



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

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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



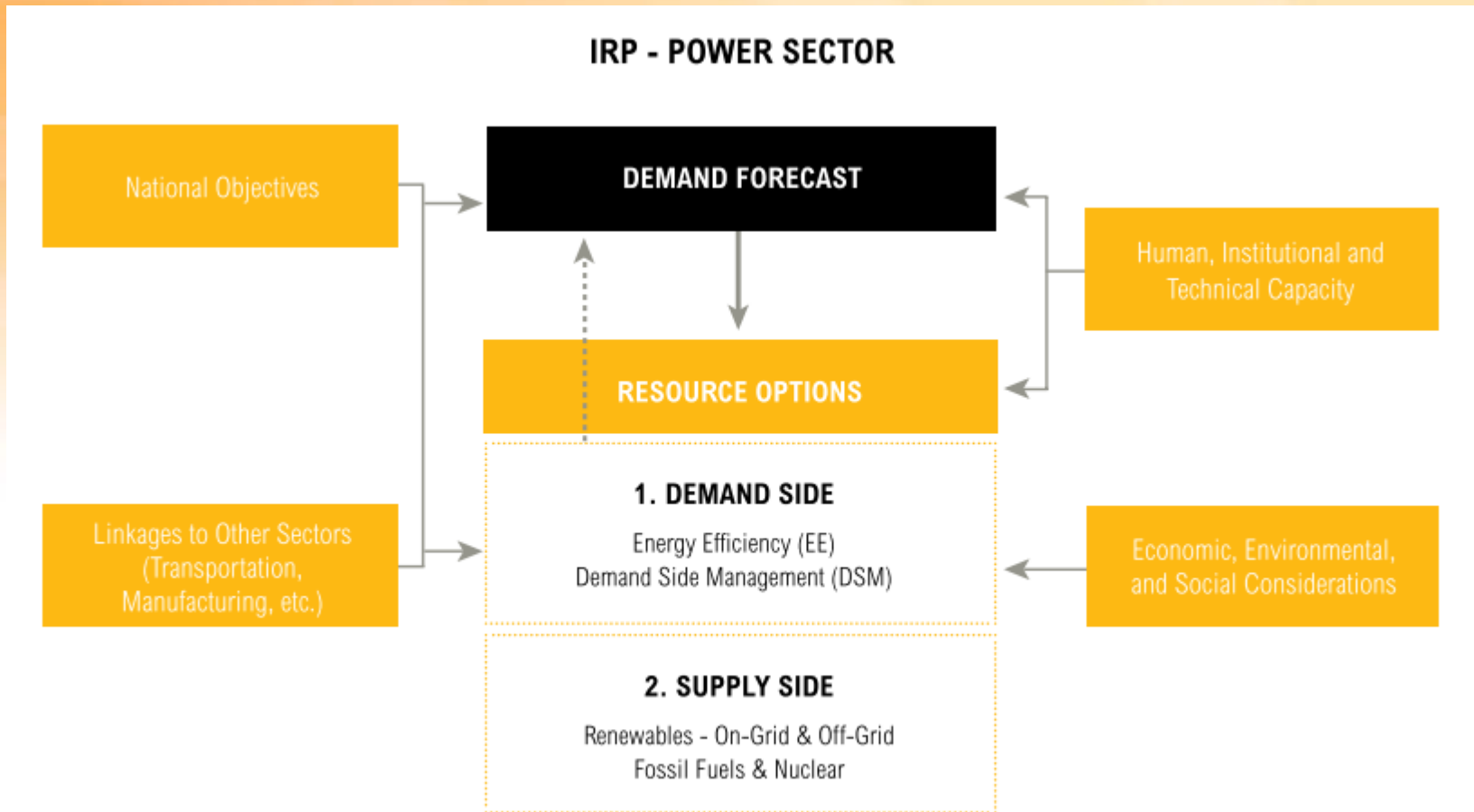
# What is planning?

- 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

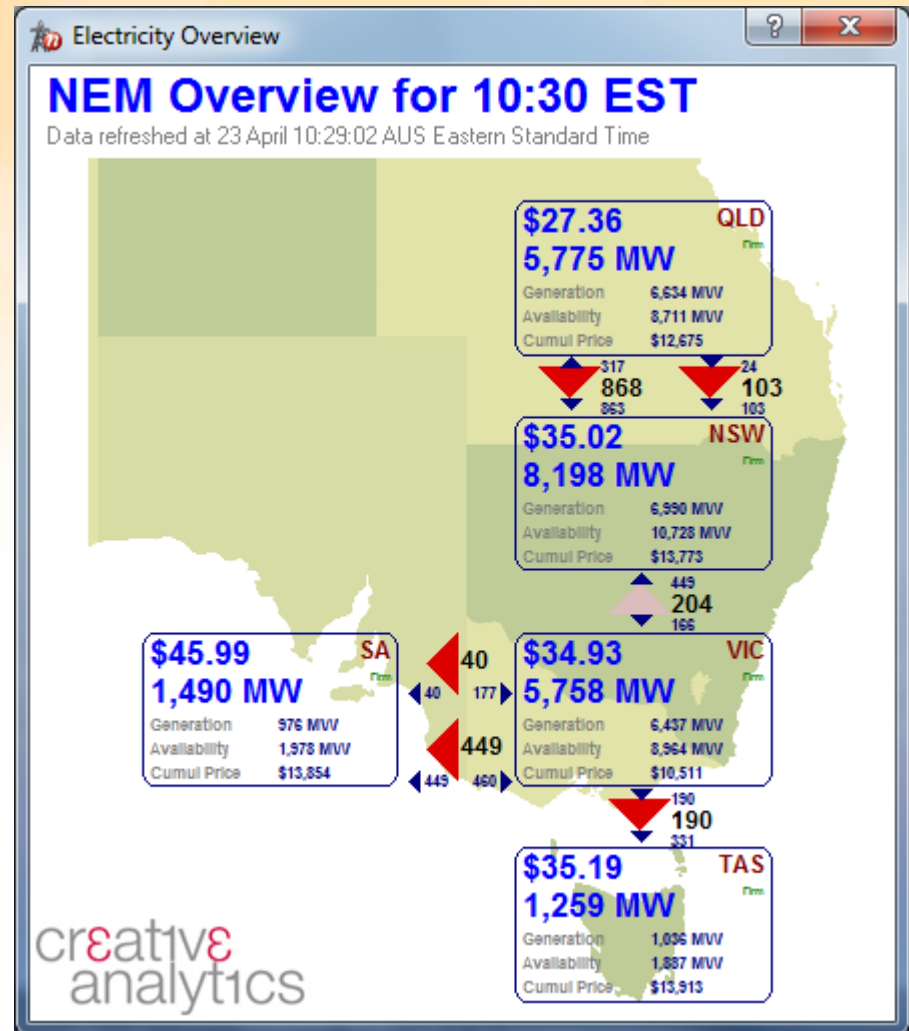
# Integrated Resource Planning (IRP)



World Resources Institute (2014)

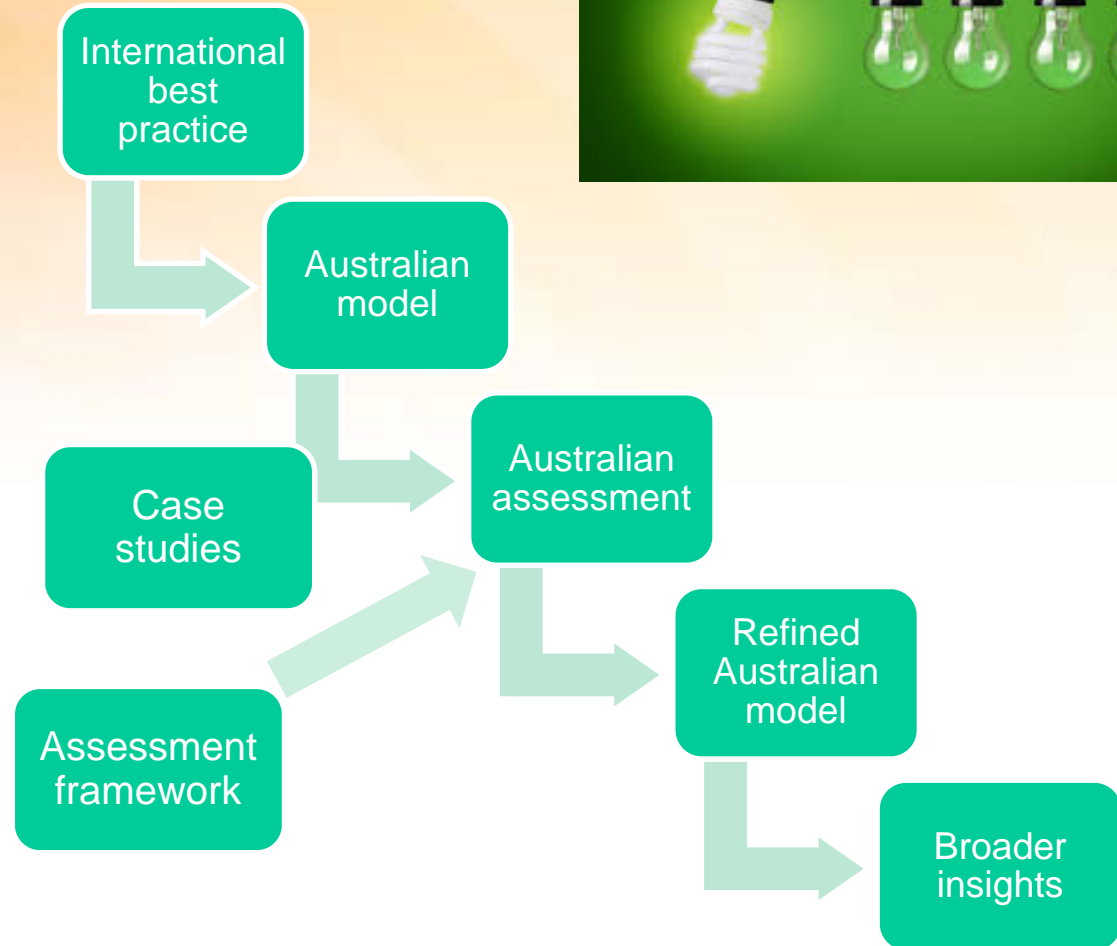
# Australia's National Electricity Market

- 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

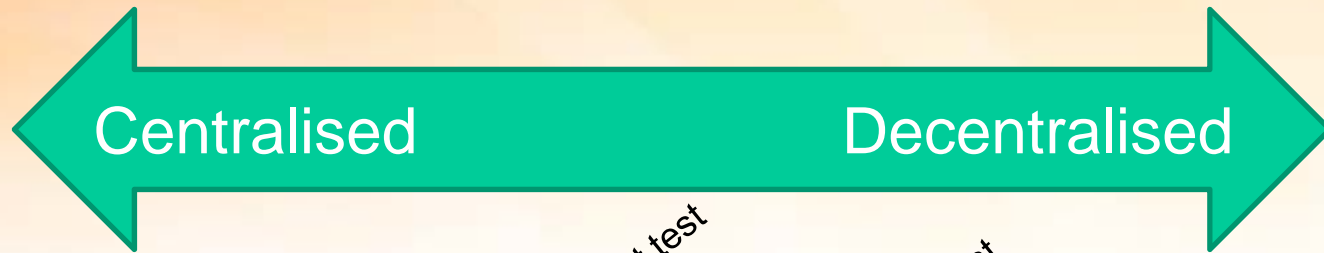
- Desktop study
- Steps:





# Results

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



**Network**

Govt build program

Regulatory investment test

Demand Management  
Code of Practice

Optional Firm Access

No govt intervention

**Generation**

Govt build program

Auction / tender

Feed-in tariff

Renewable Energy Target

Information provision

No govt intervention

# Results

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)





Factors Considered in Planning*	Current Australian Implementation
<b>Load forecasting</b>	<ul style="list-style-type: none"> <li>• Australian Energy Market Operator (AEMO) forecasts</li> <li>• Generators, retailers and other market participants' commercial decision-making</li> </ul>
<b>Generation costs</b>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>• Generators, retailers and other market participants' (which increasingly includes consumers) commercial decision-making</li> </ul>
<b>Demand-side management options and costs</b>	<ul style="list-style-type: none"> <li>•</li> <li>• Energy efficiency programs in various jurisdictions</li> <li>• Some consumers' commercial decision-making</li> </ul>
<b>Transmission and distribution costs</b>	<ul style="list-style-type: none"> <li>•</li> <li>• Regulatory Tests for Transmission and Distribution</li> </ul>
<b>Risks of fuel price volatility, drought, carbon taxes, etc</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Social and environmental "externality" costs</b>	<ul style="list-style-type: none"> <li>•</li> <li>• Local and state development approval processes</li> </ul>
<b>Public involvement throughout process</b>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>• Local and state development approval processes</li> </ul>
<b>Scenario and sensitivity analysis to ensure "least-cost" under different cost or demand assumptions</b>	<ul style="list-style-type: none"> <li>• AEMO's projected assessments of system adequacy</li> <li>• Market participants' own analysis</li> </ul>

\*International Rivers (2013)



Factors Considered in Planning*	Current Australian Implementation
<b>Load forecasting</b>	<ul style="list-style-type: none"> <li>• <b>Energy White Paper</b></li> <li>• Australian Energy Market Operator (AEMO) forecasts</li> <li>• Generators, retailers and other market participants' commercial decision-making</li> </ul>
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<b>Social and environmental "externality" costs</b>	<ul style="list-style-type: none"> <li>• <b>Renewable Energy Target legislation</b></li> <li>• Local and state development approval processes</li> </ul>
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<b>Scenario and sensitivity analysis to ensure "least-cost" under different cost or demand assumptions</b>	<ul style="list-style-type: none"> <li>• AEMO's projected assessments of system adequacy</li> <li>• Market participants' own analysis</li> </ul> <p style="text-align: center;"><b>...Complex arrangements → heightened regulatory risk</b></p>

\*International Rivers (2013)



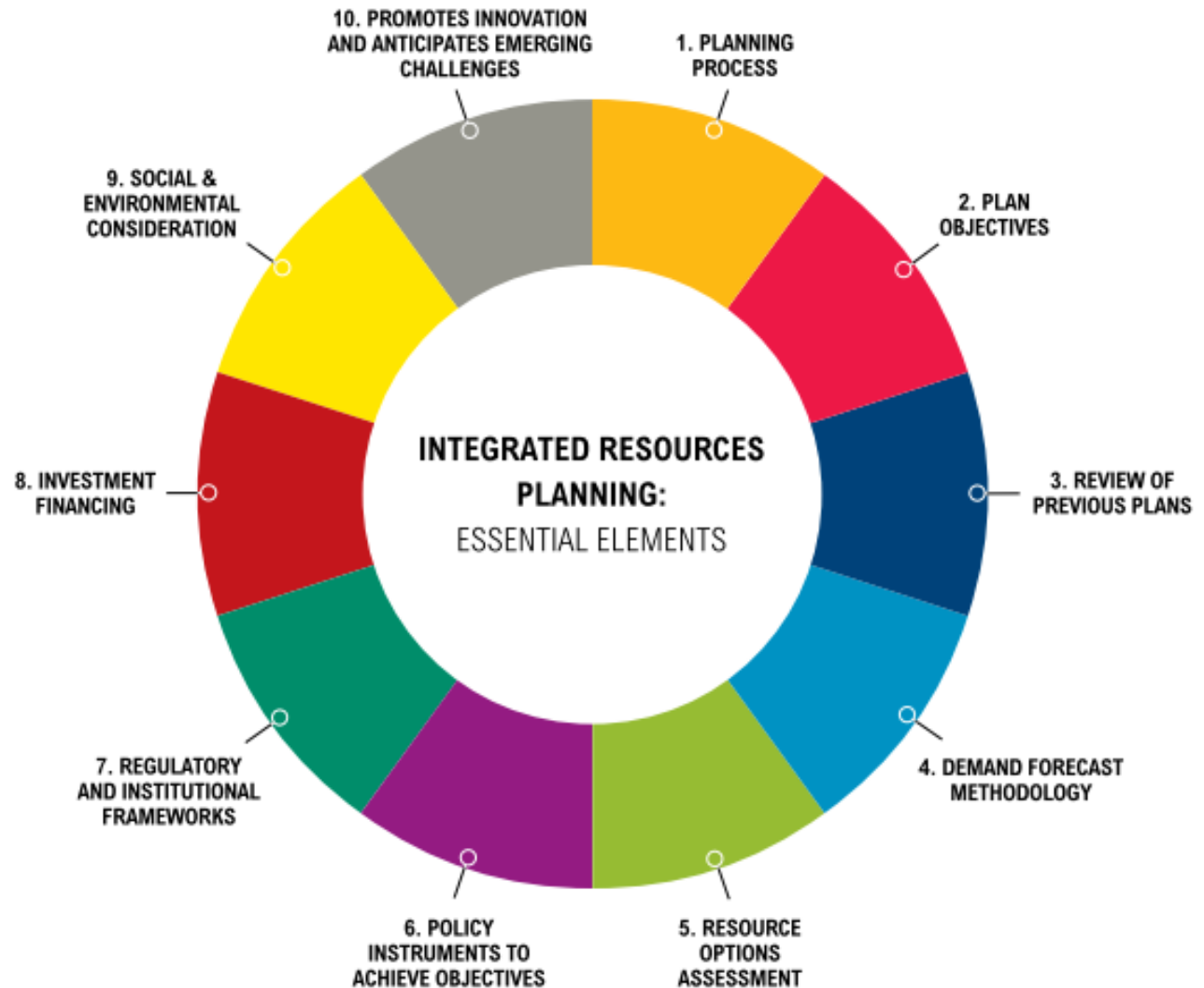
Factors Considered in Planning*	Current Australian Implementation	De/Centralised
<b>Load forecasting</b>	<ul style="list-style-type: none"> <li>Energy White Paper</li> <li>Australian Energy Market Operator (AEMO) forecasts</li> <li>Generators, retailers and other market participants' commercial decision-making</li> </ul>	-----C -----C D-----
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... a range of centralised as well as decentralised processes

\*International Rivers (2013)

# Results

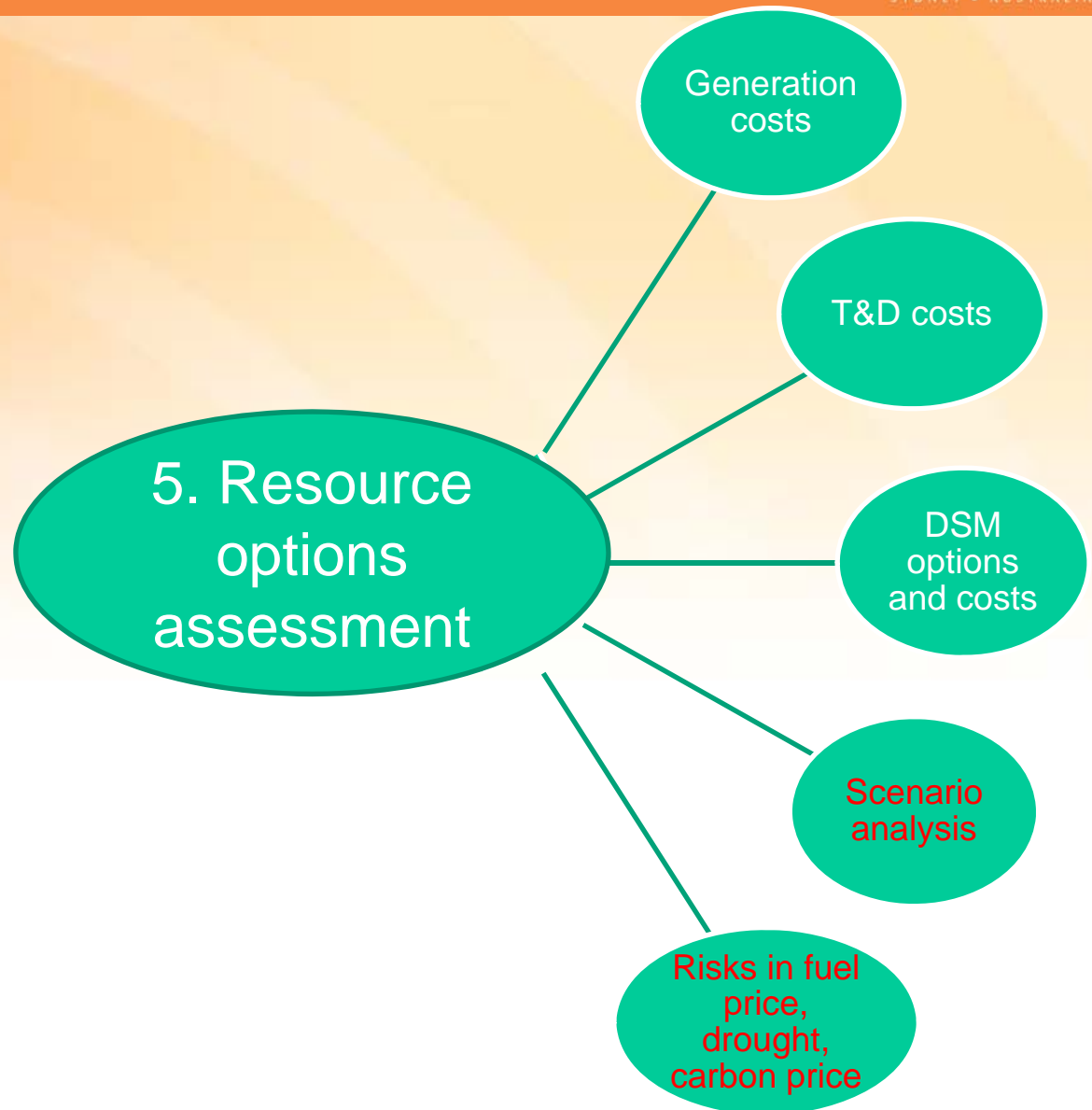
c) Assessment  
framework for  
planning:  
World  
Resources  
Institute's IRP  
framework



World Resources Institute (2014)

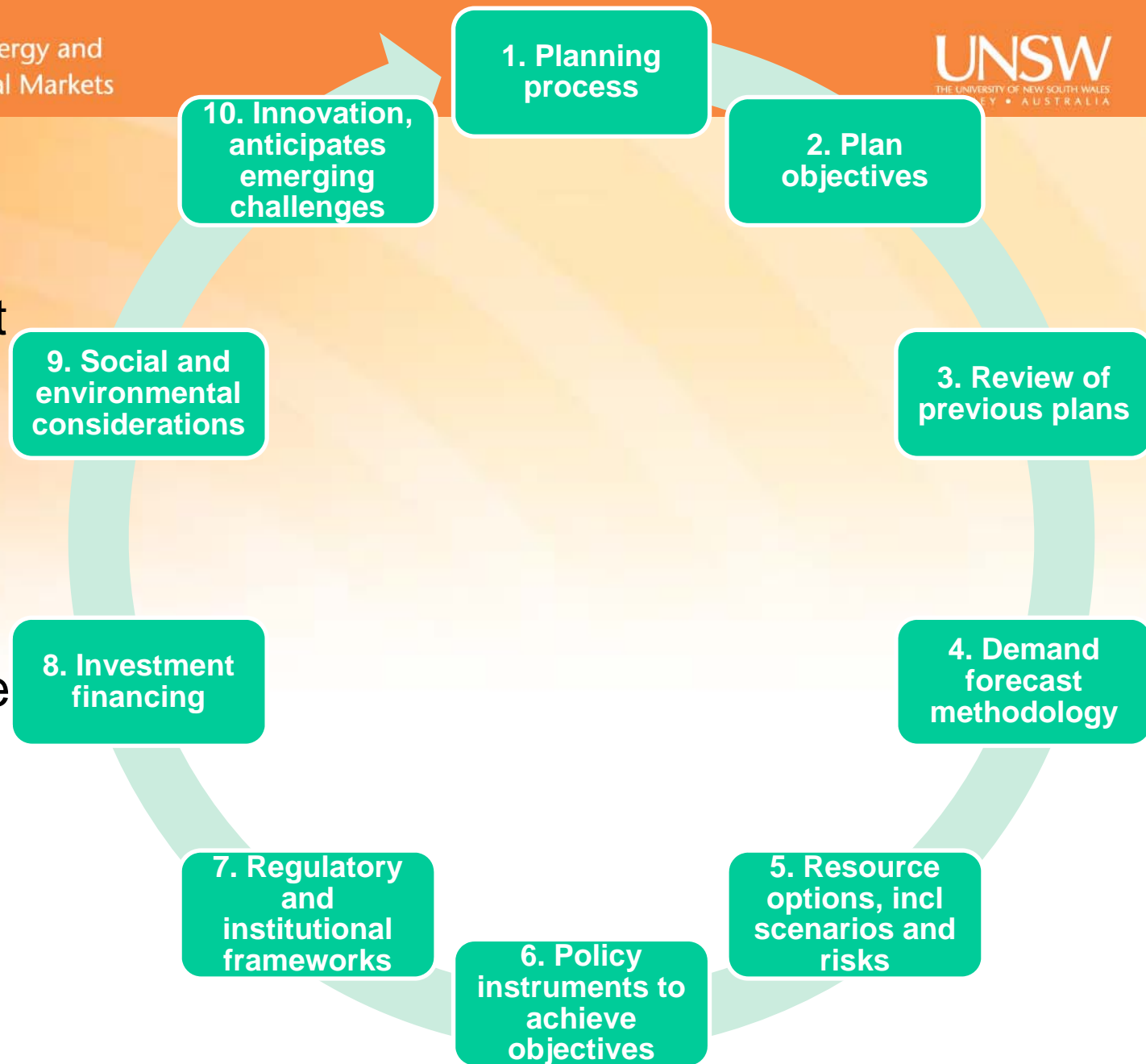
# Results

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



# Results

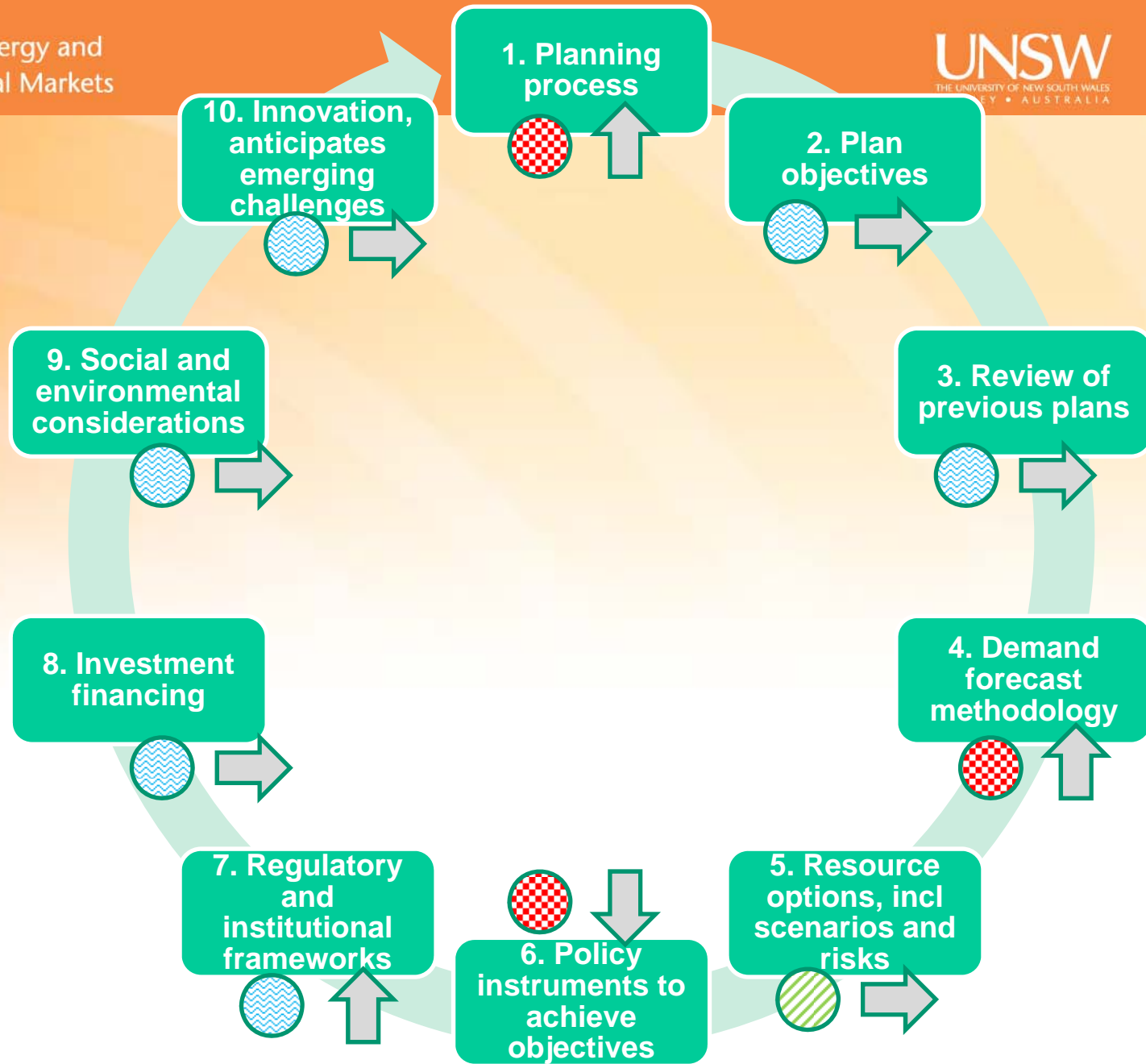
c) Assessment framework for planning: Combine frameworks in the literature and generalise to **planning** more broadly





# Results

d) Assess Australia's planning arrangements using framework

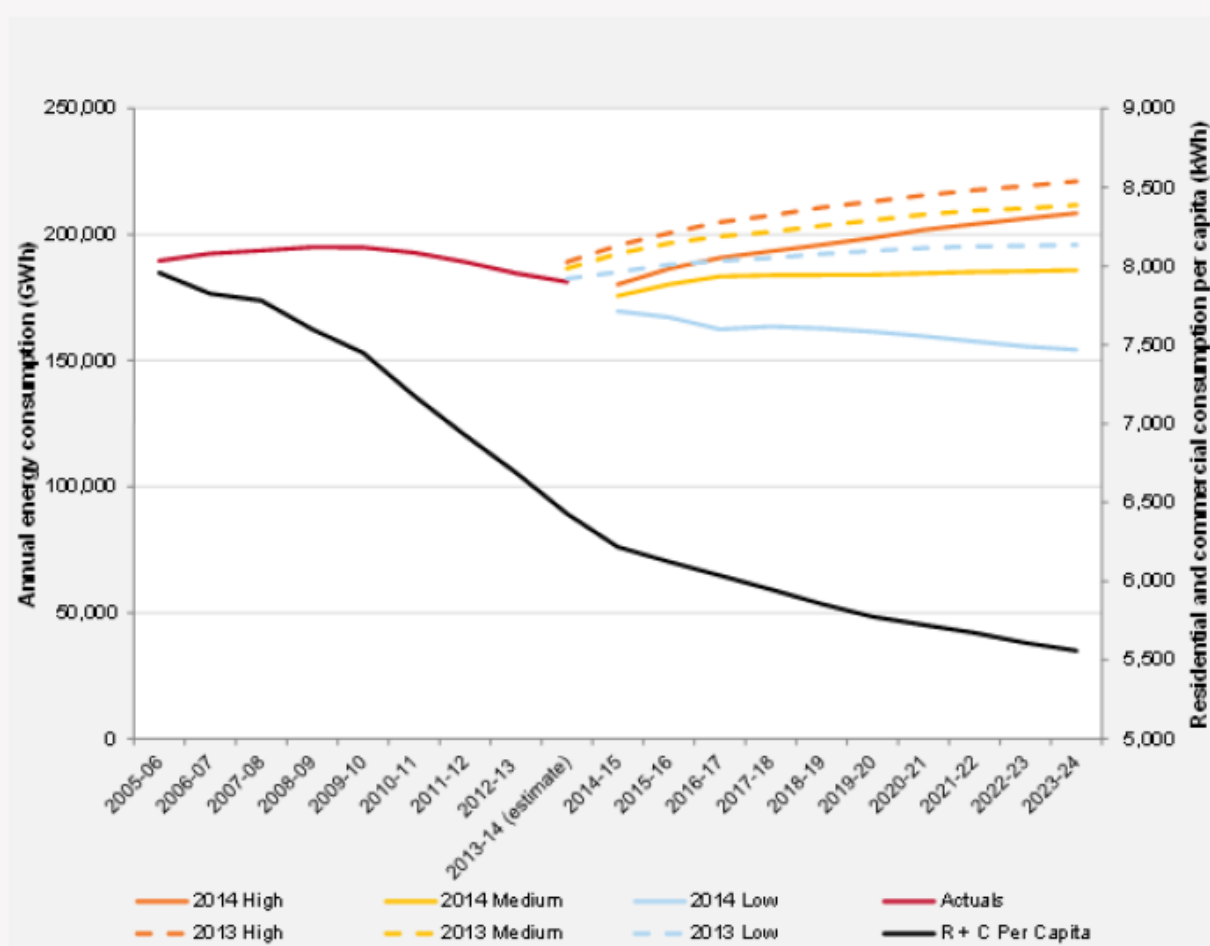


4. Demand forecast methodology

# Results

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

Figure 4 — Annual energy forecasts for the NEM



# Results



## d)(ii) Energy White Paper case study

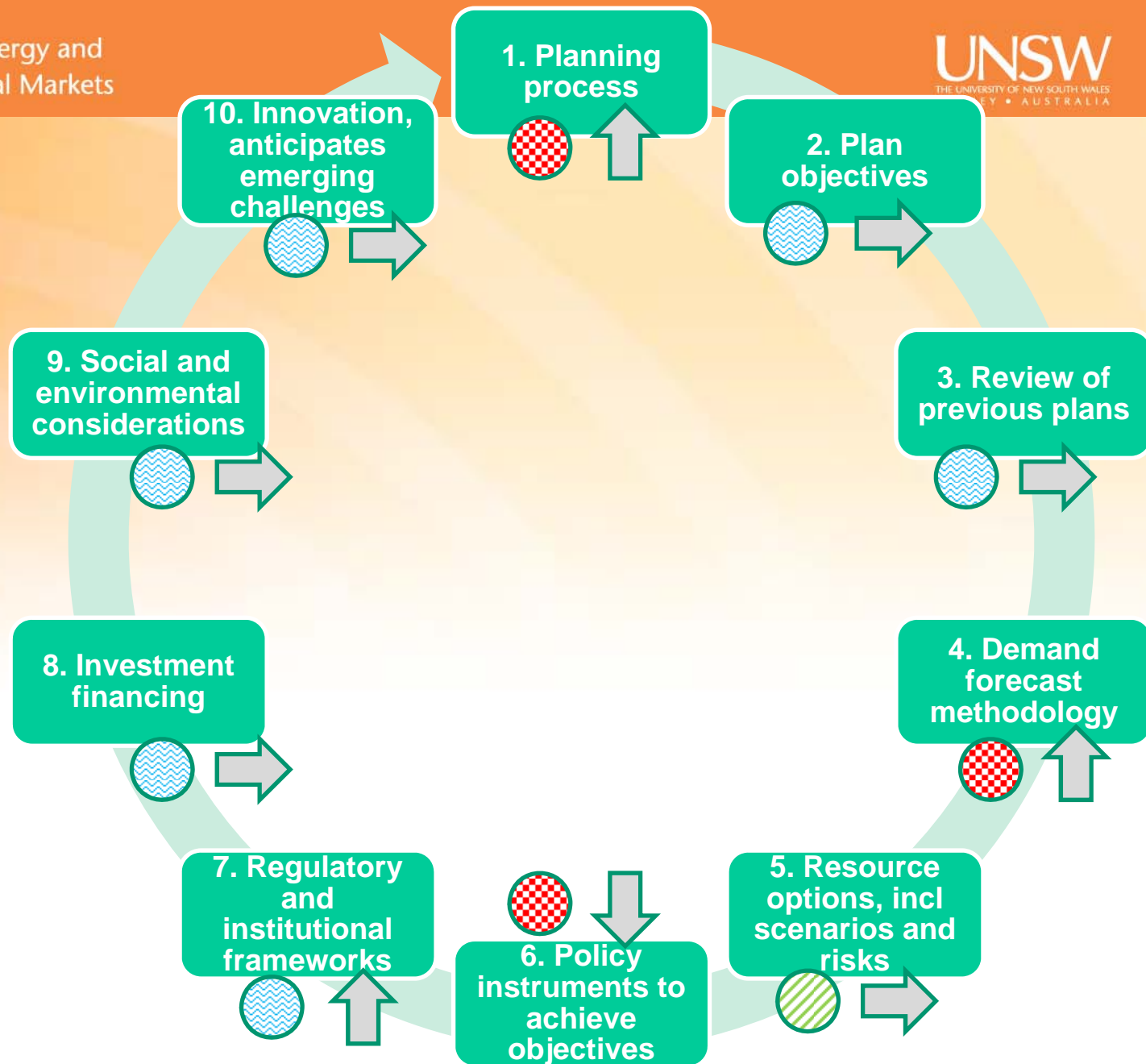
- Policy plan
- Means for govt to provide overall policy direction to industry with large private sector
- 2015 edition's weaknesses:
  - Need it to state approach to planning, who/how each factor should be performed, including whether centralised or not
  - Prioritised objectives
  - Policy coherence

Energy White Paper  
2015

[WWW.EWP.INDUSTRY.GOV.AU](http://WWW.EWP.INDUSTRY.GOV.AU)

# Results

d) Assess Australia's planning arrangements using framework



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

# 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

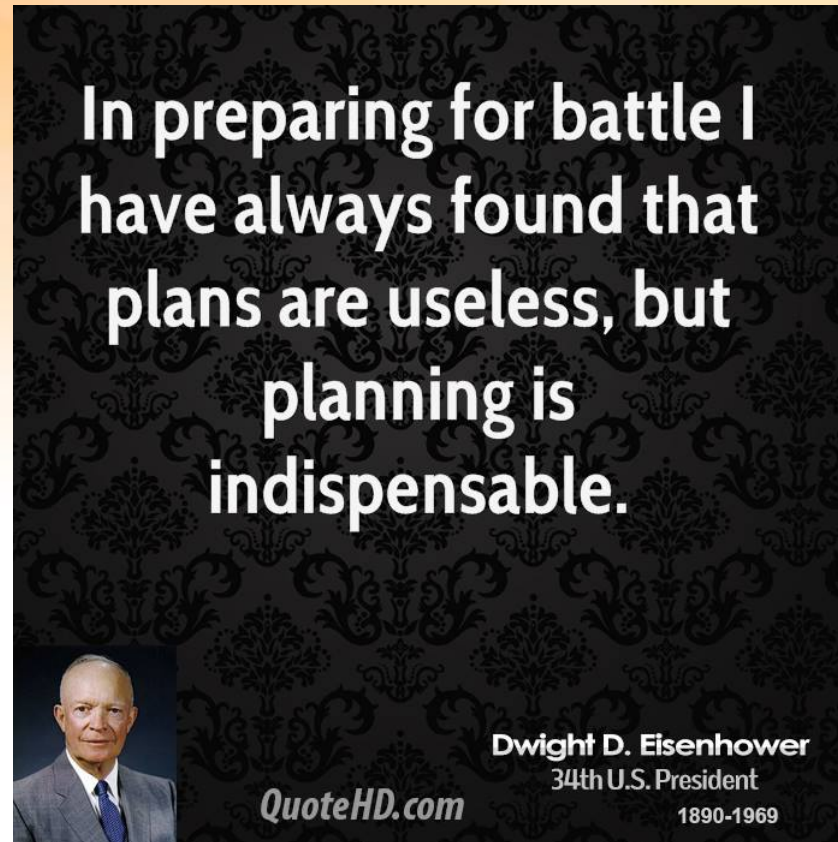


# Conclusion

- 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!



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