does not invest in new power plants, the policy will effectively be a slow privatisation as the old publicly owned assets are replaced by privately owned assets.

The key objective is the second one of promoting private sector investment. The Green Paper states (p 46): 'The Government does not consider it appropriate to invest further capital in high risk commercial activities like electricity generation, when this capital and risk exposure can be provided by the private sector.' As with the first objective, this misses the point. The priority for the government should be seeking policies that maximise the welfare of the New South Wales people and if that requires the government to take risks, then it is the duty of the government to do that.

The first section (pp 46-47) deals with the New South Wales Treasury's Risk Management Proposal published in May 2004. This was entirely misconceived and has now been withdrawn, although much of the thinking from that document persists. Annex 2 contains a critique of the proposals by Public Service International Research Unit submitted to the consultation process for the Risk Management Proposal.

11.1. Vertical integration of generation and retail

The second section (pp 47-48) deals with vertical integration of generation and retail. Vertical integration of generation and retail has very strong practical advantages in electricity reducing investment risk and providing better assurance of supply security (an integrated company will have an incentive to ensure its consumers can be fully supplied). However, vertical integration, especially if it is the dominant form of organisation as it is in the UK makes a mockery of the attempt to introduce competition. The wholesale market is bypassed and the barriers to entry for new generators and retailers are probably insuperable.

The Green Paper argues that the rest of Australia is restructuring with consolidation into a handful of large integrated companies and New South Wales needs to follow suit creating a large publicly-owned integrated company capable of competing on a national scale and also to maintain the value of the existing government-owned retail businesses. It identifies four priorities:

- Reducing risk exposure and retaining value;

¹² The government's proposals are contained on pp 46-53 of the Green Paper. They also include proposals on restructuring the distribution businesses. These are not covered in this account.

- Enhancing competition in the national market by creating a new integrated company;
- Supporting retail competition in New South Wales by leaving some government owned generation 'unaligned' (not part of an integrated company); and
- Allowing the new vertically integrated entity to enter joint ventures and use private capital to build new power plants.

11.1.1. Reducing risk exposure and retaining value

The objective of retaining value is at best irrelevant – if the business is not going to be sold, its value is of no interest to the New South Wales public – and at worst misguided – steps taken to retain value might have an adverse effect on the cost of electricity and be a net loss to the public. Similarly, vertical integration would reduce risk, but simply by reducing competition. It is a very curious policy to re-organise the electricity industry on competitive lines and then block off competition because of risk aversion.

11.1.2. Enhancing competition in the national market

It is not clear how creating a vertically integrated company would enhance competition. A vertically integrated company would generate to supply its own consumers. It would have no interest in selling power to the wholesale market because that would give independent retailers access to cheap power with which they could compete against the integrated company. Whether retail competition would be enhanced is also unclear. Most large consumers buy power purely on price and an additional large company might provide more competition. Small consumers generally prefer to stick with tried and tested companies and would be unlikely to switch. However, the risk of creating large companies is oligopoly. A handful of large integrated companies operating across Australia would have little incentive to engage in vigorous competition. Their profits would be better served by retaining their existing market share and keeping prices high.

11.1.3. Supporting retail competition in New South Wales

In theory, leaving some independent power producers (IPP) should enhance competition by providing power to the market for independent retailers. However, British experience suggests that IPPs will not survive long in market with a large proportion of integrated companies. The 40 per cent of British generation owned by IPPs in 2002 was easily bankrupted. In a spot market with minimal liquidity, prices can easily be manipulated up or down. It is not suggested that any market manipulation took place in Britain, but the collapse of the IPPs clearly suited the integrated companies.

11.1.4. Bringing private investment to generation

Here, the government's thinking seems particularly muddled. The rationale for public private partnerships (PPPs) is for the private sector to take risk – if there is no transfer of risk, a PPP is not justifiable. Yet here, the suggestion seems to be that the private sector would be commissioned to build power plants to supply the needs of a publicly-owned integrated company, presumably under long-term power purchase agreements (PPAs). Without a PPA, no private company will build a power plant on the off-chance the integrated company will buy the output. The publicly-owned integrated company would be taking most the risk because it would be selling the output, while the private company would be supplying the capital inevitably at higher cost than if the finance came from the public sector. Clearly, there is likely to be private sector interest to build power plants under commission from a publicly owned company backed by a long term PPA, but this would not transfer significant risk away from the public sector and would not be a low cost option because the cost of borrowing for the private sector would be higher than for the public sector. The key risk with power plants is demand risk – that there will not be sufficient demand for the electricity to cover the costs of production and the return on capital. A PPA removes this risk from the private investor and places it on the government by guaranteeing demand.

11.2. Private sector involvement in other retail businesses

This section (pp 48-49) retains much of the thinking behind the abandoned Treasury proposal on risk management. It aims to find ways of transferring the risk involved in purchasing electricity in the wholesale market from the public sector to the private sector. Specifically, the risks are that the retailer will buy more power than is needed and will have to sell it on at distress prices and that spikes in the wholesale market price will not be recoverable from consumers. These risks are real, albeit created by the government when it took the decision to try to run the electricity industry on competitive lines. The two objectives identified are:

- Reducing risk exposure and retaining value; and
- Providing incentives for investment in new generation capacity.

The first objective was dealt with in the previous section. To summarise, reducing risk exposure and retaining value are not worthwhile government objectives in their own right. They are only useful if they contribute improving the electricity supply received by New South Wales consumers.

The government claims the second objective can be met by the creation of joint ventures with the private sector or reselling arrangements that would involve the private sector taking the majority of risks. There is no acknowledgement that there are inevitable costs as well as possible benefits to transferring the risk to the private sector. Until there is some solid analysis that shows how much better the private sector is than the public sector at dealing with risks, and that these improvements will more than pay for the price the private sector will charge for assuming these risks, the proposals are based on unsupported assertion. The government needs to meet the tests listed by the IMF on PPPs (see section 2) to demonstrate the case.

The issues raised in PSIRU's comments on the Treasury's proposals are still relevant. These were:

- What risks are being transferred?
- Can private sector traders credibly take these risks and if it can, what evidence is there that it would do it more efficiently than the public sector?
- Will long-term security of supply be jeopardised?

Annex 2 includes detailed argument on these points.

11.3. The Electricity Tariff Equalisation Fund

This fund (see pp 49-50 of the Green Paper) was established in to 'hedge' the risk that the wholesale market would produce price spikes, a figure of A\$10,000 per MWh is mentioned, that could not be recovered from consumers. Essentially, money is paid into the fund by retailers when the wholesale price is low, which is paid to retailers when the price is high. This begs the questions: if the market is likely to produce such extreme prices, which clearly do not reflect costs, is the form of market appropriate; and what is the point of introducing a market if market signals are going to be blunted in this way? The fund will expire in 2007.

11.4. Review of distribution network boundaries

Under these proposals (pp 50-51 of the Green Paper), the existing regional distribution-retail companies would be split into separate distribution and retail companies.

The distribution companies might be reorganized into two companies, one covering the urban network and the other the regional network. Before such a major change to the management of the distribution network was undertaken, it would need to demonstrated that there were clear net benefits to this that would more than pay for the significant cost breaking up three companies and creating two new companies. It seems unlikely that there would be significant scale economies in moving from three to two companies.

The retail businesses would be absorbed into one large, publicly-owned generation-retail company. The government-owned retail company would be obliged to supply small consumers that did not want to shop around for their power with electricity at regulated rates.

There is some logic in competition policy in separating distribution and retail (preventing cross-subsidy), but the alternative of allowing integration of generation and retail is much more harmful to competition. The protection that small consumers who do not want to switch are given by offering them a regulated rate from the publicly owned company may not be as strong as it appears. The regulated rate will inevitably be higher than the market rate because the companies will reserve its best deals for the competitive market.

There good alternatives that the government has not considered. In recognition that small consumers do not have the resources to compete against large consumers to get cheap power, it would make sense to leave retail as a monopoly for small consumers. Regulators would be required to ensure that retailers did not discriminate against small consumers, for example, by allocating their cheapest generation to large consumers. This would mean that the break-up of regional distributors was not required.

11.5. Contracts for output of state-owned generators

To reduce the risk of new generation construction, the government proposes that government allows retailers to sign longer term contracts than the present three to five years. This raises the issue of how credible a contract of, say, ten years, signed by a retailer. If the contract is credible, it can only be because the retail market is not fully competitive. If the retail market was fully competitive, no retailer would be able to predict what its market share would be more than, say, a year ahead. The experience of the British Drax power

station is instructive here. The retailer, TXU (UK) signed a long-term contract to take some of the output of the plant with the plant's owner, AES in 2001. Within a year, TXU (UK) had failed, essentially because it had bought too much power and had paid too much for it. TXU (UK) collapsed and the contract with AES Drax was largely worthless and AES Drax also collapsed. So, unless the retail market is sham, long-term PPAs would be of little value in reducing risk.

11.6. The role of the state in the development of new power plants

Under this proposal, the government owned generators would develop generation options to the point at which equipment would be purchased and construction started. These options would then be sold on to a private developer or developed as a joint venture with the public sector building the plant and the private sector providing the power purchase agreement (PPA). Again, the public sector is shouldering the risk of going through the plant planning procedure – if there was no risk to this activity, there would be no reason not to leave it to the market. As above, the credibility of long-term PPAs must be questioned. If a long-term PPA is not 'bankable', then the transfer of risk away from the public sector is minimal.

A third option noted is that the private sector builds the plant and the private and public sector form a joint venture to trade the output of the plant along with the output of an existing plant. This seems to be an option that the government finds attractive.

Clearly blending new with existing power plants will provide some hedging of the risk, but the question remains, what is the evidence that the private sector can handle the risk so much better than the public sector that the benefits will more than pay for the cost of requiring the private sector to shoulder risk? Simply transferring risk from the public to the private sector is not a worthwhile objective in itself.

11.7. Security of supply

This is a key point. If the reforms cannot match the excellent record of security of supply that the current model has provided, it is highly unlikely that any reductions in electricity price will compensate.

The Green Paper states that the government will develop a strategy to deal with the risk that insufficient capacity will be provided by the market. In Section 3.3, we argued that all experience elsewhere suggests that any mechanisms by government to step in to fill a shortfall in capacity will be at the expense of the market. Potential generators will wait for a government tender to build plant rather than take the huge risk of building plant speculatively to live off the market. We also argued that predicting capacity shortage will be impossible unless government has full control over exit from the market and can predict how much capacity will be built and when it will be brought online. Clearly if these conditions are met, the principles of a free market, notably free entry and exit, will be seriously compromised.

There are additional practical risks. It is not sufficient for security of supply that enough capacity is in place; its output must be offered to the market. In Britain, independent generators have withdrawn plant from the market at key times to force up the wholesale market price. Proving such behaviour is not easy. If a generator claims a plant was inoperable a week ago, how can a regulator prove otherwise?

Also in an interconnected system, having sufficient capacity in a given area does not guarantee security of supply. If an adjoining state to New South Wales does not have sufficient capacity, unless New South Wales is able to isolate itself from that state, any blackouts will be felt across the interconnected system.

12. Conclusions

One of the key aims set out in the New South Wales government's Green Paper on energy is to reduce the risk to the New South Wales government of its involvement in the electricity industry while retaining ownership of the existing assets. It hopes to do this through operating the existing assets through Public Private Partnerships (PPPs) and relying mainly on the private sector to build new power plants.

The New South Wales government's earlier reforms to the electricity industry added to the already large risk inherent in the electricity industry by attempting to introduce competition. In a monopoly industry, this risk is borne directly by consumers. If anything goes wrong, the extra cost is passed on in the form of higher tariffs. Competition introduces additional risks – if there is no additional risk, there is no competition. Some of these risks are in the form of additional costs. For example, the cost of capital for new power plants is likely to double. Other risks are in the form of risk of loss of security of supply. Advocates of competition seldom acknowledge that competition is not a 'free lunch' and the prevailing political climate under which

competition is always the answer does not encourage rigorous examination of the issues. Cost benefit analyses for introducing competition into electricity have not usually been done: for many of its advocates, the idea that competition inevitably brings net benefits to electricity supply is a tenet of faith.

One of the promises of liberalisation and of the Green Paper is that risk can be transferred from consumers to the shareholders of private companies. This is a highly misleading claim. The cost of risk can only ultimately fall on consumers, and if the risk is in some way dealt with by the private sector, the overall cost borne by consumers will tend to be higher because the private sector will require a 'fee' for dealing with the risk as well as the actual risk cost.

Introducing competition and requiring the private sector to deal with risk is therefore only justified if some or all of the following conditions are met:

- The costs of competition are outweighed by the benefits;
- The private sector is more efficient than the public sector at implementing policies that reduce risk and that these efficiency benefits more than pay for the private sector's fee for dealing with risk; and
- The form in which consumers experience the risk through the private sector is more palatable than if the risk was borne directly. For example, in the insurance analogy, paying a predictable premium is preferable to bearing the risk directly.

The Green Paper is founded on two misguided objectives: that it is desirable to shift the risk of the electricity industry from government to the private sector and that the value of government owned businesses should be preserved. While these sound worthwhile aims at first sight, closer examination shows that they are only sensible if they improve the electricity service that the citizens of New South Wales receive.

While the government might prefer, all things being equal, not to bear risk, if the result of the government bearing the risk rather than the private sector is lower electricity costs, government must face up to its responsibility of doing what is best for those that elected it and if this requires that government bear risk, so be it.

The value of the government's businesses is largely only of interest if the government proposes to sell them. If, as the government promises, it is not going to privatise them, their value is irrelevant. It is possible that measures that would maintain the value of these businesses may be detrimental to the New South Wales public, if, for example, the price of electricity is forced up, or the reliability of electricity supplies is adversely affected. If either of these outcomes happens, it will be of little consolation to the public that the value of these businesses, which are not going to be sold, has been maintained.

The government's thinking on Private Public Partnerships is muddled. For a PPP to be justified, the IMF set down four conditions:

- The superiority of a private option has to be demonstrated, not assumed;
- The PPP has to demonstrate that there are sufficient efficiency gains from involving the private sector, to offset the higher borrowing costs that the private sector will inevitably face;
- Governments should not use PPPs simply because the private sector investment appears to reduce government borrowing; and
- The value of risk transfers to the private sector should not be over-estimated and the potential cost of government guarantees should not be under-estimated.

The government has not provided evidence on any of these four issues.

The issue of security of supply is not adequately analysed in the Green Paper. It states that it will develop a strategy that will cover the eventuality that the private sector does not invest in sufficient new generating capacity. Any mechanisms that will reduce the risk that liberalisation will lead to reduced security of supply are inevitably at the expense of competition. The risk is that the liberalised model will evolve into one that has little real competition and does not provide security of supply.

Annex 1 Risk in the electricity industry

In order to analyse the government's proposals, it is useful to identify the main commercial risks involved in investment in power plants. For those risks that apply whether or not the sector is run on competitive lines, the analysis will identify what arguments there might be about whether the public or private sector is more capable of implementing policies that reduce the risk and how these risks will be affected by the implementation of competition. For those risks introduced by competition, the analysis will identify the scale of these new risks and how consumers will have to pay for them.

A. Intrinsic risks in power station investment

A.1 Construction cost overrun

Power plants of all types are capital intensive. The most expensive plant to build, a 1000MW nuclear power plant could cost about A\$5bn, while much lower cost options such as a combined cycle gas turbine (CCGT) using natural gas would still cost in excess of A\$500m for a plant of comparable size. Other options, such as coal or hydro usually cost somewhere in between, depending for example, on the extent of the pollution control measures for coal plants or on the site's geographic conditions for hydro plant. Particularly for the capital intensive options, complex site activity is required that can be difficult to manage efficiently leading to cost escalation and construction lead-time extensions. An argument in favour of privatisation and liberalisation is that traditional utilities do not have a strong enough incentive to control costs because the management know the costs can almost invariably be passed on to consumers. If the additional costs were passed on to shareholders, management would be under stronger pressure to control costs.

As discussed later, the effect of competition on the construction of new power plants is to raise the cost of capital, perhaps doubling it. Because the investment in a new power station is not guaranteed to be repaid to investors, those providing the finance charge a higher rate of interest to reflect the risk they might lose their money. So, since repaying the construction cost is generally one of the two major costs (with fuel) in the cost of power from any given power station, in practice, if the cost of capital is doubled, capital intensive options are unlikely to be attractive in competitive electricity industries. Thus, in the 15 years since the British electricity industry was reformed, the only power plants built without public subsidy have been CCGTs. CCGTs are substantially factory-built with the lowest construction cost of any of the commercial generation technologies and can be brought on line in about 2 years compared to about 5 years or more for more complex plant involving substantial site construction. So there is no strong evidence from the UK about whether introducing competition has been a strong discipline controlling costs.

In practice, there is no evidence that the issue of cost control is to do with ownership despite the rhetoric about the efficiency of private companies compared to publicly owned companies. Some of the worst cases of cost-inflation have been at US power plants owned by private utilities. The issue is management in the case of publicly owned utilities and regulation in the case of privately owned utilities. Good management should ensure that construction costs are controlled and good regulation should ensure that excessive costs are not passed on to consumers.

A2. Fuel cost inflation

Along with repaying the construction cost, paying for fuel is the major cost in a fossil-fuel (coal, oil or gas) plant. Fuel prices are volatile and impossible to forecast accurately even in the short term. An error might occur if a type of fuel is chosen for which the relative price increases significantly. For example, if demand for gas rises sharply, the gas price is likely to increase relative to other fuels. Alternatively, a long-term fixed price contract might prove very expensive if the market price of the fuel falls. For example, in the UK, many companies signed 15 year fixed price take-or-pay contracts for gas. Within three years, the market gas price had halved leaving the power from the affected power stations as the most expensive on the system. Ironically, far from writing off these contracts, the companies have simply allocated them to the less price sensitive residential market and small consumers are still paying for this error.

The promise of liberalisation is that plant owners will be more motivated to ensure fuel costs are kept low than a monopoly company because of the risk to their business of over-paying for fuel. While this sounds intuitively plausible, in practice it does not apply. A sensible fuel procurement policy is not necessarily one that tries to minimise the fuel cost unless there is an option that will clearly be cheaper than the alternatives. Forecasting world fuel prices is not possible so it would be largely good luck if a company happened to

choose the cheapest option for all its fuel. A more robust policy would be to get a diversified portfolio of contracts and fuels so that if one source proves expensive it can be substituted by cheaper contracts in the portfolio. Traditional large utilities have been able to build up skills in fuel portfolio management. In a fragmented competitive market, companies are not large enough to operate a portfolio. In this situation, the prudent policy for the company would be to follow the market. If all companies have similar fuel contracts, the risk to a generator of ending up with a fuel contract much more expensive than their competitors is low. Equally, of course, the chances of ending up with a much cheaper fuel deal are low. But investors do not invest hundreds of millions of dollars in a power plant to risk that investment in a speculative fuel contract. So the net effect of liberalisation may be to prevent diversified portfolios of fuel supply contracts.

A3. Plant unreliability

Particularly for complex plant, such as nuclear plants and advanced coal-fired technologies, plant performance may be significantly worse than forecast. This will mean that the power expected from the plant will have to be replaced with power from another plant not then operating. Inevitably, this will be more expensive power – electricity systems are generally run on a least cost basis, in other words, the cheapest plants necessary to meet demand are used. The argument for liberalisation is that in a competitive market, if a plant cannot produce, its owners receive no income, whereas in a monopoly industry, the owners replace the broken down plant with another from their portfolio of plants and pass on the extra costs to consumers.

Typically, it has been the most complex plants that have proved problematic because they are technologically demanding and the overall design is likely to be specific to the site. Even if it contains a number of standard design items, in combination their performance is not easy to predict. In these circumstances, equipment suppliers will not provide performance guarantees, nor will insurers provide insurance. Of course, the cost of performance guarantees or insurance cover would be factored into the cost of the equipment or paid as an insurance premium.

CCGT technology was very attractive to companies competing in electricity markets because it was largely a factory built standard design. Manufacturers were willing to guarantee performance and insurance was available (except for first-of-a-kind designs). In practice, performance of many CCGTs was very poor initially and manufacturers and insurers have paid heavily for unreliability.

B. New risks created by competition

In many respects, liberalisation does not change the risks, merely the way they are handled and who apparently bears them. In an ideal market, if construction costs over-run, if fuel purchases are uneconomic or if plant reliability is poor, the companies will lose market share to companies better at minimising these risks. However, there is still a cost to consumers. Thus, the cost of capital is likely to increase from perhaps a real rate of 8 per cent to one in excess of 15 per cent and this additional cost is inevitably borne ultimately by consumers. Also there is likely to be a ‘herd instinct’ with investors following the same ‘safe’ options in terms of fuel and technology so that they cannot be badly wrong. This makes sense for investors but is unlikely to be the best solution for electricity consumers.

B.1 Wholesale market risk

A wholesale electricity market that meets the criteria for perfect market is even less likely to emerge than a perfect market for any other commodity and the inevitable imperfections lead to additional risks. Under a monopoly model, power is dispatched on an hourly or half hourly basis under ‘merit order’. The power plants available to generate are sorted by their marginal cost of generation¹³. The cheapest plants are selected for operation until demand is fully met for the given period. This ensures that the cost of meeting demand from a given set of power plants is minimised because only plants with the lowest running costs are used. Fixed costs will be incurred regardless of which plants are operated so do not play any part in the decision about which plants should be used.

Arguably, in the ideal liberalised scheme, all power should be bought and sold in a spot market (Power Pool) that works in essentially the same way as ‘merit order dispatch’ but instead of plants being chosen for operation according to the marginal cost, they should be chosen on price bid. All plant owners would submit a ‘bid’ to the system operator (the company that in a liberalised market controls carries out the decisions on

¹³ Marginal cost is the cost to generate an extra kWh of power, mainly fuel, ignoring the costs that would be incurred whether or not the plant was used, mainly repaying the cost of construction.

which plants are operated) for each half hour of each day and the system operator would choose the plants with the lowest bids for operation. Usually, the highest successful bid sets the Pool price and is paid to all successful bidders regardless of their actual bid. Under this scheme, plant owners would be under intense pressure every hour of every day to minimise their costs so that they could bid low enough to be operated yet still make a profit. Clearly this scheme of operation would only work well if ownership of the power plants was fragmented so that no one plant owner could control the market.

In practice, this ideal has never been achieved probably because such a scheme would make investment in new power plants intolerably risky. How would it be possible to justify investment in a new power plant costing a billion dollars if there was no way to know how much power would be sold and at what price?

B.2 British experience of wholesale markets

B.2.1 The Power Pool and NETA

In Britain, investment risk was initially dealt with by allowing generators to sign long-term 'hedging' contracts with retailers that effectively insulated them from the risks of the Power Pool. Under the British rules, the generator had to place a successful bid in the Power Pool if it was to operate and had to sell its output to the Pool, while all retailers had to buy their power from the Pool. However, generators were allowed to have bilateral contracts with retailers that bypassed the Pool financially. These (contracts for differences) allowed the generator to bid zero into the Pool insuring the bid would be successful, but the price paid to the generator was the contract price regardless of what the Pool price actually was.¹⁴

A market that could be described as competitive would still have been possible if the contracts were indexed to the spot market so that even if only a relatively small amount of power was bought and sold at Pool Prices, the Pool Price strongly influenced contract prices. In the time the Power Pool operated in Britain (1990-2001), more than 95 per cent of power was bought and sold at prices that were in no way related to the Pool prices, mostly under contracts for differences. The competitiveness of the market was also compromised because for most of the period from 1990-2001, only two companies dominated generation, hardly a competitive market. As a result, Pool Prices were volatile and did not reflect any underlying market dynamics (for example, a shortage of generation), and market participants did not trust the Power Pool to provide market signals. Thus generators did not have to compete on a half hourly basis to sell their power; they had to compete to win long-term (several years) contracts to supply retailers, a much less intense form of competition especially with such a limited field of competitors.

In terms of investment risk, whether power station investment was viable depended on the market position of the company. The two large generators controlled the market and were able to invest because of their market dominance. The retail companies were allowed to build their own power stations and were able to pass the risk on to small consumers who were captive to their local retailer until 1999. So the period from 1990 onwards, while the two large generators were dominant and the retailers had a captive market was characterised, arguably, by overinvestment. But this was not due to the companies following market signals; it was because of the imperfections of the markets – the duopoly in generation and the ability of the retailers to pass on expensive generation costs to small consumers.

In 2002, the Power Pool was replaced by a complex and expensive (about A\$3bn) new market design, the New Electricity Trading Arrangements (NETA). For these purposes, the details of this market are not important. The important issue is that liquidity in this market (the percentage of power bought and sold through it) is minimal, about 1 per cent, and the spot price is not an important determinant of contract prices.

B.2.2 Integration of generation and retail

While most of the publicity at the time surrounded the introduction of NETA, the far more important development in 1998 was that the British government then allowed full-scale vertical integration of generation and retail. In theory, this is wrong, because if retail and generation are integrated, the wholesale market will be bypassed and companies will be generating to supply their own consumers directly and the

¹⁴ Under a contract for differences, the generator must sell all their power to the Pool and they will be paid the Pool price. The retailer must purchase all their power from the Pool at the Pool price. However, the difference between the Pool price and the contract price is settled bilaterally between the retailer and the generator. So if the Pool price is less than the contract price, the retailer pays the generator the difference between the Pool price and the contract price. Under a contract for differences, both the retailer and generator are indifferent to the level of the Pool price because both either pay or receive the contract price. Thus a generator is able to bid zero into the Pool.

wholesale market will be too little used to provide price signals.¹⁵ In a very short period, all 14 regional retail companies were taken over by just five generation companies. From a competition point of view, this is a very dangerous situation because the barriers to entry for new generators or retailers are probably insurmountable. Who would a new generation company sell its power to if all the retailers had their own generating capacity? And who would a new retail company buy its power from if all the generators sold their output to their own retail businesses. This means that in Britain, there will be no new entrants into the market unless the government takes dramatic and radical steps and if any of the existing companies fail, the market will get even more concentrated.

Effectively this has meant that the wholesale market is not the main arena for competition. Competition will be felt only through consumers regularly and systematically switching to the cheapest supplier. While large consumers who have the resources, incentive and muscle to exploit the market to the maximum will probably not suffer from this, it is a very different story for small consumers. In most countries with retail competition, fewer than 5 per cent of consumers switch each year¹⁶ and retailers can generally assume most consumers are not price sensitive and will not switch even if they are paying significantly more than they should. This is a recipe for exploitation of residential consumers. There is also a strong risk that retailers will 'cherry-pick' the most profitable consumers, leaving less profitable consumers (likely to be the poorest consumers, especially those that have difficulty paying their bill) with an expensive and inferior service. The cost of switching in Britain, including the cost of marketing, and the cost of re-registering a consumer with a new retail supplier has been estimated to be in the order A\$200. This cost is shared across all consumers and if switching rates for residential consumers reached the level at which the market could be said to be working might well more than outweigh any benefits from competition.

B.2.3 Loss of retail market

These market imperfections mean that instead of a generator simply having to be able to produce electricity cost-effectively to be successful, as would be the case if an ideal wholesale market was possible, generators must find buyers, either wholesale or retail, for their power. If the industry is fully de-integrated generators sell to retailers via long-term contracts to avoid the exposure to an unpredictable spot market. If the retailer is not competitive, it might lose market share and ultimately end up bankrupt, leaving the generator with a worthless contract. This was essentially what happened in the UK with Texas Utilities (TXU) and AES. AES bought the 4000MW Drax coal-fired power station for about £2bn in 2001, on the basis of a long-term power purchase agreement (PPA) with TXU, then a retailer in Britain¹⁷. By 2002, TXU had lost market share and was over-contracted for power, which they could only dump on the spot market at a loss. TXU collapsed and was taken over by the German company E.ON leaving the PPA as essentially worthless. AES wrote off their entire investment in the power plant and the plant was repossessed by the banks that had loaned AES the money for its purchase. There were a number of other generating company failures at that time so that at one point, the owners of about 40 per cent of Britain's generating capacity were bankrupt or near bankrupt. The banks that had loaned the money for the purchase of this plant were the second largest plant owner in Britain. On the face of it, consumers did not pay directly for these company failures, but in reality, this experience will be remembered by the banks and factored into the cost of capital for future plant purchases.

For integrated companies, the risk is reduced because the generating part of the business is not at the mercy of the competitiveness an independent power retailer. However, integration does have a heavy price in terms of competition and must be seen as a rather 'Faustian' solution.

B.3 Retail market risk

In a monopoly electricity business, the retail part of the industry (purchasing power, meter-reading and billing) represents a small and simple activity. Typically it accounts for no more than 5 per cent of the cost of supplying a consumer and the risks involved are minimal and are borne entirely by consumers. Errors in forecast of demand might lead to an over- or under-contracting for power, but, especially if the retailer is

¹⁵ If generators were forced to sell all their output into the Pool and receive the Pool price with no hedging contracts allowed, vertical integration would be acceptable, but such measures would mean there was no incentive to integrate vertically.

¹⁶ In Britain, about 15 per cent of small consumers switch every year, but the majority are switching to a supplier that is the (or amongst the) most expensive (British Gas). So even in Britain where switching rates are high, competition is not working well.

¹⁷ TXU was actually an integrated generator retailer then but did not have sufficient capacity to supply its market so bought additional power under long-term contracts with independent power producers.

fully integrated in generation, the costs of such errors are generally small and can readily be passed on to consumers. Generally retailers will tend to err on the high side to avoid the risk that there will physically not be enough power plants to meet demand. Retailers might also contract for power from plants that turn out not to be the cheapest available. Technologically the demands are small and investment needs are minimal.

However, in a competitive market, retail becomes a highly risky business. Unlike most products, electricity is entirely a standard product. This means that, *if the market is working well*, retailers cannot rely on 'brand name' or 'product differentiation' to protect their market share if their prices are not the lowest. It is not possible in a network industry like electricity to buy a 'better' or a 'more prestigious' kWh of electricity. Consumers will only be interested in price and should, in theory switch regularly to the cheapest supplier. Under economic theory, this should mean that prices will be forced down to short run marginal cost levels, levels too low to allow replacement of old assets and for new assets to be built to meet demand growth.

In practice, this does not happen because: consumers do not ruthlessly switch to the cheapest supplier; they often cannot make the appropriate price comparison; the savings available do not justify their time; and they believe that buying from a trusted supplier will give them a better service. This means that the electricity retail business does not become ruinously competitive *because* the market is not working as a theoretically ideal market should. These 'imperfections' are largely caused by the behaviour of small consumers and, as argued elsewhere, they mean that small consumers will almost inevitably do badly from competition because companies will exploit their behaviour to charge them higher prices than would apply in a perfect market.

These imperfections do not mean that retail is not a highly risky business. Retailers must compete in the wholesale market to buy power in the spot market and under long-term contracts. They must make a judgement about the degree of exposure to a volatile and unpredictable, but potentially cheap spot market; they must choose the type of power station for long-term contracts, the length of the deal and the terms, for example, the degree of indexation to the spot market. There is huge scope for error in such decisions.

In addition, in a competitive market, their market share is not easily forecast. Particularly, for large consumers who typically buy their power under annual contracts, they will choose the cheapest supplier and any supplier who does not match the lowest offer in the market could easily suffer a massive loss of market share. In practice, they are likely to cross-subsidise their large consumer business from their small consumer business to prevent catastrophic loss of market share.

B.3.1 Structural change

In an ideal liberalised electricity market structure, the retail sector should be independent of both the network and of generation. If the retail company is part of a distribution company, there will be suspicions that it will use its ownership of the network to give itself advantages over its retail competitors, for example, by subsidising the retail business from the network. In theory, good regulation should deal with this risk. If the retail business is integrated with generation, the risk is that, as argued above, the wholesale market will become irrelevant and competition will be much weaker and imperfect (favouring large consumers).

However, the characteristics of the retail sector as described above - minimal physical assets, inability to protect market share with brand name, product differentiation – mean that retail is far too risky to be viable as a long-term stand-alone business. Consumers would also not have much confidence in an industry where their retail supplier frequently went bankrupt.

So, if frequent retailer bankruptcies are judged unacceptable, integration with a more solid business is necessary. There are three possibilities:

- First, the multi-utility business would see electricity retail combined with other services such as gas, water, cable TV, telecoms, financial services etc. The synergies of these businesses and selling as a 'package' would give savings that would protect the retailer from loss of market share. This is an attractive concept on the face of it, but it has failed completely in almost all the places it has been tried. The only two businesses that seem to fit together are gas and electricity;
- Second, retail could be integrated with distribution. This is the traditional way of organising the two activities. In practice, the two businesses have little or nothing in common technically. So if regulation is good enough to prevent cross-subsidy, there will be no commercial incentive for a company to keep the two businesses under one roof; and;
- Third, retail could be integrated with generation. From a competition point of view, this is undesirable, but from a corporate point of view it is highly attractive as a risk minimisation strategy.

The generation business would not be exposed to the risk of selling to a volatile and unpredictable market, and prices might not cover costs. The retail business would not be exposed to the risk of buying from such a market at prices that it might not be able to recover from its consumers.

B.4 Experience of retail markets from Britain

When the 12 regional distribution/retail companies were privatised in 1990, the retail business was expected to be opened to competition in three stages: for large consumers making up about a third of the market in 1990; for medium consumers, making up about a sixth of the market in 1994; and to all remaining consumers including households in 1998. When the 12 regional companies were privatised, the value given to the retail businesses was zero. For large consumers, the retail costs are minimal (perhaps 1 per cent of the bill) and large consumers were expected to buy aggressively enough to ensure profits were low, while for other consumers, the retail price was set by the regulator and not expected to allow much profit. Government policy was not to allow vertical integration and in 1995, the government prevented the two large generators from buying any of the 12 regional companies.¹⁸ In this situation, with few assets, limited profitability and high risk, the assumption that the value of the businesses was zero was probably not too far off the mark.

However, in 1997, with retail competition for small users looming, the regulator became concerned that retail businesses were being subsidised by distribution businesses, making the prices for distributors artificially low in their home territories.¹⁹ As a result, he required the regional companies to make a full legal split between the distribution and retail businesses so they were entirely separate companies. In theory, it was possible for the two companies to remain under common ownership but in practice, without the possibility of cross-subsidy, there was no incentive to keep the companies under common ownership and in many cases, the distribution and retail businesses for a given regional area are now under separate ownership.

At about the same time, the government reversed its policy on integration of retail and generation and within a couple of years, the retail businesses of all 12 regions of England and Wales and the two regions of Scotland had been taken over by just five companies each owning 2-4 regions. In technical terms, there is no synergy between generation and retail but in commercial terms, the synergies are massive. Integration of retail and generation makes a huge reduction in the risk of both businesses.

As a result, retail businesses became highly valuable, often changing hands for more than the associated distribution business. Typically, a retail only business would be worth about £250 per consumer. So a retail company with one million consumers would be worth about £250m. The large consumers have little long-term value as they are only on annual contracts and would have no loyalty when the contract came to be renewed. Since the average electricity bill for a residential consumer is only of the order £250 per year, this shows the very high value that generators place on being able to sell to their own consumers rather than bidding into a risky and unpredictable spot and contract market.

The risks of this structure were clearly illustrated in 2002. At that time, about 40 per cent of British generation was owned by companies with no retail business. About half of this was nuclear plant and the rest a mixture of coal and gas-fired plant. For reasons that are not at all clear, the spot price collapsed, falling by about 40 per cent. Given that spot sales and contracts indexed to the spot price make up a tiny proportion of all wholesale trades, this fall in the spot price did not necessarily reflect any change in the price at which most electricity was bought and sold. The terms of wholesale contracts are only known to the two parties: not even the Regulator has knowledge of the price.

For the integrated companies, this collapse of the spot price caused no problems. The retail price they charged small consumers did not change so their income was not affected. However, for the independent power producers (IPPs), who often had to sell into the spot market or on spot related terms, the impact was catastrophic and by the end of 2002, essentially all IPPs were financially distressed. Since then, the nuclear company has had to be bailed out by the government at high cost to taxpayers and most of the rest of the power plants owned by IPPs have been bought by the integrated companies at distress prices.

There is no evidence that the integrated companies engineered the spot price collapse but it clearly suited their long-term aims. With the IPPs essentially out of the market, the industry was effectively closed to new

¹⁸ In fact, the policy was ambiguous. Retailers were allowed to build some power plants (to cover up to 15 per cent of their needs and the large generators were allowed to supply large users directly.

¹⁹ The retail and distribution businesses were separated at an accounting level but there was an overlap of about 25 per cent between the two businesses in terms of the system and staff used.

entry and new competitors. All the integrated companies can make good profits and have absolutely no incentive compete vigorously against each other.

B.5 Security of supply

As noted above, the 'regulatory bargain' required monopoly utilities to provide a secure supply of electricity and in return they were guaranteed to be reimbursed the cost of the investments necessary to provide a secure supply of electricity. Advocates of competition seldom acknowledge the excellent record of monopoly systems in providing a secure supply of electricity. In a liberalised market this bargain cannot apply and the assumption is that market signals will stimulate the necessary investment. This seems implausible. Power stations may take eight years from start of planning to first power production. Market signals in electricity are inevitably volatile and difficult to interpret. The price changes every 30 minutes and is highly dependent weather, time of day, day of the week etc. For anyone to base an investment of, say, a billion dollars on such arbitrary signals seems unlikely.

For most commodities, prices follow 'hog cycles'. There is a shortage of production capacity; prices rise; all investors see the signals and respond by investing; there is over-investment because there is no planning process to match supply and demand; the price collapses; the highest cost producers are forced out of the market etc. Such cycles are acceptable for many products especially those easily stored and for which there are ready substitutes. If the price rises, stocks can be drawn down and substitutes used until the price reaches acceptable proportions. Of course, electricity is almost the only product for which the system will collapse if only a small proportion of demand cannot be met. In addition, electricity has very high barriers to entry and producers profit from a shortage. For other products, entry is often easy, for example, if there is a shortage of a food commodity, it is generally easy for farmers to start producing the commodity, bringing down prices. With electricity, there will be very few companies other than the existing ones willing to take the risk of building a power station. So it makes commercial sense for generators not to build new plant to avoid shortages because they will make more money (and incur less risk) if they do not.

These factors have always been understood, but were overlooked by those determined to make electricity supply just like any other normal commodity. There is now an increasing acknowledgement that market forces will not produce supply security. For example, the European Commission is introducing a Supply Security Directive (COM(2003) 740 final)²⁰ that will re-introduce many elements of planning to the sector. These measures are inevitably at the expense of competition. For example, there is a process by which government identifies a prospective shortage of capacity and commissions a company to build the necessary capacity. In return, the company commissioned will require a long-term contract for the purchase of the power, taking them out of the market. The European Commission acknowledges there is this risk ('wait for the tender') and that, in the end, all capacity would probably be built under this mechanism. Why would any company build a plant speculatively to compete in the market when it can wait for the tender and get a long-term contract for the power the plant will produce?

B.6 Experience of security of supply from Britain

While the government tender scheme outlined above might not be desirable from a competition point of view, it does appear to deal with the security of supply issue. However, this is an illusion for two reasons. First, in a free market, there is free entry and exit. In Britain, there was massive investment in new generation after privatisation, but this was more than matched by plant retirements so there was no net increase in capacity. If we assume a situation whereby the government foresees a capacity shortage and commissions the construction of a new plant, an existing company with a portfolio of power plants might decide that the extra capacity will make one of their plants uneconomic and they will retire it, leaving no net increase in capacity. If the government is to prevent companies retiring plants the companies claim are not economic, that would require significant powers and would further remove any competitive element to the market.

Second, in practice, in a free market, companies are reluctant to make irreversible commitments to build new plants and often have a portfolio of options from which they can activate elements depending on market conditions. Thus in Britain, in 2004, companies had announced power plant projects totalling a capacity of 40,000MW (maximum demand is about 50,000MW) all of which could be online by 2010. Clearly much of this capacity will not be built, but how can any planning authority predict what the proportion built will

²⁰ European Commission. Proposal for a Directive of the European Parliament and of the Council concerning measures to safeguard security of electricity supply and infrastructure investment. COM(2003) 740 final 2003/0301 (COD), Brussels.

actually be? If it is 10 per cent, there could be a capacity shortage, if it is 25 per cent, there could be a capacity surplus. Power plant commissioning dates are commercially highly sensitive pieces of information that companies are unwilling to divulge. A significant size new power station will depress spot prices so there is money to be made from knowing when plants will come online. The idea of a planning 'backstop' that can step in to prevent capacity shortages is therefore misguided.

B.7 Summary of risks in the electricity sector

Electricity is inevitably a highly risky business. In a monopoly industry, this risk is borne directly by consumers. If anything goes wrong, the extra cost is passed on in the form of higher tariffs. Competition introduces additional risks – if there is no additional risk, there is no competition. Some of these risks are in the form of additional costs. For example, the cost of capital for new power plants is likely to double. Other risks are in the form of risk of loss of security of supply. Advocates of competition seldom acknowledge that competition is not a 'free lunch' and the prevailing political climate under which competition is always the answer does not encourage proper examination of the issues. Cost benefit analyses for introducing competition into electricity have seldom been done: the idea that competition inevitably brings net benefits to electricity supply is an act of faith.

One of the promises of liberalisation is that risk will be transferred from consumers to the shareholders of the company. This is a highly misleading claim. The cost of risk can only ultimately fall on consumers, and if the risk is in some way dealt with by the private sector, the overall cost borne by consumers will tend to be higher because the private sector will require a 'fee' for dealing with the risk as well as the actual risk cost.

Introducing competition and requiring the private sector to deal with risk is therefore only justified if some or all of the following conditions are met:

- The costs of competition are outweighed by the benefits;
- The private sector is more efficient than the public sector at implementing policies that reduce risk and that these efficiency benefits more than pay for the private sector's fee for dealing with risk; and
- The form in which consumers experience the risk through the private sector is more palatable than if the risk was borne directly. For example, in the insurance analogy, paying a predictable premium is preferable to bearing the risk directly.

The issue of security of supply is also important. Any mechanisms that will reduce the risk that liberalisation will lead to reduced security of supply are inevitably at the expense of competition. The risk is that the liberalised model will evolve into one that has little real competition and does not provide security of supply.

Annex 2 A risk management proposal for New South Wales' electricity businesses: Comments by Public Service International Research Unit

a. Introduction

In May 2004, the Office of Financial Management of the New South Wales Treasury published a document outlining proposals to bring privately owned trading companies at both the wholesale and retail level into the New South Wales electricity market.²¹ Existing generation and retail companies would remain in public ownership although new private generators and retailers would be encouraged into the market. The objective would be to shift the risk of the electricity wholesale market (NEM) from the publicly owned companies and hence the taxpayers and electricity consumers to the private traders. The network activities, distribution and transmission would not be directly affected by these proposals.

In the summary, it suggests that 'The costs of managing these risks were reflected in inefficiently high electricity prices being charged to NSW customers.' It assumes that the private sector would be able to manage and deal with these risks more efficiently, presumably lowering the cost of electricity to consumers.²² This raises three issues:

- What risks are being transferred?
- Can private sector traders credibly take these risks and if it can, what evidence is there that it would do it more efficiently than the public sector?
- Will long-term security of supply be jeopardised?

Prior to discussing these issues, it is useful to summarise the proposals.

b. Summary of the proposals

For the wholesale part of the business, it is proposed that private traders (apparently one for each of the three companies) would sign contracts with the publicly owned generators for (exclusive) access to the output of the generator. The contract would have three parts:

- A monthly 'retainer' fee;
- A variable payment to cover the cost of fuel used in generation;
- A variable payment to cover other variable generation costs.

The retainer fee would presumably cover all the generator's fixed costs if the risk to the generator was to be minimized. The generation company would still bear the technological risk of operating the station, for example, if the plant was unreliable, the generation company would have to give some compensation to the trader for the power the trader was not able to supply. The trader would then be able to sell the output into the wholesale market through contracts of various durations, presumably not more than 5 years and sales into the spot market.

For the retail part of the business, traders would take over the running of existing contracts to the free market. At the end of the term of these contracts, the consumer would be free to contract from any private trader. Supplies to small consumers who continue to be supplied by the local incumbent company under regulated terms would continue as before.

c. What risks are being transferred?

The competitive parts of the New South Wales electricity industry currently mainly comprise three publicly owned generation companies and three publicly owned retail companies as well as some private sector companies such as the US company, TXU, which bought the Tallawarra power plant in 2003. In June 2003, Singapore Power had agreed to purchase all TXU's Australian electricity assets but the deal was subject to the approval of the competition authorities. The major risks to the generator from the wholesale market

²¹ Office of Financial Management (2004) 'A risk management proposal for New South Wales' electricity businesses' New South Wales Treasury, New South Wales.

²² It conflates tax-payers and electricity consumers as the public sector ('for all intents and purposes, the same'). This is probably not appropriate because while effectively all electricity consumers are tax-payers, their relative contributions to public funds are not equal. For example, an electric intensive industry will consume a proportionately far higher proportion of total electricity consumption than its contribution to public finances, so the interests of electricity consumers are not necessarily the same as interests of tax-payers.

would appear to be that the wholesale price falls below their costs and the companies would incur losses. If the revenues from sales to the wholesale market were greater than the contractual payments to the generator, the trader would make a profit and if not the trader would bear the loss.

For a retailer, the risk would be, as in California, that if wholesale price rose, the higher than expected costs could not be recovered from consumers. In California, nearly all the retail companies were forced in chapter 11 bankruptcy protection as a result of wholesale price rises they could not pass on to consumers. In New South Wales, there are two classes of consumer. Large consumers and small consumers that have opted to switch (an option for small consumers since January 2001) are known as negotiated customers, while those that remain with their local company on regulated terms are known as regulated small retail consumers. The proposal assumes that this risk only arises with negotiated customers because for regulated consumers, the retailers are protected from unexpected rises in the wholesale market by the Electricity Tariff Equalisation Fund (ETEF). If the trader could buy more cheaply from the wholesale market than it sold to contracted consumers, the trader would make a profit, if it paid more, then it would make a loss.

The traders would sign contracts with retailers at predictable prices that the retailer could be sure to recover from its consumers. If the trader also signed matching deals with retailers, this would reduce the incentive to force up the price, but this would effectively be 'integration', which the paper, rightly, says would be undesirable if the objective was to create a competitive electricity market.²³ If wholesale traders buy directly from publicly-owned generators under their 5 year contracts and sell to final consumers, the wholesale market would effectively be by-passed and the whole point of the reforms would be lost.

d. Can the private sector credibly take these risks?

This raises the issue, what sort of company would enter as a trader? Following the demise of Enron, it is far from clear that there would be many companies willing to take such risks. Many large utility companies, such as TXU, Southern Company were inspired by Enron, in the 1990s to open 'trading floors' that would buy and sell power and arbitrage between markets, for example, between the gas and electricity markets. The demise of Enron led to a disillusionment with trading both from the companies who realised the scale of risk they were running and from public authorities who realised the scope for market manipulation trading led to and, almost without exception, these company trading floors have been closed.

It seems highly unlikely given the scale of risks involved that large companies would expose themselves to such risks. The only companies likely to be interested would be small companies with minimal assets or subsidiaries of large companies who would not expose their core assets to risk.

To illustrate the scale of the risks for companies trading wholesale power, let us assume the wholesale price is about A\$50/MWh: the value of a year's output of, say, Delta Electric's 4200MW of plant would then be about A\$1900m. Let us assume the wholesale price fell by 40 per cent, as happened in Britain in the period 1998-2002: then the income of the trading company would fall by A\$750m per year. What sort of company could sustain such losses without going bankrupt?

It should be remembered that TXU, which had an apparently strong position in the British market, owning about 6000MW of plant and supplying about 5 million consumers very quickly had to exit the market in 2002 because it had over-contracted for power from a generator and at prices that turned out to be above the market. This in turn put the company it had contracted power from out of business in the UK (the UK division of AES) and also put the company supplying the coal to the contracted plant in serious difficulties. So three companies, all with substantial assets, were essentially bankrupted very quickly once the wholesale price began to fall and an error in contracting was exposed. Many of the losses ultimately still fell on consumers/tax-payers.

The paper specifies that the five-year contracts would not be subject to renegotiation, but of course if the trader went bankrupt, a new trader would have to be bought in. Clearly potential candidates would have seen the experience of the previous incumbent, and the fees would be much less advantageous to the generator, so the contract would effectively be renegotiated.

If the government were to demand assurances, such as some form of 'deposit' or recourse to physical assets, the trading company would factor this into its prices: there is always a cost if a commercial company is asked to bear a risk. The incentive on the trading company would be to ensure the wholesale price was as high as

²³ The Treasury paper states: 'The Government will also not allow the risk management proposal to be used to re-integrate the NSW generators to reduce competition.' page iv.

possible to maximise its profits. Strong measures would have to be in place to ensure that, as happened in California in 2001, the traders do not artificially inflate the wholesale price.

For the traders in the retail market, the risks would be comparable. If a trader signed a contract at prices that proved unprofitable, they would quickly lose customers and go bankrupt. It is also worth noting that the Treasury proposal claims that the ETEF arrangements will continue to protect regulated consumers. It is not clear how this can be done. The publicly owned retail companies will still have to purchase from the market and if the price is high, somebody will have to pay that price, and it can only be electricity consumers or taxpayers.

e. Will long-term security of supply be jeopardised?

For most commodities, there are cycles of low prices, when there is over-capacity and no incentive to invest and high prices, when there is a capacity shortage and incentives to invest. Of course the result of investment is to remove the price signals (high prices) that generated the investment so a significant proportion of new investment is likely to be unprofitable. For most commodities, these cycles are tolerable. Measures such as storage and substitution with other commodities can dampen the impact of high spot prices. And few if any tradable commodities are as fundamental to the operation of society as electricity. However, even a small shortage of generation capacity can lead to large price spikes and if power cannot be maintained, the social and economic costs will be huge. Thus, even the European Union's requirements on Member States to liberalise their electricity industries are now requiring governments to monitor capacity and take non-market measures to prevent generation shortages.

Most experience of liberalised electricity markets shows that, unless there is significant market power, while there is excess capacity, prices will be forced down to cost of entry (in other words the cost of building and operating a new plant) or less. While the short-term benefits of low prices appear attractive, prices must rise if new investment to meet growing electricity demand is to be generated. Experience in Brazil, California and perhaps the Nordic countries where the apparently successful 'NordPool' arrangements have largely failed to stimulate new investment in generation, suggests that a free market in power generation will not produce investment reliably enough to ensure security of supply.

The proposal assumes all incremental generation would be built by private companies. This raises the issue would the risk of investment in new generating capacity be justifiable in a competitive market and, even if it was, what would be the cost of the 'risk premium' that consumers would have to pay because private sector companies were being asked to bear risk? The Treasury's proposals would tend to lead to short-term contracting by both wholesale and retail traders. The risks of being locked into a long-term contract that could prove uneconomic would be huge and unjustifiable.

If we assume a new combined cycle gas-fired power station (the cheapest technology to build) of, say 400MW, would cost about A\$300m, this would be a major investment by any standards. A generator would hope to sell the output to a trader under long-term contract to underwrite the investment. However, such a contract would only be credible if the trader was offering very strong financial guarantees: without these, the contract would not be worth the paper it was written on. Alternatively, the generator could sell the output to the market. However, as argued above, price signals encouraging investment could be short lived and capacity shortage could be replaced by a surplus in a short time. In addition, a new entrant building a new plant would be at serious risk of predatory action by the (much larger) incumbent generators. The incumbent generators would have an incentive to force new entrants out of the market, because new entrants would increase competition and capacity, reducing prices.

Even if an investment of this scale was financeable, the risk premium on capital could be very high. In the UK, where a competitive electricity wholesale market has been in operation for 14 years, the real required rate of return for new electricity generating plants is at least 15 per cent, reflecting the risks, whereas the owners of the network, a low investment risk survive well on an allowed rate of return of 6-6.5 per cent. If generation reverted to being a regulated monopoly, there is no reason why generators would not be able to survive on a 6-7 per cent rate of return. Will the competition benefits of the wholesale electricity market pay for these huge additional financing costs? For a 400MW plant, the change from monopoly (6.5 per cent rate of return) to a competitive environment (15 per cent) would lead to additional costs of A\$25m, costs that would inevitably end up being paid by consumers.

It is also worth recalling that when the Norwegian market opened to competition in 1991, the companies there remained in public ownership. There was, as in New South Wales, a surplus of capacity there in 1991

and traders entered the market in the first few years, making good profits, but when the market tightened, the traders were soon out of business and have not returned. No significant amount of new capacity has been built in Norway since 1991 and the whole Nordic market is now getting seriously short of capacity.

f. Conclusions

The central theme of the Treasury's proposals is that risk should be placed fall on those that can deal with it most efficiently. It argues that risk should not fall on consumers, because they have no way to mitigate the risk and that the private sector, through commodity markets is efficient at dealing with risk.

Closer examination of the proposals suggests that the shifting of risk from the public sector is illusory. The contracts with traders will not ultimately be enforceable because the private sector will not expose itself to the scale of risk that investment in electricity generation entails. The contracts will only be enforceable as long as the outcome is favourable to the traders: as soon as conditions are adverse, the private investors are likely to 'cut and run'. The effect of the proposals is also likely to shorten the length of contracts making investment in new generation even more risky and hence raising the risk premium consumers will have to pay.

The rest of the world is drawing back from imposing a free market in electricity generation. The European Union is underpinning its market with increased planning, liberalisation efforts in the USA have stalled after the California experience of 2000 and countries like Brazil, Mexico and Korea are going back to a planned approach based on public ownership. The Enron experience was also a sobering reminder of the risk that private companies will try to distort markets for their own ends unless rigorously regulated. In this light, the proposal by New South Wales to adopt a radical free market solution not supported by any demonstrably successful experience elsewhere in the world seems an extraordinarily risky policy.