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Our Power System Imbalance

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Key Points

- **Power system reliability is being diminished by the increasing entry of variable renewables, requiring greater intervention in electricity markets.**
- **Many politicians and climate activists cling to the hope that increasing renewables, accompanied by ‘firming technologies’ and additional transmission, will bring a high level of reliable, affordable and clean energy to the power system.**
- **This hope is largely misplaced – without maintaining a high level of dispatchable generation, from coal, gas, hydropower or nuclear, our power system will increasingly be unbalanced. Put another way, the higher we go with renewables, the more unreliable our power system may become.**

Diversity as The Overriding Policy Principle

Energy policy should, in the view of the author, be based on the overriding principle of diversity, not on ‘clean energy’ or ‘variable renewables’.

The Indo-Pacific is one of the world’s fastest growing regions and is the consumer of around half of global energy. The Australian Government is to host an ‘Indo-Pacific Clean Energy Supply Forum’ in Sydney in July 2022. Its essential concern is how to negotiate the ‘clean energy transition’ by the development and deployment of ‘reliable and low cost clean energy technologies’ and the creation of secure and diverse ‘clean energy supply chains’, not just for the benefit of the region but for the achievement of global climate objectives.


It is nonetheless plain that power system reliability is being diminished by the increasing entry of variable renewables, requiring greater intervention in electricity markets to maintain reliability.

Some politicians and climate activists cling to the hope that increasing renewables, aided by ‘firming technologies’ and additional transmission, will deliver a high level of reliable, affordable and clean energy to the power system. In the author’s view, this hope is largely misplaced – without maintaining a high level of dispatchable generation, from coal, gas, hydropower or nuclear, our power system will increasingly be unbalanced.

This paper follows a recent review by EPIA of the geopolitics of what has been called the ‘Energy Transition’, that is, the transition of the global energy economy to one characterised by ‘net zero’ greenhouse gas emissions. In our review of the geopolitics, we suggested that energy trade in the region could be affected, for better or worse, as Australia and its energy partners worked their way through contemporary geopolitical issues. We emphasised that Australian energy policy should be based on the overriding principle of diversity: diversity of resources, diversity of technologies and diversity of solutions.¹

The most recent controversy attracting public attention has been the push by advocates of variable renewable energy (VRE) technologies to push out dispatchable technologies, such

¹ Robert Pritchard, “*Geopolitics of the Energy Transition After the Ukraine Crisis*”, Energy Policy Institute of Australia, Public Policy Paper 1/2022, April, 2022.



as coal and gas. The problem is however that clean energy needs ‘firming technologies’ to overcome its susceptibility to interruption.

For over a decade, EPIA has emphasised the criticality of dispatchable generation for power system reliability and has warned of the increasing need for market interventions to maintain reliable supply.²

In addition, Australia’s longstanding moratorium on nuclear energy has reduced Australia’s dispatchable technology options. The lifting of the moratorium has been resisted on political grounds despite the development of modern technology such as small modular reactors (SMRs).

Russia Lifts Energy Supply Risk

Oil has always been a global commodity, although political factors have always posed a risk to uninterrupted supply. Russia’s appalling invasion of Ukraine in February 2022 has lifted global supply risk to the highest level since World War II.


Over recent years, policymakers may have hoped that more efficient functioning of energy markets, boosted by subsidies for new infrastructure and new ‘green energy’ energy technologies, would deliver a high level of reliable, affordable and clean energy supply.

These hopes have not been fully realised.

The ‘Seven Sisters’ Led the Way After WWII

After World War II, Western economies had to be rebuilt. To a large degree, the rebuilding was financed by a plentiful supply of oil from the Middle East at static, sometimes falling, prices. Oil was a global commodity.

² Robert Pritchard, *Finding the Right Balance: Power System Flexibility in an Era of Decarbonisation: An Annotated Bibliography*, Energy Policy Institute of Australia, Public Policy Paper 3/2019.



From the earliest days, the international oil companies known as the Seven Sisters led the way in pursuing oil concessions from host countries and dominating international oil trade.

The Cold War

The start of the Cold War in 1947 was symbolised by the Soviet Union's construction of the Berlin Wall. The end in 1989 was symbolised by its demolition.

Western access to oil supplies was one of the premier foreign policy interests throughout the Cold War years. Western and Eastern Europe were then worlds apart—so far that energy economists separated discussion of the oil industry into the communist and non-communist markets.

In 1960, sagging oil prices gave rise to the formation of OPEC. For years, however, OPEC members could never agree on the reductions in production which would have brought about increases in price.

The nationalisation of BP's interests in Libya in 1971 led to the 1973 'oil shock' and to oil becoming a political weapon. It damaged trust in commercial relationships. The oil shock led to the creation of the IEA in 1974, with its broad mandate on energy security and policy co-operation. This included an emergency response mechanism to respond to disruptions in supply.


The End of the Cold War and the Acceleration of FDI

The Cold War came to an end in 1989. Most of the ideological and political barriers between the communist and non-communist systems began to be removed.

Many countries became both host and home countries – 'takers' as well as 'makers' of FDI. FDI was typically accompanied by technology and operating and marketing know-how.

Gas Markets

Like oil, gas also evolved into a global commodity, with pipelines linking production to markets in adjacent countries and the expansion of LNG trade. Global markets were supported by cross-border contracting and financing arrangements and by direct



investment in upstream facilities. In 2011, the International Energy Agency published an important report on the 'Golden Age' of gas.³

Climate Change and Greenhouse Gas Emissions

In the 1990s, climate change and greenhouse gas emissions moved to centre stage.

The international community responded with the UN Framework Convention on Climate Change in 1992. This was followed in 1997 by the Kyoto Protocol which for the first time specified emission reduction commitments for individual countries.

Transition Technologies

Subsidies for transition technologies and renewable energy developments started to be commonplace in the 2000s. The International Renewable Energy Agency (IRENA) was formed in 2009.


Renewable energy technologies continue to attract subsidies but there is greatly increased controversy over the diversion of capital from traditional technologies. It has, for example, recently been claimed:

'Over the last decade billions of dollars have been diverted from traditional energy investment to so-called 'transition technologies', notably wind, solar, and lithium-ion-powered electric vehicles. These technologies represent the worst of all possible worlds: not only do they generate inferior economic returns, but they are unable to address our carbon reduction needs.

... we believe the huge investments made in renewables over the last decade are responsible for the energy crisis that is gripping Europe today.

... To maintain our standard of surplus and allow for growth, we must adopt an energy system with a superior EROEI (Energy Return on Energy Invested). Nuclear Energy enjoys an EROEI of 100:1, three times better than hydrocarbons and thirty times better than renewables. Moreover, it has extremely low carbon intensity. A

³ International Energy Agency, "Are We Entering the Golden Age of Gas?", Paris, France, 2011.



widespread move towards nuclear power could be as valuable to humanity as biomass to coal was in the sixteenth century.

... Renewables promise much, but because of the terrible energy efficiency, they will never be able to accomplish their goals of supplying cheap, abundant, and carbon-free power to a world that still wishes to grow.’⁴

Policy Uncertainty in Australia

Australia has struggled to articulate a clear policy on energy and climate change. At the end of 2018, its Energy Security Board said:

‘Uncertainty around the integration of energy and climate policy has reduced policy confidence in the NEM and distorted generation investment and disinvestment decisions.’


The board acknowledged that government schemes had encouraged investment in renewables irrespective of demand for electricity and price signals from the spot and contract markets. The link between the physical needs of a reliable power system, and the economic incentives for market participants to keep energy costs as low as possible, had been broken.

In September 2020, the government committed itself to a low-emissions technology (LET) policy. Each year, it invites applications for subsidies.

Conclusion: Diversity and Technology Neutrality

Over the last decade, in the electricity sector, there has been a concerted push towards renewable energy technologies, mainly towards non-dispatchable wind and solar power. This has required costly investment in storage systems and transmission facilities.

⁴ Goehring & Rozencwajg Associates, *The Distortions of Cheap Energy*, New York, February 23rd 2022.



All energy forms, including renewables, fossil fuels and nuclear power, have contributions to make to the global goal of net zero by 2050.

Diversity and vertical integration remain effective strategies for underpinning the delivery of energy, especially where delivery has to be made across international borders. Host governments just need to provide a safe place to invest.

About the Author

Robert Pritchard is Executive Director of the Energy Policy Institute of Australia.

Robert has over 40 years' experience as a lawyer and adviser to industry, governments and organisations on energy projects and policies, both in Australia and overseas, and as a director of companies in the energy sector. This includes serving as chairman of the St Baker Energy Innovation Fund and SMR Nuclear Technology Pty Ltd. Robert was the first chairman of the Energy Law Section of the International Bar Association. He served for nine years on the Finance Committee of the World Energy Council. He is a former member of the CSIRO Energy Transformed Flagship. He is a consultant to the Piper Alderman law firm in Sydney.