"Ready For Anything – How Companies Can Build Resilient Strategies"

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I'm going to talk today about the future of energy and how to be ready for it. And I'd like to start by encouraging you to take everything that I or anybody else up here today says about the future with a grain of salt.

The late great screenwriter William Goldman once said that in Hollywood, when it comes to what movies are going to be hits, "Nobody knows anything". Energy is less glamorous but no less uncertain. Nobody knows what's going to happen.

Ai Group is as deeply involved in energy as any industry organisation in Australia today, and we benefit from the feedback of members who are energy users, energy suppliers, technology and solutions providers and more. But while we have warned about the impacts of LNG exports on gas prices since 2011, we did not foresee how far or fast prices would rise – or how much of their own shareholder value the export projects would destroy.

We don't know what's going to happen.

State and Federal Governments have legions of public servants, consultants and energy market authorities to advise them. But in late 2016, with the closure of Hazelwood looming, the pessimistic end of that advice was that wholesale electricity prices might hit $80 a megawatt hour in Victoria and approach $70 in NSW, and then fall.

Government doesn't know what's going to happen either.

The International Energy Agency calls on expertise from governments and energy businesses around the world. Every year they issue projections for the World Energy Outlook. Every year those projections show that growth in solar energy is going to stabilise. But every year actual growth in solar capacity accelerates.

The IEA certainly doesn't know what's going to happen.

How we shouldn't plan (but often do)

None of this is to say that experts or projections are worthless. Experts can have great knowledge of the history of our energy systems, of different approaches around the world, and of developments now taking shape. Projections can illustrate how our assumptions play out and interact. These are very useful resources if we think about them critically and use them carefully.

Too often, however, that is not how we use experts and projections. Instead we expect them to give us the Answer: what are supply, demand, prices, costs actually going to be? Whatever qualifications, hedges and asterisks the experts provide are barely reported by the media and steadfastly ignored by most of us. Instead, governments – and too many businesses – take these presumptive Answers and build them into policies and strategies that rely on those inputs being correct. And those strategies prove to be dangerously brittle when their assumptions prove wrong.

Examples abound.

Early this decade a massive expansion in electricity network investment was locked in by the regulator because demand was projected to keep growing forever. Instead demand tanked and we will be paying for the excess for decades – even now that new investment has slowed.

Many businesses invested in gas-fired cogeneration to cut their electricity bills based on extrapolating Eastern Australia's history of low gas prices. Then the LNG export terminals fundamentally reshaped the gas market.

Today another set of brittle decisions may be taking shape around the Federal Government's wholesale price target for the National Electricity Market. The target is $70 per megawatt hour in 2021 – an improvement from today, but still well above where prices used to be, even under the carbon tax.

It is probably not a coincidence that the target has been set close to the existing volume weighted average of wholesale futures prices for 2021. However, <u>if</u> the target is actually met that probably <u>will</u> be a coincidence. Futures prices bounce around all the time, for reasons over which the Federal Government has almost no control. Over the past year the futures prices have risen due to higher gas price expectations, drought constraining future hydro output, and delays in some renewables projects. The same factors could easily keep pushing back the price decline – or other factors like a local or global slowdown could accelerate it. In other words, we should be cautious about building plans around that target price.

How we should plan (but often don't)

So, if we shouldn't take projections and expert opinion as absolutes, what should we all be doing?

Questioning pronouncements and projections is important – for those who have the time. The qualifiers and uncertainties that make up about 90% of energy reports and about 0% of energy headlines provide rich food for thought on the factors that shape our energy prices. Just questioning will only get us so far, though.

A second option is to try to take account of all the variables that matter and form a view of how they may play out in the market and impact you. But this is impractically complex for almost anyone, given the number of factors at play across energy markets and public policy.

Scenarios are the best answer we've got. Any business for whom energy matters should be testing their options against multiple scenarios for how markets and policy may evolve. And we should be very careful about thinking of any of those scenarios as 'central'. It's a short mental hop from 'central scenario' back to 'what will happen'. A representative and frequently updated set of scenarios should push us to consider just how robust our plans may be.

Factors that matter

What those scenarios should look like is going to depend on who you are and which parts of the energy system matter the most to you. For most of us, though, the biggest variables are as follows:

- Where do international oil prices go? East Asian markets price gas against oil, and Eastern Australia now prices gas against East Asia. Political problems could pull more supply out of places like Iran and Venezuela, pushing prices up. Economic problems could reduce demand in major economies, pushing prices down.
- Does anything break the link between domestic gas prices and international prices? A huge surge of supply investment beyond the capacity of export facilities, a decision by producers to forego export-linked pricing, a massive intervention by policy makers – any of these might see local conditions set prices, at least for a while. In their absence, international pricing prevails.
- Does gas supply keep pace with demand? Existing production is depleting, new supply from domestic production or imports is in development but often faces commercial and community challenges, and demand is impacted by efficiency, fuel switching and closure of gas intensive facilities. If supply falls short prices may go well above export parity again.
- How strong is the link between gas prices and electricity prices? The current supply mix and market design put high cost gas generators in the box seat to set electricity prices more often. Will growing renewables or alternate dispatchable resources like pumped hydro, demand response, batteries or flexible coal reduce gas generators' pricing power? And when?
- How soon do old electricity generators retire? The fleet is ageing and faces carbon risk, but it is very profitable while it lasts. Do conditions allow operators to sweat big assets for decades to come, or does mishap or climate policy knock some out much sooner?
- How well do we prepare for retirements? With time and a pipeline of suitable generation and transmission projects we can digest them well. With little warning, slow decision-making or a lack of investment confidence we could have more price surges.
- How do the costs of renewables evolve? The levelized cost of energy from wind and solar has been plunging, and should keep doing so with scale, experience and innovation. But the system integration costs to back variability and stabilise the grid are more debatable and accelerate at very high levels of renewable penetration.
- What does public policy do? Higher ambition for emissions reduction implies faster retirement of old generators, more demand for electricity as transport, heating and industry partly electrify, and probably less supply and demand for gas. Uncertainty about the direction or form of State or Federal climate policy impacts willingness to invest and the risk premiums demanded.

Scenarios to think about

We could go on and consider even more variables – exchange rates are a big deal for gas and coal prices and costs of imported capital equipment, for instance. But it should be clear that there is room

for several outcomes on each of the questions I've raised. The permutations of possible outcomes look intimidatingly complex. However, if the main thing you're worried about is the overall level of energy prices, we can boil it down to three broad scenarios for the next five to ten years. Let's not call them low, medium and high, lest medium be misinterpreted as 'most likely'. Let's try Nice, Mediocre, and Terrible.

In the Nice Price Scenario gas supply is adequate – whether because supply grows or demand falls – and somehow the link to export prices is broken. Prices reflect local production and pipeline costs – though these are much higher than they used to be given the change where and how gas is produced. Potentially gas could be $7 to $8 per gigajoule. In dealing with electricity, government, regulators and investors sort themselves out to the extent that a healthy pipeline of new projects smoothly replaces well-flagged retirements and finance costs are low. Electricity prices would reflect a mix of relatively low short-run costs of existing generators, cheap new energy from renewables, less pricing power for gas generators in a better served market and lower fuel costs for gas. Prices could potentially be around $60 a megawatt hour. I would say two things about this scenario: you sure can't bank on it happening, and even if it did, prices would still be well above their historic levels.

In the Mediocre Price Scenario gas supply is adequate, prices stay linked to international oil and gas markets, and the international scene is calm. Gas prices float around $8 to $12 per gigajoule. The electricity market haltingly replaces past retirements and absorbs State and Federal interventions without disaster, and a wave of renewables investment lowers prices – but more big lumpy retirements follow, and prices sawtooth down and up between $70/MWh and $100/MWh. This scenario is closer to many people's expectations today – so it's doubly important to remember it may not happen.

In the Terrible Price Scenario gas prices are very high, either because we let domestic supply fall short of demand or because international oil prices and exchange rates are unfavourable. Say $14 to $18 per gigajoule. In electricity we combine faster retirement, unplanned exit of failing facilities, and a highly uncertain and unwelcoming environment for new projects of all sorts. The market is persistently tight and chaotic, and high-cost gas sees power prices stuck in a range of $100 to $150/MWh. This scenario is frighteningly plausible.

What to do next

There's three broad worlds industry might need to be ready for. What can you do about it?

Ai Group spends a lot of time with governments and stakeholders to build a better outcome on energy and climate policy. Individual businesses can lend their voices to the call for strategic, certain and effective policy. However, we can't plan on the basis that we will get what we ask for.

It is up to us all to be ready for anything. Don't take the current futures market or the ACCC gas price metric or expert opinion at face value. Keep up with the risks and emerging hinge points around gas supply and electricity retirements.

What I will emphasise in closing is that the range of plausible energy price outcomes is broad but none of it looks like what we used to think was cheap. Gas in particular looks historically expensive even in the best imaginable scenario. Investment in energy efficiency makes sense for a lot of us. Options to fuel switch from gas to electricity are opening up to an increasing range of businesses, like using high temperature industrial heat pumps to make steam.

It makes sense for all of us to keep an up to date portfolio of options to implement as and when conditions make it worthwhile. Industry needs to be ready to make our own luck. The energy market may or may not be in a position to help us, but there is much we can do to help ourselves.