Planning in Restructured Electricity Industries – Lessons from Australia’s National Electricity Market

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*International Association of Energy Economics*

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Agenda

- Background
  - What is planning?
  - Restructuring of electricity industries
  - Integrated Resource Planning
  - Australia’s National Electricity Market
- Method
- Results
  - Centralised vs decentralised
  - Assessment of Australia’s planning model
- Future research
- Conclusion
  - Role of governments
  - Risk awareness
What is planning?

- The process of analysing, deciding upon and then organising the activities required to achieve desired goals

- In electricity industries (EI) planning can result in decisions on what to invest/divest… generators, poles and wires, loads, energy efficiency opportunities

- In EI: particularly important due to:
  - High level of coordination required
  - Large, lumpy investment
  - Significant environmental impact
  - Essential service
- Traditionally required centralised utility decision making
Restructuring of electricity industries

• Since 1980’s EI restructuring as part of broader microeconomic reform… Chile, England, Wales, NZ, Australia, Europe, some parts of US

• Intentional shift from formal planning to spread its practice to competitive, market arrangements

• Meanwhile Integrated Resource Planning (IRP) has been adopted in many jurisdictions, *but only those* with regulated or partially regulated industry structures
Integrated Resource Planning (IRP)

IRP - POWER SECTOR

DEMAND FORECAST

RESOURCE OPTIONS

1. DEMAND SIDE
   - Energy Efficiency (EE)
   - Demand Side Management (DSM)

2. SUPPLY SIDE
   - Renewables - On-Grid & Off-Grid
   - Fossil Fuels & Nuclear

National Objectives

Linkages to Other Sectors (Transportation, Manufacturing, etc.)

Human, Institutional and Technical Capacity

Economic, Environmental, and Social Considerations

World Resources Institute (2014)
Australia’s National Electricity Market

- Recent ‘market’ surprises:
  - Falling demand
  - Unstable carbon policy

- Can IRP be employed in Australia?

- If not, what is the planning model most suitable for Australia?
Method

- Desktop study
- Steps:
  - International best practice
  - Australian model
  - Case studies
  - Assessment framework
  - Australian assessment
  - Refined Australian model
  - Broader insights
Results

a) A range of planning approaches are available, from fully centralised to decentralised

Centralised | Decentralised
---|---
Network
Govt build program | Govt build program
Regulatory investment test | Auction / tender
Demand Management Code of Practice | Feed-in tariff
Optional Firm Access | Renewable Energy Target
No govt intervention | Information provision
No govt intervention

Generation
b) Australian electricity industry, when mapped to a planning model, shows that arrangements have been made over time; perhaps more to come (refer following table)
<table>
<thead>
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<th>Factors Considered in Planning*</th>
<th>Current Australian Implementation</th>
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| Load forecasting               | • Australian Energy Market Operator (AEMO) forecasts  
|                                | • Generators, retailers and other market participants’ commercial decision-making |
| Generation costs               | • Generators, retailers and other market participants’ (which increasingly includes consumers) commercial decision-making |
| Demand-side management options and costs | • Energy efficiency programs in various jurisdictions  
|                                | • Some consumers’ commercial decision-making |
| Transmission and distribution costs | • Regulatory Tests for Transmission and Distribution |
| Risks of fuel price volatility, drought, carbon taxes, etc | • |
| Social and environmental “externality” costs | • Local and state development approval processes |
| Public involvement throughout process | • Local and state development approval processes |
| Scenario and sensitivity analysis to ensure “least-cost” under different cost or demand assumptions | • AEMO’s projected assessments of system adequacy  
|                                | • Market participants’ own analysis |

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...Complex arrangements → heightened regulatory risk

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*International Rivers (2013) … a range of centralised as well as decentralised processes
c) Assessment framework for planning: World Resources Institute’s IRP framework

World Resources Institute (2014)
Results

c) Assessment framework for planning: Combine frameworks in the literature and generalise to planning more broadly.

5. Resource options assessment

- Generation costs
- T&D costs
- DSM options and costs
- Scenario analysis
- Risks in fuel price, drought, carbon price
Results

c) Assessment framework for planning: Combine frameworks in the literature and generalise to planning more broadly.
d) Assess Australia’s planning arrangements using framework

Key
- Ineffective
- Mixed
- Effective
- Trend improving / worsening

1. Planning process
2. Plan objectives
3. Review of previous plans
4. Demand forecast methodology
5. Resource options, incl scenarios and risks
6. Policy instruments to achieve objectives
7. Regulatory and institutional frameworks
8. Investment financing
9. Social and environmental considerations
10. Innovation, anticipates emerging challenges

Results
Results

d)(i) Falling demand has caught many stakeholders by surprise - Market operator forced to shift to bottom-up approach to forecasting.

Source: AEMO 2014 National Electricity Forecasting Report
d)(ii) Energy White Paper case study

- Policy plan
- Means for govt to provide overall policy direction to industry with large private sector
- 2015 edition’s weaknesses:
  - Need it to state approach to planning, who/how each factor should be performed, including whether centralised or not
  - Prioritised objectives
  - Policy coherence
Results

d) Assess Australia’s planning arrangements using framework

Key
- Ineffective
- Mixed
- Effective
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Future Research

• Further case studies, including network planning
• Risk allocation
  • Who are the decision-makers?
  • Who is exposed to the risks/rewards associated with their decisions?
• International comparisons
  • Similar issues faced to Australia?
    • Restructured industry
    • Energy resource profile
    • Short political cycle
Conclusion

• Restructuring electricity industries means
  → replacing centralised coordination of planning
  → complex arrangements, regulatory risk
  → national governments must clarify arrangements

• Intentional changes to planning: worth acknowledging the risks
Feedback and questions please!

In preparing for battle I have always found that plans are useless, but planning is indispensable.

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ceem.unsw.edu.au
References

Many of our publications are available at:
www.ceem.unsw.edu.au