

**Flinders University**  
Australian Industrial  
Transformation  
Institute

# Grid Renationalisation – a discussion paper

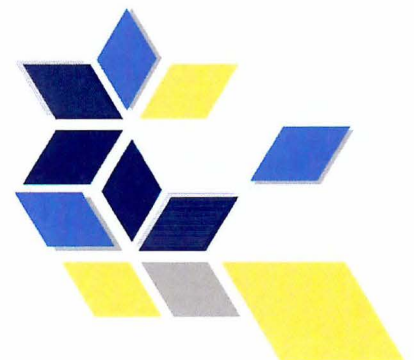


John Quiggin

Visiting Professor

Australian Industrial Transformation Institute

February 2017





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# **Grid Renationalisation**

## **– a discussion paper**

# Australian Industrial Transformation Institute

Flinders Business School  
Faculty of Social & Behavioural Sciences  
Flinders University of South Australia

1284 South Road  
Clovelly Park  
South Australia 5042

[www.flinders.edu.au/aiti](http://www.flinders.edu.au/aiti)

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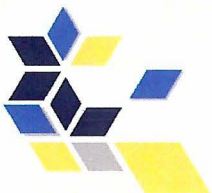
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# 1 Introduction

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Electricity reform in Australia has been a comprehensive failure since the creation of the National Electricity Market (NEM) in the 1990s. None of the objectives of lower prices, greater system reliability or environmental sustainability have been met. The core aim of policy should be a genuine National Electricity Grid, driven by the goal of providing secure, affordable electricity to Australian households and businesses while reducing and ultimately eliminating emissions of carbon dioxide (CO<sub>2</sub>). The current NEM is not designed for this purpose and cannot achieve it. Rather, it is the product of a late 20th century ideological project, in which it was hoped that market incentives could outperform rational system design and management in the electricity supply industry. Nearly 20 years of unsatisfactory experience has proved that this is not the case, even for a traditional system based on coal-fired generation.

Until relatively recently, most attention has been paid to the dramatic increases in the cost of electricity, driven primarily by the increased rate of return required for commercial investments in distribution networks, as compared to the former statutory authority model. However, recent failures of the transmission network in South Australia, Victoria and Tasmania have focused attention on the inadequacy of the national grid itself, and the fragmentation of responsibility between the electricity generators, owners of state transmission networks and interconnectors and multiple regulators.

The appropriate policy solution is a unified, publicly owned, National Grid encompassing the ownership of physical transmission networks in each state and interconnectors between states, and responsibility for maintaining security of supply and planning the transition to a sustainable, zero emissions electricity supply industry.

There is a strong case for extending the role of public ownership to include renationalisation of electricity distribution in addition to transmission, and for public investment in renewable energy.

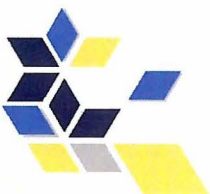
## 2 Background

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In principle, the Independent Review into the Future Security of the National Electricity Market (NEM) should provide an opportunity to reconsider the reasons for the failure of market-oriented electricity reform. Unfortunately, the starting point for the Review is the assumption that the National Electricity Market is a system that was well designed for an electricity supply industry based on fossil fuels but that needs reform in the light of the unanticipated effects of the growth of renewable energy. This assumption is false in two crucial respects.

First, even for a fossil-fuel only system, the NEM was poorly designed. Not only have the anticipated benefits not materialised, but the performance of the system has actually gone backwards. Prices have risen instead of falling and the National Grid has not lived up to its potential. The reasons for this failure are discussed at length in my report *Electricity Privatisation in Australia: A Record of Failure*, released in 2014.

Second, the claim that the system was designed for a world without renewables is over-generous. The history of the National Electricity Market (beginning with a COAG meeting in 1992) coincides almost perfectly with that of the UN Framework Convention on Climate Change (adopted in May 1992). The NEM began operating in 1998, only three years before the introduction of the (Mandatory) Renewable



Energy Target in 2001. Throughout the existence of the NEM, the designers of the NEM have failed to take adequate account of the need to reduce CO<sub>2</sub> emissions in general, and of renewable energy in particular.

Had the importance of CO<sub>2</sub> emissions and renewables been taken into account in the original design of the NEM, as it should have been, some policy mistakes might have been avoided. For example, costly errors like the decision to refurbish the Hazelwood plant might have been prevented.

However, such adjustments would not have overcome the fundamental problem. Reliance on decentralised, profit-driven investment decisions will never yield sensible outcomes in the provision of complex infrastructure networks in which a number of competing policy and social concerns must be balanced.

### 3 The failure of the NEM

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The National Electricity Objective, as stated in the National Electricity Law 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 –*

1. *price, quality, safety, reliability, and security of supply of electricity; and*
2. *the reliability, safety and security of the national electricity system.*

This objective has clearly not been met by the existing system. The main failures are:

- (a) Pricing: electricity prices have risen greatly, reversing a long-term declining trend under the previous system of integrated publicly owned electrify supply systems.
- (b) Reliability: the shift to market-based systems was followed by a series of supply failures, which necessitated costly investment in distribution networks at high cost to consumers.
- (c) Quality: competition has led to substantial churn in retail markets, but customer satisfaction is very poor, as bad as that for banks.

<http://www.choice.com.au/media-and-news/media-releases/2012-media-releases/electricity-providers-perform-just-as-poorly-as-the-big-four-banks-for-customer-satisfaction.aspx>

- (d) Efficient investment: the pricing system has not delivered coherent signals for investment. In particular, the existing system has failed to cope with the entry of renewables.
- (e) Efficient operation: resources have been diverted from operational functions to management and marketing, resulting in higher costs and poorer service.

These failures are not accidental. Rather they can be explained by fundamental and incurable flaws in the NEM model of pricing, regulation and incentives for investment. Marginal adjustments such as those being proposed at present will inevitably prove inadequate. The only satisfactory option is a substantial shift away from reliance on artificial markets and the introduction of strategic and operational planning for the national grid.

Advocates of the reform process have claimed that the poor outcomes are due to the fact that the ultimate goal of the process, privatisation of the entire system has not been achieved in

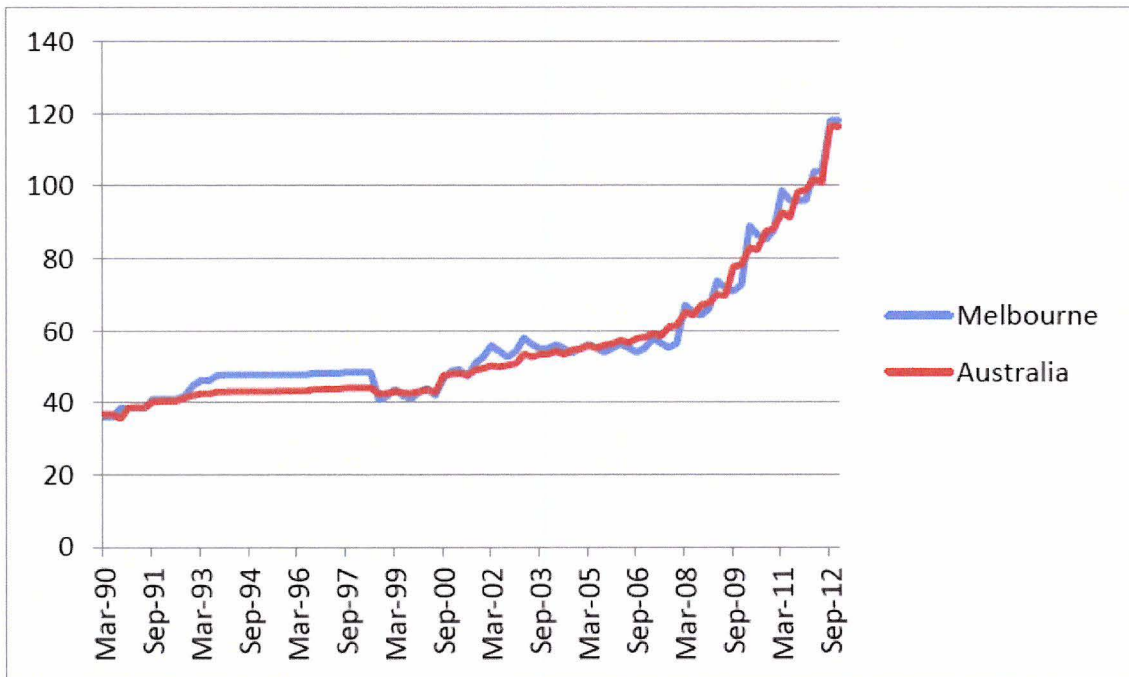




Queensland nor, until recently, in New South Wales<sup>1</sup>. This claim is belied by the fact that similar problems (differing in detail, but with the same outcome as regards rising prices) have been observed in all states in the NEM regardless of the extent of privatisation.

A second, more recent claim is that renewable energy is to blame. Although popular on the political right, where energy policy is driven by 'culture war' attitudes, this claim has been rejected both by expert analysts and the general public.

**Figure 1: Melbourne and Australian electricity indices compared**



Source: ABS (2013) Consumer Price Index, Australia, Dec 2012, Cat no 6401.0, 23 January.

### 3.1 Labour costs and productivity

One of the primary aims of the NEM reforms was to drive improvements in labour productivity. Efforts to reduce perceived overstaffing and featherbedding were directed primarily at technical and trade workers, who experienced successive waves of redundancies over the past decade. However, these reductions in employment have been more than offset by increases in the number of managers, sales workers and marketing professionals needed to operate in the new market framework.

A study of the electricity, gas and water industries undertaken by the Australia Institute found that the number of technical and trades workers employed in these industries had grown by less than the workforce as a whole between 1997 and 2012 (28 per cent as opposed to 37 per cent). By contrast, the number of managers had more than doubled, HR and marketing professionals had

<sup>1</sup> Such claims are characteristic of all failed policy programs from the claim that 'communism has never really been tried' to Ayn Rand's description of free-market capitalism as 'the unknown ideal'.



more than tripled, and the number of sales workers had risen by 500 per cent. At the beginning of the period, technicians outnumbered managerial and retail staff. By the end, the reverse was true. In particular, 'in 1997 there was a manager for every 13 workers, but by 2012 there was a manager for every nine workers'.

### 3.2 The failure of the pricing model

In a theoretically ideal competitive market, prices perform at least four distinct functions.

1. Prices provide a signal to consumers about the social cost of the product they are consuming. Consumers will buy the product if, and only if, its value to them exceeds the price, which represents the value of the resources used to produce it.
2. Conversely, prices provide a signal to producers about the value of their product. Firms will produce more (or less) if the price is greater (or less) than their cost of additional production.
3. In addition, prices provide a signal to firms on whether to invest in additional production capacity. If prices are high, and expected to remain so for some time, the industry will attract new investment. If prices are low, there will be no new investment and existing capacity will be scrapped or allowed to run down.
4. Finally, competitive prices ensure that, in the long run, firms earn the market rate of return on the capital they have invested, no more and no less.

The designers of electricity markets have attempted to reproduce all of these outcomes but have failed. There are several critical problems.

First, there are problems generic to network infrastructure industries. The physical network is a natural monopoly which means the market is best served by a single set of wires or pipes. In the absence of regulation, a monopolist will charge prices that are too high, with the result that they will not perform their signalling functions properly. Consumers will get less than they should at a higher price, profits will be excessive and investment will be distorted.

These problems can be reduced, though not eliminated completely, by comprehensive price regulation. But when privatised firms are regulated in this way, their primary incentive is to 'game' the system to secure higher returns. This often entails delaying investment (a pattern seen with Telstra on broadband).

Another problem is specific to electricity. Because electricity can only be stored at high cost, using batteries or pumped storage, the cost of additional generation can fluctuate wildly. When all available generation capacity is in use, additional demand can only be met by such measures as 'load-shedding'. The Australian pool market price of power can rise as high as \$10,000/MWh, and even this is not high enough for the market to perform as it supposed to. On the other hand, the price can be zero or even negative on nights when demand is low and operators prefer to keep their plants running than to shut them down and restart the next day.

Because the balance of supply and demand fluctuates greatly over short periods and because sources of electricity vary in their supply characteristics, pool price models are unable to achieve these objectives.

On the demand side, most consumers face fixed prices, and therefore take no account of the actual cost of the electricity consumed at any given time. Attempts to address this problem through 'smart meters' have so far had little if any success.



## 4 Private rates of return

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Electricity networks are highly capital-intensive. As a result, the cost of electricity is predominantly determined by the capital value of the network and the rate of return earned by its owners. In the pre-reform era, public electricity enterprises funded their investment by issuing bonds, normally at a small premium to the government bond rate. In some cases, governments guaranteed these bonds.

However, the primary reason for the low rate of return demanded by investors is that, under normal conditions, the risk of these investments is very low. The only major default by a publicly owned electricity utility in a developed country was the collapse of the Washington Public Power Supply System in the early 1980s, following the failure of a massive project to build five nuclear power stations.

By disaggregating the industry, the National Electricity Market created new sources of risk. Most notably, fluctuations in the pool price created risks for generators (who lost money when prices were low) and for retailers (who lost money when prices were high). Under the previous integrated system these gains and losses netted out automatically. By contrast, the NEM required either a complex system of hedging markets or the integration of generators and retailers to form 'gentailers'. Neither worked perfectly and the resulting costs were passed on to consumers.

By contrast, the risk associated with the regulated monopoly components of the industry, transmission and distribution, remained low. The standard method of regulation involved fixing an allowable revenue based on an estimate of the efficient costs of operation.

The dominant component of efficient costs was the need for a return to capital. Under National Competition Policy, regulators were required to set a rate of return derived from private enterprises. This normally involved setting a 'Weighted Average Cost of Capital' which was substantially higher than the true cost of capital for private firms, let alone the government bond rate that had previously formed the basis of electricity pricing.

The result of the requirement for excessive rates of return is that distributors have had a strong incentive to 'game' the system. This is a two-step process. First, distributors make arguments that the required level of capital investment, to which the rate of return is applicable, is very high. Then, to the extent possible within a given regulatory period, they under-invest and claim to have made gains in efficiency. The success of this process can be seen from the fact that the market value of distribution assets is substantially greater than the value imputed by regulators.

## 5 Transmission, interconnectors and the National Grid

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The problems of relying on private investment to determine the structure of an infrastructure network are even more severe in relation to long-distance transmission grids than they are in relation to distribution. Conceptually at least, the problem of distribution is relatively simple. The core requirement is that each house or business in a given service area should be connected to the electricity supply and that the network should have sufficient capacity to service the (relatively predictable) demand for electricity.

By contrast, a transmission network must connect widely disparate generators to a variety of local distribution networks. Because the demand for transmission is a residual demand, reflecting imbalances between local supply and demand it is more variable than demand in general. Transmission grids must also deal



with the consequences of failures in generations and networks. As a result, flows of electricity may vary sharply and unpredictably in different directions.

## 6 Failures of the National Grid and the inevitability of government responsibility

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Recent failures in the National Grid, and their political consequences illustrate the point that, despite the rhetoric of privatisation and competition, governments are ultimately responsible for maintaining the reliability of power supplies. Under a privatised system, the government bears the costs of system failures, but receives no offsetting return.

### 6.1 South Australian blackout

Severe storms in September 2016 led to a blackout causing almost the entire state of South Australia to lose electricity supply. The blackout was the result of multiple failures in the transmission system, including the power lines and software linking wind farms to the grid. Conservative politicians and media commentators seized on the latter fact to draw a spurious link between renewable energy and the vulnerability of the grid to disruption. The underlying problem, however, was that the system was insufficiently resilient to cope with such an event.

### 6.2 Portland Smelter

The pattern was repeated in December 2016 when a fault in the Victorian transmission system caused a sudden loss of power to the Portland aluminium smelter, with severe damage to potlines resulting in the closure of most of the smelter's operations. The fault also interrupted the transmission of electricity from Victoria (generated by coal-fired power stations) to South Australia, which was, however able to maintain supply from its own (wind and gas-fired) generators. In both cases, the problems lay, not with the generators but with the transmission network and the management of the Grid.

The idea that the performance of an infrastructure system as vital as the National Grid can be treated as a problem of market design, in which private firms operate under the guidance of a technical regulator, is a nonsense. When the system fails, governments will inevitably be held accountable. Under the current system, with no capacity for systematic public management of the grid, the response will inevitably be one of short-term panic.

### 6.3 Basslink failure

The fragility of the current Grid is illustrated by yet another failure in the transmission system. The Basslink interconnector between Tasmania and Victoria, which broke down in December 2015 and was not restored to service until June 2016.

No system is immune to technical failures like the breaking of an undersea cable. But the problems of Basslink were compounded by the fact that Basslink is owned by a foreign 'special purpose vehicle' the Keppel Infrastructure Trust, which in turn is part-owned by the Singapore government. The failure of Basslink, and the unwillingness of its main customer, the publicly owned Hydro Tasmania, to pay for the facility until it was compensated for the breakdown, brought Keppel to the brink of bankruptcy. This in turn raised the risk that the maintenance of the link might be neglected as insolvency approaches, raising the danger of further breakdowns.



A number of options are being considered, notably including a purchase of the link by Hydro Tasmania, or increased regulation. These are, however, half measures. Fixing the Basslink problem should be the first step towards a National Grid.

## 7 A National Grid

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The ultimate goal of a National Grid would be the establishment of a unified system combining the current roles of the Australian Energy Market Operator, as they apply to electricity with the ownership and control of state transmission systems and interconnectors. As at present, AEMO would develop plans for the maintenance and expansion of the grid, and the construction of interconnectors would be undertaken by competitive tender. Where appropriate maintenance and operational functions would also be subject to tendering. However, ownership and control of the Grid would be public.

A publicly owned National Grid would be responsive to concerns about sustainability and system reliability, and would allow for the integration of network planning with policy decisions regarding, for example, the replacement of coal-fired electricity. At present, while AEMO anticipates and responds to such developments its processes are entirely separate from those driving climate policy.

### 7.1 The path to a National Grid

As a starting point, the National Grid should begin with the compulsory acquisition of the most important interconnectors; Heywood (between Victoria and SA) and Basslink (between Tasmania and Victoria). The existing system of light-handed regulation has clearly failed here as it has internationally.

<http://www.reuters.com/article/utilities-unplugged-re-nationalisation-idUSL6N0KH2QQ20140119>

The next step towards a national grid should be a commitment that newly constructed interconnectors should be publicly owned and managed. The indirect process of planning currently in operation should be replaced with a coherent policy integrating the need for reliable electricity supply with the management of the process of decarbonization. Over time, operational control should be extended to encompass the entire system of interconnection and transmission, regardless of ownership.

Private owners of existing components of the grid should be offered the chance to sell their assets to the publicly owned Grid. Over time, returns to private owners should be pushed down towards the government bond rate with a corresponding reduction in risk and variability.

Financing of the process is straightforward. The rates of return currently earned by private firms are well in excess of the government's cost of long term borrowing. This gap is unlikely to be closed completely. Hence, purchases can be financed by the issue of bonds, and the revenue from the assets will be sufficient both to service interest costs and to repay the principal over time.

A gradual process of this kind should be sufficient to return most of the grid to public ownership. If necessary, any remaining holdouts could be subject to compulsory acquisition on just terms.



## 8 Distribution

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While the need for public ownership and control is most urgent in relation to transmission, most of the same arguments apply to the distribution network as a whole. Electricity networks are natural monopolies. Despite the hopes of market liberal reformers, no satisfactory system of regulation for private (or corporatised) natural monopolies has emerged from decades of policy experiments since the 1980s.

Restoring public ownership of distribution monopolies is the only tenable solution in the long run. The first step should be a reduction in the regulated rates of return for distribution monopolies to reflect the fact that these returns carry little or no risk.

The excess profits associated with current regulatory practices are reflected in the fact that market valuations of distribution monopolies show a substantial premium over the valuations of the regulated asset base used in determining allowable prices. This implies that the appropriate rate of return for regulated monopolies should be lower than that implied by the private sector model.

## 9 Renewable energy

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The failure of market-oriented electricity reform suggests we need continuing public involvement in both generation and distribution. In a decarbonising energy system, this can't happen without public investment in renewable energy. Such investments benefit the public in a diversified portfolio of publicly-owned generation assets

The situation is particularly urgent because of the continued attacks on renewable energy by the Abbott-Turnbull government. The sovereign risk generated by Abbott and Turnbull has reduced private investment, leading some retailers paying penalties rather than meeting their obligations to purchase renewable energy certificates. State investment in renewable energy would help to fill the gap created by the mismanagement of the issue at the national level.

Another possibility is that governments could innovate in financing of rooftop solar. Australia lags in this area compared to the United States.

## 10 Concluding comments

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A publicly owned National Grid might seem unthinkable. Yet it is the only coherent response to the failure of neoliberal electricity reform, just as the establishment of a publicly owned National Broadband Network was the only feasible response to the failure of telecommunications reform. And, in the light of the political upheavals of 2016, the idea that any political possibility should be dismissed as unthinkable appears obsolete.









Australian Industrial Transformation Institute  
Flinders Business School  
Faculty of Social & Behavioural Sciences  
Flinders University  
GPO Box 2100  
Adelaide SA 5001  
**P:** 08 8201 5083  
**E:** [aiti@flinders.edu.au](mailto:aiti@flinders.edu.au)

