

FH Gruen lecture

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Economic Ideas and Policy Outcomes: Applications to Climate and Energy

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Fred Gruen signed up as Professor of Economics in the ANU's Research School of Social Sciences in 1972, at the same time that I joined the Research School of Pacific and Asian Studies as a Research Fellow. Fred spent the next few years as a Consultant to Prime Minister Gough Whitlam. My work was initially based at the ANU's New Guinea Research Unit in Port Moresby. Two years or so later, I was seconded from the ANU by Papua New Guinea's first national Secretary for Treasury and Finance, Mekere Morauta, to help him build the economic policies and institutions for Independence.

From Port Moresby I kept close contact with the economists in the Institute at the ANU, presenting a number of seminars on issues I was thinking through in Port Moresby. I recall John Crawford chairing one public seminar adapting the Swan model of internal and external balance to an economy with a predominant subsistence or non-market sector, and another presenting Anthony Clunies Ross' and my paper on the Resource Rent Tax. Fred was present and engaged on these occasions.

So was Ann Gruen. She had a strong interest in Papua New Guinea development. I learned much later that Fred's first visit to Papua New Guinea provided his first scholarly contact with Austro-Hungarian economics and also with the top echelons of wartime (and subsequently postwar) Australian social democratic economic thought, while igniting a long, happy and fruitful marriage.

I'll retell the New Guinea story because it is Fred's first point of contact with the two intellectual traditions that I discuss in this lecture. Fred joined the Australian Army after his detention on the Hay Plains as a refugee from an enemy country. He was passing north through Brisbane and sought a copy of Frederick Hayek's "Road to Serfdom". The helpful librarian said that she did not have it; but her cousin was reading it and she would see what she could arrange. So Fred was introduced to Ann and Austro-Hungarian economics at the same time. Travelling on to Lae, now occupied by inactive Australian forces, Fred provided lectures to servicemen. Nugget Coombs, visiting as Secretary of the Department of Postwar Reconstruction was at the back of one.

The ANU was an outcome of the Curtin and Chifley Governments' Department of Postwar Reconstruction. Stuart Macintyre's compelling history tells how a group of young men, believing that knowledge can guide economic policy to better outcomes for ordinary people, shaped Australian policies and institutions through the second half of the twentieth century. Curtin and Chifley, and Minister for Postwar Reconstruction John Dedman, were committed to building a different Australia after the war, free of high unemployment and poverty. Coombs led thought about postwar reconstruction, and had the administrative skills to make good new ideas work in practice. His Director of Research was John Crawford; recruited from the NSW Government's Agriculture Department and the Rural Bank of NSW.

The ANU was established to provide knowledge for building sound economic and independent foreign policy. The new University would have global standing in research, and reverse the brain drain to the UK and US. The three most influential figures in shaping the early approach to policy-related economic analysis at the new ANU were deeply steeped in an Australian version of the established North Atlantic liberal Social Democratic tradition. Beyond the work on foundation of the ANU, Coombs was Chancellor with active interest in the University's work for eight years and an active visiting fellow in the Centre for Resource and Environmental Studies for twenty one. Crawford was inaugural Director and Professor of Economics in the Research School of Pacific Studies and then Vice Chancellor, Chancellor and Visiting Fellow in the Economics Department from 1960 until his death in 1984. The third, Trevor Swan, had been recruited into Coombs' Department of Postwar Reconstruction by its Director of Research John Crawford, and joined the ANU as the foundation Professor of Economics in the Research School of Social Science in 1952. Coombs gave me my PhD and Crawford was on the supervisory committee of two chaired by Peter Drysdale.

Swan and the Department made brilliant contributions over the next half dozen years or so, but lost dynamism and impact. Fred Gruen took over in late 1975, and Social Sciences Economics again became an important contributor to Australian economic policy discussion.

In a poignant coda to this story, Fred Gruen and Nugget Coombs died on the same day in 1998.

Ludwig von Mises was the father of Austro-Hungarian thought in the North Atlantic. Hayek, his student, was the most influential of several emigres from Germanic Central Europe who reshaped UK and US ideas about economic policy in the second half of the twentieth century. Von Mises, Hayek and Friedman were all major figures in the establishment and influence of the Mont Pelerin Society, which elevated the Austro-Hungarian model of untrammelled free markets, and minimal Government intervention in the economy except to forcefully uphold private contracts and property rights. Friedman, born in the US of migrant parents recently from Austro-Hungary, was close to but not altogether at one with the older Professors. Joseph Schumpeter was at the University of Vienna with von Mises and Hayek after WWI. He spent a brief time as Finance Minister in the postwar Socialist Government, struggling with the legacy of debt from war and reparations. He spent more time close to owners of substantial financial businesses in Vienna. Schumpeter contributed profound insights into capitalist development. He favoured a capitalist market system with minimal intervention by Government—to the point of opposing regulatory measures to increase competition. He was pessimistic about its survival in a democracy.

Austro-Hungarian thought became immensely influential in Anglo-American thinking and policy in the 1980s. Its influence reached its zenith in the Reagan Presidency 1980-88, but has remained important. Martin Wolf from the Financial Times has noted that the brilliantly successful approach to economic policy of 1946-70, with sustained strong growth in productivity, output and living standards, low unemployment and moderate inflation, was easily pushed aside in the 1970s when it ran into what now seem small problems. On the other hand, its successor, the Austro-Hungarian approach, has shown great tenacity through the stagnation of living standards of ordinary US and UK citizens and recurring financial crises. Wolf's explanation of the paradox is that the successful mid-century consensus in mainstream economics, while favourable for business in aggregate, challenged and damaged vested interests on important matters. The Austro-Hungarian approach in practice was unambiguously supportive of vested business interests.

Austro-Hungarian economic thought always contained doubts about democracy, back to its origins under Emperor Franz Joseph. Democratic pressures are likely to lead to interventions that affect the operations of a market economy. It kept a place for suspension of democracy while rules are established to block future interventions. Such was Friedman's explanation of his association with the Pinochet regime in Chile. It has appeared in critiques of contemporary US political economy close to former President Donald Trump.

Alerted by a Newscorp columnist's sympathetic reference to Carl Schmidt's political philosophy, I took time over Christmas 2021 to re-read his "The Crisis of Parliamentary Democracy". In Schmidt's view, Representative Democracy was useful in its place. But there were times when resetting power and constitutional arrangements by a strong leader was necessary for government to work effectively. Schmidt was appreciated by Nazi leaders and reciprocated, but withdrew his appreciation when Nazi rule was leading to national ruin.

Austro-Hungarian thought makes valid points. Go too far from market exchange and large problems of economic efficiency arise. Its big contribution to North Atlantic economic thought was as antidote to uncritical support for central planning in the Soviet style during and immediately after the second world war. The Austro-Hungarians were not concerned that untrammelled market exchange leaves behind those who, out of bad luck, or low ambition or effort, or poor genetic or cultural or financial inheritance, do badly in market competition. This leads to extreme inequality and generates pressures for intervention that challenge property rights and distort resource allocation. These pressures must be resisted, if necessary by illiberal means.

These Austro-Hungarian positions on inequality had parallels in nineteenth century British thought. In the English-speaking countries, they had gradually been leavened by acceptance of the advantages of democracy, including in releasing pressure for revolutionary change.

The market fundamentalism of the Austro-Hungarians had another weakness. It was blind to the observed reality that sustained strong economic growth is more likely with effective government provision of public goods and correction for market failure.

Mainstream Anglo-American thought through the middle decades of the twentieth century recognised the immense advantages of market exchange in goods and services in areas of economic activity in which competition could be effective, alongside efficient fiscal or regulatory corrections for external costs and benefits of private decisions, provision of public goods where appropriate, and interventions to correct extremes of inequality. Economic growth was strongest in practice in an optimality zone, with neither untrammelled free markets, nor indiscriminate heavy state intervention. Knowledge and analysis could inform policy about the optimality zone.

Fred was part of the succeeding generation of leaders in economic thought in ANU's Institute of Advanced Studies. Over the decade or so before his retirement in 1986 he was one of three refugees from Germanic Central Europe who were influential in extending and strengthening the liberal social democratic tradition of economics at the ANU. Far from challenging and overthrowing the successful intellectual tradition into which they were welcomed, they refreshed and extended it. The contrast with the Central European emigres to the North Atlantic is sharp.

Fred was from Vienna, the glittering artistic and intellectual capital of central and eastern Europe, and maybe of the world. Heinz Arndt and Max Corden both were young children in the culturally German city of Breslau, now part of Poland. Different refugee experiences took them through England to Australia and then the young ANU.

Max saw Fred as having the poise and confidence of a citizen of Vienna. The three were sometimes together on particular issues and sometimes opposed. Heinz was an active supporter of Chifley's and Coombs' proposals to nationalise the private commercial banks in 1949, and then the most prolific author explaining how the establishment of a central bank with Coombs as Governor served the same purpose well enough. He moved across the Australian political divide without abandoning fundamental perspectives. Max remained a committed liberal social democrat, at some times supporting and at others opposing current fashions in political economic thought from a well-anchored centrist position. Fred became more actively engaged in directly advising Labor Governments, and a steady defender of centrist balance against challenge from the simplicity both of market fundamentalism and neo-Marxism. They were all defenders and valuable contributors to the successful Australian liberal social democratic tradition that began with the Chifley and Curtin

Governments, was maintained by Menzies, survived through Whitlam and Fraser and reached its apotheosis with the Hawke and Keating Governments.

In his graduate coursework at Chicago, Fred attended lectures by Hayek and Friedman. We know from Fred's life's work that he was able to pick out the grain in Hayek and his Austro-Hungarian colleagues and leave the chaff. He argued the case for markets against neo-Marxist challenge at Monash in the late 1960s and early 1970s. He was a participant in the correction of the Curtin-Chifley-Menzies underutilisation of international markets—most importantly in advocacy before and after the event of the Whitlam Government's tariff cut in 1973. He wrote about aboriginal disadvantage in 1966, favouring equal pay as a right, and increased education and training as a means of making it work. He contributed to the Hawke Government's enhancement of equity in taxation and social security in the mid-1980s. He promoted informed discussion of policy and a large role for knowledge and analysis in the policy-making process. He cautioned against over-simplification of complex issues which lends itself to extreme solutions. He helped to maintain liberal social democratic traditions in Australia when they were giving way to Austro-Hungarian simplicity in our great and powerful English-speaking friends.

Liberal social democratic traditions have come under stress in Australia in the twenty first century. The recession of 1990-91, a mistake, provided opportunity for criticism of the Hawke reforms, as if they were echoes of developments in the US and the UK. The ALP in opposition chose not to own them for a critical decade or so. This allowed other traditions to claim credit for the remarkable period of broadly based economic prosperity that followed, in the longest period of economic growth unbroken by recession in any developed country ever. Misunderstanding of the success supported neglect of judicious public investment in public goods, correction of market imperfections and measures to secure equitable distribution of incomes and services.

Australia went too far in an Austro-Hungarian direction. We sought to introduce market exchange into supply of public goods. We confused doing what business wants with supporting a large role for markets in the economy. We downgraded the role of knowledge and analysis in policy-making, and elevated that of vested interests. Productivity growth collapsed, from the highest in the developed world in the 1990s to close to the lowest in the seven years before the pandemic. We entered the Dog Days that I anticipated in 2013.

Nowhere was the change more consequential than in climate and energy policy. The remainder of this lecture focusses on that.

This story intersects with Fred's early life in Australia. Survivors and some descendants of refugees who were delivered to Australia by the Dunera in 1940 had a 70th anniversary reunion on the Hay Plains in 2010. Nick Stern, Professor at the London School of Economics and President of the Royal Society, was passing through Canberra on his way to remembering his Dad's experience of our country. I had been spending some time with the two independent members of the House of Representatives who were in the process of deciding whether Tony Abbott or Julia Gillard should be the Prime Minister of Australia. They wanted the new Government to move the country forward on climate change. Nick joined me one day. Most of the institutions and policies that have taken us forward on the climate and energy transition since 2010 were established in that Parliamentary term. One late gift of the Dunera boys.

The timing of the election of the Albanese Government has haunting parallels with that of the Scullin Labor Government in 1929. Scullin won an overwhelming majority in elections on October 12. The Cabinet was sworn in on October 22. October 24 saw the Black Thursday sell-off on the New York Stock Exchange that heralded the start of the Great Depression.

The energy crisis that hit the new Government in its first days has the potential severely to disrupt the economic welfare of most Australians. This comes on top of the stagnation in real wages and living standards through the Dog Days 2013-19 and the pressures of the pandemic recession. Poor understanding of and reaction to the crisis could knock Australian decarbonisation and the building of the low carbon Superpower off course and undermine the new Government.

The biggest element in this prospective outcome is the increase in Australian electricity and gas prices. These had their immediate origins in the higher global gas and coal prices that followed the Russian invasion of Ukraine, finding their ways into Australian prices over the following months. If the high international prices persist and price-forming institutional and fiscal arrangements are left exactly as they were when the Government was elected, several percent of Australian household income will be transferred to producers of gas and coal over the three years 2022-25. The inflationary effects of the fossil energy price increases contribute to forces driving Reserve Bank increases in interest rates. Falling household real incomes and higher interest rates introduce risks of Australia moving into its second recession in three years.

The general election was on May 21. The Minister for Energy and Climate Change, Chris Bowen and most of the Cabinet were sworn in on June 1. At the Yarralumla ceremony, the

new Minister was receiving text messages from his office and new Department about the energy crisis. Wholesale gas prices were at times thousands of a percent higher than on average in the preceding year. Together with high coal prices, these lifted wholesale electricity prices far higher than ever before.

On May 30, the Queensland cumulated gas price threshold over 7 days (May 23-30) exceeded the extremely high levels that triggered a price cap of \$40 per GJ under the market rules—several hundred percent higher than in the previous year. On June 7, the price cap on gas was extended throughout eastern Australia.

Wholesale electricity prices through the National Electricity Market (NEM) were several hundred percent higher than on average through any of the immediately preceding years. On June 12, the cumulated electricity price threshold in Queensland over 7 days (June 5-12) exceeded the extremely high level that trigger a \$300 per MWh price cap under the NEM rules. Two days later, price caps were imposed throughout the NEM.

At the capped gas and high coal prices, many generators could not operate profitably at the regulated maximum electricity price. The rules provided for generators to be compensated for losses in these circumstances. There was uncertainty about how the compensation would work. Generators began withdrawing from the market. Anxieties developed about shortfalls leading to blackouts. The Australian Energy Market Operator (AEMO) began directing generators to supply the market. Direction attracted more certain compensation and was favoured. More generators withdrew from the market, awaiting direction from AEMO. On June 15 it declared the market “impossible to operate” and for the first time since the establishment of the NEM in 1998 suspended trade. Normal operation of the market was tentatively restored on June 23 without the wholesale electricity price cap and confirmed on June 24. Average prices remained far above any previous experience.

You have heard of the perfect storm driving the crisis of Autumn 2022. The unusual weather gave way to the usual cold in late June. The rate of breakdowns returned to expectations from an ageing fleet. Mines ceased to be affected by floods. Extraordinarily high electricity prices remained.

The full pass-through of international into Australian power and gas prices will take at least two years, as households and businesses come off old and enter new contracts, and regulatory agencies take account of these lags in their pricing decisions. If electricity prices hold for the next two years at the forward prices set by the market for the next year, then by July 2024 we can expect household electricity bills to double. Price increases for gas and electricity will pass through to business users more quickly.

Average household usage of grid-sourced electricity in NSW is about 5.5 MWh per annum, the increase in wholesale prices from \$60 to the June forward price of about \$250 alone would increase average NSW household electricity bills by about \$1000 per annum by 2025. The increase would be several hundred dollars more with normal mark-ups. Wholesale gas prices have gone up proportionately more than electricity. The average Australian household spends a bit more than a third as much on gas as on electricity. Wholesale prices represent a higher proportion of household costs for gas than for electricity. The increase in average household expenditure on gas and electricity would be around \$2,000. The effects of higher electricity, coal and gas prices on business costs that are passed on to consumers are on top of that. The total increase in the average household's costs might be around \$3,000. That is a 3% of mean weekly household income of a bit over \$100,000 or 5% of disposable income of around \$60,000. The proportions are higher for people on lower incomes. Direct and indirect increases in prices from higher petrol and diesel costs from the Ukraine war are on top of that. So are price increases for other goods in these inflationary times. We are Austro-Hungarian if we think that such changes are inconsequential.

The Economic Security Board advised Energy Ministers that the solution was the Capacity Mechanism that had been developed for the previous Government. It was premised on an ideal of technological neutrality—that more carbon emissions are as good as less. This was one of the mantras of resistance to action on climate change in the Climate Wars.

What is happening is incomprehensible without knowledge of how electricity prices are determined in the NEM.

There are five regions, corresponding to all states except WA and with the ACT part of NSW. Interconnection allows movement of power in response to price differentials, but insufficient to equalise prices across the regions. Large price disparities can persist.

Retailers and users of power in each state offer to purchase quantities of power at specified prices for each 5 minute interval. The price is set so that the sum of offers to buy at or above that price equals the sum of offers to sell at or below that price.

I will now tell a stylised story of how prices are set through the interaction of supply of power from different technologies with total demand. I sacrifice some complexity for clarity.

There are three types of power generation. One is variable renewables—solar and wind. Most of the cost of these is borne at the beginning. Once the plant is in place, costs are no higher if the generator is delivering power to the network than if it is not. Indeed, total costs are lower if power is delivered. So solar and wind generators bid into the market at a price near or below zero.

Coal power has substantial operating as well as capital costs. The main operating cost is buying coal. If the coal is unsuitable for export, production costs determine the price. If exportable, the international price determines the cost to domestic generators.

Gas power under contemporary conditions in eastern Australia has lower capital and higher operating costs than coal generation.

If there is enough solar and wind to meet demand, wholesale power prices are near or below zero. This now happens frequently in the regions with largest renewable energy capacity, especially SA.

If there is not enough solar and wind generation to meet demand in a region in some period, price is set by the next lowest-cost source of power. This is usually coal. In Victoria, the lift in global coal prices has no effect on electricity costs because it is not exportable. In NSW and Queensland, the cost of coal power has lifted sharply since the Russian war, but remains below gas.

If renewables and coal generation together are insufficient to meet demand, gas generation fills the gap. Prices are then higher again.

Increasing the renewables share of power supply expands the proportion of the time in which renewables meet the whole of demand and prices are very low. It expands the proportion of the time when renewables and coal together meet demand. It reduces average prices.

A contraction of coal supply increases the proportion of time when some gas generation is required. That increases average prices.

The withdrawal of large amounts of coal power increases the proportion of time when high-cost gas generation is required. This increases the average price of power. We saw that with

the closure of the Northern power station in SA in 2016 and Hazelwood in Victoria in 2017. Since then, the supply of renewable energy has increased by large amounts in SA and Victoria. This increased the proportion of the time when renewables set the price near zero, and reduced the proportion of the time during which gas set the price at high levels. These developments have shifted average SA prices from well above to well below Queensland and NSW over recent years.

The result is a saw-tooth pattern of price changes over time. Expanding renewable supplies (including from rooftops) tends to reduce power prices. At some time, this leads to the closure of a coal generator. Prices then jump to higher levels, and then resume their downward slide. The profile is of a saw-tooth blade with a downward slope.

The dynamic is disrupted if international coal and gas prices increase. These raise the level of the saw while leaving in touch the profile of the saw teeth.

Eastern Australian electricity prices are vulnerable to increases in international gas and coal prices for as long as internationally tradeable coal and gas are important. They are vulnerable to closure of coal-fired generators until the last one is closed. When renewables supply almost all requirements, average power prices are relatively low and insulated from international energy market developments.

Three Time Horizons

There is a short term crisis of high prices to users of power. There is a medium term challenge of maintaining reliability of power with the lowest possible prices while we remove carbon from our electricity system. There is a long term opportunity for Australia as an immense supplier of zero emissions goods and carbon credits in the emerging zero emissions world economy.

The challenge is to respond to the short term crisis without damaging our medium-and long-term prospects. We have to start work on all three horizons, making sure that steps taken towards one do not create problems for the others,

The first Horizon: The Russian War Price Crisis

Two kinds of response are available: driving a wedge between international and domestic prices to hold the latter to prewar levels; and taxing temporary profits from the coal and gas industries directly or indirectly to compensate users of power. Each type of response could be implemented at State or Commonwealth level.

Measures can be designed that automatically phase out as prices return to prewar levels. How long will that be? Restrictions on Russian exports are likely to continue long after military action ceases. Russia will find markets for a major part of its coal, gas and oil export potential, but probably not for all.

There are two ways of driving a wedge between domestic and international prices: restricting quantities of exports so that the domestic market clears at a low price; or taxing exports to provide incentives to sell into the domestic market below the international price.

Domestic Reservation: Strong domestic reservation along the lines used in WA could be introduced in eastern Australia. Commonwealth legislation enacted by the Turnbull Government is a possible instrument. To be effective in returning domestic gas prices to pre-Russian war levels, this would require amendment. Alternatively, companies may choose to expand supplies to the domestic market by enough to push prices back to prewar levels, to avert regulatory action by Government. The three LNG producers operating in Gladstone would be wise to offer what is possible. The exporters have referred to constraints associated with contractual commitments. Only contracts in place prior to the current crisis give rise to valid concerns. Relatively small additional amounts provided to domestic markets would have large leverage over domestic prices.

A similar domestic reservation measure could be designed for coal, although the larger number of mines would complicate administration. Whether mandated or implemented voluntarily, expansion of supply to eastern Australian markets at prewar prices would leave the LNG and coal producers with prodigiously high profits from the large majority of their production that would be sold at wartime prices.

A “Russian War price normalisation levy”: This could be applied to exports of coal and gas at a rate related to export prices that reduced after-tax receipts from exports to average levels before the Russian war (say, the average of the year before the war). The lower receipts from exports would hold domestic prices down to prewar levels. The levy would be applied by the ATO shipment by shipment. Old contracts at pre-Russian war prices would not attract a levy, so would not affect the integrity of sales contracts. The structure of the levy would see it phasing out automatically as prices fall over time towards prewar levels. There would be challenges of avoidance through offshore marketing centres and in other ways—but

these challenges for the ATO are no greater than for compliance with standard income tax laws. The revenue collected would be small at first, when most exports were being sold at prices contracted before the war. Spot sales and new contracts would attract the levy. Revenue would rise over time while international prices remain high.

What would be done with the revenue from a Russian war price normalisation levy?

There would not be a compelling case for compensatory payments to households, as prices for gas and electricity would return to levels before the Russian war. The revenue could be returned to producers, so long as amounts were not related to current export revenues—for example, in proportions equal to gas and coal companies' shares of export revenue in the year before the Russian war. It could be used to fund an expansion beyond election commitments of support for electricity reliability or programmes directed at reducing household and business energy costs in ways consistent with building the renewable energy superpower. Or it could be used to pay off some of the trillion dollar Commonwealth debt.

Commonwealth or State Responses? Under the Australian Constitution, the States own mineral resources except in offshore areas and the Territories. Requirements on domestic supply ,or price related levies with rebates for domestic sales, could be introduced as conditions of mining.

One complication with a national response is that the 11 percent of Australians resident in WA do not have an energy crisis. Gas is available at about one tenth of the eastern Australian price and in adequate supply. Electricity prices have been increasing with or at a lower rate than the Consumer Price Index. The WA Premier announced on June 12 that the state-owned coal generators would be phased out between now and 2029, and the one small private coal generator is expected to be closed within this time frame. Reliability will be secured by policies designed to expand wind and solar supply, supported by battery and pumped hydro-electric storage and gas peakers.

Queensland's new coal royalties announced in June 2022 collect 40 percent of revenue from high prices, which is more than would be required to compensate domestic users of coal. There is no rebate for domestic sales, so compensation to residents would have to be provided through mechanisms other than lower prices. The royalty automatically phases down as prices fall. The State has the powers to adjust gas royalties as well.

New South Wales has the power to do something similar to Queensland on coal, and local gas is of small consequence.

Victoria is not an exporter of coal or gas. Its gas producers receive much higher domestic prices as a result of the Russian war. Its coal generators are not affected by higher international prices. They are handsome beneficiaries, however, of higher electricity prices driven by high gas prices and high electricity prices established by arbitrage through the NEM. Victorian users of power are heavily exposed to the Russian war prices through these mechanisms. It is open to the Victorian Government to raise coal royalties to provide indirect compensation to residents paying extraordinarily high prices for gas and electricity.

Tasmania's renewable energy supply roughly matches local use. Domestic prices have risen largely through the Basslink submarine connection to Victoria and arbitrage through the NEM. The state-owned electricity companies' profits are higher. Increased dividends to the State could support substantial direct or indirect compensatory payments.

The Commonwealth itself has powers in relation to export volumes and taxes, income-related taxes and royalties for offshore gas production. The Commonwealth Petroleum Resource Rent Tax (PRRT) operated successfully in Bass Strait for many years, but its value was damaged by amendments to allow deductions for processing costs to denude resource rent revenue from later projects. Now is a good time to correct those anomalies for offshore projects. A Commonwealth role in coal taxation would have to be worked out with Queensland and NSW and have value for them. Rationalisation with state royalties and other measures would be necessary for good outcomes.

The highly varied circumstances across the Federation argue for cooperation and close consultation among governments, and for caution in the Commonwealth enforcing a national approach. The different histories of eastern states coal and gas may warrant different responses: measures (regulatory or voluntary) to increase domestic supply of gas; and some version of a Russian war price normalisation levy for coal.

Medium Term Horizon: Reliability and New Investment

Acceleration of investment in renewables is necessary for lower electricity prices and for climate change. That has to be supported by measures to secure reliability. The Prime Minister and Energy Minister correctly frame the reliability challenge as one of buying insurance. What is the cheapest and best insurance?

The ESB "Consultation Paper on the high-level design of a capacity system" in June 2022 says that higher prices are not the intent of the proposal. That's reassuring. We need more

reassurance than that. It is reasonable for citizens to expect rigorous analysis of costs and comparisons of alternative means of reaching the same objectives.

Although the WA capacity market is similar to that proposed by the ESB for eastern Australia, almost nothing is said about its costs and effectiveness. If you divide the total capacity payments by the flow of electricity through the South West Interconnected System in 2021, it comes to about \$35 per Mwh. That is a large number. Is there some reduction in energy costs resulting from encouragement of more power into the system? There may be; but we have no evidence. The majority of capacity payments are to the coal generators at Collie. When Premier Mark McGowan announced a timetable of closures for the state-owned coal generators between now and 2029, he said the winding out of coal generation was necessary to avoid increases in power costs. Reliability of power supply would be secured by new investment in wind and solar and state support for battery and pumped hydro-electric storage. The expensive capacity market was not mentioned as being relevant to reliability in this compressed transition.

The operations of the NEM and associated privatisations and corporatisations of generation, transmission, distribution and retail businesses have had mixed success over the past quarter century. There has been a problem of declining productivity and rising costs in the poles and wires, and of oligopoly influencing retail pricing.

The one clear success in the NEM is the energy market. The competitive energy market has facilitated large investments in new and old technologies while adjusting to huge variations in economic and policy circumstances. Until the current crisis, it delivered reasonably low wholesale power prices. High prices encourage new investment and supply to bring prices down again.

The ESB's capacity market would change radically the one part of the NEM that was working well before the current crisis. The ESB's version of a capacity mechanism would add new layers of administrative complexity. The consequences are unpredictable.

Alternative ways of securing reliability aim more directly at the objective of reliability.

Nelson and Gilmour at Iberdrola have proposed a publicly controlled reserve mechanism to balance the market. This version of a capacity mechanism, and variations on this theme, should be compared with the ESB model for its effects on electricity prices, compliance burden on participants in the NEM, time to effective implementation, and reliability in securing the objective of balancing supply with demand at specified prices.

The following is my own preferred variation on the Nelson and Gilmour theme.

The Government would specify the range within which unrestricted market exchange would determine prices. It would be wide enough for large interventions by the reserve mechanism to be infrequent. The price limits would emerge from analysis. My initial suggestion would be a lower limit at levels now imposed on the NEM by regulatory means (minus \$1,000 per Mwh). My initial suggestion is for an upper limit of \$5000-- lower than the current upper limit in the NEM (\$15,100). Enforcement of upper and lower limits now involves suspension of market transactions, with unmet demand at the higher limit and unabsorbed surplus at the lower limit. With the reserve mechanism, the price limits would be secured not by decree, but by physical injection of power at the upper limit and absorption at the lower.

The mechanism would be managed by an Energy Reserve authority. The authority would have access to enough storage capacity or flexible demand for power to hold the price at minus \$1,000 whenever the market fell to that level.

The Energy Reserve would hold enough generation and storage capacity to stop the price rising above \$5,000. It would not sell power below \$5,000.

To protect the upper limit on prices, the Energy Reserve would seek to have its storage full whenever prices were approaching the limit. This would often require purchase of power at prices above minus \$1,000. The Reserve would set clear rules under which it would purchase power.

The Energy Reserve would meet its objectives at the lowest possible cost. Costs would be net of profits from arbitrage—buying at low and selling for high prices.

Authoritative assessment of future demand and supply would be required. AEMO now provides those market perspectives and is well placed to guide the Energy Reserve.

The Energy Reserve would have to cover injections of power for both short and long periods to protect a \$5,000 maximum price. This would require a mixture of storage and peaking assets. Batteries could efficiently cover shortfalls up to 4 hours, perhaps more with improvement of flow and other emerging technologies. They could be backed up thermal

generation and pumped hydro. Thermal generation can be from biomass, bio-gas, bio-oil, gas, hydrogen. Through the transition period when coal generation is closing, there may be a place for holding some mothballed coal generation capacity in reserve for rare long-lasting events.

For the electricity system as a whole, stability within the Energy Reserve's price range would come from more flexible use of established hydro-electric capacity, from thermal peaking generators, from geographic diversification of solar and wind supply through stronger interconnection, and from managing demand to reduce stress on the grid when demand and prices are high.

In choosing the lowest cost approach to protecting the maximum price, the Energy Reserve would recognise the advantage of storage over thermal peakers, as storage has opportunities for arbitrage and no fuel costs.

Who would own the storage and peaking assets? That would be a matter for the Energy Reserve. It would have access to the Commonwealth's balance sheet, so it would be a low-cost owner of capital assets. Its participation would facilitate rapid development of some storage and peaking opportunities. However, leasing provides more flexibility and requires less management capacity. The Energy Reserve could lease part of a privately owned peaker or storage asset, and leave the private owner to participate in market exchange with the balance. Or the Energy Reserve could own that proportion of the asset that it seeks to bring within its operational portfolio. Sharing the use of an asset could also be over time. For example, the Energy Reserve could lease the use of an asset for a number of years, with use rights reverting to a private owner after that time. This might be valuable, as demands on firming are likely to fall after the completion of the transition to zero emissions.

The "technology neutrality" mantra from the culture wars would be dropped in favour of an environmentally and economically rational approach. Suppliers of services would be required to surrender credible carbon offsets. The supplier would be the Energy Reserve for any thermal peaking assets that it operated itself. With this recognition of the cost of carbon emissions, the Energy Reserve could draw power supplies from their lowest cost sources.

Would purchase of demand management potential be part of the Energy Reserve's brief? Industrial and other processes which can reduce demand at little cost when prices are high and expand use of power when low will become much more important in the energy system. Production of hydrogen by electrolysis will be the most important case, eventually absorbing a high proportion of electricity output. The cost of hydrogen storage is low compared with requirements to purchase electricity at premia above average levels, so

electrolysers will be fully engaged in their own arbitrage within the price range protected by the Energy Reserve. The private market in demand management will expand. This development alone will greatly reduce the requirements of intervention by the Energy Reserve. My own inclination is that demand management is better left to private markets. Perhaps the Energy Reserve could own or lease access to an electrolyser for hydrogen production, which would be used to absorb power when storage is full and the price is negative. It could be located at a thick part of the gas pipeline network, and add hydrogen into the pipeline system when in operation. That hydrogen production would have low or negative operating costs.

I have suggested elsewhere (Superpower; RESET) that one way of beginning the building of a reliability reserve would be to separate the peaking and storage assets from the conventional hydro-electric and retail businesses of Snowy Hydro. The Energy Reserve could be responsible for managing established gas generation and pumped hydro storage and also for completion and operation of Snowy 2.0 and the Kurri Kurri gas and hydrogen generator. The knowledge that these assets in the hands of a sovereign entity will enter the market under rules that are not known to other participants has been a substantial deterrent to private investment in peaking and storage assets. Operation by the Energy Reserve under transparent rules would remove uncertainty.

The Energy Reserve would be a Commonwealth-owned entity.

Prices will be lower sooner the shorter the transition to zero net emissions from electricity generation. The time of transition is governed by the reliability issues, as well as planning and construction time for a huge volume of solar and wind generation and transmission infrastructure. How short can the transition period be? In my assessment, 13 years, so that a zero carbon electricity sector is achieved in 2035. Demands on the Energy Reserve would be heavy during the period of retirement of coal generators, and ease after that. Private markets for arbitrage will become more sophisticated and absorb more of the balancing load. Decentralised storage in home batteries and especially in electric motor vehicles will add immense depth to private storage. The growth of the Superpower economy with large-scale electrolysis to produce hydrogen for industry and export will greatly expand the size of the system and the proportion of demand absorbed into flexible uses. The Superpower economy will expand inter-regional interconnection, allowing diversification of solar and wind resources and the absorption of regional shocks over a larger market.

The special demands of the transition years make delivery time a crucial factor in choice between alternative reliability systems. The ESB says that it will take until 2025 to implement their conception of the capacity mechanism. That is three years too late. The Energy Reserve could be established immediately based on AEMO's Reliability and

Emergency Reserve Trader (RERT), strengthened by addition of the Snowy assets (now 100 percent owned by the Commonwealth and so available to quick decisions) and built quickly from that foundation.

THIRD HORIZON: reliable low-cost supply of zero carbon energy

As we make progress on the short- and medium-term issues, we should keep an eye on where policy needs to be later on.

We will not be able to make progress to net zero in some sectors and activities without a carbon price. That will be crucial in the later stages, after 2035. Carbon prices will be much higher than any previously contemplated in Australia, and provide powerful incentives for Australians to capture and store carbon in plants and soils. They will not affect the cost of electricity, or much affect transport, or much of industry, which will have or be close to zero emissions.

The practical consideration of broadly based carbon pricing for the time being is ruled out politically in Australia by the legacy of the climate wars.

The Australian Secretary-General of the OECD, former Finance Minister Matthias Cormann, is leading OECD efforts to establish a carbon pricing system across developed countries. The G7 on 28 June 2022 agreed to form a club of countries committed to strong action on climate change and imposing restrictions on imports from countries thought to be doing less than their fair shares. We should join that work and participate in a scheme that emerges. I suggest that we anchor our work now with an expectation that conditions will support establishment of a new Australian emissions trading scheme with deep international links by 2035.

In the meantime, we get on with what is possible. Measures within the new Government's election policies and others that contribute to increasing real living standards can take us a long way.

The building of the Superpower requires international acceptance of Australia as a full participant as a developed country in the global effort to defeat climate change. Intense diplomatic activity in the first month of the Albanese Government is successful in demonstrating that Australia has moved on from its destructive role in the Glasgow UNFCCC conference in November 2021. That early progress can be consolidated at the conference in Egypt in November by confirmation of the 43 percent commitment for 2030, acceptance of the methane pledge, and joining the US and developed countries in commitment to phasing out coal power generation by 2035.

Minister for Energy and Climate Change Chris Bowen said on June 24 that the best way to reduce electricity prices is to accelerate the growth of renewable energy supply. He is right. The Government's stated objective of 82 percent of electricity from renewables by 2030 would make a decisive difference in reducing prices. Achieving that goal is much easier said than done. Investment in renewables has been declining recently, as the incentives provided by the renewable energy target wind out and increased supplies of wind and especially solar electricity depress prices at the times when their output is highest.

Removing bottlenecks from renewable energy zones to major load centres through the Government's Rewiring the Nation programme is a necessary condition for success. It will add momentum to important state initiatives. It is not a sufficient condition.

High electricity prices themselves provide stronger incentives for investment in renewable energy. But only if they are expected to persist for long enough to support the recovery of capital with an acceptable return. Investors anticipate return to old patterns of pricing at some time after the end of dislocation from the Russian war.

Wholesale power prices before the war—and from time to time since—have been negative for extensive periods in SA and lesser but significant periods in Victoria, when the sun is shining and the wind blowing. Negative prices lower the average cost of power. That's good. They reduce returns for generators that sell at those times. That removes the incentive to continue investment in the renewable energy that is necessary to keep average prices on a downward path.

In the absence of changes in the incentive structure, renewable energy investment will not deliver anything like the Government's 82 percent renewables by 2030.

A general carbon price would have provided the required incentive. In its absence, achievement of the Government's renewable objective and putting average power prices on a downward path requires other incentives. The simplest would be extension of the life of the current RET out from 2030 to 2035.

The Renewable Energy Target (RET) was introduced in 2009. It was designed to encourage installation of 41 Twh of new renewable energy by 2020. The annual targets increased annually from low initial numbers to the full 41 Twh in 2020 and then stayed there until 2030. A renewable energy generator receives large generation certificates (LGCs) according to annual output. Each retailer or large user is required to buy and surrender to the Australian Energy Regulator its proportionate share of the target for that year. When carbon pricing was introduced in 2011, it was expected to take over the provision of incentives for new renewable energy from the mid-2020s. The abolition of carbon pricing made the RET crucially important in maintaining momentum in renewables investment.

The Abbott Government reduced the target to 33 TWh with the support of the Labor Opposition, after failing to abolish it altogether.

Surrender of an LGC has become the way in which a business or government or private purchaser of green power can be confident that a purchase of renewable energy is real. In the 2020s, this has underpinned a large voluntary market in renewable energy. Companies, governments and individuals wishing to demonstrate that they are purchasing green power rely on the RET system. This is increasingly important, as companies and governments demonstrate their zero carbon supply chains to investors, customers and constituents, in Australia and in other countries. As a result, LGC's retain value even when the target has been notionally met by quantities of renewable energy generation. The RET system of certification of green electricity will be crucial to G7 and EU acceptance of imports prior to the re-introduction of an Australian carbon price.

If the RET wound out as currently scheduled, without an Australian carbon price, there would be inadequate incentives for investment in renewables to achieve the Government's 82 percent objective. And there would be no mechanism for certifying that renewable electricity was supplied for a particular use for which green energy was essential. One could develop various mechanisms to serve these purposes. None would be as straightforward as extension of the RET, and others are likely to be more expensive. Expansion of renewable energy supply encouraged by the RET is likely to continue to bring down average electricity prices and has no budget costs. Extension of the RET is simple, and uses a familiar instrument the administration of which is well established.

If we are looking forward to a carbon price in 2035, an extension of the closure date for the RET from 2030 to 2035 would close the gap.

How to calibrate the extension? We could start with the 33 Twh base in 2022, and extend it linearly to an amount corresponding to estimates of 82 percent of expected total power use in 2030. It would be helpful to business confidence if the trajectory of increases in the target to 2035 were established at the same time.

The short, medium and long-term horizons for the electricity sector all require more Australian liberal social democratic and less Austro-Hungarian thinking.

Responding effectively to the energy crisis requires acceptance that avoidance of large reductions in the standard of living of ordinary Australians matters. There are responses that could greatly alleviate the stress on our society. Knowledge and analysis is required to settle upon the best answers. That was the foundation of policy-making in earlier times when economic policy has worked for our community, as in the immediate postwar period

and the reform era late last century. The expectations of business vested interests may be disappointed at a time when they have become accustomed to disappointment being something endured by others in society. But wise business leaders will recognise their interests in Australian democracy working for its citizens.

Finding the right mechanisms for reliability requires clear-headed identification of where and how markets work effectively, and where and how Government intervention is necessary. My suggestions for the Energy Reserve would preserve a central role for markets in the area in which competitive conditions allow them to work effectively.

Introducing enough renewable electricity soon enough to provide low electricity prices and climate change imperatives has to draw on the power of the competitive market, modified by fiscal or regulatory intervention to align private and public goals. That is a market with a carbon price. Failing the carbon price, second best is another broadly based measure that increases incentives for socially valuable investment. Fred Gruen would agree. Actually, on this one, so would Milton Friedman. “Technology not taxes” and “technological neutrality” are lonely in economic thought. Fortunately, they are now also lonely in the Australian Parliament.