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Policy Brief

MAGICAL THINKING?

Will Technology Save Us from
the Climate Crisis? ?

7 December 2021 | Jeremy Baskin

Summary

Key Points

This Policy Brief makes the following key points:

(a) Can the Australian Government's policy of 'net zero emissions by 2050' and Long-Term Emissions Reduction Plan be achieved by 'technology not taxes'?

(b) Technologies are not value neutral or beyond politics. Even where a society agrees on the end (here, avoiding runaway climate change), it must still choose from among the available technological means. Other considerations at play may include how costly a technology is, whether it generates other, unacceptable, problems (e.g. carbon capture projects increasing emissions), and what happens if it should fail.

(c) When thinking about climate change and technology there are two unfortunate tendencies. Firstly, to think only, or mainly, about 'big' highly-engineered technologies – such as nuclear power or hydrogen power – and to overlook technologies such as afforestation, improved home insulation, and public transport. Secondly, to spend too much time thinking of novel technologies and not enough time thinking about the technologies that already exist.

(d) We already have all the technologies we need to de-carbonise our economy and society.

(e) If we do not accelerate our transition to a clean economy, using the right technologies, we may end up relying on dystopian technologies such as solar geoengineering. For Australians this would mean taking the climate that others decide to give us.

Recommendations

This Policy Brief makes the following recommendations:

(a) **Avoiding 'magical thinking':** We need to avoid the trap of assuming that thinking about something amounts to doing it, expecting an outcome without the instruments to get there.

(b) **Using existing technologies:** We need to adopt a more expansive understanding of climate technologies to include measures such as afforestation, improved home insulation, and public transport, and invest in them.

(c) **Using overlooked policy levers:** For instance, energy demand technologies are as important as energy supply technologies. If demand can be reduced, then the greening of supply becomes easier. Reducing electricity demand does not get the attention it deserves.

(d) **Thinking small to think big:** Hundreds of smaller initiatives, often local, can make a real difference. Many available and affordable technologies have not been rolled out at scale.

(e) **Thriving within our limits:** We need to approach climate change, not as a single problem, but as a manifestation of a larger problem: that the human footprint has gone beyond the Earth's carrying capacity. Developing new technologies to help us tackle climate change requires giving reward and recognition to those able to produce technologies that can do more with less.

Magical Thinking?
Will Technology Save Us from the Climate Crisis?

1. Introduction

The Australian Government has now committed to a climate policy of 'net zero emissions by 2050' and a Long-Term Emissions Reduction Plan. Can this goal be achieved by 'technology not taxes' and with 'choices not mandates', as government claims? Or does the plan contain fatal flaws, as many critics suggest?

Here I focus on technology and climate change. I put to one side four widely criticised aspects of the plan:

- **the lack of clarity** as to whether this policy covers all greenhouse gas emissions or only carbon dioxide, alongside the potential for 'net' to be a weasel word;

- **the absence of clear interim targets**, or stepping stones, to facilitate reaching the 2050 goal;

- **the forgoing of taxation as a policy instrument**, whilst committing government to invest in some technologies. Taxing what one wants less of, and subsidising what one wants more of, is the standard tool of market-based policymaking;

- **the exclusion of mandates** implies not requiring, for example, appliances to be more energy efficient or energy companies to derive an increasing proportion of their supply from renewable energy sources.

We can, following the scholar Jon Agar, think of technology as the 'designed, material means to an end' which typically 'intervenes between scales'. Even where a society agrees on the end (in this case avoiding runaway climate change), it must still choose from among the available technological means. Further, there may be other considerations influencing this choice, such as how costly a particular technology is, how it is produced (does it generate other, unacceptable, problems?), whether an acceptable balance between beneficiaries and losers can be anticipated, and what happens if it should fail (think Fukushima)? In short, as Boaz Miller observes, technologies are never simply value neutral or beyond politics.

2. There are Technologies and then there are Technologies

When thinking about climate change and technology there are two unfortunate proclivities. Firstly, to think only, or mainly, about 'big' highly-engineered technologies – such as nuclear power or hydrogen power.

These are, of course, technologies. But planting a tree, or re-foresting a despoiled landscape, is a technology too. Whether nuclear power, say, has a place in enabling low emission energy generation, as even some 'deep green' advocates acknowledge, is not the point here.

When thinking about climate change and technology there are two unfortunate proclivities. Firstly, to think mainly about 'big' highly-engineered technologies – such as nuclear power or hydrogen power. Second, to focus unduly on new technologies.

> We run the risk of what some call 'magical thinking': the assumption that thinking about something amounts to doing it, expecting an outcome without the instruments to get there.

My point is that we need a more expansive understanding of climate technologies. Afforestation, improved home insulation, and public transport are technologies too. In addition, technologies which operate at human scale and are less centralised, are more likely to be resilient in a fast-changing world.

A second unfortunate tendency is to spend too much time thinking of novel technologies and not enough time thinking about the technologies that already exist.

I have spent hours in geo-engineering seminars listening to proposals to place mirrors in space to deflect incoming sunlight, or to scatter olivine as a powder on tropical lands, among many, many other proposals. Often these are the hobbyhorse of a particular, well-meaning, scientist. Generally, they are unproven at scale or ignore the many negative externalities which accompany them, or the lifecycle emissions needed implement them.

These novel proposals are all very well and there is even a case for providing public seed funding to some of them. Technologies such as so-called 'clean hydrogen' to produce energy may even be important additions to society's quiver.

But the general truth of the matter is that we already have all the technologies we need to de-carbonise our economy and society. It is not an absence of technology that is the obstacle to tackling climate change. We run the risk of what some call 'magical thinking': the assumption that thinking about something amounts to doing it, expecting an outcome without the instruments to get there.

Geo-sequestration by means of Carbon Capture and Storage (CCS) is the most obvious contemporary example. CCS involves capturing CO_2 at the point of emission – say a coal-fired power plant or a gas extraction platform – then compressing the gas into liquid form (a high energy activity), then injecting it into available underground reservoirs, and finally ensuring it does not leak back into the atmosphere. Its appeal, for its proponents, lies in its promise to enable CO_2-emitting activities to continue.

Billions of dollars of taxpayer subsidies have been invested into this technology, almost $4bn in Australia alone. The limited number of CCS pilot projects globally have performed underwhelmingly from an emissions reduction perspective. Indeed many have generated an increase in net emissions! The biggest project, in Western Australia, is associated with major technical problems. In short, as a growing body of research indicates (see e.g. here and here), CCS is not proven at scale, or from a cost perspective, as an emissions-reducing technology.

3. Energy Demand Technologies are as Critical as Energy Supply Ones

A major reason behind Australia's high per capita emissions, is our long-term reliance on coal-fired generation. Low emission technologies – mainly solar, wind and hydro – are increasing and last year renewable energy comprised about 27% of total generation capacity.

But, as the numbers imply, the vast bulk (over 70%), came from emissions-intensive, fossil fuel sources. Contestation around greening electricity supply dominates the headlines, and technological considerations and reliability concerns form part of this.

Far less policy attention is paid to reducing electricity demand. If demand can be reduced, then the greening of supply becomes easier. Reducing electricity demand does not get the attention it deserves.

Hundreds of smaller initiatives, often local, can make a real difference. Many existing technologies are available and affordable but have simply not been rolled out at scale. At the household level alone there is a great deal of room to install more efficient insulation, notwithstanding the implem-

entation problems with the 'pink batts' programme. And we have hardly begun to explore (and mandate) improved appliance efficiency, nor have we scaled-up the use of reverse-cycle aircon and heat-pump or electric-resistance water heaters.

4.   The Need to 'Think Inside the Box'

We are regularly enjoined to 'think outside the box' and there is a social bias towards applauding the new, the surprising and those with limitless vision. Some disruptive technologies, using 'disruption' in a positive sense, are certainly linked to leaps in the imagination of their inventors and producers.

But in reality, most new technologies emerge out of incremental adjustments to existing technologies, or through the application of an existing technology in a new way – think the re-imagining of the original handful of mainframe computers as tools that could be smaller, dispersed and widely available.

When it comes to climate change and technology the big challenge is to innovate 'inside the box'. Climate change is, after all, not so much a problem as a manifestation of a larger problem: that the human footprint has gone beyond the Earth's carrying capacity.

Other manifestations include declining biodiversity and species extinction, disruption of the phosphorus cycle, and the increased spread of zoonotic disease. This overshooting of 'planetary boundaries', as the Stockholm Institute calls it, suggests there are limits we should respect if we want the Earth, as our home, to continue to be recognisably habitable in the years ahead.

We need to learn to innovate within those limits, to thrive inside the box so to speak. Technologies which, whilst tackling carbon emissions, also produce added pressures on other aspects of the Earth system may simply displace the fundamental problem of 'overshoot' from climate to another vector. The real innovators are those able to develop new technologies, or adapt existing ones, within planetary limits. Technologies that facilitate a lighter footprint include innovations that assist the transition from fossil fuels in established industries such as agriculture or transport.

Developing new technologies to help us tackle climate change requires giving reward and recognition to those able to innovate 'within the box', producing technologies that can do more with less: using fewer resources, with limited negative social externalities, and with positive impacts on the Earth system generally.

These will often be modest, incremental, locally-adapted technologies. They will enhance our capacity to transform our current Take-Make-Waste linear paradigm into a more sustainable "circular economy". They are unlikely to be things like CCS and so-called 'clean hydrogen' (reliant on CCS for its 'clean' claim), two of the technologies prioritised in government's Long-Term Emissions Reduction Plan.

Inside the box innovation is not only about doing more with less. It is also about creating a route to a more contented and sustainable future, ensuring that less can indeed be more.

The big challenge is to innovate 'inside the box'. Climate change is, after all, not so much a problem as a manifestation of a larger problem: that the human footprint has gone beyond the Earth's carrying capacity. The overshooting of 'planetary boundaries' suggests there are limits we should respect if we want the Earth, as our home, to continue to be recognisably habitable in the years ahead.

5. Conclusion

Climate change has many drivers. The absence of technologies to tackle it is not one. The technologies we need are already here. It would be wonderful if new technologies emerge. And the pandemic has given hope by showing us the speed with which a new technology, mRNA vaccines, can be developed and rolled out.

But waiting for these inventions before acting to cut emissions is irresponsible, and we should not make our transition to net zero dependent on this. In meeting the climate challenge governments will need to use technology *and* taxes, encourage good public choices *and* use mandates where needed, to encourage a transition from old to new.

It is one thing to encourage private investors to make CCS workable as a technology to achieve net zero emissions. It is another thing to allocate more taxpayer funding to a technology that has not delivered on its promise.

Subsidising 'clean hydrogen' needs to be treated with similar caution to avoid the risk of throwing good money after bad.   Better to subsidise a hundred projects developing technologies that enable us to live in new ways, with a lighter footprint and within the Earth's limits, rather than 'picking winners' and selecting a handful of projects aimed at allowing us to continue our existing ways.   Better to focus as much on technologies which reduce energy demand as on technologies which green energy supply.

Technologies of humility, as Sheila Jasanoff has called them, are more likely to be effective than technologies of hubris. If we don't get our transition to a clean economy moving sooner and faster, and using the appropriate technologies, then we may end up relying on dystopian technologies such as solar geoengineering.   For Australians this would mean taking the climate that others decide to give us.

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COP26: Resources

Find out more about the COP26 United Nations Climate Change Conference, hosted by Italy and the UK in Glasgow from 31 October–12 November 2021, and its aftermath, at the following websites:

Official website

https://ukcop26.org/

Pursuit-University of Melbourne

The Pursuit platform at the University of Melbourne provides cutting-edge research and insightful commentary by world-leading experts, including a special section on COP26:

https://pursuit.unimelb.edu.au/topics/cop26

Melbourne Climate Futures

Melbourne Climate Futures at the University of Melbourne brings researchers together to contribute to greater action on climate change. See their explainers and analysis of COP26:

https://law.unimelb.edu.au/centres/mcf#cop26

What Technologies are We Talking About?

When thinking about climate change and technology there are two unfortunate proclivities. Firstly, to think only, or mainly, about 'big' highly-engineered technologies – such as nuclear power or hydrogen power. Secondly, to spend too much time thinking of novel technologies and not enough time thinking about the technologies that already exist. We need a more expansive understanding of climate technologies. Home insulation, public transport, planting a tree, or re-foresting a despoiled landscape are technologies too.

References

Note: A variety of references in this text are provided as hyperlinks within the text. This references section provides an alphabetical list of the main sources cited throughout the text.

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Governing After Glasgow is a mini-series focused on the climate crisis summit in Glasgow (31 October - 12 November 2021) under the Governing During Crises research theme established by the School of Government at the University of Melbourne. The series seeks to develop our understanding of governing in the face of different types of crisis, at a time when Australia has recently faced the bushfire crisis, is currently addressing the COVID-19 pandemic, and faces even larger and longer-term challenges including climate change.

This Policy Brief series aims to distil academic research into policy analysis and clear recommendations, drawing on the cutting-edge research taking place at the School of Government and the University of Melbourne more broadly, as well as the School of Government's extensive global networks. Selected briefs will be produced in collaboration with the COVID-DEM project (www.democratic-decay.org), which examines how the pandemic is affecting democracy in Australia and worldwide.

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