

# ***PLANNING IN RESTRUCTURED ELECTRICITY INDUSTRIES – LESSONS FROM AUSTRALIA’S NATIONAL ELECTRICITY MARKET***

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## **Overview**

For the Australian energy industry to develop sustainably it must contend with competing challenges of cost, security and environmental concerns. Meanwhile current trends including rapid technological development in key technologies (eg. photovoltaics, battery storage) and increasing consumer engagement and empowerment (eg. distributed generation, demand-side management, political attention) are expanding the range of options, considerations and challenges for policy makers and regulators. Planning - the process of analysing, deciding upon and then organising the activities required to achieve desired goals – is particularly challenging with complex and sometimes competing objectives, and a growing range of uncertain options.

There are further challenges within electricity industries given: the physical complexities of electricity and hence industry operation that requires very high levels of coordination; the typically large, lumpy and irreversible nature of generation investment; and the shared nature of the network. Electricity provision can have a significant environmental impact, at global as well as local scales. As an essential service, decision-making about the provision of electricity receives close public scrutiny. Consequently, the effectiveness of decision-making, and hence associated planning processes, can have a significant influence on the prospects for electricity industries to maximise societal benefit.

Until relatively recently, these challenges were generally seen to require centralised utility decision making. Since the 1980’s, however, broader micro-economic reform agendas in numerous jurisdictions have seen electricity industry restructuring take greater advantage of market-driven decision making by private industry participants. Restructuring was carried out in various forms, starting in Chile in the 1980’s, England and Wales in 1990, and then in New Zealand, Australia, Europe and some parts of the US in the 1990’s [1].

Such restructuring has intentionally reduced the prominence of formal planning processes and spread its practice such that a significant amount of decision making takes place within commercial, competitive market, arrangements. The compelling principles of best practice integrated resource planning (IRP) as practiced in a number of jurisdictions with regulated monopoly utilities, however, call into question whether planning concepts should be revisited for restructured industries. IRP in the electricity industry involves consideration of all options, regardless of their nature, for addressing societal objectives and constraints, and attempts identification of the most appropriate response based on a common metric. This question has particular relevance to the Australian National Electricity Market (NEM) given a range of recent ‘market’ surprises including falling demand, steeply rising gas prices and arguably chaotic carbon policy developments.

This research identifies the most significant barriers to best practice planning processes in restructured electricity industries today. Insights and guidance are provided on how the inevitable and necessary resource planning required in our electricity industries might be better integrated to permit a wide range of options, including new technologies and market participants, to contribute to addressing industry challenges.

## **Methods**

This research involves a desktop study, considering a series of planning-related research questions, and undertaking an assessment of alternative models using a common framework. The key steps are:

- Development of a proposed planning model through:
  - Researching and identifying best-practice IRP frameworks from electricity industries around the world;
  - Assessing their appropriateness for Australia’s NEM and its current institutional and policy settings;
- Use of a relevant case study - Australia’s Energy White Paper process - to test the proposed model;
- Development of an assessment framework, through which to validate the effectiveness of the proposed model;
- Articulation of the proposed model, including refinement based on the case study findings, in terms of adjustments to Australian policy settings that if implemented are likely to improve industry outcomes; and
- Identification of shared themes with other restructured electricity industries, to enable broader insights into planning issues to be drawn.

## **Results**

There is significant variation in what electricity industry restructuring can mean. It can broadly be categorised as involving one or more of: commercialisation, privatisation, unbundling, introduction of competition [2]. The type and extent of restructuring has a critical influence on the planning process in electricity industries [3], [4].

Australia’s electricity industry restructuring varies by state and industry sector, ranging from full generation and network privatisation and wholesale and retail energy market competition in the state of Victoria, to networks and retail remaining aggregated and government owned in Tasmania.

This research identifies various Australian electricity industry arrangements, mapped to a planning framework put forward in [5]:

Factors Considered in Planning	Current NEM Implementation
Load forecasting	<ul style="list-style-type: none"> <li>The Energy White Paper sets out electricity needs at a high level</li> <li>The Australian Energy Market Operator (AEMO) forecasts demand for electricity</li> <li>Generators, retailers and other market participants forecast demand as part of their commercial decision-making</li> </ul>
Generation costs	<ul style="list-style-type: none"> <li>The Energy White Paper summarises key trends for electricity generation technologies</li> <li>The Australian Energy Technology Assessment is regularly published to inform stakeholders of detailed estimates of current and prospective costs</li> <li>Generators, retailers and other market participants (which increasingly includes consumers) assess current and future generation costs as part of their commercial decision-making</li> </ul>
Demand-side management options and costs	<ul style="list-style-type: none"> <li>Council of Australian Governments' Energy Council's program includes priority on energy efficiency</li> <li>Energy efficiency programs in various jurisdictions</li> <li>Some consumers actively assess demand-side management options as part of their commercial decision-making</li> </ul>
Transmission and distribution costs	<ul style="list-style-type: none"> <li>AEMO annually prepare the National Transmission Network Development Plan</li> <li>Regulatory Investment Tests for Transmission and Distribution</li> </ul>
Risks of fuel price volatility, drought, carbon taxes, etc	<ul style="list-style-type: none"> <li>AEMO compiles data from many of the above sources, as well as from surveying generators, to annually publish the Statement of Opportunities for each of electricity and gas supply</li> </ul>
Social and environmental "externality" costs	<ul style="list-style-type: none"> <li>Renewable Energy Target legislation</li> <li>Local and state development approval processes</li> </ul>
Public involvement throughout process	<ul style="list-style-type: none"> <li>Energy White Paper formation</li> <li>Regulatory Investment Tests for Transmission and Distribution</li> <li>Local and state development approval processes</li> </ul>
Scenario and sensitivity analysis to ensure "least-cost" under different cost or demand assumptions	<ul style="list-style-type: none"> <li>AEMO regularly publishes projected assessments of system adequacy</li> <li>Market participants conduct their own analysis to determine their own "least-cost" to inform their investment decisions</li> </ul>

This table serves to highlight that despite planning being largely unacknowledged during Australia's restructuring process (indeed, general consensus was that the process would help avoid what was invariably flawed centralised planning), arrangements have been made over time to ensure that it does indeed occur. The need for the now formalised and centralised planning arrangements for networks was not immediately accepted, and it may be that other areas will follow in a similar manner.

IRP is recognised as a highly effective approach to planning, however restructuring presents various barriers to its implementation: Commercialisation extends the tension between reducing consumers' consumption and maintaining utilities' revenue. Unbundling reduces the sharing of knowledge through the supply chain of opportunities to achieve least-cost. Competition in retail reduces the incentive for investment in demand-side management because customers can switch to another provider at short notice. Privatisation leads to organisations with narrower objectives, unlikely to consider externalities that do not impact them. [2].

However some opportunities to utilise IRP principles in the Australian context are recognised. As one example, the Australian Energy Market Commission (AEMC) advocates the ongoing consideration of the trade-offs between the costs of network investments (and non-network options) and reliability outcomes [6], [7]. Network decision making does, of course, fall within economically regulated monopoly network service providers.

The Energy White Paper, the Australian Government's energy policy plan, has the potential to be the foundational planning process in the industry. This research finds that it should be improved to comprise: prioritised objectives; understanding of the status quo (including past policy performance and policy coherence and comprehensiveness); targeted strategies; steps, resourcing, time and risks to implement; monitoring of progress. Stakeholder consultation is critical throughout, and the process should be dynamic, utilising information technology.

## Conclusions

- By restructuring electricity industries governments have replaced the centralised coordination of planning with a more complex collection of arrangements that has resulted in heightened regulatory risk. National governments have a critical role to play in clarifying to stakeholders the planning arrangements in restructured electricity industries. In Australia, the Energy White Paper process has the potential to drive such planning improvement.
- Although microeconomic reforms have been explicitly made to improve planning by spreading responsibility for it towards market participants, there was little acknowledgement at the time of the risks in doing so. Familiarity with the risks may facilitate management of them as they become issues.

## References

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