Applying Hilmer Principles in changing energy markets

A paper prepared for the 2016 ACCC Conference

4 August 2016

Synergies Economic Consulting Pty Ltd
www.synergies.com.au

Executive Summary

Nearly twenty-five years ago, Hilmer set out a transformative framework for delivering better products and services at lower prices from Australia's public utilities. At that time, the electricity industry was largely publicly owned, self-regulated, bereft of competition and inefficient. The largest gains to customers were rightly thought to come from measures that would improve productive efficiency.

The Hilmer Principles — fostering competition where it could deliver gains, and regulating only where the costs of do doing were less than the benefits — led to a new industry model based on strict separation of the networks from generation and retail supply, to foster competition in generation and retail supply, and what we now term 'economic regulation' of the networks, largely directed at making the networks more productively efficient.

Remarkable changes are taking place in the power sector: in the characteristics of demand, in technology, and in the external, particularly environmental, pressures under which it operates. In this disruptive environment, the next wave of gains for customers are increasingly likely to depend upon innovative, perhaps transformative, services. We see signs of this in solar power, storage, microgrids and new approaches to measurement and control. But the full extent of innovation is, as is its nature, uncertain. The Hilmer Principles are sound. But if we apply them to today's industry context, a very different policy and regulatory framework might well arise. In particular, the benefits of increased innovation would be given greater weight, and greater emphasis would be placed on business structures which foster that innovation.

The conclusion of this short paper is that this shift in focus from productive efficiency to innovation demands that we reconsider our regulatory strictures. In today's disruptive environment, successful innovations may well emerge from more vertically integrated business models. In order to meet the long term interests of consumers, regulators and policy makers should be open to a different balance between an overly restrictive regulatory scheme and the innovation benefits that can arise from more flexible approaches that can accommodate greater vertical integration.

In a report Prof George Yarrow and I prepared for the ENA earlier this year, we suggested that multiple 'rule-books' could be developed. Each would be adapted to the business choices of the firms operating in the market, as opposed to a fixed framework that forces all business to adopt the same, rigidly separated form. Such a process could ensure regulation protects the integrity of the process of competition as a means of generating the most valuable innovations, rather than protecting particular competitors by enshrining a status quo that emerged in a different context and different time.

Finally, we highlight the importance of flexibility, keeping policy and regulatory options open, so we do not force today's market players into business arrangements that, a decade from now, will be inapt.

Contents

The importance of context

In 1993, the Hilmer Report presented a ground breaking review of national competition policy, establishing the framework for public utility regulation in Australia that has, in large part, defined today's electricity industry structure.

At a time when the industry was inefficient and exhibited almost no competition, Hilmer represented a different mindset, signalling a shift of emphasis of regulation and reform towards competition promoting welfare and thereby meeting the long term interests of customers. Hilmer's principles have been a touchstone for Australian governments' thinking in energy market reform, and continue to shape policy considerations on issues as diverse as ownership, market structure and the introduction of competitive forces to previous monopoly services.

The policy and regulatory regime for the electricity industry pre-Hilmer developed in a context of government owned, vertically integrated, self-regulated monopolies. The industry was inefficient, with no competition and modest interstate coordination and trade. The largest source of gains for consumers would arise from improvements in productive efficiency — simply put, better services at lower cost. The *status quo*, continuing to rely on government ownership, self-regulation and restricted entry, would not deliver the investment, integration and modernisation that was needed to achieve these outcomes.

With a focus on the large productivity gains that could be achieved from this low base, the Hilmer's reforms focused on separation and regulation of the natural monopoly[1] networks or network service providers ('NSPs') from generation and retail supply that could support competition. The judgement at the time was that this approach best advanced the long term interest of consumers. The big long term gains for consumers at that point were thought, quite rightly, to come from:

- unleashing competition in generation and retail supply, best achieved by separating out networks and system control, and imposing open access on those services; and
- driving out inefficiencies through competition in the case of generation and retail supply, and regulation in the case of networks where competition was not sustainable.

[1] Classical economic theory sustains that a natural monopoly occurs when a single producer will eventually be able to produce at a lower cost than any two other producers, thereby creating a "natural" monopoly. Higher prices will result if more than one producer supplies the market (See Laffont and Tirole (1993)). We note in passing that what constitutes a 'naturally' monopolistic activity in modern classification schemes – which themselves differ from those used in classical economics – is itself context-dependent; the boundaries can shift with changes in technology, input prices and demand, for example.

As a result, the industry would be able to experience productive efficiency gains[2] that would lead to lower prices, and thus, greater welfare for consumers. The National Electricity Law and the current regulatory framework have emerged from and enshrined these reforms.

Hilmer's cost benefit test: balancing policing against greater competition

The Hilmer reforms were based on an implicit cost benefit test: regulation should be applied only when the costs of regulation (including costs from constraints on business form) were less than the benefits and were therefore in the long term interests of consumers (LTIC). There was a clear and largely uncontentious view that the cost of regulation of the natural monopoly networks would be less than the benefits. But the decision to vertically separate the networks was based on the view that the costs of policing behaviour in vertically integrated electricity market in order to minimise the adverse consequences of anti-competitive behaviour were likely to be greater than any offsetting benefits that vertical integration might generate.[3]

The fundamental trade-off, then, was the costs of policing business conduct against the benefits that can be expected to derive from greater competition. The preference for the electricity industry post-Hilmer was to select rules, including vertical separation, which would at least in principle not require large policing costs to foster a sufficient increase in competition.

Those rules made sense at that time. The largest source of gains for consumers were rightly believed to come from productive efficiency gains, which in turn were likely to be unlocked by greater competition in generation and retail supply, and a narrow focus on efficiency improvements in networks largely through regulation. These argued for a framework based in vertical separation, particularly at a time of relative technological maturity within the sector.

The potential benefits of greater vertical integration

But we know, as economists, that vertical integration between stages of the supply chain is often commercially sensible and beneficial for consumers.

---

[2] Productive efficiency gains are achieved when a firm is able to produce at the minimum average cost. In the classical sense productive efficiency gains imply: i) the least costly inputs and best available technologies are used; ii) firms get close to a minimum efficient scale of production; and, iii) wastage of resources is minimized.

[3] Vertical integration occurs when there is combination in one firm of two or more stages of production normally operated by separate firms. In neoclassical economics, vertical integration can be efficient for the reasons noted in the main text. However, it may also reflect an attempt to make use of market power in an upstream or downstream markets to gain a competitive advantage in a vertically related but otherwise competitive market. Vertical separation is a regulatory response to the latter situation.

For example:

- economies of scope[4] can arise, where undertaking two different functions together as a single enterprise is more efficient that separating those functions — integrated blast furnace and steel rolling mills is a typical example; and
- vertical externalities[5] and complementarities in demand[6] can also arise where activity at one stage of production affects and is affected by activity at another stage.

Many of the emerging disruptive technologies operate across several levels of the electricity supply chain and not solely on one side of a clear, existing boundary between contestable and natural monopoly (network) levels, boundaries which themselves are defined by regulatory decisions taken in an earlier, rather different economic context. This strongly suggests that scope economies, vertical externalities and demand complementarities will play an increasingly important role in ensuring the long term interests of consumers.

The belief at the time of the Hilmer reforms, with strong justification, was that policing costs of any structure other than vertical separation would be substantial. But the belief was contingent on four considerations that are harder to justify today:

- the legacy of state ownership and limited private sector participation;
- limited scope economies (between the stages of production), 'vertical externalities' and price distortions;
- alternative regulations suited to a structure with a greater degree of vertical integration would have been costlier; and
- the need to persist with a structure of 'second-best' network pricing that would make the policing of vertically integrated behaviour more difficult, particularly with the proliferation new low cost technologies of measurement and analysis.

---

[4] In the strict sense, economies of scope involve lowering the average cost by producing more types of products in the same firm. See Panzar & Willig, (1977).

[5] An externality arises when the transactions of a firm gives rise to costs or benefits to another party that was not involved in the original transaction. Nicholson (1989), defines it as an interaction between the firm's level of production and individuals' wellbeing that is not accounted in the price system. A vertical externality as expounded by Tirole (1998) refers to situations where the externalities occur at different levels of the same supply chain. A vertical externality exists where expansion of a business activity at one level of a supply chain confers benefits (e.g. via lower costs or increased demand) on a separate business operating at a different level. Vertical integration is one, but only one, way to 'internalise the externalities' and increase the payoffs from expansion, including by innovation. Video games is an oft-cited example of the problems that can arise in the development stage: absent software that can run on it, there is no demand for an innovative console; absent an innovative console, there is no demand for software than can run on it.

[6] The term complementarities in demand refers to the situation when the demand for one good is linked to the demand for another good (i.e. when the price of one good falls, the demand of its complement increases). In a vertical supply chain, demand for games consoles and demand for games software are similarly complementary.

Average pricing across networks with disparate underlying costs to serve has been a feature of the NEM. This would have created a significant problem had vertically integration prevailed, because it would have been difficult (and therefore costly) for regulators to ensure that competition by vertically integrated providers was based on true efficiency advantages rather than distortions in the underlying pricing of network services.[7] However, it also creates a problem in the current context because entry opportunities may be driven more by the exploitation of price arbitrage opportunities rather than underlying efficiency.

A changing sector, a changing context

The costs and benefits of different approaches to policing business conduct are very likely to change as markets change. Identifying where the balance lies depends on the relevant economic context. The objective of regulation, to foster the long term interests of consumers, has not fundamentally changed, but technology changes in the industry can change the optimal structures to achieve this objective.

The power sector has rarely seen such rapid technological change. A new set of emerging technologies is blurring the distinction between layers. Generators are increasingly seeking to connect at the distribution rather than the transmission level, a reflection of the move away from large-scale thermal generation to smaller-scale generation technologies such as wind and solar. Flexible storage technologies are emerging[8] that can be deployed at different scales at different locations in the networks. This promises to transform the simultaneous balancing of supply and demand which has fundamentally underpinned the industry since its inception.

There has been an explosion of new low cost digital technologies that enable much better monitoring and control of all aspects of the power supply chain including the control of consumption behind the meter. Networks are increasingly 'intelligent'. External pressures, most notably climate change concerns, are leading to dramatic changes in the technologies of supply (e.g. solar, wind, other renewables) and demand (e.g. electric vehicles). Demand side management with these technological advances can play an even more significant role in meeting the long term interests of consumers. We have even reached the point where some consumers can consider moving 'off-grid' with either true self-sufficiency or through emerging technologies such as microgrids.

In this market environment, innovative services are set to play a greater role in meeting consumer needs. All these changes (along with changes in demand characteristics such as the decline in industrial demand seen in Australia) herald the prospect of a range of

[7] This is a common problem in telecommunications regulation, where vertical integration is common.

[8] At the time of Hilmer, storage was largely confined to pumped storage.

innovative services and opportunities to meet consumer demands using innovative and lower-cost technological mixes. It is early days for many of the new technologies and services, and difficult to predict which will and will not be successful.

Markets and competition as the drivers of innovation

However, the challenge with innovations is that they are, by their very nature, uncertain. It is difficult to know which innovations will be the most valuable to the consumer and what commercial structures are most likely to ensure that they are most efficiently delivered. This very uncertainty is why we prefer to rely on markets and competition to weed out the innovations and business structures that consumers do not want in favour of those that they do; the process of competition is, in effect, elevation of the valuable and elimination of the poor. On the other hand, most would agree that regulators and policy makers are poorly placed to do this. Instead, they need to consider whether the level of innovation arising under the current framework is the best that can be achieved, and assess whether different regulatory frameworks, better able to foster the processes of competition from which valuable innovations will emerge, are needed.

Risk of misalignment of interests

There is a close alignment between regulation and the long term interests of customers when the principal source of gains derives from productive efficiency, and where the functional levels of the supply chain are essentially discrete; reducing the costs of regulation by requiring strict vertical separation and ring-fencing is harmless because there are few if any benefits from integration.

That is no longer the case when innovation, and particularly innovation that is fostered by greater vertical integration, is an important driver of long term benefits. In such a world, higher regulatory costs associated with policing the conduct of vertically integrated providers may well be appropriate[9] from an overall efficiency perspective. In this world, the desire of regulators to minimise the costs of regulation is no longer necessarily aligned with the long term interests of customers. We run the risk today that measures such as strict vertical separation which make the regulators life easier may, in fact, be harmful to the long term interests of users.

Energy networks have important attributes for innovation

Energy networks have a potentially important role to play in competing to provide services to consumers that give rise to and make use of these innovations. They have a

[9] It is important, here, to note that we do not consider imposing ring-fencing so severe that it effectively precludes vertically integrated businesses from providing any form of bundled services is, at least from the economic perspective, any different from strict vertical separation.

number of attributes that can make them effective contributors to innovation. Networks, for example, have:

- a great deal of knowledge about their customer's demand characteristics and preferences;
- a comprehensive understanding of their network, and how and where to invest to deliver superior outcomes (such as exploiting opportunities for scale economies); and
- the skills and resources to implement investments and design choices, including through pricing reforms.

It is important, then, for regulators to distinguish measures that protect competition, including competition from vertically integrated suppliers, from measures that merely protect existing and potential competitors.

Innovation experience

There is at least a suggestion of more innovation from the one market that continues to exhibit a high degree of vertical integration, the US, than from vertically separated markets such as the UK.

In the UK, the RIIO[10] initiative sought to place greater emphasis on innovation but, noting that it is early days, the quantum of innovative expenditure has not been large and it remains the case that the regulator is an important determinant of what constitutes innovation. In the US, there appear to be a large number of projects that are based on improved data collection and disclosure, delivered through a range of technologies such as smart meters and better and more densely distributed sensors. These services add value using this data in a variety of ways, such as: better design and integration of storage, network and renewable (solar PV) generation; identification of possible targets for contestable service deployment such microgrids; improved network performance and reliability; better customer engagement (such as information on end use efficiency and potential savings that can arise from it, and the benefits of behind the meter technologies); better outcomes for customers by direct control of customer usage and generation; and new structural approaches to meeting customer needs such as distributed system platforms ('DSO').

There are other drivers at work, not solely vertical integration, so we should be careful in drawing strong conclusions. Nevertheless, the experience of the US should at least highlight the importance of business structure to successful innovation.

[10] **R**evenue = **I**ncentives + **I**nnovation + **O**utputs.

A greater emphasis on innovation to meet LTIC

It is therefore pertinent to ask whether the long term interests of consumers could be better met by evolving current regulation to a model that might more effectively capture the increasingly significant efficiency benefits of scope economies and reduced vertical externalities, by allowing greater participation of NSPs in the competitive markets from which these new services will spring. At the same time, meeting the long term interests of consumers requires a recognition that NSPs are likely to retain monopoly power over some network activities, and managing that concern in the least restrictive effective manner remains a necessity.

The current regulatory framework, to the extent it is reliant upon quite strict separation, will be almost entirely antithetical to these goals. It is premised on the implicit view that the benefits of innovation that might arise from looser structural constraints are clearly less than the costs of alternative means of managing the risks of reduced competition that could arise if there was greater freedom over business form.

The challenge is to transform the regulatory model as quickly as possible and one that is more compatible with the rapid adoption of innovation and risk-taking whilst protecting consumers against the risk that network owners will pass risk on to consumers and stifle the emergence of competitors in markets.

A possible approach — calibrated regulation

Hilmer, in essence, espoused the 'necessity' principle: competition restrictions should only be considered where there is no less restrictive way of ensuring network ownership does not adversely affect competition. The 'no less restrictive' criterion cannot be settled once and for all in relation to NSPs. It will depend on the specifics of the context at *a particular time*. The question, therefore, is whether it is satisfied by current arrangements in the emerging context.

The best form of regulation going forward will not be resolved easily, but it is possible to set out some alternatives that merit serious consideration. Some may require evolving away from the current model of 'strict' structural separation and the presumption that NSPs should be excluded from (or have little involvement) in contestable markets.

The fallacy of the 'one-size' fits all

There is nothing novel in seeking to adapt rules to context; one obvious example is when businesses below a threshold size are exempt from particular regulations, because compliance costs are judged excessive relative to the benefits. In electricity, there is a wider range of possibilities than the near blanket prohibition of NSP participation in contestable activities; for example, a distributor that separates out its network assets to

form a DSO[11], which then tenders for inputs (such as wires and storage services) to meet defined consumer needs, is a very different regulatory proposition from today's distribution networks.

There are likely to be commercial arrangements, including supply from vertically integrated providers, that foster greater innovation. It is essential for the long term interest of the consumers that policy makers and regulators are open to these models. Tailoring regulation to such emerging commercial frameworks is surely preferable to outright or constructive prohibition.

The process of competition, particularly in the development of innovative/disruptive services, depends upon participants in those markets being able to adopt business forms and relationships that better allow them to manage the risks. At times of rapid change, when the nature and value of innovations are uncertain, selecting appropriate business structures can be critical: indeed, it is part of the competitive discovery process itself.

Where innovations affect multiple levels of the supply chain — for example electricity storage which can affect the provision of network, wholesale power and retail power services — vertical business relations can be critical, and vertical integration is often an appropriate business form for managing the risks of delivering innovative services (addressing vertical externalities) and exploiting scope economies. Regulatory constraints on business form necessarily impact competition, in turn affecting the extent to which consumers benefit from innovation.

There are, unfortunately, signs that this fallacy persists in current thinking. This is apparent in the AER's proposed national distribution ring fencing guideline. Its Preliminary Positions Paper released in April this year proposes a default approach that subjects all contestable services provided by electricity distributors to the ring-fencing guideline i.e. it flags strict vertical separation including in relation to legal, physical (location) and staff. Potentially more restrictive ring-fencing obligations that would prevent asset sharing are also flagged. While there is a proposal for ring-fencing waivers where there is no net benefit from their application, this essentially asks regulators to assess the benefits of innovations. The approach seems particularly poorly adapted to fostering innovation, for example, of the type that is apparent in the more vertically integrate US markets.

Differentiated rule-books

This raises the intriguing prospect that, rather than regulators defining one set of rules prescribing certain business relations, regulators could offer a 'menu' of rule books suited to the business choices of the market participants. That is, different regulatory

[11] DSOs refer to distribution system operations, a form of business structure emerging in parts of the US.

rules could be applied to the various business forms NSPs adopt. NSPs that sought to compete in identifying, developing and supplying innovative services to consumers might operate under a different 'rule book' from NSPs that were content not to do so.

The regulator has several tools at its disposal (e.g. ring-fencing, accounting separation, information disclosure, standardised costs, pricing rules, prescription and proscription). The extent to which a particular set of rules — or combination of these tools — supports competitive neutrality and non-discrimination might then depend upon, or be calibrated against, the extent to which an NSP's business's choices affect policing costs and the risks of anti-competitive behaviour.

Diversity is generally good for innovation. So long as proportionate regulatory responses to clearly identifiable problems are possible (via calibrated regulatory measures), removing incentives for NSPs to compete imposes avoidable costs that policy-makers and regulators should recognise and re-assess when there are material changes in circumstances.

The balance inherent in the Hilmer principles then comes down to whether the set of rules is well calibrated (i.e. appropriate and proportionate) to preferred business choices, particularly in relation to their likely implications for the long term interests of consumers.[12]

Keeping options open

A regulatory framework based on multiple rule-books, tailored to the business choices of providers, would represent a departure from network regulation in Australia, which has evolved into a somewhat rule-bound and restrictive framework, notably in its reliance on rigid structural separation.

The industry today is going through a period of considerable disruption, with the emergence of new technologies and services, driven in no small part by external policy pressures. The events underway in South Australia at the moment are just one manifestation of that disruption. But rapid changes — in the prices of new technologies (e.g. in solar and storage) and with innovative services continuing to emerge, well evidenced by changes underway in the more vertically integrated US industry — bring considerable uncertainty as to the best overall framework.

Multiple rule-books is one response. But whatever response is adopted, we know the value of keeping options open. Regulation needs to be alive to this: for example, if it emerges over the next decade that vertically integrated businesses are best at meeting the long term interests of customers, regulations today that constructively preclude

[12] A flavour of this approach is to be found in the policies of Clare Spottiswoode, Director General of Gas Supply in the UK in the 1990s. For a more detailed description of Ms Spottiswoode's approach see the main paper.

vertical integration will impose a heavy future cost. Regulation today that has a rule-book and path that does not foreclose on this will avoid these costs.

Accordingly, there is considerable value in keeping options open today because we don't know how things will play out and doing so will avoid forcing businesses into arrangements that may in the future turn out to be poorly adapted to customer needs.

Could calibrated regulation operate in Australia?

The inherent conservatism and rigidity of the processes that are perhaps desirable for minimising regulatory risk must not be so rigid as to rule out organisation forms essential to getting the most from innovation.

In Australia it might be feasible, for example, to adopt a rule-book that is provided for:

- NSPs that did not participate (or had little involvement) in contestable segments might remain under broadly current arrangements;
- NSPs that adopted a split structure comprising, say, a distribution network assets business and a distribution system operation business (a DSO) might operate under a regulatory model more akin to telecommunications; or
- NSPs that participated in contestable markets under their current structure might be offered a set of rules with more onerous accounting separation, information disclosure and ring fencing, with attendant higher compliance costs.

In providing this 'menu' policymakers and regulators should seek balance between:

- on the one hand, incentives to foster innovation; and
- on the other hand, not weakening the safeguards against anti-competitive so much as to obviate the benefits that increased competition can deliver.