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The National Electricity Market 20 years on: Struggling with renewables or a national asset?

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As ever I am very pleased to be back at the ANU.

Two years ago I was here making the case for the large department with a single Secretary and many Ministers. I was of the view that such a structure held out the prospect of greater policy coherence and better outcomes.

As Chief Executive of the South Australian Department for State Development (DSD), I again have five Ministers and while I would be the first to admit it has its challenges, I remain convinced that such a structure is far superior to the alternative of many Secretaries and many Ministers.

And this is particularly the case when it comes to the National Electricity Market (NEM) where it is very helpful to have NEM responsibilities located in a department which is also responsible for the overall economic health of the State.

It is not really an option in such a department, for those directly involved with the NEM, to maintain an inward looking culture largely detached from the economic consequences of what they are doing; I fear that the heightened linkages that now exist in SA between the NEM and economic outcomes, are not necessarily duplicated in other jurisdictions around Australia.

Which brings me to the NEM itself.

In 1996 SA, as lead legislator, passed the National Electricity Law which paved the way for the establishment of the NEM. This was a milestone development and from any perspective an extraordinary accomplishment.

It required a high degree of partnership between the States and the Commonwealth and a level of purpose and reformist zeal that is unusual for our Federation.

My involvement with the NEM predates 1996 and stretches back to the early years of the Industry Commission and National Competition Policy.

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The Industry Commission (IC) started life as the Tariff Board, became the Industry Assistance Commission (IAC) and was transferred to the Treasurer Paul Keating after the 1987 election on its way to becoming the Productivity Commission in 1998.

At the beginning of the 1990s, there was an opportunity to harness the resources of the Industry Commission and direct them towards broad industry wide Inquiries and in the process change the focus of the economic debate.

To give purpose to his new responsibility, Keating announced in May 1990 the details of three important Inquiries covering; Energy Generation and Distribution; Rail Transport; and Statutory Marketing Arrangements.

These three Inquiries were the triggers for dramatic reform of three key areas of the Australian economy which until then had operated with only limited attention to costs or efficiency.

And in the process launched what was to become known as the micro-economic reform agenda which preoccupied the nation for the next decade or so.

By the beginning of the 1990s the full force of international competition was well and truly driving the Australian economy. The dollar had been floated and the industrial tariff was becoming a thing of the past.

There were those who thought that the big prices in the economy were now sending the right signals to industry and that the residual reform task was to lower inflation and have wages determined on a decentralized or negotiated basis.

But such thinking missed the point.

It was important not to follow the example of other countries, such as Japan, who had made the mistake of thinking that competition is only something that matters for the traded goods sector.

An arrangement whereby the traded goods sector had to be internationally competitive but the rest of the economy lived a comfy protected existence was a recipe for serious underperformance.

What was at issue was the efficiency of the services sector with the efficiency of how we deliver a wide of state government services of particular importance.

The micro-economic reform agenda became increasingly esoteric and convoluted and many have lost sight of both its importance and what has been achieved.

A wide range of Australian firms in such industries as transport, health care, medical services and construction have built successful international businesses and Australians are often surprised as to just how competitive the Australian services sector has become when comparisons are made with comparable industries around the world.

It is true that the internationalization of the Australian economy put great pressure on all input costs and this was an important force working to bring improved productivity and efficiency to all sectors of the economy, but the recasting of the Industry Commission and the micro-economic reform agenda that it triggered, were also important drivers.

In giving the 1990 Energy Generation and Distribution Inquiry to the Industry Commission, Keating had revolution in mind, for the industry at that time was so far away from the model embedded in the directions to the IC, it was as if it operated on a different planet.

At this point, I should observe that it was never Keating's style to set up inquiries without having a reasonably clear idea as to what he was going to do with the results.

Which brings me to 1992, Fred Hilmer and the National Competition Policy Review.

Shortly before October 1992, Keating asked me what he should do with the proposed National Competition Policy Review that Mike Keating, Rod Sims and the Department of the Prime Minister and Cabinet were actively promoting.

In a sense, the National Competition Policy Review had already been agreed at the Council of Australian Governments (COAG) meeting that Keating had chaired with the Premier's earlier in the year. That COAG meeting had also progressed the electricity reform agenda and strengthened the National Grid Management Council (NGMC).

The 1992 Budget had also made provision for the Commonwealth to contribute $100 million over three years to upgrade existing transmission links between SA, Victoria and Queensland. This contribution was conditional on agreement with relevant States on a timetable for the development of the National Grid Management Council and the separation of transmission assets to form part of the Corporation.

At that stage there were no links between Queensland and NSW and no link with Tasmania.

But I understood the reason for Keating's question.

He was comfortable with how the national electricity agenda was progressing. He had set it off with the IC Inquiry and now with developing support from the Premiers and a sizable budget carrot he felt he knew where things were going.

How would a major, wide ranging inquiry Chaired by Fred Hilmer affect all of this?

And most importantly for Keating what was he unleashing?

I thought about my answer.

The changes that Keating was pursuing with electricity generation and distribution were monumental and even with support in Victoria and NSW were likely to take years to implement.

It would be very easy for unfolding events to derail the whole process and continued support from Victoria and NSW was not a given.

Policy debate at a State level tends to be less transparent than at the national level and State governments can often find it difficult to deal with affected stakeholders particularly if the issues are complex.

Broadening the discussion to cover competition areas beyond electricity would help focus the debate and give it national urgency.

It would provide a framework to consider a broad range of State services, such as water and transport which would be hard to deal with in isolation.

A framework driven by the Prime Minister and the Premiers put the agenda in the hands of central agencies where there was a greater likelihood for significant change and less likelihood that the discussion would be sidetracked by the need to deal with the interests of particular stakeholders.

Most importantly, an agreed framework would allow the Commonwealth to put in place an incentive structure that would reward States for progress.

I was conscious that the High Court was progressively undermining the capacity of the States to raise revenue which was further distorting the workings of our Federation.

On this score, the National Competition agenda threatened the States capacity to use their utilities as de facto revenue raising bodies which would only make the situation worse.

Nevertheless, I thought that the efficiency gains were of such an order that we couldn't keep current arrangements just to satisfy the States need for revenue.

Moreover, the IC energy recommendations provided for the sale of State assets which would provide an immediate opportunity to reduce State debt and heal State balance sheets which in the case of Victoria and SA were in a parlous state at that time.

And while I did not know Fred Hilmer, I had respect for Rod Sims and Mike Keating and I was willing to back their judgement and their capacity to put forward someone acceptable to the States.

So I spoke up in favour and Keating, notwithstanding his misgivings, signed off on Fred Hilmer and the National Competition Review.

Looking back, and despite the chequered history of National Competition Policy, I still believe that the Review was a useful exercise.

National Competition Policy has delivered useful outcomes and as I have mentioned, Australia has ended up with an efficient services sector of some strength.

And, as I hoped, the Hilmer Review did help strengthen the Related Reform agenda which among other things picked up Keating's electricity and gas reform objective and ran with it long after Keating had left office; it also led to important reform of water and road transport both of which would have been unlikely to have progressed without the Review.

But enough of history.

How then has the NEM turned out and how is it helping or hindering my responsibilities as Chief Executive of the SA Department of State Development?

Having attended multiple COAG Energy Ministers meetings around the country and spoken with many participants, it is easy to be critical of the National Electricity Market.

There are those who will tell you that the NEM is neither national nor a market and it clearly annoys a lot of people.

My Minister, Tom Koutsantonis, not infrequently, is fond of blaming me for any aspect of the NEM he finds delinquent or frustrating.

I have met people who will cheerfully tell you that the NEM is in the hands of a NEM Mafia that will hunt down and render ineffectual anyone who dares encroach into their territory.

Others will say that while the NEM was conceived by economists, who were focused on lifting national productivity and efficiency, these people were sidelined long ago. These people would say that the NEM is now run by regulators, engineers and self interested stakeholders, who have built an edifice that is so complex and opaque that it is beyond the capacity of policy makers and ministers to understand its purpose or manage its evolution.

With such a structure, periodic attempts to improve the operation of the NEM lead to paralysing fights sponsored by those who feel that their interests might be threatened and whereas ministers should be able to see through such self-serving bluster, in this situation, they feel powerless to get involved.

But as with a lot of important reforms in this country, such analysis does not do justice to what has been achieved and certainly undervalues the great potential that the NEM has to deliver important national objectives in the future.

This was all brought home to me quite recently at a conference in the US, set up to discuss climate change, renewables and electricity markets.

It was an interesting conference from many perspectives, but realizing that the US has a very fragmented and unsophisticated electricity market was a surprise.

We had a member of the Board of Governors of the California Independent System Operator Corporation (ISO) at the conference. The ISO is responsible for the reliable

operation of the power grid in the state of California and the efficient operation of the electricity market.

The Board member was intrigued about the role of the Australian Electricity Market Operator (AEMO), immediately understood its role, and was impressed that it had national responsibilities.

For my part, it was sobering to realize that the ISO had no authority outside California, that its powers seemed more limited than those of AEMO and it was troubling to think what might happen in other US states less attuned to electricity management issues than California.

In fact, there are many US states where the electricity market is entirely in the hands of a utility company; there are states where it is prohibited to put solar PV panels on a consumer's roof.

In such states, decisions about electricity generation, distribution and transmission and the involvement of renewables are in the hands of the utility company.

It would appear that in all states, the terms under which renewables connect to the grid and the options provided to consumers are determined through a highly contested political process.

The location of renewables generation is therefor determined largely by political happenstance and not by market or geographic logic.

This then is Australia's great advantage.

Because of the prolonged leadership of a few at the Commonwealth and State level, Australia has arrived at a point where we do have enough of the national infrastructure in place to run a sensible electricity system which supports market driven investment and generation decisions and, in key areas, rewards efficiency.

Importantly, we have a framework in place which allows Australia to address issues to do with renewables and climate change in a structured manner and help us make sensible decisions.

A measure of the magnitude of our achievement is the comparison with the US, where they are still wrestling with the consequences of a vertically integrated state based electricity system, where investment and operating decisions are heavily influenced by fractious political conflict.

But that is not to say that the task in Australia is complete and that we can leave the NEM to look after itself.

On the contrary, 25 years after we started on this journey to reform the nation's energy generation and distribution system we are again at a watershed.

Then it was the need to make the industry run more efficiently and to make investment decisions more sensibly; as the IC Inquiry found, State budgets were heavily burden by large scale investment in generation capacity of questionable logic while the industry itself stood accused of unwarranted over staffing.

At stake was the opportunity to make productivity gains of national significance.

Now the issues are more subtle but no less important.

Climate change is not a new issue.

In looking back to 1991, I was intrigued to find that in that same year, the IC also delivered the Report, “Costs and Benefits of Reducing Greenhouse Gas Emissions”.

But it is fair to say that the issue has progressed considerably since 1991 and we have now reached the point where there is something close to national agreement that climate change is real and that Australia needs to respond.

As a result of the COP21 meeting in Paris last year, the government is committed to a 2030 target involving a 26-28% reduction in emissions from 2005 level.

The Opposition is committed to a 45% reduction which is consistent with Climate Change Authority advice.

Regardless of the outcome of the July 2 election, it is clear that the nation will be committed to an emissions reduction target for 2030 which will require an even higher level of renewables generation than we have at the moment, assuming of course that we don't go down a path where we purchase almost all of the reduction offshore.

The good news is that the NEM provides a useful platform to deal with our 2030 targets.

But the NEM needs to evolve, because significantly lifting the proportion of electricity generated by renewable sources of energy at a national level, will further expose tensions within the NEM.

Which brings me to South Australia.

South Australia’s current experience is a powerful indicator of the complexities that high levels of renewables bring to any electricity system.

But our experience also provides useful guidance as to the way forward and what we need to do with the NEM.

Let me quickly summarise some of the distinctive aspects of the SA electricity system which are relevant to what I am talking about.

Chart 1: SA has a different mix of generation

In 2015 some 41% of supply came from renewables with roughly 2/3rd coming from wind and 1/3rd solar. Renewables are capital intensive but because they have close to zero marginal cost they create problems for coal and gas fired generators in situations where there is excess supply. Augusta Power Station ceased power generation early last week (9 May 2016) bringing coal fired generation to an end in SA which will further lift this ratio.

Chart 2: SA has peakier demand

Peakier demand requires capacity that is only used occasionally which in a closed system adds to costs.

Chart 3: Solar PV behind the meter is a driver

A high Probability of Excedence makes life difficult for generators if they are operating in closed system. AEMO numbers suggest that, as things stand, there is a 90% chance there will be a day in summer 2024-25 where there will be no network demand.

Chart 4: The security of the system is becoming more difficult to manage

AEMO continues to manage the system effectively but there is a trend decline in inertia. Maintaining system frequency, which is critical to maintaining power system security will become more challenging.

Chart 5: The SA market is concentrated & vertically integrated

Available capacity is largely used by vertically integrated utilities to manage the risks associated with having large retail businesses with fixed price contracts. The interconnector is important but currently does not have the reliability to adequately support risk management.

Chart 6: The futures market in SA reflects the underlying problem

Because of fixed price contracts, retailers need to hedge. As the NEM becomes more dependent on renewables, the behaviour of the futures market will become an increasingly important indicator of the health of the NEM. (As an intermittent source of energy, renewables are currently not well suited for writing futures contracts.)

When describing the challenge for SA, I tend to describe it in relatively simple terms. We need to put depth into the futures market for SA electricity and bring the futures curve down to something approximating that in NSW and Victoria.

Lowering the futures curve is a possibility, as average spot prices in SA have not increased to anywhere like the increase in the futures. In other words, there is reason to believe that the futures price overstates the expected future spot price and is driven largely by the absence of sellers of electricity forward following the closure of Alinta.

On average there has been no shortage of electricity for the spot market but much of it is unsuitable for writing futures contracts because of its intermittent nature.

Lowering the futures curve would deliver SA businesses more competitive pricing because contract prices tend to be driven by the futures price.

And a deeper futures market would mean that there are more participants in a position to take the risk of the future price of electricity and to the extent that a deeper futures market is backed by increased sources of supply, then it is likely that AEMO would have more options when it comes to managing the stability of the network.

How then can this be done?

And is it something that should be viewed in isolation as a SA problem?

New generating capacity or storage options suitable for writing futures contracts could be commissioned.

Batteries have become cheaper but they are still not competitive.

Some therefore argue that we need to look at commissioning new gas fired generation or bringing back existing capacity in SA.

However, the reality is that the cheapest sources of electricity suitable for writing futures contracts already exists, but they are not in SA.

As a long run proposition, it makes little sense from a national perspective to commission new generation in SA to bring down the futures curve for SA electricity when there already is excess capacity in the rest of the NEM.

We are therefore back in the world of the 1991 IC report and Keating's mission to reform electricity generation and distribution.

Just as it was in 1991, solutions have to be viewed from a national perspective not from that of an individual state.

Back in 1991 we were wrestling with the well entrenched view that each State's electricity network had to be self sufficient and the over arching need was for more capacity.

In those days, whenever an opportunity came up for a State to build a new generator it tended to be supported and the bigger the better.

With considerable market power and lacking an entrepreneurial culture, there was little discipline on utility costs.

The IC solution was to separate distribution from generation and link up the State networks.

This would put competitive pressure on existing generators to reduce costs and disciple new investment to be located in the best places.

It would stop utilities investing in one location when there was excess capacity elsewhere.

And so the story went.

The IC was very aware that their new blue print for the industry was potentially quite threatening to existing players and they were conscious that there would be intense pressure to neuter their recommendations.

The IC in 1991 actually recommended that an independent body be formed to acquire transmission assets in New South Wales, Victoria, Queensland, South Australia and Tasmania.

And the IC noted that while State electricity authorities supported the formation of a national grid, they proposed that management of the grid be undertaken on a cooperative basis by a Council comprising the chief executive officers of the relevant State utilities.[2]

Even for a body that knew it was writing for a Treasurer keen for change, the IC reaction to such a proposal was very strong and is worth rereading because of its relevance to current circumstances. I have quoted the paragraph in its entirety.

> The Commission considers this alternative totally inappropriate. The proposal, which is an extension of the arrangements which have applied to the existing interconnected grid for some years, would perpetuate inefficiencies that have held back consideration of new interconnections in the past. Each state would be free to determine how much, if any, electricity it buys and sells interstate. There would be no guarantee that new capacity and grid extensions would be considered from a national perspective. With ownership remaining in the hands of six governments, the scope for governments to intervene would be substantially greater than if transmission were handled by the one body. The failure to separate transmission from generating authorities would inevitably create conflicts of interest, jeopardise the attainment of non-discriminatory access to the grid and stifle the prospects for competition emerging in the generation and distribution sectors.[3]

With the NEM, we have of course made considerable progress interconnecting the State systems. Queensland is now connected, as is Tasmania. The links with SA and between Victoria and NSW have been strengthened. Ownership has changed and transmission has been separated.

But the pressures highlighted by the IC remain and continue to hamper investment in the national grid.

The national system of interconnectors remains fragmented and apart from Bass link all interconnectors are regulated.

New capacity needs to run the full gauntlet of NEM processes and because interconnectors tend to be regulated, the Australian Energy Regulator (AER) is heavily involved.

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[2] Industry Commission Report No 11, Volume 1 Summary and Recommendations, page 19

[3] Industry Commission Report No 11, Volume 1 Summary and Recommendations, page 19

Let me quickly look at Chart 9 which gives a snap shot of NEM processes.

Chart 9: NEM policy and regulatory arrangements are unhelpfully complex
By and large, Ministers and policy makers from across jurisdictions tend to be overwhelmed by NEM processes and find it very difficult to manage the evolution of the NEM. How we have managed merits review and the way that the Australian Competition Tribunal has been inserted into the regulatory process has tended to reinforce the status quo and disempower the Australian Energy Regulator.

There is scope for unregulated interconnectors which can seek to take advantage of structural price differences between States, but such investments have proved highly risky. There is something of a safety net in that an unregulated interconnector can opt to become a regulated entity, but overall, the market has not found unregulated investment in interconnectors that attractive.

With interconnectors, the role of the AER is therefore very important because in the first instance it is the AER which makes the determination as to whether a new interconnector or an upgrade to an existing interconnector is consistent with the rules.

The rules are just a means to an end and that end must be that a new interconnector or an upgrade must bring greater benefits than the costs incurred.

The skill is to make sure that the rules properly capture the right benefits and measure costs appropriately.

At the present time making sure that the rules give appropriate weight to climate change objectives, improved competition and the optionality that an improved national grid brings is important.

Getting the balance right between those wishing to enhance their Regulated Asset Base and those wishing to protect their existing businesses is also a challenge.

The rules guiding the AER are determined in a complicated process by the Australian Energy Market Commission (AEMC). Where goes the rules goes the broad thrust of policy. The COAG Energy Council of Ministers takes an interest and the views of ministers have influence. It is important that the processes developing and deciding on rule changes focus on the right issues and are consistent with a proper functioning NEM.

But that is not the end of the story.

We have developed the practice in Australia of appealing AER determinations to the Australian Competition Tribunal under the Limited Merits Review Regime introduced in 2008.

All AER decisions can of course be appealed to the courts but such appeals tend to be limited to questions of process. The industry broadly defined, felt that more scrutiny of AER

decisions was needed. The industry wanted a mechanism which went beyond process but gave them the opportunity to challenge decisions where they thought it might be reasonable to take a different view.

Limits were placed around the merits review process in light of the complicated nature of the issues but the Limited Merits Review Regime was designed to allow the industry to hold the AER accountable for its decisions.

I suspect community concerns about the consequences of recent network upgrades drove this desire for greater accountability.

Between 2008 and 2011 all but 1 network decisions by the AER were appealed to the Australian Competition Tribunal; in 2013 corrective action was taken to try and restore the balance.

But since 2013, 6 out of 10 AER decisions have been appealed to the ACT and the 4 that didn't appeal were State owned and their appeals were not supported by ministers.

The current structure is therefore heavily biased to the protection of the status quo.

In terms of the IC's concerns from 1991, we have replaced the Council of chief executives of the State owned utilities, with a labyrinth of rule setting and appeal processes.

But unless we are careful, the purpose can be the same.

We need a process which supports improved interconnection where it is in the national interest to do so and doesn't leave us struggling with peripheral issues over an unnecessarily drawn out time period.

And we have to avoid processes designed to protect existing industry and curb competition which have the effect of making it more difficult to develop specialization of supply around the most efficient producers.

And that is why an efficient approvals process for new and upgraded interconnectors is important for both SA and Australia.

The driving incentive behind the growth in renewables in Australia has, of course, been the Renewable Energy Target (RET).

And arguably SA has a comparative advantage in wind and solar and from a national perspective it makes sense to locate wind and solar in SA.

Australia needs diversity of supply to manage the system but just as in 1991, when the task was to stop each State viewing generation in isolation, the task today is again to seek the efficiencies that come from specialization.

But as was identified so clearly in 1991, specialization can only come about through a national grid of properly structured interconnectors.

And a properly structured national grid not only allows efficient specialization, it also saves on aggregate capacity, because regions can share reserve capacity.

A proper national grid also broadens Australia's generation options over time as technology changes.

If geothermal, tidal, carbon sequestration or even nuclear make sense at some stage in the future, we will not be seeking to have such investment mirrored in each region, but located where it is most efficient to do so.

We do of course have a recent experience of an active attempt to upgrade the national grid.

And that was NEMLink which was floated by AEMO and Matt Zema[4] in 2010.

NEMLink was a conceptual project designed to enable large-scale power transfers between the regions.

It was costed at around $8.3 billion and brought with it a range of benefits.

It was designed to develop major generation centres which could more efficiently serve the NEM.

It would have given rise to less new generation in NSW, SA and Tasmania and more generation in Queensland; SA would have required approximately 800 MW less new generation.

Geothermal and coal with carbon capture and sequestration were topical in 2010, and NEMLink would have allowed for high capital cost, low emission-intensity generation technologies during the later years of the 20 year outlook period.

It would have course been expensive and the benefit cost ratio for such a grand project was ambiguous, but it would also have brought intense competitive pressure to all involved in the industry.

There would have been winners and the NEM would have been strengthened but there would have been losers.

The world has changed since 2010 and the numbers would be quite different if the exercise was redone today, but the logic for considering something like NEMLink, or perhaps something less ambitious, hasn't changed.

But what is relevant today is that NEMLink was not well received.

[4] Matt Zema is Managing Director and Chief Executive Officer of AEMO

And that would be an understatement.

Fortified by the knowledge that the numbers underlying NEMLink were hardly compelling, the forces identified so acutely by the IC in 1991 came to the fore.

There was no appetite for NEMLink but there was also no appetite for a scaled back version or ongoing work.

All that came of the proposal was a greater focus on the National Transmission Network Development Plan which is published annually by AEMO.

So what are we to do?

Looking back over the sweep of the last 25 years, what is missing is a capacity to identify problems and drive solutions.

We need to empower ministers and strip away the structures that have grown up that tend to protect the self serving interests of those currently in the industry and unfortunately make the status quo the preferred option.

In the process we need to make sure that the regulator is in a position to bring a confident imaginative approach to its role and the system operator is encouraged to be an effective voice with policy makers.

The reality is that only ministers can change things and people should not be surprised that nothing happens when ministers are marginalized.

But ministers find it hard to be involved when the agenda is set by others and when that agenda is verging on the impenetrable. It is true that ministers can be captured by particular interests but that can happen with current arrangements.

What happened in the 1990s was that all ministers were brought along by the national challenge of the times and the capacity of key ministers from that period to articulate that national challenge.

I see no alternative but to better surround ministers with their own sources of advice and give them more opportunity to control and articulate that agenda; ministers need line of sight of the rules that govern the industry and have a capacity to guide their evolution.

In particular we do need to bring ministerial attention to the rules that govern the test that determines whether new interconnector investment occurs. This is the Regulatory Investment Test for Transmission or the RIT-T as it is affectionately known.

We need to be sure that in measuring the costs and benefits of new investment, we are capturing the right costs and benefits and measuring them in the right manner.

With the experience of the 1990s in mind, it is fair to say that any recasting of the NEM will require Commonwealth leadership.

We also need to give close attention to how the Australian Energy Regulator operates.

It is true that because of the unfortunate recent experience where the Regulator appeared to facilitate an unwarranted expansion of network costs, there have been pressures to hem in the workings of the AER.

But this short sighted.

We need a regulator who is in a position to deal with a wide range of difficult but important issues without having to operate on the assumption that every determination will be appealed and that the industry will be holding them to account in the Australian Competition Tribunal for every decision made.

The industry is in a state of flux with the value of many grid assets under threat.

Should the equity risk premium be seen as compensation for equity risk?

Should a regulator be in a position to write down assets when working out the Regulated Asset Base for regulated businesses if business circumstances change?

What methodology should a regulator use?

These are complicated matters and reasonable people can come to different conclusions.

It is fair to conclude that if a regulator has to arrive at these judgements knowing full well that every decision that is made will be appealed by those affected, then their appetite for innovation will be diminished.

Serious thought should therefore be given to removing appeals to the Australian Competition Tribunal for decisions made by the AER.

In saying this, I have always believed in solving problems at source.

Knowing that all decisions are subject to judicial review, it would be far better to treat the AER with respect, value their expertise and encourage them to be forward looking in their thinking.

Decisions have to be made somewhere and it is better that they be made by a well resourced and confident agency than an under resourced appeals tribunal.

To prevent regulatory overreach, it would be better to develop a practice of reviewing the performance of the AER and replacing key personnel if necessary, than expect this correcting role to be performed remotely by an appeals process.

The systems operator, the Australian Energy Market Operator (AEMO), may well of stubbed its toe with NEMLink but AEMO should be encouraged to take an active and influential role in how we plan for future investment in the grid. And we do need to be conscious that current processes are tortuous and we need to do better.

AEMO also manages the Settlement Residue Auctions (SRAs) where there are real possibilities to improve the management of the NEM.

The SRAs are an obscure part of the NEM and many would prefer not to have to get their minds around either their purpose or how they operate.

Chart 7 gives some clues as to why the SRAs exist.

You can see that AEMO makes payments to the generators and receives payments from customers.

As you can also see, AEMO receives offers from the generators and bids from the customers.

AEMO then performs the role of the invisible hand much beloved by Adam Smith and the economists and arrives at a market clearing price by ranking all the bids from the customers and the offers from the generators.

In keeping with all properly drawn supply and demand curves, there will be suppliers who receive a higher price than they offered and consumers who are charged a lower price than what they bid.

But the great wrinkle in all of this is that AEMO does this on a regional basis.

Which means if the spot price in SA is higher than the price in Victoria (meaning the Victoria to SA interconnector is at capacity) then the Victorian generator receives the Victorian clearing price and the SA consumer pays the SA price.

And AEMO is left with a pot of money.

And because this pot of money is highly correlated to the difference in the spot price between Victoria and SA, people have had high hopes from the very beginning of the NEM, that AEMO's pot of money could provide a useful hedge for people interested in protecting themselves against high or low prices in either Victoria or SA.

So AEMO runs an auction every quarter for the proceeds of the pot; this is the Settlement Residue Auction.

And they provide the proceeds of the SRA to the owner of the interconnector which because it is a regulated asset reduces the cost of running the interconnector to consumers.

This means that a structural price difference between two regions does not send a price signal to the owner of the interconnector; but that is another story.

Chart 8 shows recent price behaviour for SRAs for the Victoria-SA interconnector.
As can be seen, there was a sharp lift upwards in SRA pricing after the announcement that Alinta would close in Q2 2016.

While SRAs have in principle provided an opportunity for people who do not have access to physical generation to hedge themselves against future volatility in the spot market, they have proved less successful than people have hoped because the pot of money is dependent not only on the difference in the spot price between Victoria and SA but also the capacity of the interconnector at the time.

And as we know, the capacity of the interconnector is variable and can be influenced by such random events as lightning strikes, bush fires or simply poor maintenance.

It is true we have been down the path of trying to breathe new life into the SRAs before but it seems a fruitful avenue for further effort as the potential benefits are large.

It would be good to bring a whole new range of financial investors into the market who have no links to the physical market and who would be attracted to offering financial instruments that would lower the price of risk and help consumers and generators hedge themselves against the volatility of the spot market.

Chart 7: Understanding NEM market arrangements can be daunting

AEMO performs the role of the invisible hand setting a market clearing price in each region. Because of the way the market is structured there are opportunities to develop risk management instruments but it is not straight forward.

Chart 8: Settlement Residue Auctions (SRA)

The spot electricity market is very volatile but unlike other volatile markets where risk management is important, only a limited number of financial instruments, or derivatives, have developed to reduce the price of risk for producers and consumers. If we could deepen the Settlement Residue Auction (SRA) market managed by AEMO, that could lower the price of risk and make it easier for consumers and generators to hedge themselves against the volatility of the spot market.

Conclusion

The NEM has been a great accomplishment.

Energy utilities are powerful institutions in all countries and it is to Australia's credit that we have made so much progress in separating their functions and brought economic rigour to investment decisions and the way the electricity market operates.

With broad national support to deal with climate change, we are heading down a path where renewables will provide an increasing proportion of our energy needs and as a nation

we need to take action to ensure that renewables play their part in the NEM in an efficient manner.

It has always been a NEM objective that investment in new generation capacity be driven by economic factors and located accordingly. It makes sense for new renewables investment to be driven by similar considerations.

The extra consideration with renewables is that while storage is part of the answer, diversification of supply is also important.

Diversification of supply should be viewed on a national basis because there are clear benefits that come from sharing capacity. There are benefits for all in having regions that are particularly well suited for renewables become specialist suppliers. For this to happen we need to look carefully at NEM processes to make sure that new investment in the grid is consistent with this priority.

There is further work to do to complete the task that began with the 1991 Industry Commission Report to build a properly functioning national grid.

For this to happen we need more effective NEM decision making which will inevitably require greater understanding of the national challenge and greater engagement from ministers. As part of this process more effective use can be made of the Australian Energy Regulator and the Australian Energy Market Operator to streamline NEM processes and allow the system to evolve more rapidly.

Thank you for the opportunity to talk to you today.