The (Energy) Restaurant at the (Other) End of the Universe

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Good afternoon Ladies and Gentlemen.

It's a pleasure to be with you today and a privilege to join you in your reflections on the evolution of regulatory policies.

A number of years ago I gave an address entitled *"The Hitchhiker's Guide to the National Electricity Market: What was the Question Again?"*[1]

It concluded that the entry to the Hitchhikers Guide to the Australian National Electricity Market would read as follows . . .

When making changes to the regulatory framework:

- Be sure that you know what the question or problem is that you are trying to answer . . . so you will know what to do with the answer;
- Never be without your towel . . . that has "How are risks allocated?" printed on it, and however you answer that question, act consistently with it;
- Manage the change process in a way that takes your fellow travellers with you; you will need their help along the way; and have some idea where you are going. (see step 1);
- Always apply the Pierce consistency theorem . . . which is about simultaneously respecting the fundamental laws of physics, economics and finance; and
- Remember that consumers are at the centre of the universe, not waiting in the outer reaches.

A key theme was that as policy priorities and regulatory mechanisms evolve, as they must, there is a need for everyone involved to be disciplined and clear about the specification of objectives, constraints and institutional roles.

In short, you are sure to become lost without what I will label as good governance in the broadest sense of the term. There are many reasons why outcomes for consumers may not materialise as we would wish, but unless a good governance framework for decision making is applied; you are lost before the journey starts.

Given the question for this conference is, "what has and hasn't worked well in the evolution of regulatory policy?" it seemed appropriate to return to this theme. It is also highly relevant to the way contemporary issues facing the stationary energy sector in Australia are, or more precisely perhaps, should, be addressed.

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[1] Pierce, J (Chairman, Australian Energy Market Commission) 2013, *The Hitchhiker's Guide to the National Electricity Market: What was the Question Again?*, speech, 7 August, Australian Energy Market Commission, viewed 12 September 2016, http://www.aemc.gov.au/media/docs/J-Pierce-speech-The-Hitchhikers-Guide-to-the-NEM-cb613a64-1059-4d15-9020-d77cf9c78fab-0.pdf.

So this is what I would like to do today.

First, by providing the briefest of possible descriptions of the context for the establishment of the Australian National Electricity Market.

Second, by drawing on what I think are a few of the more pertinent lessons from what has and hasn't worked well in our corner of the Universe.

And finally by touching on how these lessons can be applied to issues such as the integration of traditional energy policy objectives with greenhouse gas emission reduction ones; without the objective functions becoming so broad and all-encompassing they become vague, and inoperable.

The National Electricity Market

The main drivers for the establishment of the national market[2] back in the early 1990's were the Commonwealth Government's desire to improve the productivity of important sectors of the economy[3] not directly exposed to international competition and address the experience of some of the larger states with their (mostly) vertically integrated public utilities.[4]

Generation investment decisions made during the 1980's, saw the emergence of significant excess capacity as demand growth turned out to be less than expected. This inefficient allocation of resources was a drain on the economy, a strain on State government finances[5] and a source of upward pressure on prices.

Some saw a market covering the interconnected jurisdictions as a mechanism to reduce the duplication of generation assets . . . a means to facilitate greater sharing of the output of this capacity. Transmission investment that increases transfer capability between different regions in the National Electricity Market would be guided by whether gains from lower energy costs were expected to be greater than the efficient cost of adding to the network. A gross pool spot market would co-ordinate physical dispatch with economic and financial outcomes driven by over-the-counter (OTC) and exchange traded derivatives. And yes we did plagiarize the original England and Wales pool heavily.

It was recognised in the wholesale market design that just as the value of electricity varies over time, particularly by time of day, it also varies by location. The geographic spread of load centres and generation sources, gives us the "stringy" nature of our transmission network. It was therefore vital that wholesale spot prices and the contract markets that developed around them to have a geographic dimension in order to signal efficient transmission and generation investment and to be consistent with the requirements of physical power system operations.

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[2] Although it is referred to as the National Electricity Market (NEM), the regulatory framework for the competitive generation and retail sectors applies in the physically interconnected jurisdictions of Queensland, New South Wales, Victoria, South Australia and Tasmania.

[3] AEMC and KPMG 2013, *A case study in successful microeconomic reform*, publication, 13 December, Australian Energy Market Commission, viewed 12 September 2016, http://www.aemc.gov.au/getattachment/8c426f7d-ea5c-4823-9b86-510dfd4e82dd/The-National-Electricity-Market-A-case-study-in-mi.aspx.

[4] Pierce, J (Chairman, Australian Energy Market Commission) 2014, *The Environment for successful Infrastructure Reform: The NEM as a case study*, speech, 7 August, Australian Energy Market Commission, viewed 12 September 2016, http://www.aemc.gov.au/getattachment/d45e9169-a486-4733-b982-e631a8abe189/John-Pierce-speech-at-ACCC-AER-Regulatory-Conferen.aspx.

[5] See for example, Curran, C. P. (NSW Commission of Audit) 1988, *Focus on Reform: Report on the State's Finances*

At one extreme, a single national wholesale price would distort the economics of generation and network investment and be inconsistent with the physics of power system operations. At the other extreme, with full nodal prices the demand and/or supply of derivatives would be too thin for competitive pricing to emerge and to support the financing and risk management tools needed by commercial generation and retail businesses.

Regional reference prices were therefore specified for "network regions" defined by reference to the "density" of the transmission network at different locations and with an eye to the diversity of generation and retail businesses that could feasibly compete in those regions. In effect, they emerged as a means of integrating the requirements of physics, economics and finance.[6]

There have been some notable bumps in the road, but for a good number of years this seemed to be how things were turning out. To judge success simply by the degree to which generation is "shared" between regions however, ignores something far more fundamental. The change in the way risks were allocated and managed. It's the way risks are allocated that makes a market a market. The future would simply not have been any different to the past if the only thing that had changed was the replacement of state government based, centralised decision making by a "Fat Controller" of the national market.

The point is <u>not</u> whether you believe that business people are better than "planners" at working out future demand, or input prices, or costs of current and future technologies. These things are by their very nature uncertain.

In the same way that energy cannot be created nor destroyed, but merely converted from one form to another; there is what we may think of as a Law of Conservation of Risk. Risks are not reduced by either centralising or disaggregating decision making, but merely shifted from one party to another.

The essential feature of Australia's electricity reforms was the reallocation of risks, primarily from consumers to businesses operating in a workably competitive market. This means that the consequences when the future turns out to be different to what was expected or forecast are different; and that changes incentives.

In the simplest of examples, overinvestment and excess supply leads to falling prices in a competitive market rather than increasing ones when investment decisions are centralised. The incentives on consumers, retailers and generators are all very different in these circumstances. It is this that changes real decisions and actual outcomes.[7]

Now this may seem like an obvious point and one might wonder why someone would fly half way around the world to make it. Yet I cannot tell you the number of times I have sat in rooms with policy makers and advisers where they have argued over questions like when this or that technology is going to become economically viable, as if they can know these things; or in the mistaken belief that they <u>need</u> to know them in order to make the decisions that policy makers need to make.

I will pause here and draw a distinction between policy objectives; such as a safe, secure, reliable and affordable energy supply and/or a reduction in greenhouse gas emissions; and

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[6] The definition of regions for the purposes specifying regional reference prices can, and have evolved over time. For instance the Snowy region was abolished in 2008.

[7] This has also been influential in the way the AEMC has thought about development of the market and regulatory frameworks in response to the emergence of new technologies and changes in their relative costs. For instance, the Commission has advised against mandating the rollout of so called "smart meters", and introduced a framework for the development of a competitive market for the provision of metering services. This means that their deployment is driven by consumer demand for the services this technology enables rather than by being imposed by regulation.

the mechanisms that are used to achieve them. In our system of governance, regulators take policy objectives as a given. Ultimately these are government decisions. They receive advice of course but ultimately it is the government's call[8] to specify objectives. If officials or regulators don't like the call my response tends to be "Well guess what sport? You get to vote just like everyone else in the country. In the meantime get on with what you are paid to do."

Lessons from our corner of the Universe

In reflecting on what has worked well and what hasn't over the last 20 years or so, it appears that the following three things are determinative:

a) *The sharper the distinction between specification of policy objectives and the design of mechanisms used to achieve them the better.*

Now this doesn't imply some naïve notion of having ministers, officials and regulators sitting in separate boxes with reporting or communication lines drawn between them . . . like some management consultant's organisational chart. In fact the more often they can all be in the same room and have proper, open conversations, underpinned by mutual understanding of and respect for their respective roles, the better.

It's just those conversations tend to be more fruitful and result in implementable outcomes if a distinction between objectives and the means of achieving them are kept in mind.

It is important not to underestimate difficulties in specifying policy objectives; facing up to the opportunity costs of alternatives; and hence arriving at clear priorities. This can be hard. For that reason it can be so tempting, particularly in a federation structured the way it is in Australia, to allow a conversation that needs to be about objectives to slip into one about means before objectives are clear. It's often easier.

As a Treasury Secretary I would have conversations that started like this. "You can have X, or Y, or Z, but you cannot have all three." Alternatively the conversation may start with the statement that A was really important to which I would have to respond "That's fine as long as you are prepared to give up B and C to get it." I will let you fill in how the rest of these conversations often proceeded. The natural human tendencies to eschew explicitly facing up to opportunity costs afflicts us all. Good governance arrangements, in addition to making accountabilities clear, can be thought of as assisting us to collectively be able to make more informed decisions than if these structures were not in place. I am often reminded of a former Premier of New South Wales who commented that he had never seen a proposal that had not been improved by subjecting it to the disciplines of the Cabinet process.

In the energy context, a relevant question is not; do you want a secure and reliable energy supply, or say, a reduction in emissions?

It is necessary to ask questions like whether the primary objective is environment policy, such as reduced greenhouse gas emissions, or industry policy, such as increased deployment of a particular group of technologies called renewables.

The critical relevance of the question being that the mechanisms chosen to achieve these alternative objectives are likely to be very different as are the outcomes for consumers; for emission levels; and for the economy because of those mechanisms.

b) *If the design of a policy mechanism or regulatory framework depends on a particular view of the future, such as forecasts of demand or the relative costs of different technologies for it to be successful, you are heading for a world of pain.*

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[8] Or in the case of the NEM, given the particular split of functions between the Commonwealth and States within the federation, governments' call.

It is perhaps not surprising but nevertheless disappointing how infrequently we ask the questions:

"If the future turns out differently than I currently expect, what will happen?"

"What self-correcting properties does the policy mechanism have to allow the policy objective to still be met in ways that will continue to be acceptable . . . or will we be forced back to the drawing board with all the heartache and time that that usually entails?"

Australia's historical experience with the particular design of its renewable energy target, when energy demand once again turned out to be a lot less than expected, is perhaps a relevant example.

Another would be the initial, and arguably aspects of the current, regulatory arrangements for the determination of network revenues.

Of course there are people who have to make decisions based on their forecasts or expectations of the future. Businesses operating in the competitive generation and retail sectors; the Australian Energy Regulator when they are making network revenue determinations; the Australian Energy Market Operator when they are deciding how much plant to schedule for this evening; consumers when they are deciding between different contracts and services on offer; and larger commercial and industrial customers deciding how much contract cover and spot exposure they want.

But these are not the policy mechanisms or regulatory frameworks themselves . . . which as far as is possible should be designed to adjust to whatever the future may bring . . . and not dependent on bets that others need to make and are in a far better position to make.

c) *When joining together the mechanisms used to achieve different policy objectives, great care is needed to make sure they fit snuggly together, or you risk damaging them all.*

Like the docking and berthing of two space vehicles . . . the interfaces between the mechanisms used to achieve traditional energy policy objectives, and those used to achieve environmental, incomes and industry policies, need to be designed with a degree of precision.

The details matter.

A design principle of the National Electricity Market was that price signals were to be allowed to do what prices do. Convey information, balance supply and demand over multiple time frames, guide production, consumption and investment decisions.

Most particularly when it came to generation investment, the risks associated with whether the 'right' type of plant was being built, in the 'right' place, at the 'right' time and whether the demand for its output materialised as expected, were to rest with the businesses operating in competitive wholesale and retail sectors. Given the physics of power systems this was achieved through the separation of a direct link between physical production and consumption, from the contractual position of generators, retailers and major customers. Outcomes at both the wholesale and retail levels depend on effective markets for these financial derivatives or hedges.

Hence when designing policy mechanisms to achieve an environmental objective for instance, it is worth asking two questions. First, do they reallocate management of demand risk from the supply side of the industry back to consumers? Which is what so called capacity 'markets' tend to do. Second, what effect will there be on the demand for and supply of hedge contracts? Will they introduce a disconnection or wedge between the demand for, and supply of these contracts? If so, then the resulting misalignment of interfaces can have some pretty ugly unintended consequences for both vehicles.

Asking these types of questions is not in any way a challenge to the legitimacy of various policy objectives or a way of asserting the primacy of one over another.

It's about getting the mechanics to work.

Integrating energy policy objectives with greenhouse gas emission reduction objectives

The objective function embedded in our National Electricity Law is affectionately known as the NEO, the National Electricity Objective. There are similar objectives specified in the legislation dealing with the gas sector and retail consumer protection. It is the test against which the AEMC makes both its statutory decisions and provides its advice to governments.

The National Electricity Objective is to:
promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to – (a) price, quality, safety, reliability, and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system.

Now because we're bureaucrats we of course cannot call it a vision.

The first point to highlight is its reference to services. In other words, its scope includes what energy is used for rather than what it is. This is a key consideration in the way in which the Commission frames its decisions and advice, because it means we take into account the interaction between demand and supply when we're thinking about outcomes for consumers – not just the supply side.

With respect to price, quality, safety, reliability and security etc.

When we provide advice to governments on market and regulatory development, and make rules that govern the sector, we are required to consider the impact on this explicit set of variables – and these variables alone.

Collectively they describe a nuanced version of traditional energy policy concerns often listed as safe, secure, reliable, and affordable. A particular nuance was the replacement of the normative term "affordable" with the more positive or objective term "price".

This was thought to be appropriate given the powers delegated to the Commission. Governments of course are concerned about issues like affordability as well as a host of other policy objectives relevant to the energy sector including environmental ones. The point is that decisions about these usually involve subjective value judgements rather than primarily technical, engineering, economic, and financial ones.

Governments also have other policy mechanisms available to them such as, concessions and environmental regulations to address policy objectives beyond the impacts of the variables listed in the energy objectives.

That's not to say that the Commission is blind to these wider policy issues.

It's all about how they are taken into account.

Rather than requiring us to make subjective trade-offs . . . which is the role of elected politicians within the broader governance framework . . . the National Electricity Objective is constructed so these wider considerations can be taken as constraints on the furthering of the energy objectives, typically through the way implementation is managed.

A particularly relevant aspect of governments' environmental policy objectives is the difference between what may be termed systemic objectives vs. site specific ones. The latter refers to things that relate to a particular plant or geographical area like NOx and SOx emissions, water quality, buffer zones, easements, or noise limits and so on. These are the province of land use planning and environmental regulation instruments.

Environmental objectives of this nature and the instruments used to achieve them typically lie outside the Commission's consideration of the National Electricity Objective.

Systemic environmental objectives affect the operation of the whole energy system; they have systemic impacts on the market; and the variables that need to be considered when making decisions to further the National Electricity Objective.

Greenhouse gas emission targets are the obvious case in point.

In this case while a target for the electricity sector would need to be specified and hence taken as a given, being the role of government to set . . . the means by which it is achieved, could be something that the Commission could address via rule changes or reviews.

If government specifies an emission reduction target . . . the policy objective . . . and the Commission were to be asked to make rules to achieve it . . . the policy mechanism . . . the Commission's job becomes: to maximize the National Electricity Objective subject to the emission constraint.

An analogous situation can be found in the consumer protection area. While concessions lie outside the energy law and rules, the Commission could be asked to review the relationship between energy specific consumer protections and the more generally applicable Australian Consumer Law, given its systemic scope and the way technological change is changing the nature of retail competition.

Overall, and as far as possible, the construct of objectives and constraints is to avoid giving institutions multiple objectives that require regulators to "balance" things or trade objectives off against one other.

Efficient investment, operation and use . . . for the interests of consumers . . .

While investment, operation and use that is in consumers interest will always be efficient, it does not follow that all efficient solutions are.

This may be a subtle point but an important one.

Whether the consumer interest test is satisfied often depends on how prices are structured. Hence the importance of network tariff reform. More generally there can be a number of equally efficient market and regulatory outcomes but the one that is in the interests of consumers will often depend on how prices are structured.

Consumers in the context of the National Electricity Objective etc. are consumers in general, or all consumers rather than a particular type or group. The energy objectives have been constructed in this way because again, it is not considered appropriate for an institution with delegated powers like the AEMC to be making decisions that involve trading off the interests of one consumer group against another. As a practical matter given the nature of the National Electricity Rules, and that incomes policy objectives and instruments lie outside of the rules and relevant laws, such a situation tends not to arise in dealing with rule changes in any case.

The efficiency condition in the context of the National Electricity Objective etc., involves assessment of three things.

(i) That a given level of production, reliability, security, services etc. is provided at minimum cost, termed productive efficiency.

(ii) That the value of these things to consumers is equal to or greater than the efficient cost of providing them, termed allocative efficiency.

(iii) That market and regulatory arrangements can adapt to whatever the future may bring in terms of changes in technology, relative prices of inputs, business models, consumer preferences and demand, innovation etc., termed dynamic efficiency.

. . . in the long term . . .

The final phrase in the National Electricity Objective to interrogate for our purposes today is long term.

This does not refer to a specific time period. Rather, it refers to changes in the capital used on both sides of the meter to provide the services that consumers value.

Depending on the capital equipment involved, this can be expended over a relatively short time, for computer software, for example, or over a relatively long one, for household appliances, housing stock, the configuration of networks or the make-up of the generation fleet.

Viewed in this way, the Commission is rarely in the position of having to trade off consumers' short term interests against their long term ones.

Rather more typically we are faced with a choice between alternative development paths with varying impacts on the variables embedded in the National Electricity Objective.

Navigating through an evolving universe

An important part of the governance structure[9], and the way the policy mechanisms keep pace with changing market dynamics and new scenarios, is that anyone . . . quite literally anyone . . . other than the Commission itself . . . can propose a rule change and have it assessed against the policy objectives and constraints . . . the destination . . . set by governments. The result is that the effectiveness of the policy mechanisms designed to achieve government objectives are not reliant on a single source of wisdom.

While the decision on the destination always remains with participating jurisdictions via the COAG Energy Council the power to change how the market operates and regulatory mechanisms is as much in the hands of individuals, consumer and community groups as it is in the hands of individual jurisdictions, regulatory bodies and the industry.

This is a particular advantage of Australia's institutional and governance structures during periods of rapid change with all their inherent uncertainties. It also provides a systematic way of capturing the lessons learnt from experience.

These structures began as a pragmatic way of dealing with the way functions are split between the Commonwealth, States and Territories within the federation.

Within the finest traditions of the Westminster system that Australia inherited they have resulted in a clear distinction between the difficult role that governments have to perform, those of the market institutions they have created and the role of market participants. One where they can each play to their comparative advantages

Thank you.

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[9]Vertigan, M, Yarrow, G, Morton, E (Review Panel for the 2015 Review of Governance Arrangements for Energy Markets) 2015, *Review of Governance Arrangements for Australian Energy Markets: Final Report,* publication, *23* October, COAG Energy Council, viewed 12 September 2016, https://scer.govspace.gov.au/files/2015/10/Review-of-Gov-Arrangements-for-Energy-Markets-Final-Report-Oct-2015-PDFTAG.pdf.