

Energy Regulation in Australia

Cooperative federalism and unilateralism

Raif Sarcich

University of Melbourne

19 April 2017

Outline

- 1 Fundamentals
 - The Sector
 - History
- 2 Cooperation
- 3 Unilateralism
- 4 Co-evolution
- 5 Conclusion

Scope

“Energy” means:

- Electricity through interconnected networks
- Processed (not raw) natural gas

Not included:

- Non-interconnected electricity networks (rural towns)
- Untreated, containerised or liquefied natural gas
- Transport fuels

Western Australia and Northern Territory are special cases

This presentation will focus only on electricity and the National Electricity Market (NEM).

Socio-technical regimes

Definition of “Regime”

“A technological regime is the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, skills and procedures, ways of handling relevant artifacts and persons, ways of defining problems—all of them embedded in institutions and infrastructures.”
(Rip and Kemp 1998)

Socio-technical regimes

Definition of “Regime”

“A technological regime is the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, skills and procedures, ways of handling relevant artifacts and persons, ways of defining problems—all of them embedded in institutions and infrastructures.”
(Rip and Kemp 1998)

Socio-technical regimes

“... patterns of artefacts, institutions, rules and norms assembled and maintained to perform economic and social activities.” (Berkhout, Smith, and Stirling 2004)

Socio-technical regimes

Definition of “Regime”

“A technological regime is the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, skills and procedures, ways of handling relevant artifacts and persons, ways of defining problems—all of them embedded in institutions and infrastructures.”
(Rip and Kemp 1998)

Socio-technical regimes

“... patterns of artefacts, institutions, rules and norms assembled and maintained to perform economic and social activities.” (Berkhout, Smith, and Stirling 2004)

Intersecting rule regimes

Sociotechnical regimes are made up of intersecting but separate rule sets linked to particular actor groups. Changes to one implies changes to all. (Geels 2004)

What is the NEM?

- An infrastructural system - transmission, generation and distribution

What is the NEM?

- An infrastructural system - transmission, generation and distribution
- A technical system - IT, metering, communications and control

What is the NEM?

- An infrastructural system - transmission, generation and distribution
- A technical system - IT, metering, communications and control
- A political/institutional system - laws, rules, regulations, governing institutions

What is the NEM?

- An infrastructural system - transmission, generation and distribution
- A technical system - IT, metering, communications and control
- A political/institutional system - laws, rules, regulations, governing institutions
- A financial system - gross pool spot market, associated financial risk management markets, bilateral contracts, risk, debt, shareholders, insurance and prudential requirements.

The NEM as infrastructural system

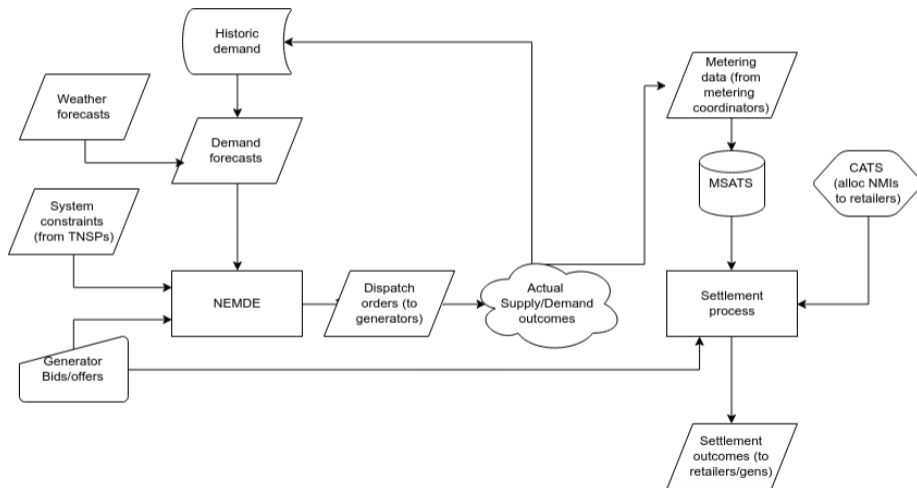
- Spans 5000 kilometres
- Supplies around 80% of Australia's electricity
- 44,482 MW installed generation capacity
- ~200 TWh output per year

Source: AER

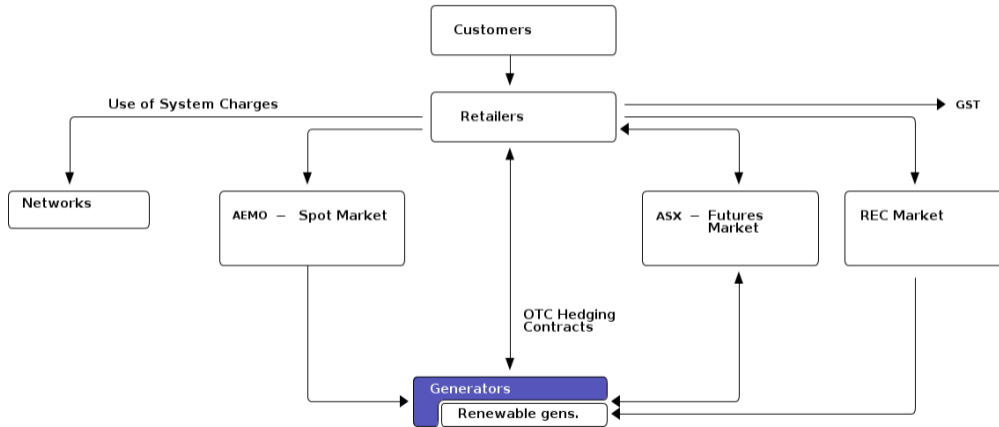


Sources: AEMO, AER.

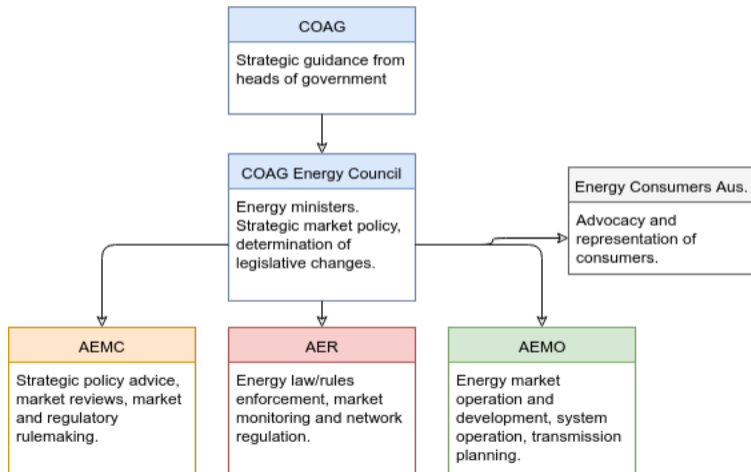
The NEM as IT system



The NEM as financial system



The NEM as political/governance system



Legal architecture

Roles of jurisdictions:

- Commonwealth can legislate regarding interstate trade, international trade and corporations.

Legal architecture

Roles of jurisdictions:

- Commonwealth can legislate regarding interstate trade, international trade and corporations.
- States retain all residual constitutional authority. Energy historically an intra-state matter (but no longer).

Legal architecture

Roles of jurisdictions:

- Commonwealth can legislate regarding interstate trade, international trade and corporations.
- States retain all residual constitutional authority. Energy historically an intra-state matter (but no longer).

Legislation

The NEM uses an “applied law” framework. The National Electricity Law (NEL) is a schedule to a law of South Australia. The other states, territories and Commonwealth then ‘apply’ this schedule through their own Acts as a law of their own jurisdiction. Changes to the NEL in SA automatically take effect in other jurisdictions.

Legal architecture

Roles of jurisdictions:

- Commonwealth can legislate regarding interstate trade, international trade and corporations.
- States retain all residual constitutional authority. Energy historically an intra-state matter (but no longer).

Legislation

The NEM uses an “applied law” framework. The National Electricity Law (NEL) is a schedule to a law of South Australia. The other states, territories and Commonwealth then ‘apply’ this schedule through their own Acts as a law of their own jurisdiction. Changes to the NEL in SA automatically take effect in other jurisdictions.

Governance

The operation of this legal framework is agreed between the jurisdictions through the Australian Energy Market Agreement.

Regulatory architecture

- Large volume of regulation required to make the system work together, covering:
 - Market rules
 - Metrology
 - Monopoly network regulation
 - Access and connection to networks
 - (Through NERL:) Retail and distribution customer protection and contracts
- These are set out in subordinate Rules under the NEL
- To administer these, the AEMC exists as an independent statutory authority, guided by the national electricity objective.
- Enforcement and application of the rules is done by the AER.

National Electricity Objective

“The National Electricity Objective 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 price, quality, safety, reliability, and security of supply.”

Stages of industry structural development

- Stage 1 - Private & Municipal (1900 - 1940). Small scale generators and local area sale arrangements. Competitive challenge to gas lighting and coal motive power.

Stages of industry structural development

- Stage 1 - Private & Municipal (1900 - 1940). Small scale generators and local area sale arrangements. Competitive challenge to gas lighting and coal motive power.
- Stage 2 - State Monopoly (1940 - 1990). States nationalised generation from 1921 (Victoria) - 1950 (New South Wales). Development driven by pursuit of economies of scale in transmission & generation.

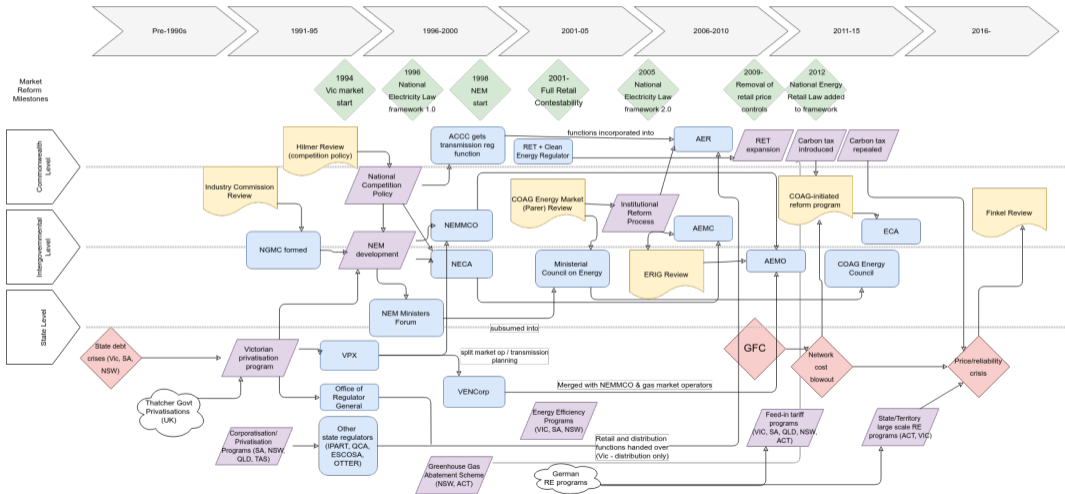
Stages of industry structural development

- Stage 1 - Private & Municipal (1900 - 1940). Small scale generators and local area sale arrangements. Competitive challenge to gas lighting and coal motive power.
- Stage 2 - State Monopoly (1940 - 1990). States nationalised generation from 1921 (Victoria) - 1950 (New South Wales). Development driven by pursuit of economies of scale in transmission & generation.
- Stage 3a - Early restructuring. (1992-98). Breakdown of returns to scale, Loy Yang & Eraring project problems. Influence of UK privatisations. Victorian market, SECV breakup and privatisation, NSW corporatisation.
- Stage 3b - NEM, National Competition Policy (1996 - 2004). Keating government push for comprehensive reform of economy. Reform state dependence on monopoly rents from state owned businesses. National access regime developed, and national competition payments.

Stages of industry structural development

- Stage 1 - Private & Municipal (1900 - 1940). Small scale generators and local area sale arrangements. Competitive challenge to gas lighting and coal motive power.
- Stage 2 - State Monopoly (1940 - 1990). States nationalised generation from 1921 (Victoria) - 1950 (New South Wales). Development driven by pursuit of economies of scale in transmission & generation.
- Stage 3a - Early restructuring. (1992-98). Breakdown of returns to scale, Loy Yang & Eraring project problems. Influence of UK privatisations. Victorian market, SECV breakup and privatisation, NSW corporatisation.
- Stage 3b - NEM, National Competition Policy (1996 - 2004). Keating government push for comprehensive reform of economy. Reform state dependence on monopoly rents from state owned businesses. National access regime developed, and national competition payments.
- Stage 4 - The AEMA era (2004 - Present). Move away from NCP-based regulatory framework. Vertical reintegration, breakdown in economies of scale, small scale generation, renewables and the problem of carbon pricing.

Institutional History



Theoretical perspective – punctuated equilibrium

- Derived from evolutionary perspectives on complex systems.
- Feedbacks:
 - Negative – tend to retard change, push systems back toward equilibrium when disturbed.
 - Positive – pressure toward change of state, pose existential challenge for the system as-is.
- Fitness landscape: selection environment that determines the criteria of success of systems.

Case study – NEM development

Why was the *status quo ante* so stable for about 40 years? Negative feedbacks:

- Accountability of state governments to electorates for utility supply.
- Dependence on monopoly rents from utilities for state budgets.
- Usefulness of utilities as agents of state development, community service obligations.
- Strong demand growth, increasing returns to scale in electricity infrastructure.
- Institutional and personal investments in status quo.
- General postwar mixed-economy economic doctrine. Lack of private capital for utilities.
- Difficulty of integrating third parties into grids. Economies of vertical integration.

Case study - NEM development

What changed to bring the NEM about? Positive feedbacks.

- Buildup of pressures – state debt, overbuilding, labour problems.
- Shift in possibilities – development of complex realtime IT systems. Allowed dis-integration of supply chain.
- Ideological shift – influence of neoliberal thought, emphasis on microeconomic reform.
- Alignment of interests – need for states to realise efficiencies by trading, Commonwealth interest in impact of energy sector on national economy.
- Shift in selection environment – increasing scale no longer generating the returns it used to.

Theoretical perspectives

- Regulatory federalism – protected autonomy of States will lead to adoption of regulatory policies which reflect local preferences.
- Diffusion of innovation – federations constitute discrete but linked policy communities, between which comparison is possible. Policy ideas will spread and be reproduced.

Case study – feed-in tariffs (FiTs)

- Begin in Europe in early 2000s – picked up as a lobbying goal by Australian renewable energy sector.
- Predecessor program at the Commonwealth level – solar grants from 2000.

Case study – feed-in tariffs (FiTs)

- Begin in Europe in early 2000s – picked up as a lobbying goal by Australian renewable energy sector.
- Predecessor program at the Commonwealth level – solar grants from 2000.
- Diffusion of FiTs (race to the top):
 - Victoria – from 2007
 - Queensland – from 2008
 - ACT – from 2009
 - South Australia – from 2010
 - New South Wales – from 2010
 - Western Australia – from 2010

Case study – feed-in tariffs (FiTs)

- Begin in Europe in early 2000s – picked up as a lobbying goal by Australian renewable energy sector.
- Predecessor program at the Commonwealth level – solar grants from 2000.
- Diffusion of FiTs (race to the top):
 - Victoria – from 2007
 - Queensland – from 2008
 - ACT – from 2009
 - South Australia – from 2010
 - New South Wales – from 2010
 - Western Australia – from 2010
- Commonwealth discouraging of the increase of subsidy, attempts to use COAG to enforce design principles for FiTs in 2008, fails.

Case study – feed-in tariffs (FiTs)

- Begin in Europe in early 2000s – picked up as a lobbying goal by Australian renewable energy sector.
- Predecessor program at the Commonwealth level – solar grants from 2000.
- Diffusion of FiTs (race to the top):
 - Victoria – from 2007
 - Queensland – from 2008
 - ACT – from 2009
 - South Australia – from 2010
 - New South Wales – from 2010
 - Western Australia – from 2010
- Commonwealth discouraging of the increase of subsidy, attempts to use COAG to enforce design principles for FiTs in 2008, fails.
- Attempt to develop a national FiT scheme through the National Energy Customer Framework (NECF) in around 2010, also fails.

Case study – feed-in tariffs (FiTs)

- Begin in Europe in early 2000s – picked up as a lobbying goal by Australian renewable energy sector.
- Predecessor program at the Commonwealth level – solar grants from 2000.
- Diffusion of FiTs (race to the top):
 - Victoria – from 2007
 - Queensland – from 2008
 - ACT – from 2009
 - South Australia – from 2010
 - New South Wales – from 2010
 - Western Australia – from 2010
- Commonwealth discouraging of the increase of subsidy, attempts to use COAG to enforce design principles for FiTs in 2008, fails.
- Attempt to develop a national FiT scheme through the National Energy Customer Framework (NECF) in around 2010, also fails.
- States pare back subsidy in schemes from 2012 as installations skyrocket, but schemes effectively institutionalised in some form at state level.

Theoretical perspective – Regime interlinkage

Reverse salients

“As technological systems expand, reverse salients develop. Reverse salients are components in the system that have fallen behind or are out of phase with the others.”
(Hughes 1987, p. 73)

- As Geels 2004 notes, in sociotechnical systems, sociotechnical regimes comprise of overlapping separate conceptual regimes.
- Change in one area requires changes in others, to address reverse salients.
- Those that are addressed lead to system evolution. Inability to address them leads eventually to system replacement.
- Notwithstanding the unilateralism of the FiT breakout, that process created reverse salients within the COAG regulatory framework that had to be addressed.

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).
- A particular reverse salient developed in that there was no regulatory framework governing the connection process and rights of connecting PV customers.

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).
- A particular reverse salient developed in that there was no regulatory framework governing the connection process and rights of connecting PV customers.
- The institutional reform program had committed to transferring distribution functions to the AER as part of the NECF.

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).
- A particular reverse salient developed in that there was no regulatory framework governing the connection process and rights of connecting PV customers.
- The institutional reform program had committed to transferring distribution functions to the AER as part of the NECF.
- Earlier Commonwealth policy (solar grants) had been addressed by industry voluntary code of practice (COPEG).

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).
- A particular reverse salient developed in that there was no regulatory framework governing the connection process and rights of connecting PV customers.
- The institutional reform program had committed to transferring distribution functions to the AER as part of the NECF.
- Earlier Commonwealth policy (solar grants) had been addressed by industry voluntary code of practice (COPEG).
- Early movement by Victoria resulted in local regulator issuing first regulatory guideline on embedded generation connections.

Case study – development of small customer/generator connections framework

- Changes to the financial system (subsidisation of solar PV) had implications for the infrastructural system (need to connect large numbers of PV panels); the IT system (need to address mass metering of FiT customers).
- A particular reverse salient developed in that there was no regulatory framework governing the connection process and rights of connecting PV customers.
- The institutional reform program had committed to transferring distribution functions to the AER as part of the NECF.
- Earlier Commonwealth policy (solar grants) had been addressed by industry voluntary code of practice (COPEG).
- Early movement by Victoria resulted in local regulator issuing first regulatory guideline on embedded generation connections.
- Confluence of state interests in facilitating local FiT uptake led to embedded generation being incorporated in the NECF, implemented 2012, based on COPEG, Vic guideline.

Lessons

- COAG is one layer of a three-stream energy policy process in Australia.

Lessons

- COAG is one layer of a three-stream energy policy process in Australia.
- Significant developments have happened within and through this layer, albeit triggered by confluences of interests and exogenous circumstances.

Lessons

- COAG is one layer of a three-stream energy policy process in Australia.
- Significant developments have happened within and through this layer, albeit triggered by confluences of interests and exogenous circumstances.
- It has not by any stretch of the imagination displaced or inhibited unilateral policy-making around discrete issues by either the Commonwealth or the states.

Lessons

- COAG is one layer of a three-stream energy policy process in Australia.
- Significant developments have happened within and through this layer, albeit triggered by confluences of interests and exogenous circumstances.
- It has not by any stretch of the imagination displaced or inhibited unilateral policy-making around discrete issues by either the Commonwealth or the states.
- Even where unilateral action is being taken, cooperative policy development is still undertaken, of necessity, to maintain the coherence of the COAG layer.

Bibliography

-  Berkhout, F., A. Smith, and A. Stirling (2004). "Socio-technological regimes and transition contexts". English. In: ed. by B. Elzen, F. W. Geels, and K. Green. *Transitions Towards Sustainability Through System Innovation*. Cheltenham, Edward Elgar, pp. 48–75. ISBN: 978-1-84376-683-4.
-  Geels, Frank W. (2004). "From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory". In: *Research Policy* 33.67, pp. 897–920. ISSN: 0048-7333. DOI: 10.1016/j.respol.2004.01.015. URL: <http://www.sciencedirect.com/science/article/pii/S0048733304000496> (visited on 04/14/2017).
-  Hughes, Thomas P et al. (1987). "The evolution of large technological systems". In: *The social construction of technological systems: New directions in the sociology and history of technology*, pp. 51–82.
-  Rip, Arie and Ren Kemp (1998). *Technological change*. Battelle Press.