MONASH ENERGY INSTITUTE

MONASH BUSINESS SCHOOL

Focussing on a timely energy transition

Dr Ron Ben-David

Professorial Fellow – Monash Business School

ron.ben-david@monash.edu

EECON 2023, Melbourne, 16 November 2023

Introduction: Will we avoid an energy dystopia?

We hear a lot these days about the challenges of the energy transition – the need to replace exiting fossil-fuel generators with renewable generation. We hear a lot about the need to decarbonise our energy grid. We have various targets from 2030 through to 2050. We hear a lot about distributed energy resources and how they are integrated into the grid, and how these assets can be deployed to lower the overall cost of electricity.

So let me invite you to think about the energy system in 2030 or maybe 2035. What might the energy market look like in this not-too-distant future? Here are a few ideas.

- Despite all the investment in transmission infrastructure over the past few years, curtailment rates for solar and wind plants remains broadly the same as in 2023. Or perhaps conversely, there has been an insufficient acceleration of investment in transmission infrastructure despite solar and wind plants 'spilling' so much of their output.

- Most of the baseload thermal power generation on the east coast is now owned and operated by either a state or federal government. Or alternatively, these power plants are now being propped up by secret funding deals hidden behind the wall of commercial-in-confidence. In any event, billions of taxpayer dollars are now keeping these plants in operation.

- Investment in grid-scale batteries has topped-out well below expectations and now falling well short of system requirements.

- Despite billions of taxpayer and consumer dollars invested in building the hydrogen economy, not a single hydrogen-powered kilowatt or megajoule has been delivered to consumers. All the hydrogen produced in Australia is going to exports. Questions are being asked about why there's no hydrogen reservation policy.

- Consumers are confused and furious. They don't understand why, depending on which side of the street they live, they might find themselves either being paid for their electricity exports or having to pay to export their surplus electricity. Despite all assurances that the price differentials reflect efficient price signals, consumers see such arrangements as grossly unfair and they're calling for political intervention.

- Version 426 of the National Electricity Rules has just been published at almost 5,000 pages, and the AER has had to expand to almost 750 staff to administer these sweeping rules.

And what do you think the hottest selling electrical appliance in this dystopian view of the not too distant future might be?

- Well, believe it or not, it's a 6.5 kW diesel-powered, inverter-enabled generator. It is particularly popular among owners of electric vehicles. The gentle whir of these super-efficient generators can be heard on most suburban streets during the early evening hours.

And on top of all of that:

- There is a huge backlog in the courts due to an avalanche of cases initiated by neighbours suing each other over access to sunlight, community batteries and to limited network capacity.

To be clear, I am not predicting these outcomes. They're scenarios not predictions. The reason for highlighting them is to emphasise that they are all possible outcomes if we don't get the balance right between our reliance on markets on the one hand, and regulation and governments on the other hand.

Right now, I haven't come across anyone who has confidence in current arrangements.

So how did we get here?

A brief history of energy reform

Next month, it will be 25 years since the National Electricity Market (the NEM) came into existence as part of a project that looked to transform the entire Australian economy. That project took on various names, like: micro-economic reform, national competition policy, the Hilmer reforms, economic rationalism, market liberalisation, and the neo-classical turn.

Back then economics had become the *lingua franca* of public policy. The economic reformers had answers to questions the rest of us didn't even know existed. They had scaled the summit of economic policy and attained a state of enlightenment. All the problems of policy making had been solved. This was Fukiyama's "end of history" in action.

The high-tide, the crowning moment, of this reform agenda – the culmination of economic policy history – the shining light that could never be outshone – was the creation of the National Electricity Market (the NEM). The NEM would serve as the beacon to which all heads turned as they contemplated reforms in other parts of the economy.

Over the next few years, institutions were put in place to lock in these reforms under the all encompassing National Electricity Objective (the NEO), with its exclusive focus on efficiency. The NEO requires all the national energy regulators to promote efficient investment in, and operation and use of, the energy system. While this objective explains *why* the regulators exists, it doesn't tell them *how* to exist. It doesn't tell them *how* they should think about problems and their solutions.

To fill that gap, the regulators developed a set of, what I call, "traditions" – that is, a set of "beliefs, customs and practices" to help them interpret and solve the problems they confront. The following table provides ten examples of the traditional beliefs that I'm talking about.

Ten traditional regulatory beliefs

1. The economics of energy markets is not fundamentally unique.
2. Consumers exercising informed choice impose discipline on the entire supply chain.
3. Specific consumer protections are justified only to the extent that energy is an essential service.
4. The system for producing and delivering energy is uniquely divisible into non-contestable and contestable services.
5. Provision of non-contestable services requires diligent regulatory institutions targeting efficient costs and cost-reflective prices (tariffs).
6. Competitive institutions (markets) deliver contestable services most efficiently.
7. All parties respond rationally to economic incentives.
8. Settling supply and demand between many sellers and many buyers produces [the most] efficient prices.
9. Efficient price signals are the optimal coordination mechanism for investment in, and operation and use of the energy system (including investments by consumers).
10. Government and regulatory interventions in the energy market generally distort price signals.

I'd argue that almost every, if not *every,* regulatory decision over the past 25 years can trace its way back to some combination of these traditional beliefs.

But what made it possible for the regulators to adopt these beliefs?

Stability then. Something else now.

I've argued that these traditional beliefs were made possible by the stability of the electricity system back in the 1990s and early 2000s.

For the previous 70-80 years, all the difficult challenges of running an electricity system had been solved in large, vertically integrated, state-owned monopolies. The system was effectively in steady-state. Inputs and outputs, and production and delivery technologies were known with near-certainty. I've highlighted some of the stable, steady-state condition in the text box below.

Steady state conditions supporting the establishment of the NEM

1. Stable, predictable and manageable demand growth
2. Stable operational and management technologies benefiting from incremental (and capturable) efficiency gains over time
3. Operational and investment risk profiles that do not vary significantly between regulatory decisions, and which are well-understood by investors, consumers and regulators
4. Capital is available for investment in non-contestable services at an objectively determinable price (rate of return)
5. Network costs, especially their long-run marginal costs, are calculated using agreed methodologies and can be used to determine prices; and
6. The overall stability of the energy system means its oversight can be removed from political considerations and left to technical specialists to regulate.

The energy regulators and, in fact, the entire body of regulation set up 'back in the day' were the product of these prevailing conditions. In that sense, the regulators and the entire regulatory framework can be said to have been created ***of*** these conditions, ***by*** these conditions, and ***for*** these conditions. Had these conditions not existed, the regulators we know today would not have been established. But therein lies a problem.

The energy transition now underway is dismantling these conditions, sometimes abruptly. Stability and linearity are being replaced by uncertainty and complexity. While uncertainty begins in the physical systems of production, storage, delivery and consumption, that uncertainty unavoidably invades the market-, regulatory and governance arrangements which sit atop those physical systems.

Of course, our regulators recognise this problem but their response to these uncertainties has been to try to corral them using the rules, methods, processes and traditions that were designed for a system in steady-state. As a result, the regulatory framework is becoming exponentially more complicated. The national electricity rules alone have doubled in length since 2006 (to over 1,800 pages). I predict, they will more than double again by the early 2030s.

I have written extensively about my concerns about how these arrangements are now at risk of failure – how they might not be able to deliver a timely energy transition. That's why I began my remarks today by describing what failure might look like.

The energy transition is now swirling around the energy market, the regulators, and policymakers. The centrifugal forces unleashed by the energy transition are tearing apart the steady-state conditions of yesteryear and with that, any clear understanding about the respective roles of markets, regulators and governments.

So, where to next?

Where to next?

I have tried to provide some ways forward in a series of papers I delivered between June and September this year. I've posted all those papers on LinkedIn and don't have time to go into detail today. But in finishing my remarks today, I'll highlight just one urgent reform that I have written about.

As I mentioned a few moments ago, for the past 25 years, the NEO has narrowly focussed regulators on the pursuit of efficiency.

Back in the 1990s and 2000s, pursuing efficiency was a logical objective to assign to independent economic regulators. As I've already noted, the system was broadly in steady-state back then. Under those circumstances, there was, actually, little else for regulators to do *other than* focus on efficiency.

But now, the energy transition means the energy system's inputs and outputs are far from clear. It is no longer certain or predictable how and where electricity will be produced, by whom and for whom. How it will be used, stored and controlled is similarly uncertain. Whether contestability delivers competition, and whether competition delivers efficient outcomes in this highly uncertain environment can no longer be simply assumed.

I believe there is an urgent need to step back from a very narrow focus on efficiency.

While, of course, no-one would suggest efficiency should be discarded as an objective, the focus on efficiency must now be tempered by an *explicit* time variable. In other words, decision-making must be able to trade-off efficiency if it means a more timely achievement of transition-focussed policy targets. Such decisions will involve difficult trade-offs – trade-offs that may be beyond the regulators to make.

If governments consider it is beyond the remit of independent regulators to make these difficult decisions, then they, governments, need to step in and relieve the regulators of that responsibility. Governments need to step in and make the difficult decisions that will ensure the greatest likelihood of a successful and timely transition.

What does all this mean for you, the engineering community?

Conclusion: Of engineers and economists

I believe there are now three high level questions that must guide decision-making in pursuit of a timely energy transition. The three core questions are shown below.

Three core questions for policymakers

1. Does the technology exist at a given coordination point in the energy system for solving all the coordination problems at that point?
2. Do the regulators know how to design an efficient market mechanism (or incentive scheme) to promote the required coordination at each of these points?
3. Are the assumptions underpinning the regulators' proposed market-based solution reasonable and verifiable?

If, at any given coordination point in the electricity system, the answer to one-or-more of these questions is 'no', then responsibility for solving the coordination problem at that point (and maybe beyond) should shift to governments to coordinate through: determinative regulation, centralised procurement, direct ownership and provision, or any other approach they consider appropriate. Each government would be responsible for implementing the arrangements most likely to succeed in its jurisdiction. Yes. This will see a narrower role for markets (and regulators) and greater responsibility placed on governments (and engineers) for shepherding forth the energy transition.

It is hard to see what alternative options remain if timely progress towards an energy transition is the objective.

Needless to say, this approach will result in some (or much?) re-balkanisation of the energy system's governance. But in reality, this is already happening. Each state is now pursuing its own energy transition policy. Accepting and advancing a confederated approach is the only realistic way forward for now. So be it. Let's embrace a competition of ideas and invention among the states – at least for the foreseeable future.

*

This is not the vision of the economic reformers of the 1990s or their torchbearers who still carry the flame of those long ago reforms. It flies in the face of the regulatory beliefs and traditions that have dominated the oversight of the energy system since those times. But those traditional perspectives emerged at a very different time; and under very different conditions. Those conditions no longer exist. Time has moved on. So must we.

— END —