

In defence of doubt

Hello. I'll begin by acknowledging the traditional owners of the land upon which we meet, the Wurundjeri people of the Kulin nation. I pay my respect to their elders past, present and emerging.

To tonight;

- President of the Academy, Professor Hugh Bradlow
- Members of the Board
- New Fellows
- Fellows and guests

...thank you for the invitation to speak. It is a great honour.

It's also daunting, given the experience and expertise we have assembled in this room. But perhaps the subject of my talk this evening will be familiar to all of us.

This evening I want to talk to you about certainty ... and about doubt.

Before we start, I have an admission, perhaps born of fundamental optimism: I believe the problems we face today can be fixed.

I believe that, whether driven by altruism or profit, we *can* raise standards of living, we *can* live healthier lives, we *can* reduce poverty and we *can* lessen inequality.

We *can* make Australia better, for everyone.

I also believe that in my industry – energy – we *can* deliver affordable, reliable and cleaner supplies of power to Australian families and businesses, wherever they live and no matter how much they earn.

We *can* address climate change.

So, why *don't* we do those things? ... Great question.

Unfortunately, I'm beginning to doubt our generation will be the one to do it.

What concerns me has less to do with the technology and invention we use to address the challenges we face. I worry more about how the technology and invention is applied.

Let me explain: most ways of describing or defining technology refer to the *application of knowledge*.

...the application of knowledge...

Often there's more than one viable solution to a given problem, particularly a societal problem. But there are almost always multiple, competing views on which approach is best or more likely to succeed.

How do we resolve those views, so we can move forward?

The most effective system yet created by humans for resolving argument was developed thousands of years ago: it is reasoned discussion underpinned by thoughtful and objective consideration of the facts.

Whether peer review or political debate, truth should be the aim.

That means the human sciences and the technical sciences are intertwined. Unless both are working effectively a society leaves its advancement to chance.

But there's something standing in the way. Today, our system for applying knowledge is faltering, maybe even broken. We're risking that vested interests or those possessed by ideology will steer us towards second-rate outcomes.

That's certainly true in energy.

Here's a favourite quote of mine. It sums up where we are going wrong.

"One of the painful things about our time is that those who feel certainty are stupid, and those with any imagination and understanding are filled with doubt and indecision."

If that sounds familiar it's because Bertrand Russell wrote it more than 80 years ago.

It feels like it was written for today, a time when there is no longer room for doubt in public debate; only the certain prevail.

How we view, discuss and debate problems has become about personal victory, rather than a triumph of ideas.

And we are losing perspective as the rhetoric escalates and becomes more strident, insistent and certain.

How many of us ever reflect on the great advances of the past few hundred years? Progress in health, poverty and equality which, depending on your point in history, would seem truly miraculous.

Yet we're fed a narrative of doom and we are certain that the world has gone badly wrong.

Without perspective everything becomes a problem.

Recently I participated in a panel discussion about Australia's economy where the conversation adopted a tone of despair.

But let's take stock:

- Australia's economic growth in the June quarter was 3.4 per cent
- Our unemployment rate is around 5 per cent
- Inflation is modest, around the 2 per cent mark, and

- Australia is one of the richest nations on earth per capita¹.

By any measure, these are good numbers. In many countries they would win you the next election, and likely the one after as well.

Yet our politicians and commentators have persuaded Australians that the country is in dire straits; they're being taken advantage of every way they turn; we're one misstep away from ruin.

And the proponents of fear are positioning themselves as saviours, the only ones capable of lifting that fear.

We are in a sea of madness.

That's true in energy, and you may recognise that tendency in your own sectors or even more generally.

It's not that certainty is bad. But devoid of doubt and perspective it becomes fanaticism. And fanatics aren't known for compromising, or for solving problems.

For the past decade energy policy in Australia has been mired in a climate war. There's no national framework and families have paid a heavy price.

Customers have been shocked by electricity bills, their supplies of power are less reliable and a transition to a zero-emissions future is still in debate.

Let's agree what we're solving for:

- Today in Australia we get around 70 per cent or more of our electricity from coal-fired generation. We want that, eventually, to be zero percent.

¹ <https://www.smh.com.au/business/the-economy/the-wealthy-country-australians-are-the-richest-people-in-the-world-20181109-p50eyc.html>

- Generating energy for millions of households and businesses around the country produces some 180 million tonnes of carbon-dioxide equivalent each year. We also want that, eventually, to be zero.
- Depending on your assumptions about economic growth and industry transformation, the market operator AEMO estimates it will cost between \$8 billion and \$27 billion to replace retiring generation and meet consumer demand – it's a long way from zero dollars. And that's just over the next two decades.

So, the challenge is:

- To cut millions of tonnes of carbon emissions
- To make energy affordable while investing billions of dollars, and
- To keep the lights on as the equivalent of 14 Hazelwood power stations are withdrawn from the energy system.

In 2017 Victorian customers got first-hand experience of what happens when the retirement of just one of those plants is mismanaged.

The lessons of the recent past have been hard earned. Yet our rule-makers are forgetting what they already know.

In energy we have an ambition we call the "trilemma". Affordable, reliable and cleaner energy...it's like a three-legged stool.

Balance on just one of those legs for too long and eventually the stool topples over. The energy system breaks, and it breaks badly.

For much of the past decade the wholesale electricity market was chronically over-supplied, and prices were very low, around \$30 to \$40 a megawatt hour.

From 2006 to 2014 my company EnergyAustralia lost around \$200 million in aggregate and had to write-off some \$1.9 billion from the value of its assets.

It is just as well we have patient owners.

A depressed wholesale market meant companies struggled to make a case for investing in reliability – either in maintaining existing baseload generation or planning for how the system would cope with a flood of intermittent solar and wind energy.

With prices low and seemingly under control, emissions became the consuming goal.

Then, old coal-plants were closed at short notice... The shock was felt around the country in the quarterly bills of customers from Ceduna in South Australia to Cairns in Queensland.

And remember South Australia? In 2016 the nation watched in disbelief as an entire state's energy system went black.

Every method we have of generating energy has its own distinct impacts on people and the environment; advantages and drawbacks to be debated and managed.

But once an electron is in the system, it's the same whether it was produced by a wind turbine or by a coal plant.

However, there is a world of consequences between having a thoughtful national energy framework and not.

Today, affordability has cycled around to top of mind. Think what might happen if we balance our stool on that one leg to the exclusion of reliability and emissions...

In Australia it took 20 years for the installed capacity of renewable energy to reach five gigawatts. It will take less than two years for the next five gigawatts.

By around 2021 it's possible renewable energy, including solar PV, might supply half the market demand when the sun is shining.

Eventually it becomes cheaper to keep building solar systems and spill what can't be used, rather than store the excess.

The market operator, AEMO, points to the possibility that slabs of renewable power won't be dispatched to safeguard system reliability.

If left unmitigated, it's possible energy will have zero market value for large parts of the day.

We are already seeing this phenomenon in California.

"Free electricity", you might think. That sounds great.

Then the sun goes down.

Now you're buying electricity from the grid, assuming dispatchable generation hasn't been forced from the market.

Storage has a critical role in a modern energy system, but it won't have scale by 2021.

At night you're paying far more than you used to. That's because the fixed costs of the energy system, including networks and generators, must be recovered in a lot fewer hours.

If you own a solar PV system you're exporting power during the day at zero dollars. And you're buying it at much higher rates in the morning and evening.

Your system may never pay for itself.

That's the path we're on. Even now, the market operator intervenes almost every day in South Australia to turn off renewable generation and keep dispatchable power stations operating.

Here's the truth – we have all the existing and planned capacity the system needs.

The National Energy Market has around 50,000 megawatts of installed capacity.

Average demand is around 22,000 megawatts. Yet more than 37,000 megawatts of renewable generation are proposed beyond the 11,300 megawatts already built or committed.

Our exam question for the next decade is not building more generation – it's getting it all to work seamlessly.

What we lack is a national framework to guide emissions-reduction and make the grid stable.

Human ingenuity has already provided all the pieces of the puzzle. We can stabilise our system by integrating wind and solar power with flexible generation, like pumped hydro and flexible, fast-start gas plants.

The question is *how* we get there, *how* soon and at *what* cost.

It's in the *application* of technology; it's in the *application* of knowledge where we're failing. We can't agree on how the puzzle goes together.

It's frustrating. There are viewpoints on the extremes, but most sides do agree: Australia is making the transition to a cleaner energy future.

Rather than informed discussion, the complex story of electricity and gas in Australia is too often reduced to a sound bite.

Public debate is less about rational argument and interrogating a proposal; it's about assuming your adversary is motivated by the very worst of intentions and dismissing them with a label, or the flourish of a "*big stick*".

"*Gouging, fat-cat energy companies*" ... It's a phrase repeated so often you'd be forgiven for asking if there is any other kind of energy company.

"*Lazy tax*" and "*bandits*" are made for hashtags.

Last month news leaked that the Business Council of Australia was exploring with members an approach where industry would take responsibility for reducing emissions.

The government responded by accusing business of lacking humility and implying the proposal was an attack on democracy.

Energy companies aren't blameless. So, permit me a soundbite of my own: *politics is making it very hard for good politicians to do the right thing.*

The entire electricity supply chain, including retailers, is culpable in a failure to provide affordable, reliable and cleaner energy.

We've let down families and businesses across the country.

However, the Australian Competition & Consumer Commission makes no reference to "gouging" in its recent 400-page assessment of what went wrong.

It starts by castigating federal and state governments for an inability or unwillingness to agree a workable national policy.

My point is, no one's hands are clean. There is more than enough blame to go around.

So, what's to be done? The trouble is it's very hard to reason your way out of a problem you didn't reason yourself into.

That's where we are today. More recently the English comedian, actor and activist Stephen Fry said this:

"One of the greatest human failings is to prefer to be right than to be effective."

I love that. For me, it speaks to resisting the temptation to rush to certainty, to having the conviction to ask questions with an open mind and having the courage to risk being wrong.

It's about being humble and listening to our experts – whether that's in science, technology, engineering and mathematics generally, or in energy specifically.

The Australian Academy of Technology & Engineering – *our* Academy – is needed more than ever in the public debate. Otherwise we risk solutions which *feel* right, rather than what *is* the right thing to do.

It's a bleak picture, and scaremongering is not what we want to be known for.

We want to be known for fixing things. We do believe energy is solvable.

Australians live in the greatest country on earth. In the more than 60,000 years people have spent on this continent, our home has been harsh on us. That's made us smart, inventive and tough. We are used to tackling challenges.

I am convinced it is possible to deliver affordable, reliable and cleaner energy for families and businesses, no matter where they are or how much they make.

The first step is for our experts and our business leaders to speak up. Ask questions. If not us, then who? Be brave and test the arguments, and not the individual – in other words, play the ball, not the person.

Let's remember, the proven route to advancing scientific understanding and public debate is constantly challenging what we think we know.

The world is not flat. And some of the systems we created thousands of years ago are as vital today as they ever were.

If only occasionally, have some doubt. Try it. It's good for the soul. And it's good for people.

Thank you for listening.

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