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Climate Change Blueprints

Justice and Climate Transitions

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Grand Challenge on Climate Change
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Preface



Climate change poses one of the most unfair environmental crises imaginable. Globally, the poorest nations have contributed the least to past emissions of greenhouse gases, yet they are the most vulnerable to their impact. Richer, high-emitting nations are in stark contrast equipped with better means for adaptation via existing wealth, established infrastructure, and access to advanced technology. When Australian cities such as Perth and Sydney get low on drinking water, desalination plants are built. Who will build a desalination plant in sub-Saharan Africa or Syria?

Climate inequity is not just about a limited means to adapt: some of the worst impacts of climate change look set to target tropical nations and low-lying communities the most, with unliveable heat extremes, intensifying tropical cyclones, and inundation from sea-level rise. Many of the wealthier higher-latitude nations might in contrast temporarily benefit from more favourable cropping conditions and milder winters. Ultimately, though, all nations are set to lose from climate change, so a pathway to zero emissions is needed, but it must be established fairly.

This *Justice and Climate Transitions* blueprint sets out a framework for how justice and equality should not only shape but also motivate our transition to a low carbon future. The report is one of three Climate Change Blueprints launched in November 2017. The aim of this blueprint

is to outline the necessity, and benefits, of embedding justice and equality into our transition framework for moving to a zero emissions future. The report was compiled by leading experts in the field and produced under the auspices of the UNSW Grand Challenges program.

The UNSW Grand Challenges program, an initiative introduced in the UNSW 2025 Strategy, aims to address the biggest issues facing humanity. The program leads the debate and facilitates critical discussions and actions with researchers, government, policymakers, business and the wider community; on areas such as refugees and migration, inequality, technology in the 21st century, and climate change.

Since its inception in 2015, the UNSW Grand Challenge on Climate Change has hosted lectures, events, and facilitated discussions on topics ranging from impacts and security to intergenerational consequences and adaptation. These Climate Change Blueprints represent a major effort to inform the community of the challenges and opportunities facing society in the areas of energy, human health, and justice.

This *Justice and Climate Transitions* blueprint is one of the few pieces of research to consider justice and equality and their relation to climate transitions in detail. The blueprint considers Australia's role as a global and fair citizen, demonstrating that if we are to play a just

and equitable role, we should dig deeper than our current Paris commitments. We are not only very high emitters per capita; we are also massive exporters of fossil fuels. The report also considers the more local context of fairness and justice within nations including Australia. Poor communities and people, like poor nations, are generally the worst equipped to deal with the harsh changes set to accelerate as our planet warms.

I commend this *Justice and Climate Transitions* blueprint as a landmark report outlining the ways we need to incorporate justice and equality as we transition to a new zero emissions society. As a nation that is highly vulnerable to climate change, Australia has much to gain by doing so. Not only can we create a fairer and more equitable society, but we can also limit the scale of climate change by participating in international negotiations as a fair, and therefore exemplary, player, and prosper economically by exporting our best technologies for safe renewable energy to poorer nations worldwide.

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Executive Summary

This blueprint demonstrates the important role justice-related goals play in shaping and motivating a transition to a low carbon future. It discusses the kind of framework required to incorporate justice and some of the questions such a framework raises.

The blueprint makes the case that justice goals are crucial in two key areas of climate transition: the motivations for undertaking a transition, such as what obligations Australia has to cut its emissions, and how the benefits and burdens of a transition should be distributed within society.

The blueprint argues that justice goals will determine how quickly Australia ought to transition and how substantial the transition ought to be. Crucially, our transition will also be determined by our justice commitments to assisting other countries.

Australia's choices must be justified not only in terms of how they will help mitigate climate change, but also in terms of their fairness to the already disadvantaged and to other countries. In this sense, addressing questions of justice is essential and must, therefore, play a central role in planning a climate transition.

The blueprint argues that a fair approach to distributing the benefits and burdens of a climate transition must be the focal point of a transition strategy, not just an afterthought. Further, any climate transition should take a unified approach that balances mitigation goals with broader goals relating to justice.

This is especially important as any climate transition will be a costly and disruptive exercise, so we need to consider who benefits and who is burdened by the particular transition path we take.

The blueprint also argues that including justice considerations from the start is a better way to guarantee that a climate transition will be successful. Adopting goals other than simply reducing emissions may help make a climate transition more acceptable, as well as fairer. So not only will ignoring the importance of justice rob us of an ability to appropriately consider other benefits of a climate transition, it will also lessen the likelihood of a successful transition.

Yet expressing a commitment to justice is not enough. What is needed is a concrete framework for assessing the justice of a transition. The blueprint develops such a framework by focusing particularly on the goal of reducing inequality. It provides a framework for incorporating this goal into the decision-making process about which greenhouse gas (GHG) emission reduction strategies to pursue. In two case studies, the blueprint shows that a properly-designed climate transition will likely provide opportunities for society to decrease prevalent inequalities while also avoiding dangerous climate change, despite the possible tension between these two goals.

Focussing on justice alongside climate goals, changes the necessary climate transition not just as a challenge to overcome, but also as an opportunity to embrace. The need to make significant changes in Australian's way of living can be harnessed to make society more just in a number of positive ways.

The blueprint is not an attempt to answer all of the issues raised by incorporating justice goals, but it does articulate what a justice-based framework might look like, the challenges associated with such a framework, and why such a framework is needed.

Findings

- Issues of justice are inescapable, and must therefore play a central role in planning a climate transition;
- Incorporating justice makes a transition more likely to succeed, not less likely;
- A 'unified' conception of justice is required;
- Justice concerns the shape, speed and extent of the transition that will be required;
- Climate transitions can reduce inequalities;
- Genuine engagement with our international obligations will alter Australia's transition strategy.

Recommendations

- Australia's climate transition should be informed by considerations of justice;
- A climate transition strategy should adopt the dual goals of achieving climate mitigation *and* reducing inequality;
- Australia should adopt an emissions reduction target more stringent than that set during the Paris Agreement, taking into account its disproportionately high share of emissions in recent history;
- Australia should attempt a more rapid transition to renewable technologies;
- Australia should ensure that any mitigation strategy addresses inequalities by: directing subsidies to the disadvantaged and, increasing the active transport (walking and cycling) infrastructure.

Motivating Mitigation

Why justice?

There is widespread agreement that a climate transition strategy ought to be just and fair. Indeed, it would be surprising to find anyone who was prepared to argue explicitly that a transition should be *unjust* or *unfair*. However, merely agreeing on the need for a just transition does not, on its own, get us very far. The question of what justice consists of still remains. Despite widespread agreement on the need for a just transition, little systematic attention has been paid to what principles ought to guide a just transition, once the extent of the transition has been determined.

This is because a commitment to 'justice' or 'fairness' at an abstract level does not provide guidance about what circumstances are just or fair. What is needed is a conception of justice or fairness that says something concrete about what justice means in the context of a climate transition. For example, does a just transition involve simply reducing emissions, or also assisting the disadvantaged? If the latter, what

kind of assistance is necessary? Should the focus be on making people more equal, prioritising the needs of the disadvantaged, or something else? What if pursuing the goal of making people more equal makes our transition costlier?

Similarly, decisions about the speed and scope of a transition must consider fundamental motivations. In this blueprint we develop a framework that helps us answer these questions.

Transitions and the carbon budget

Establishing exactly why we ought to transition is one of the most important ways in which principles of justice are relevant to climate transitions. A focus on justice also helps to determine the extent and speed of the transition required, as well as balancing Australia's needs against those of other countries. To appreciate these factors, it is necessary to consider the role of local and global 'carbon budgets', discussed below.

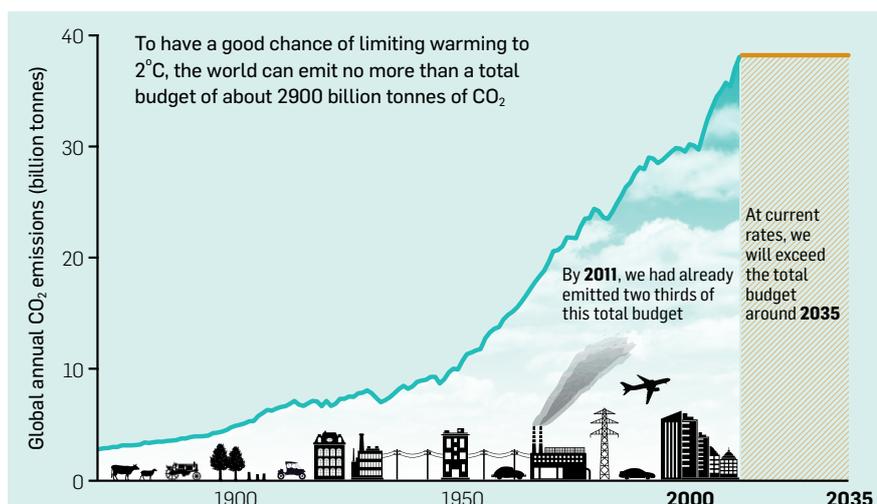
To avoid dangerous climate change the world must move from emitting high amounts of greenhouse gases (GHGs) to emitting very low, zero, or even 'negative' amounts. The transition has already begun, but needs to speed-up considerably if the world is to meet its global emission targets.

The majority of the world's countries have, by signing the Paris agreement, endorsed the common goal of keeping the global temperature rise below 2°C. The global carbon budget is the total amount of GHGs we can emit globally from now on, if we are to have a good chance of meeting this goal. Local carbon budgets are, then, the share of the global carbon budget allocated to particular countries in different regions. However, the world's current combined domestic emissions targets, even if met, are unlikely to meet the 2°C goal (Figure 1). The world must aim higher and transition faster.

A fast and efficient transition is particularly urgent for countries like Australia which have very high current levels of GHG emissions. Australia's Nationally Determined Contribution (NDC), following the Paris Agreement, includes a target of reducing GHG emissions, including land use, land use change and forestry (LULUCF) by 26–28% below 2005 levels by 2030.²

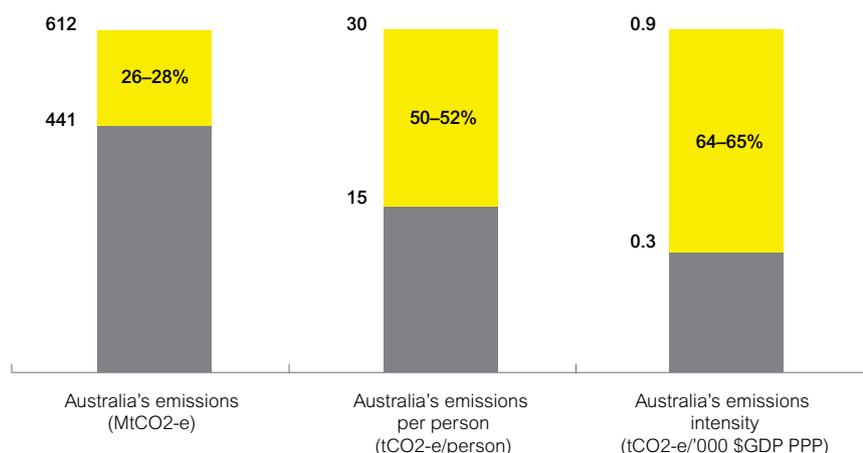
A FOCUS ON JUSTICE ALSO HELPS TO DETERMINE THE EXTENT AND SPEED OF THE TRANSITION REQUIRED, AS WELL AS BALANCING AUSTRALIA'S NEEDS AGAINST THOSE OF OTHER COUNTRIES

Figure 1: How much carbon dioxide can the world emit?¹



¹ Ministry for the Environment, New Zealand Government. (2015). New Zealand's Climate Change Target: Our Contribution to the New International Climate Change Agreement, p. 6.
² Australian Government, Department of the Environment and Energy. (2015). *Australia's 2030 Emissions Reduction Target: Strong, Credible, Responsible* (p. 4).

Figure 2: Key data and facts on Australia's 2030 emissions reduction target³



Date	Units	Number
Australia's Emissions in 2005	MtCO ₂ -e	661
Australia's Emissions Target in 2020	MtCO ₂ -e	532
Australia's Emissions Target in 2030	MtCO ₂ -e	440–452
Australia's Emissions 2020	%	-5 per cent on 2000 levels by 2020
Australia's Emissions 2030	%	-26% to 28% on 2005 levels by 2030
Reduction in emissions per capita 2005–2030	%	50–52
Reduction in Emissions per unit of GDP 2005–2030	%	64–65
Annual rate of reduction in emissions 2010–2020	%	0.9
Annual rate of reduction in emissions 2020–2030	%	1.7–1.9

This translates into a range of 445–458 Metric tons of carbon dioxide equivalent (MtCO₂-e) emissions in 2030, including LULUCF.⁴

Australia's obligation to transition from a high-emitting way of life derives, in part, from its international commitments. On the basis of our Paris commitments we have an obligation to reduce our domestic emissions. That is what we have agreed to do. Australia has also agreed under its Paris commitments to contribute to other nations' mitigation efforts via various mechanisms,

including the Green Climate Fund. The Fund was set up to address the pressing mitigation and adaptation needs of developing countries. Australia has pledged USD \$200 million between 2015 and 2018.⁵ Still, existing agreements are only part of the story. The commitments made so far do not, in all likelihood, go far enough.

Further responsibilities

Australia's current emissions reduction target (Figure 2) is below both what would accord with a fair share relative to other countries and what would align fairly with global carbon budget targets. All other industrial countries, except Canada and New Zealand, have proposed 2025 or 2030 goals significantly below 1990 levels.⁶ The European Union, for instance, has pledged a reduction in domestic emissions of 30–39% below 1990 levels.⁷ Australia's goal of reducing emissions by 26–28% below 2005 levels equates to a reduction of only 13–15% below 1990 emissions levels.⁸ Based on this comparison alone, Australia is not doing its fair share.

The view that Australia is required to follow a much steeper emissions reduction trajectory is widespread. The Climate Council states that:

Australia must cut its greenhouse gas emissions much more deeply and rapidly to contribute its fair share in meeting the climate change challenge. A 2030 target of a 40–60% reduction below 2000 levels (or a range of approximately 45 to 65% below 2005 levels) is the bare minimum for Australia to be both in line with the science and the rest of the world.⁹

Australia also has a duty to make more significant reductions in GHG emissions for two further reasons: the nation has emitted more than its share in the past, and it contributes heavily to global emissions by exporting a lot of fossil fuels.

3 Australian Government, Department of the Environment and Energy. (2015). *Australia's 2030 Emissions Reduction Target: Strong, Credible, Responsible* (p. 4).
 4 Climate Action Tracker. (n.d). *Australia set to overshoot its 2030 target by large margin* (p. 5). Retrieved from http://climateactiontracker.org/assets/publications/briefing_papers/Australia.pdf. Accessed 12/9/17.
 5 Julie Bishop (Minister For Foreign Affairs). *Australia to lead Green Climate Fund Board in 2017*, media release, Department of Foreign Affairs and Trade, Canberra, 16 December 2016. Retrieved from https://foreignminister.gov.au/releases/Pages/2016/jb_mr_161216.aspx. Accessed 12/9/17.
 6 Climate Action Tracker. (2015). *Australia*. Retrieved from <http://climateactiontracker.org/countries/australia/2015.html> (Climate Action Tracker). Accessed 12/9/17.
 7 Climate Action Tracker. (2017). *EU*. Retrieved from: <http://climateactiontracker.org/countries/eu.html> Accessed 12/9/17
 8 Climate Action Tracker. (n.d). *Australia set to overshoot its 2030 target by large margin* (p. 5). Retrieved from http://climateactiontracker.org/assets/publications/briefing_papers/Australia.pdf. Accessed 12/9/17.
 9 Hueston, G., Flannery, T., & Steffen, W. (2015). *Halfway to Paris: How the World is Tracking on Climate Change*. The Climate Council. Retrieved from <https://www.climatecouncil.org.au/halfway-to-paris-how-the-world-is-tracking-on-climate-change>. Climate Action Tracker rates Australia's pledges as "inadequate", indicating that Australia's commitment is not in line with most interpretations of a "fair" approach to reach a 2°C pathway. Climate Action Tracker. (n.d). *Australia set to overshoot its 2030 target by large margin* (p. 2). Retrieved from http://climateactiontracker.org/assets/publications/briefing_papers/Australia.pdf. Accessed 12/9/17.

Figure 3: Summary of past, present and projected figures for Australian CO₂-e emissions¹⁰

Date	Units	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Total Australian emissions with exports excluded	MtCO ₂ -e	565.6	594.4	617.3	638.2	652.7	655.6	659.8
Total Australian emissions from coal exports	MtCO ₂ -e	1016.36	1011.92	1012.52	1032.68	1048.6	1063.69	1074.44
Total Australian emissions from natural gas exports	MtCO ₂ -e	67	95.95	135.88	182.51	198.32	199.13	201.54
Total actual emissions	MtCO ₂ -e	1648.96	1702.27	1765.7	1853.39	1899.62	1918.42	1935.78
Total Australian emissions 2020 target	MtCO ₂ -e							532

Historical responsibility

One important principle of justice often applied in this context is the principle of *historical responsibility*. According to this principle, historically high-emitting countries should be allocated less of the remaining global carbon budget than historically low-emitting countries.¹¹

Historically, Australia has emitted a disproportionately high share of GHG emissions, especially in the recent past when the harmful consequences of GHG emissions have been well established. While there is no universally agreed upon formula for allocating responsibility for historical emissions, it is safe to say that Australia has far exceeded any likely past quota.

In 1990, Australia's per capita emissions were 28.02 tCO₂, excluding LULUCF. In contrast, per capita emissions for the world, the EU, and China for the same year were 5.67 tCO₂, 9.82 tCO₂, and 2.78 tCO₂, respectively. These figures are less than one-third of Australia's per capita emissions. As of 2013, Australia's per capita emissions were 25.09 tCO₂. Despite this small decrease, Australia's per capita emissions remained much higher than world, EU, and China figures for the same year, 6.31 tCO₂, 8.32 tCO₂, and 8.65 tCO₂, respectively. Australia's 2013 per capita figure is approximately three times higher than those of the EU and China.¹²

For decades, Australia has continued to emit GHGs at these high rates, despite convincing evidence that they are thereby contributing to the risk of dangerous climate change. This affects everyone on the planet: Australians, people in other countries, and especially the poorest people in the world. By over-emitting, Australia not only contributes to the risk of dangerous climate change, it places pressure on others to reduce their emissions more rapidly than would otherwise be required. By emitting more than a fair share the nation places a demand on others to 'take up the slack' in emissions reductions, creating further difficulties and hardships.

Australia's responsibility for excessive historical emissions – particularly those produced in full knowledge of modern climate science – is one justice-based reason to make more significant cuts in domestic emissions than committed so far.¹³ A principle of historical responsibility is thus one issue of justice that should motivate and inform the nation's climate transition strategy.

Exports

Australia is not only a heavy domestic emissions producer. We also export a huge quantity of coal and gas, which contribute significantly to global emissions. As shown in Figure 3 and Figure 4, the amount of emissions produced from Australia's exports of fossil fuels is double our domestic emissions. Arguably, we are partly

causally responsible for those further emissions, though they do not currently count in our domestic emissions budget.

To see why we ought to take some responsibility, consider the following analogy. Suppose that a country exported tobacco to a developing country. Given what we know about the links between smoking and death and disease, the exporting country is plausibly implicated in the harm caused and morally responsible for at least some of that harm. Another example concerns uranium exports. Most countries place restrictions on where their uranium ends up. The risks of uranium falling into the wrong hands, accidents, storage issues, and so on, are just too great with some countries to countenance an export program. Should one country knowingly export uranium to another country where these issues are present, we could rightly hold it partly liable for any harms. If this is true, we ought to take some responsibility for those emissions produced by the burning of our fossil fuels, from which we profit significantly. For the same reasons that a country ought to share the blame when they knowingly contribute to harm via their exports of, say, uranium, a country ought to also share the blame for producing and selling commodities such as coal or gas. This is not to say that Australia ought to be responsible for *all* of those emissions, as well as its own domestic emissions. It is merely to say that Australia ought to bear *some* level

10 Data from the Department of the Environment's *Australia's Emission Projections 2029-2030* (March 2015, p. 32); and Australian Government. Department of Industry, Innovation and Science. Office of the Chief Economist. *Resources and Energy Quarterly*. Commonwealth of Australia, 2016.

11 Other terminology associated with historical responsibility in this context includes "Polluter pays", "accountability/sensitivity", "contribution to problem", "Brazilian proposal" (the latter after a proposal along these lines made by the Brazilian delegation to the Kyoto Protocol negotiations in 1997 (included in Annex I to the United Nations Framework Convention on Climate Change (UNFCCC)). See: Caney, Simon. "Justice and the distribution of greenhouse gas emissions." *Journal of global ethics* 5.2 (2009): 125-46.; Page, Edward. "Climate Change Justice." In *The Handbook of Global Climate and Environmental Policy*, edited by Robert Falkner. Sussex: John Wiley and Sons, 2013.; Morrow, David R. "Climate Sins of Our Fathers? Historical Accountability in Distributing Emissions Rights." *Ethics, Policy & Environment* 19.3 (2016): 335-49.; Meyer, Lukas H. and Dominic Roser. "Climate Justice and Historical Emissions." *Critical Review of International Social and Political Philosophy* 13.1 (2010): 229-53.

12 WRI, CAIT. (2014). Climate Analysis Indicators Tool: WRI's Climate Data Explorer. Washington, DC: World Resources Institute. Available at: <http://cait2.wri.org>. Accessed 12/9/17.

13 Duus-Otterström, Göran. "The problem of past emissions and intergenerational debts." *Critical Review of International Social and Political Philosophy* 17(4) (2014): 448-69. Meyer, Lukas H. and Dominic Roser. "Climate Justice and Historical Emissions." *Critical Review of International Social and Political Philosophy* 13(1) (2010): 229-53.

of responsibility for these emissions, either by setting higher reductions targets to offset them, or by significantly downsizing its fossil fuel exports.

If we consider the consensus view about the inadequacy of the commitment Australia has already set through the Paris Agreement,

its historical responsibility for past emissions, and its status as a heavy exporter of fossil fuels, it appears that Australia is doing much less than its fair share in enabling a swift and efficient global climate transition. To meet its justice-based obligations it would appear, then, that Australia ought to set more stringent reductions targets.

International obligations

Establishing the source and strength of the motivations to reduce our emissions raises a further justice related question: how much should the focus be on domestic transition, and how much on assisting other countries to transition? Given that Australian emissions have contributed to potentially harming others, should the nation direct efforts and resources toward their climate transitions, or should it focus on making its own reductions as significant as possible?

If Australia were to further reduce its domestic emissions beyond its Paris target and beyond its historical responsibility, taking exports into account, this would lessen the emission reduction burden on other countries. This might allow them to make a smoother climate transition. Nonetheless, some action in addition to domestic emissions reductions might also be required. Many developing countries face difficulty implementing the required lifestyle and infrastructure changes.¹⁶ They will likely need practical assistance with the transition process.

To ensure a just response, Australia needs to help other nations implement their transition plans. This could be achieved in several ways. One is shifting resources from domestic transition to the Green Climate Fund or a similar fund. Another is sharing developments in renewable energy technologies. Helping to develop other countries in this manner is one way to take seriously Australia's obligation to mitigate the harms caused – and being caused – by its high historical emissions and exports.

Figure 4: Australian national and exported GHG emissions¹⁴

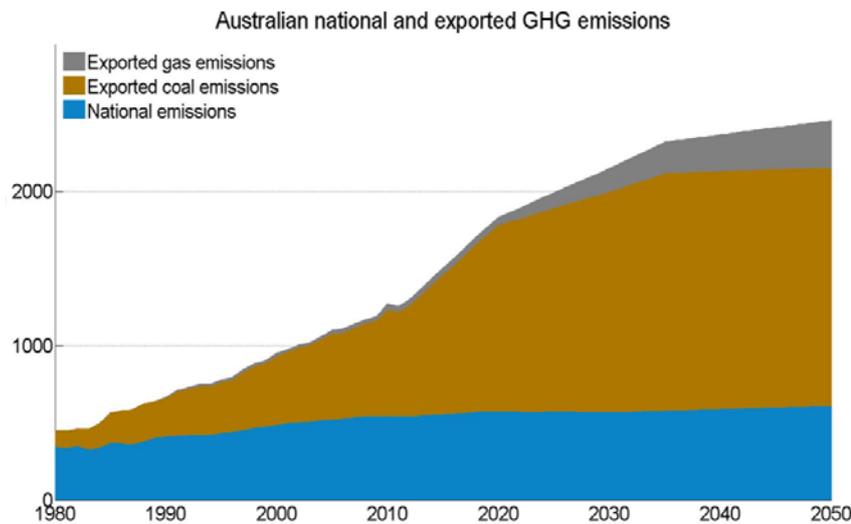
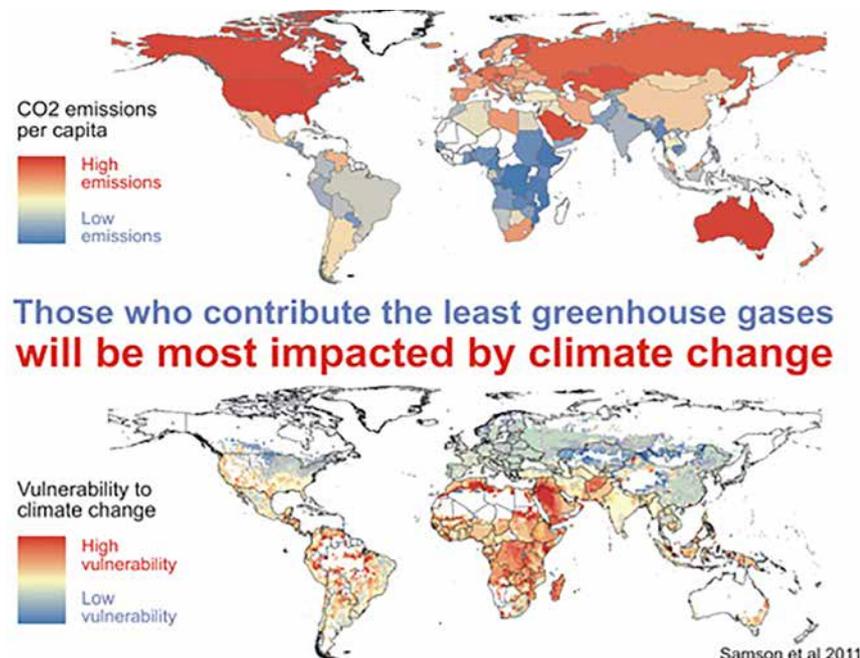


Figure 5: Those who contribute the least greenhouse gases will be most impacted by climate change¹⁵



14 Moss, J. 'Mining and Morality', *Australian Journal of Political Science* 51.3 (2016): p.499.

15 Cook, J. "Those Who Contribute the Least Greenhouse Gases Will be Most Impacted by Climate Change." *Huffpost*. May 25, 2011. http://www.huffingtonpost.com/john-cook/those-who-contribute-the-_b_835718.html

16 OECD. (2012). *Green growth and developing countries: A summary for policymakers* (p. 8). Retrieved from <https://www.oecd.org/dac/50526354.pdf>. Accessed 12/9/17.

Justly Distributing the Benefits of Climate Transitions

Dual goals

As suggested above, Australia should adopt a more ambitious emissions reduction target, and embrace a faster energy transition than it has to date. Regardless of the final details of its climate change mitigation targets, however, Australia's transition requires that resources be directed towards two goals.

The first goal is to ensure that the emissions reduction target is met. Transitioning to a low-GHG society will involve many processes, from transforming the electricity supply by investing in renewable energy to increasing public transport and changing consumption habits.

The challenges and costs are considerable. For instance, a recent report from the Australian Energy Market Operator (AEMO) indicated that the cost to build a 100% renewable power system is estimated to be at least \$219 to \$332 billion by 2030 or 2050 respectively, depending on the transition scenario adopted.¹⁷

The second goal is to ensure sure that resources employed in transition are fairly distributed to achieve optimal social justice outcomes. Evaluating this goal is the second key focus of this report.

Justice is everywhere

One reason to put distributive justice at the heart of Australia's transition planning is that the effects of transition on the well-being of many in society will inevitably be significant and widespread. In this sense, distributive justice is inescapable. Installing new renewable energy capacity, cutting subsidies for the fossil fuel industry, building extensive public transport, and the like will inevitably involve large costs, while also conferring large benefits. Costs might include restrictions on the choices individuals can make, as well as the imposition of additional forms of taxation. Benefits will include not only a fair contribution to mitigating climate change, but also cleaner air, reduced congestion and more.

No matter what technologies are chosen or policy mechanisms adopted, each will produce benefits and burdens. Those benefits and burdens – particularly the burdens – must be paid for and shared by individuals or groups within society.

Sharing benefits and burdens within and between societies is a question of distributive justice. In the broadest sense, distributive justice concerns the distribution of all relevant benefits and burdens within a society and often between societies, as well. In relation to climate transitions, it concerns the sharing of the benefits and burdens resulting from a transition from a high to a low-GHG society. Ultimately, it concerns making society a more equal place.

A focus on deploying the best emission reduction technology is paramount. But technology alone is not sufficient to achieve the best kind of climate transition. It is also essential to incorporate justice-type goals and recognising why this is so. It is well understood that a range of factors influence which technological and policy approach would reduce emissions most effectively in a given country or case. These factors include cost constraints, governance, research capacity, hostile environmental conditions and degree of urban sprawl.

These and possibly other factors also influence the distribution of benefits and burdens. That is, they influence which technological or policy approach will be most just in a given country or case. Pursuit of the necessary goal of reducing our GHG emissions must be accompanied by attention to justice goals. These goals will be affected significantly by the choice of transition path. Moreover, impacts of distributing burdens in the wrong way might be severe. It is possible, for instance, to adopt an emissions reduction strategy that includes punitive tax arrangements which may burden the already disadvantaged with more of the costs.

The impacts of transition might also be felt more keenly by specific groups: for example, those who lose their jobs in fossil fuel intensive industries, or those whose health conditions require more electricity. Thus attention must be paid to a fair distribution of the significant burdens of the transition process, along with the benefits.

¹⁷ Australian Energy Market Operator. (2013). *100 per cent renewables study: Modelling outcomes* (p. 34). Retrieved from <https://www.environment.gov.au/system/files/resources/d67797b7-d563-427f-84eb-c3bb69e34073/files/100-percent-renewables-study-modelling-outcomes-report.pdf>. Accessed 12/9/17.



Moree solar farm. Credit: CATCON, Civil & Allied Technical Construction Pty Ltd

Such considerations are not unique to climate transitions. Various industries and professions regularly shut down or move to other countries, resulting in economic and well-being impacts for large numbers of people. But it is likely that the transformation required in a robust climate transition will be more widespread than, say, the ceasing of logging in old growth forests. Because of changes to people's lifestyles and costly new infrastructure, a climate transition will involve a more profound and broader societal adjustment. Nonetheless, it offers a profound opportunity as well. Replacing high carbon societies with ones that are not only low carbon but also less unequal is a positive outcome. These considerations increase the need to ensure the transition pays attention to issues of distributive justice.

Unifying justice

Considering the justice-related implications of transition plans is an important first step. But that alone will not lead to the optimal outcome when considering which technologies to deploy or what kind of taxes to adopt.

Societies are interested in improving the lives of their citizens in numerous ways such as health, education, access to the environment and mobility. What is important is that individuals have access to a range of goods that will enable them to live a better life. The provision of this package of goods should be the goal of any government. Each of these goods is generally necessary for individuals in a society to have a good life, even though individuals will need such goods to different degrees. Moreover, it is important to ensure all the relevant goods are available to individuals. Ultimately, the presence of all these goods will determine whether the distributive arrangements in a society are fair or not.

Broader moral obligations are also relevant. There are obligations to:

- make society a more equal place, to improve the lives of those worst off;
- compensate others for any harm caused;
- prevent persecution and discrimination;
- meet people's basic needs where possible;
- fulfil commitments to protect the vulnerable and voiceless;
- and more.

Ultimately, a combination of some of these broader goals should be reflected in a justice-focused climate transition plan. The combination of these or other types of justice related broader goals with the narrower goal of mitigating climate change is what we call a 'unified' approach to a climate transition.

Contrast this unified approach with standard approaches to climate transition. One typical approach is to say that the main, if not sole, aim of climate transition is reduction of emissions as quickly and efficiently as possible. This is called the 'isolation' approach.¹⁶ It is isolated because the main goal is morally simple and minimal: reduce emissions, even if some attention is paid to other issues. According to the isolation approach, other moral goals should be set aside, or considered to

SOCIETIES ARE INTERESTED IN IMPROVING THE LIVES OF THEIR CITIZENS IN NUMEROUS WAYS SUCH AS HEALTH, EDUCATION, ACCESS TO THE ENVIRONMENT AND MOBILITY.

be of secondary importance, in the pursuit of the goal of minimising GHG emissions. According to the unified approach, however, other moral goals should be pursued in conjunction with the emission reduction goal. A transition should combine concern for justice with a concern for mitigation.

Ultimately, Australia must balance the demands of these two sets of goals. But it is important that we keep them both at the heart of our decision-making process.

Does a unified approach make the transition harder or easier?

It could be argued that bringing broader justice-based goals into the climate transition decision-making framework would over-complicate an already difficult task, hampering progress. For example, requiring that a climate transition address health, education or other justice-based goals might invite criticism that it is too controversial and pragmatically unfeasible. This is an important point. But, as philosopher Simon Caney notes, much depends on the values or goals at stake.¹⁹ What he calls a 'maximal' approach to justice would have specific and perhaps controversial commitments. For example, it might entail a radical political program. No doubt some maximal ideas of distributive justice are like this and would drastically complicate the climate transition process.

In contrast, there are elements of distributive justice which are minimal and less controversial, and where disagreement would not be so great. The rest of this blueprint focuses on one such element: reducing inequality. It explores key implications of adopting the goal of inequality reduction as a guide to climate transition, alongside the goal of GHG emissions reduction. Reducing inequality is thus an answer to the question posed at the beginning of the blueprint: how should Australians understand what it means for a climate transition to be just?

There is a further response to the objection that picking a set of justice-based goals will invite controversy and stymie mitigation efforts. It is that not considering justice-based goals as fundamental would likely worsen matters. Failure to address people's concerns about who gets the benefits and who bears the costs of a wide-ranging and expensive climate transition will likely make such a transition unworkable.

A case in point is the transformation of the stationary energy sector. As some Australian states transition to a greater reliance on renewable energy, there is fierce debate concerning the effects of this on power prices, particularly for poor households. There is also disagreement about whether or not energy companies are profiting excessively, and whether or not switching to renewables would allow reliable and secure electricity supply. Add questions regarding the value of more 'distributed' energy – in part because it allows more independence – and what emerges is a complex set of justice-related goals which must be considered as part of the switch to renewables. Failure to do so will make the acceptance of an ambitious climate transition, and thus the associated potential benefits, less likely.

Analogies (justice in other contexts)

Climate transitions should be planned with reference to a broader package of goods and values, and distributive justice, generally. Numerous other public problems have this structure. For example, up to a point more education improves people's lives. It increases work and lifestyle opportunities and leads to better health and financial outcomes. Often, poor people have less access to education. These facts, together with a minimal concern for justice, mean that efforts should be made to improve education in poorer communities.

But this goal should not be pursued in an isolationist fashion. Other moral goals that might intersect with the goal to improve education should be considered. For instance, where low education levels in a community coincide with social inequality – say, along gender or race lines – it is essential to consider ways to encourage social equality, while improving education levels in the community.

As a simplistic example, imagine there is funding for ten university scholarships for Australians from poor rural backgrounds. It would be important to consider if some proportion of the scholarships should be allocated to eligible Indigenous Australians – even if it would be more costly and, thus, mean only nine scholarships could be provided.

Similarly, broad justice-based considerations influenced Australia's response to the global financial crisis in 2008. The response of the Australian government of the day, under Prime Minister Kevin Rudd, was to provide a 'stimulus package', including various forms of financial support.²⁰ The primary goal of the government in providing the stimulus package was to avoid or minimise economic recession.²¹

However, the details of the package reveal concern for other moral goals too – a unified approach – and, particularly, concern for inequality. Thus, a tax bonus, for instance, was paid to individuals earning less than \$100,000 in the 2007/2008 financial year, scaled from \$250 for those earning over \$90,001 to \$900 for those earning less than \$80,000. Cash bonuses were also provided to various groups considered to be in particular need of financial assistance: single income families, families with school-age children, carers, students, and farmers. While injecting liquid funds into the economy, these measures clearly attempted to mitigate existing financial inequality, as well as inequality in other fundamentally important goods or capacities like education and health.

19 Simon Caney, "Just emissions." *Philosophy and Public Affairs* 40(4) (2013): 255-300.

20 Vu and Tanton, "The distributional and regional impact of the Australian Government's Household Stimulus Package," *Australasian Journal of Regional Studies* 16.1 (2010): 127-145. Li and Spencer, "Effectiveness of the Australian Fiscal Stimulus Package: A DSGE Analysis," *Economic Record* 92.296 (2016): 94-120.

21 Kevin Rudd, "The Global Financial Crisis" [online], *The Monthly*, Feb 2009: 20-29. Retrieved from <http://search.informit.com.au/documentSummary;dn=610838417780601;res=IELLCC>. Accessed 12/9/17.



Collgar wind farm. Credit: CATCON, Civil & Allied Technical Construction Pty Ltd

Likewise, a significant proportion of the infrastructure component of the stimulus package was directed to building school infrastructure, social and defence housing and local infrastructure and roads. As well as stimulating the economy, these measures suggest a concern with other issues of justice: promoting good quality education throughout Australia, assisting the poor, and redressing rural infrastructure shortfalls.

Conflict and agreement

Sometimes progress can be made on other moral goals – increasing wellbeing or reducing inequality, improving education or preventing armed conflict – without compromising climate goals and at little or no extra cost. Here, unified justice requires little support. If this can be done without impact on GHG emissions reduction efficacy, then it should be done.

Where a government decides to subsidise solar power, for example, it might prioritise projects that achieve the goal by providing subsidies to poorer households instead of wealthier households. Alternatively, it could subsidise schools in needy areas instead of directing subsidies to larger businesses. If the overall cost and emissions reductions are the same, then there is a strong reason to fund the poorer households. The fact that there may be cases in which other moral goals can be achieved without much sacrifice is a reason to look for those cases.

Not all climate change mitigation policies will be this easy to repurpose. Sometimes it may be necessary to trade values off against one another and, for example, decide whether to reduce emissions in a slower more equitable way or in a faster less equitable way. These decisions will be difficult. However, avoiding the problem and making decisions on the basis of climate change mitigation exclusively, may well lead to very unjust outcomes and is, therefore, not an acceptable way to proceed.

NOT ALL CLIMATE CHANGE MITIGATION POLICIES WILL BE THIS EASY TO REPURPOSE. SOMETIMES IT MAY BE NECESSARY TO TRADE VALUES OFF AGAINST ONE ANOTHER AND, FOR EXAMPLE, DECIDE WHETHER TO REDUCE EMISSIONS IN A SLOWER MORE EQUITABLE WAY OR IN A FASTER LESS EQUITABLE WAY.

Inequality

Focusing on inequality

How then to incorporate broader considerations of justice that are important for a just climate transition? One difficulty is that even when confined to relatively uncontroversial goals, there are potentially many such goals that might be used to guide a climate transition.

In rest of this blueprint discusses one particularly important goal – reducing inequality. An important way of assessing the justice of climate transition schemes is with reference to the extent to which they minimise significant inequalities. But focussing on inequality does not exclude other justice-related goals. Rather, justice-related goals can be incorporated into the climate transition planning process. Inequality is just one example.

Inequality has become amongst the most important topics in contemporary debates concerning justice. The rise of inequality, particularly of income and wealth, has been extensively discussed. French economist Thomas Piketty detailed the rise in inequality of income and wealth in many countries over the second half of the 20th century. Others have explored the relationships between high levels of inequality and harms like violence in society or lack of trust.²² Suffice it to say, reducing inequality should be a central goal of contemporary society.

Yet, agreeing to reduce inequality depends on what kind of inequality is being discussed. Overwhelmingly, the subject of recent debates has been reducing inequalities of income and wealth.²³ But there are many kinds of inequality that should be of concern, ranging from inequality in access to affordable housing, health care and education, to important civil rights such as marriage equality or equal recognition of one's culture or sexual identity.

Balancing different kinds of inequality so as to maximise good outcomes is not straightforward. One useful balancing method is the capability approach, developed by 1998 Nobel Prize winner Amartya Sen, among others.²⁴ Capability theorists focus on whether or not people have the freedom, 'capability', to achieve the different valuable things or states of affairs a person can be, have or do, 'functionings'. That is, whether they can be educated, housed, access health care, have mobility and so on.

Human Development Index

Exactly which capabilities are relevant for assessing the appropriateness of transition plans is complex. There are many capabilities that might be considered important to people. This blueprint concentrates on the Human Development Index (HDI) used in the 2016 Human Development Report (HDR).²⁵ Based on the capability approach, the HDI is a widely influential measure of human development that commands substantial endorsement from governments and institutions.²⁶

The HDI provides a metric for measuring inequality. It is not meant to be a complete index of everything important for inequality or for well-being more generally. Instead the HDI focuses on three key measures that are essential for human development:

- a long and healthy life.
- being knowledgeable.
- having a decent standard of living.

Each of these measures expresses something central to the ability to live a good life. How countries score on these measures determines their overall HDI score. Inequalities in these important capabilities are discussed below.

The measures provide a plausible set of important inequalities to avoid, and a good guide to the likelihood a climate transition has of increasing inequality or equality. The measures provide a plausible set of important inequalities to avoid, and a good guide to the likelihood a climate transition has of increasing inequality or equality. That is, they measure achievements, not just the opportunity to achieve something, important though opportunities are.

While acknowledging these measures of inequality are not all that should matter when assessing the justice of a transition, these inequalities are important because minimising them leads to an overall increase in important freedoms.

For example, through greater investment in public transport and neighbourhood infrastructure, people could have their freedom increased *overall* because the changes would allow them to choose different jobs, neighbourhoods or alternative ways to spend their time.

Two other important justice-related goals must be recognised: *independence* and *control*. Reducing the above inequalities could also add to the *independence* and *control* people have regarding key goods. Providing the opportunity for distributed energy, for instance, might be valued since it allows independence from others or companies.

A good way to evaluate a climate transition, then, is to test if it decreases the three important inequalities described by the HDI and if, consequently, it leads to greater independence and control, not just in Australia, but internationally. This framework gives substance to the claim that a climate transition should be just.

22 Richard Wilkinson and Kate Pickett, *The Spirit Level: Why Greater Equality Makes Societies Stronger* (London: Penguin, 2010).

23 Thomas Piketty, *Capital in 21st Century* (Cambridge, MA: The Belknap Press of Harvard University Press, 2014).

24 Amartya Sen, *Development as Freedom* (Oxford: Oxford University Press, 1999); See also Martha Nussbaum, *Creating Capabilities: The Human Development Approach* (Cambridge, MA: Harvard, 2011).

25 Selim Jahan et al. "Human development report 2016: human development for everyone." *United Nations Development Programme (UNDP)*, New York, NY. (2016).

26 United Nations. "Human Development Index (HDI)." *United Nations Development Programme Development Reports*. Retrieved from <http://hdr.undp.org/en/content/human-development-index-hdi>. Accessed 12/9/17.

Case Studies

Adding a concern for inequality to the framework guiding climate transition policy promotes a fairer outcome. But what, more specifically, will its significance be? Consider two key ingredients of any transition: distributed energy and public transport. With the rapidly decreasing cost and increasing uptake of solar PV and other renewable energy technologies, distributed energy has become a critical factor in climate transitions.

There is also significant scope for harnessing distributed energy to reduce, or at least prevent the increase of, existing inequalities in Australian society. Increasing and transforming public and active transport is also a central plank in emission reduction and equality-boosting transport design.

These two elements are not the only important ingredients of a successful transition. Community energy, transport more generally, removing fossil fuel subsidies, changing building regulations and reducing waste are just a few of the many other important elements of a successful climate transition. Regardless, distributed energy and public transport are crucial ingredients. They illustrate the difference social justice can make to the design of a climate transition. And they highlight the kinds of consideration that should be included when designing a climate transition with a concern for inequality at its core.

CASE STUDY I: DISTRIBUTED ENERGY

Renewables and distributed energy

Electricity generation accounted for 187MtCO₂-e, or 35%, of Australia's greenhouse gas emissions in 2015.²⁷ Department of the Environment and Energy projections indicate that this level of electricity-related emissions will remain roughly constant until 2030.²⁸

In 2016 renewables generated 17% of Australia's electricity (Figure 6). The costs of renewables have been steadily declining with increased uptake, and according to some assessments it is already cheaper to install renewable electricity generating capacity than fossil fuel capacity in Australia.²⁹

The share of electricity generated by renewables in Australia will undoubtedly continue to increase.

Renewable electricity generation has so far tended to be implemented in a more distributed fashion than traditional fossil-fuel generation. In place of one large coal electricity plant there might be dozens of medium-scale wind farms and over one million small-scale residential PV solar panels, distributed over a wide area. Thus, as the share of renewable electricity generation has increased, electricity generation has tended to become more distributed.

Distributed energy and inequality

Using a unified emissions reduction approach, Australia should not only increase the use of renewable electricity technologies in whichever way will minimise GHG emissions. It should also consider how its use of distributed renewable technologies will affect the distribution of important capabilities such as health, education, standard of living, and independence and control.

It may be that the most emissions-effective strategy may not align with the strategy that maximises the distribution of these capabilities. This is because there are possible interactions between distributed energy – in particular, distributed renewable electricity generation – and important inequalities in Australia.

Firstly, it may be that the capacity to generate electricity in a more distributed system will support the reduction of some stubborn and unjust inequalities in Australia, or internationally.

²⁷ Australian Government, Department of the Environment and Energy. (2016). *Australia's emissions projections 2016* (p.6).

²⁸ Australia's emissions projections 2016, p. 6. The rate will go down slightly to 176 in 2020, then rise again to 186 in 2030. Electricity use will increase over this time, due to population growth and an increase in electric vehicles (p. 9-11).

²⁹ Clean Energy Council 2017, p. 19; Stock, Petra, et al., "State of Solar 2016: Globally and in Australia." *Climate Council of Australia. 2017* (p.ii). <http://www.abc.net.au/news/2017-02-23/solar-power-cheaper-than-coal-climate-council-finds/8296232>.

Possible benefits of community micro-grids are "energy autonomy and self-sufficiency; promotion of cleaner and more sustainable electricity; more reliability; retained economic benefits in the community; job creation in the community; provision of alternative competitive electricity supply".³⁰

Clearly, many of these benefits will have an effect on those elements of the 'good life' that are the focus of the HDI: health, education, and standard of living.

Many also concern independence or autonomy. In some cases, it should be possible to use these effects to reduce inequalities in each of these dimensions.

Nonetheless, it might also be the case that some ways of implementing or encouraging distributed renewable electricity generation *exacerbate* existing inequalities. It is critical to be aware of both possible opportunities and possible pitfalls. Some examples follow.

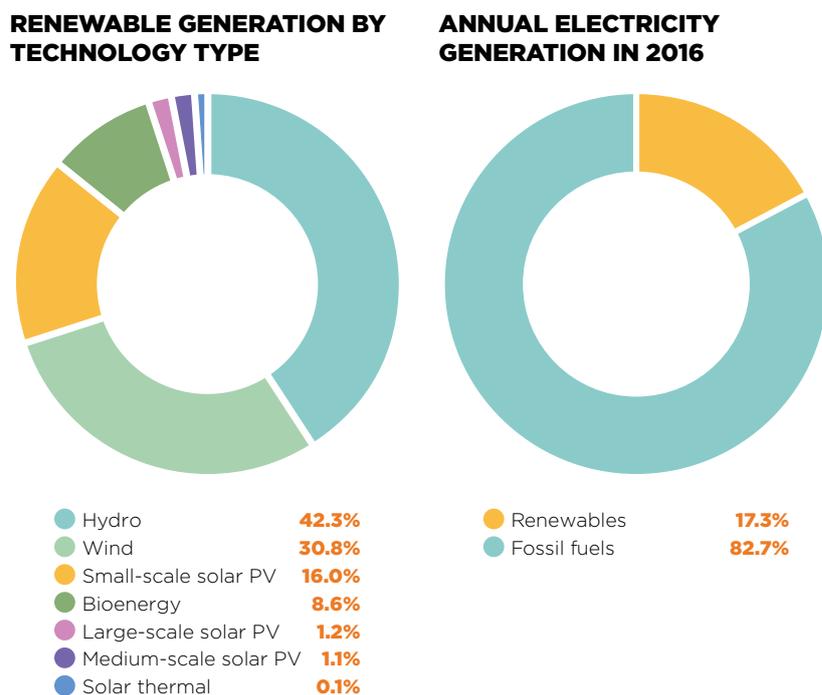
Remote Indigenous communities

Australia's greatest inequality challenges concern Aboriginal and Torres Strait Islander peoples. This is one area where distributed renewable electricity generation may help. Gross inequalities between Indigenous and non-Indigenous Australians persist. These inequalities concern all target goods: health, education, wealth and independence.

One factor in some of these inequalities is remote living. To illustrate, remoteness is associated with disadvantages in health. Whereas less than 2% of non-Indigenous Australians live in remote areas, 20% of Indigenous Australians live remotely.³¹

Remoteness is also more disadvantageous for Indigenous Australians than non-Indigenous Australians on health and other dimensions. For example, income inequalities between Indigenous and non-Indigenous Australians, which exist in all areas, are at their greatest in remote areas (Figure 7).

Figure 6: Australian electricity generation by type, 2016³²



ENERGY STORAGE



13x
increase in installations in
2016 compared to 2015



Worsening this remote Indigenous financial inequality, remote communities sometimes pay outrageous amounts for electricity. In north-west New South Wales, for example, the average quarterly electricity bill for an Indigenous household is \$1,200³³, yet remote Indigenous people's incomes are the lowest in the country. Electricity bills on this scale are unmanageable. There are multiple reasons for these prices, including poor housing, extreme temperatures and reliance on diesel generators which are expensive to run and often unreliable.³⁴

A number of programs have embraced the opportunity distributed renewable electricity generation offers for addressing these inequalities. For instance, the Federal and Northern Territory governments jointly funded a program to deliver solar power to more than 30 remote communities. Similarly, the First Nations Renewable Energy Alliance works to promote renewable energy installation in First Nations communities throughout the country.³⁵

30 Gui et al. "Distributed energy infrastructure paradigm: Community microgrids in a new institutional economics context." *Renewable and Sustainable Energy Reviews* 72 (2017): 1355-1365.
 31 Australian Government. Australian Institute of Health and Welfare. *Australia's health 2014*. Australia's health series no. 14. Cat. No. AUS 178. Canberra: AIHW, 2014: 7.7 "Remoteness and the health of Indigenous Australians".
 32 Clean Energy Australia 2016 Fact Sheet, *Clean Energy Council 2017*, <https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>
 33 <https://fbiradio.com/backchat-discusses-renewable-energy-and-electricity-cost-in-remote-communities-w-murrawarri-elder-fred-hooper/>
 34 <https://arena.gov.au/news/remote-area-power-supply-conference-2/http://www.futuredirections.org.au/publication/power-people-remote-communities/>
 35 <https://arena.gov.au/news/solar-to-power-more-than-30-remote-nt-communities/http://nationalunitygovernment.org/content/formation-first-nations-renewable-energy-alliance#renewable>

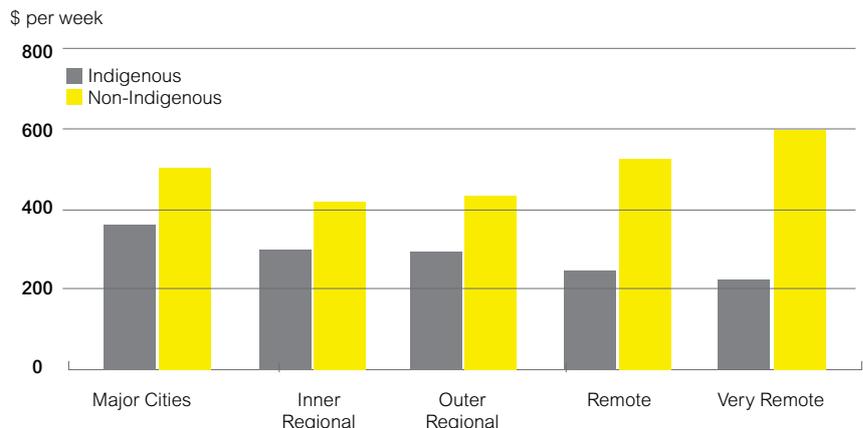
In addition to much-needed financial benefits that distributed renewable electricity generation affords to remote Indigenous communities, it may help alleviate inequalities in other areas. This may happen independently – facilitating better school or health clinic infrastructure, for example – or as a consequence of general wealth and wellbeing increases. One further advantage of distributed electricity generation in this context is that it increases the independence of the generator, in this case remote communities, thus mitigating the impact of markets.

In sum, increasing renewable electricity generation in remote Indigenous communities may not be the most cost efficient emissions reduction strategy. But because it is likely to reduce some of Australia's most unjust inequalities, it should be pursued. That this strategy has been adopted in some cases, indicates that there is some recognition that the isolationist strategy represents a goal that is overly narrow, and that justice-based considerations are essential to climate transition planning.

Solar PV subsidies

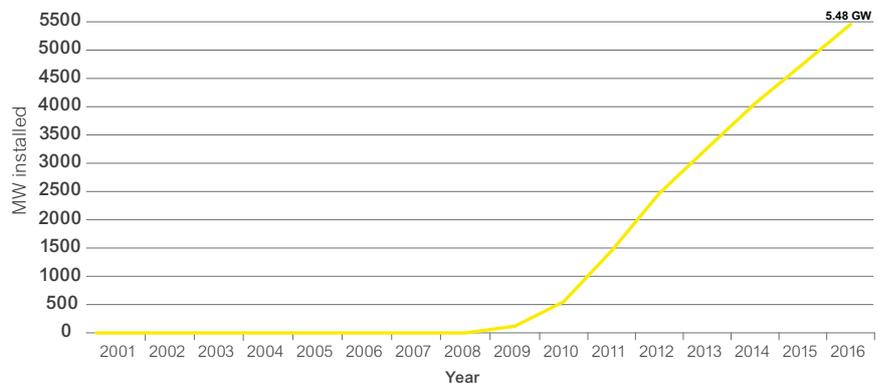
A major contribution to the up-take of solar PV in Australia has been support in the form of subsidies provided to households and businesses. Figure 8 shows the uptake of installed capacity of solar PV in Australia. In most Australian states these include point-of-sale rebates such as Renewable Energy Certificates (RECs) and Feed-in-Tariffs (FITs).

Figure 7: Median gross individual income(a) by remoteness areas, persons aged 15 years and over³⁶



(a) Excludes persons whose income was unknown.

Figure 8: Cumulative installed capacity of solar PV in Australia (MW)³⁷



These incentives, especially FITs, were partly responsible for a massive increase in take-up of solar PV. On an emissions reduction assessment they might, therefore, be considered a success, although it is questionable whether or not they were the most cost-effective approach.³⁸ Incentives may also have increased political support for action on climate change, and spurred the growth of a durable industry with significant long-term local jobs.³⁹

But the distribution of such subsidies is a prime candidate for concern when considering inequality. Subsidies are a form of financial redistribution. When considering whether to subsidise something – whether it's fossil fuels,

renewables or health-care – it is essential to ask how the benefits and burdens created by the subsidies would be distributed? Would the subsidy lessen inequality? The history of residential solar PV subsidies in Australia offers examples of both positive and negative effects on inequality.

Many Australian residential solar subsidies have been structured such that they financially favour home-owners with access to a certain amount of capital. This comes at the expense of all grid electricity users, including renters and the very poor.⁴⁰

36 Australian Bureau of Statistics, Population Characteristics, *Aboriginal and Torres Strait Islander Australians*, 2010. <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/8E4A1018AFC6332DCA2578DB00283CCE?opendocument>
 37 Clean Energy Council, *Clean Energy Australia Report 2016*, 2017, <https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>, p58.
 38 Wood and Blowers claimed in 2015 that the solar boom had been subsidised by the public to the tune of almost \$10 billion. Wood, Tony, and David Blowers. *Sundown, sunrise: how Australia can finally get solar power right*. Grattan Institute, 2015. However, this report has been widely criticised as vastly overestimating the costs.
 39 APVA Response to PV Costs and Abatement in the Productivity Commission Research Report: Carbon Emission Policies in Key Countries, May 2011. See <http://apvi.org.au/sites/default/files/documents/Releases/APVA%20-%20Response%20to%20Productivity%20Commission%20Carbon%20Emission%20Policies%20Report%20June%202011.pdf>.
 40 Nelson, Tim, Paul Simshauser, and Simon Kelley. "Australian residential solar feed-in tariffs: Industry stimulus or regressive form of taxation?" *Economic Analysis and Policy* 41.2 (2011): 113-129. Chapman, Andrew J., Benjamin McLellan, and Tetsuo Tezuka. "Residential solar PV policy: An analysis of impacts, successes and failures in the Australian case." *Renewable Energy* 86 (2016): 1265-1279. Simpson, Genevieve and Julian Clifton. "Subsidies for residential solar photovoltaic energy systems in Western Australia: Distributional, procedural and outcome justice." *Renewable and Sustainable Energy Reviews* 65 (2016): 262-273. This is the case for similar subsidy schemes in many other countries too. The home-owner/renter divide may become more significant as the proportion of Australians renting increases. See <http://theconversation.com/home-ownership-remains-strong-in-australia-but-it-masks-other-problems-census-data-80068>.

This is so, because in order to take advantage of the schemes it is necessary to purchase and install a solar panel at the home. There is a significant amount of up-front expense, even taking into account point of sale rebates. The necessary stability of residence is largely only available through home-ownership.

These are clearly obstacles which exclude poorer people and renters from participating in and, thereby, receiving the relevant subsidies. Further, those unable to receive the subsidies frequently partially pay for them. This is because most FITs have been funded by increasing the price of retail electricity across the board. In other words, the poorest Australians partially subsidise the solar investments of wealthier home-owners.

According to a 2010 analysis of FITs in New South Wales, "the implied rate of taxation is 2.6 times higher for households in the lowest income bracket (0.089%) than the higher income bracket (0.034%)".⁴¹ This is an example of a negative effect on inequality. It is a regressive subsidy system which may exacerbate existing financial inequalities.

That is not an argument against subsidising residential solar PV per se. Nor does it suggest that subsidies should not be used to accelerate Australia's climate transition. On the contrary. It is quite likely that residential solar PV subsidies were justified by their benefits in terms of emissions reduction as well as industry stimulation and social outreach.

Further, it is likely subsidies *will* be required. That is why it is important to improve the ways subsidy schemes are planned and structured. Improvements might also lead to better outcomes with respect to inequality. The fact that solar subsidy programs are already being improved demonstrates they can cut GHG emissions and boost equality. Schemes have been introduced to make the subsidies more accessible for renters and those in public housing. For example, solar power purchase agreements (SPPAs) are available in parts of Queensland.⁴² These agreements overcome the up-front cost barrier to solar installation. A provider installs, owns, and operates a PV system at the participant's home, selling the participant the produced power at a price lower than the usual retail price.

In some cases, home ownership is still a barrier to participation, so the Queensland government is trialing a program targeting the problem.⁴³ The trial is testing a SPPA program for public housing, as well as a rooftop solar farm in the remote Indigenous, and diesel powered, community of Lockhart River.

As in the remote Indigenous community example, subsidies for solar PV and other distributed renewable electricity generation technology can be harnessed to reduce inequalities. Subsidies might be an effective way to promote renewables while also reducing inequalities of health, education and independence, as well as the obvious financial inequalities.

Funding solar PV installation in public schools is another option, one already taken up around the country.⁴⁴ Installing solar panels in public schools benefits all public school system users. While reducing GHG emissions, it relieves schools' financial burden, freeing funding otherwise spent on electricity to improve education.

Keeping inequality at the heart of the climate transition planning process means actively looking for opportunities to decrease inequality. It also requires evaluation of past actions to help build better programs and policies for the future.

Finally, the effects of a possible exodus from the national electricity grid must be considered. The maintenance, running, and expansion of the large grids currently needed to transmit electricity from concentrated generation sources to consumers is expensive. Having more distributed electricity generation can reduce the overall costs of electricity provision.

However, the ability to generate and store electricity at the household or community level might affect different groups of people differently. Again, if only some people can afford to generate, and if these people then exit the communal distribution grid, electricity prices may soar for those still using the grid as all the costs of grid upkeep and transmission would fall to them.

Though there may be advantages for individuals able to generate and store their own electricity, these must be weighed against the costs that will be inflicted on others. This is of particular concern where existing inequalities would be exacerbated.

The grid exodus problem may not arise, depending on factors such as the relative costs of grid and off-grid (or microgrid) electricity in the future. It is, nonetheless, a potential problem of inequality that must be anticipated either to ensure that it doesn't occur, or to work out how to respond if it does.

This distributed energy case study demonstrates that climate transitions need a unified approach which incorporates justice-based concerns from the outset. Not considering the likely justice related impacts will both lessen the chance of a successful roll out and potentially miss an opportunity. The case study also shows that including inequality issues alters decisions about where to allocate resources and which technologies ought to be deployed.

41 Nelson et al 2011, p. 125. This finding is controversial. See for example the sunwiz report "AGL Solar Feed-in Tariffs and Merit Order Paper: Lobbying Masquerading in Academic Robes", <http://www.sunwiz.com.au/index.php/more/resources2/publications/199-solar-tariffs-and-the-merit-order-effect-agl-lobbying-masquerading-in-academic-robres.html>. However, the general point stands: we must pay careful attention to potential financial inequality effects of climate transition mechanisms and policies.

42 <https://www.dews.qld.gov.au/electricity/solar/installing/paying/sppa>

43 Queensland public housing trial: <https://www.dews.qld.gov.au/electricity/solar/solar-future/public-housing>. Similarly, the California Solar Initiative dedicates some funding to installations on low-income housing: <https://energy.gov/savings/california-solar-initiative-single-family-affordable-solar-housing-sash-program>

44 For example: <http://education.qld.gov.au/schools/grants/state/targeted/solar-schools.html>

CASE STUDY 2: PUBLIC AND ACTIVE TRANSPORT

Cars dominate Australian cities. This way of life is bad for the climate and potentially bad for health. These are two powerful reasons to increase public and transport services and infrastructure. Sometimes, though, climate-based reasons might conflict with health-based reasons.

Here, it is important to weigh emissions reductions *against* health improvements, taking particular account of inequalities in health. In some cases, it might be preferable to pursue a less effective emissions reduction strategy, one that does more to improve the health of particularly unhealthy groups of people. In this case study we explore this possibility.

Cars, cities, and climate

The car-based city is a recent phenomenon. Cities used to be built for walking. They were built on a smaller scale, denser. With the spread of railways in the 19th century cities began expanding. Commuter suburbs spread and flourished along train lines.

In the first half of the 20th century public transport was the dominant mode of travel in urban Australia. The second half of the century saw the rise and eventual dominance of the car (Figure 9 and Figure 10). By 1980, public transport use had declined to about 10 per cent of urban travel.⁴⁵ Commuters were untethered from public transport hubs, and residential sprawl blossomed. Space for cars – parked or on the move – was prioritised, at the expense of space for pedestrians, cyclists, buildings, and greenery.

Figure 9: Metropolitan passenger trips for Australia, across all modes, 1900-2013⁴⁶

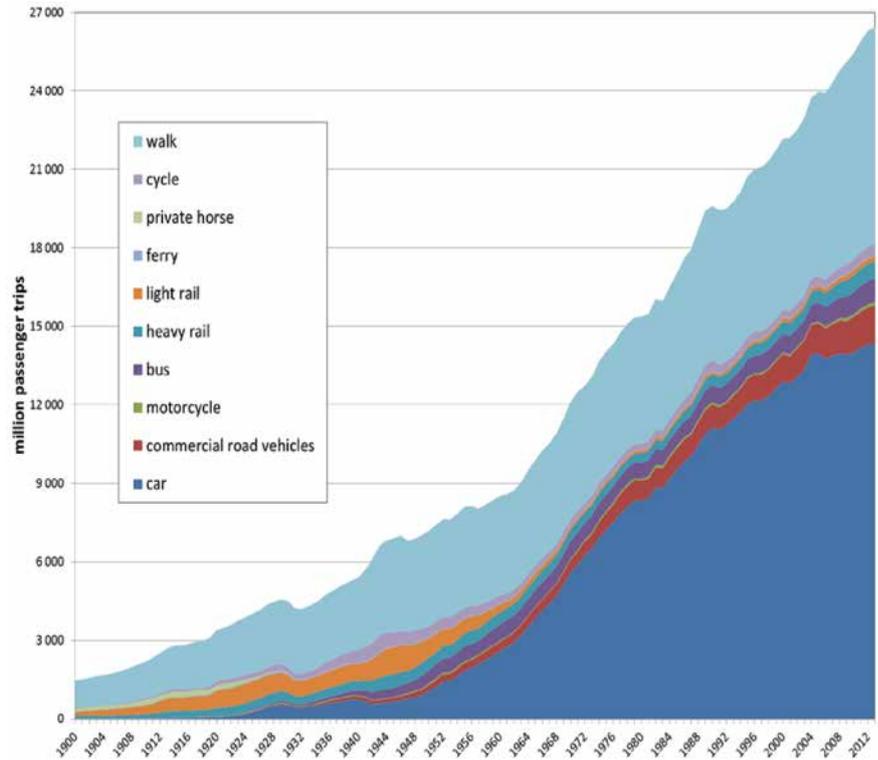
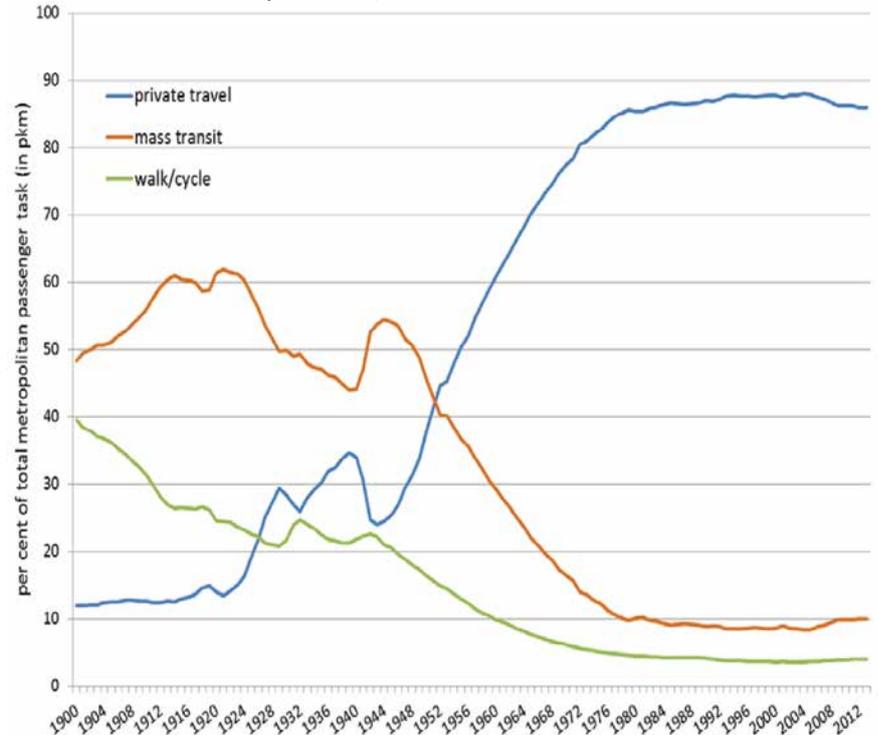


Figure 10: Aggregate modal shares for passenger task within Australian capital cities, 1900-2013⁴⁷



45 Australian Government. Department of Infrastructure and Regional Development. Bureau of Infrastructure, Transport and Regional Economics. *Long-term trends in urban public transport*. Information Sheet 60. Commonwealth of Australia. Canberra: BITRE, 2014, p. 1-4.

46 Long-term trends in urban public transport, Information Sheet 60, Commonwealth of Australia, Canberra: BITRE, 2014, p4

47 Long-term trends in urban public transport, Information Sheet 60, Commonwealth of Australia, Canberra: BITRE, 2014, p11.

The tide has turned again. It is necessary to reduce car use as part of the response to escalating global warming. The more quickly cities are restructured to reduce car use, the easier the task will be.

Transport currently accounts for about 18% of Australia's GHG emissions annually. Unfortunately, the percentage is increasing while the remaining emissions budget is shrinking rapidly.⁴⁸ Fortunately, public transport use in Australia has begun to increase in the last decade.

This is a promising trend, but it is not proceeding as quickly as necessary.⁴⁹ There are many strategies that can be employed to accelerate the shift away from cars:

- make driving cars more expensive (for example, by incorporating externalities such as climate change and air pollution into the cost of vehicles and fuel);
- increase city density;
- encourage the use of more energy-efficient vehicles;
- provide more and better public transport;
- increase and improve active transport (walking and cycling) infrastructure.

The focus of this case study is on increasing public and active transport services and infrastructure. It is one way to decrease greenhouse gas emissions, while bringing numerous other benefits.⁵⁰ In many cases health and wellbeing benefits are the greatest of these, though access to good public or active transport options also improves independence and brings financial benefits.⁵¹ This case study explores connections between the provision of public and active transport services and infrastructure, while tackling inequalities.

Cars and health inequality

The car-based way of life can have undesirable health impacts. It enables a sedentary lifestyle, increases obesity and other illnesses, and produces harmful air pollution, as well as greenhouse gases. It makes roads and cities unsafe and unpleasant for pedestrians and cyclists. Increasing public transport improves health and reduces healthcare costs.

According to one study, the likelihood of a person's being obese increases 6% for each hour spent in a car per day. It decreases by 4.8% for each hour spent walking.⁵² In developed countries 1.5-3% of total direct healthcare costs are related to inactivity. Globally 1.9 million deaths per year (roughly 1 in 25) are due to inactivity.⁵³

Though other factors such as poor diets and low activity levels are undoubtedly involved, obesity has increased (Figure 11) as cars have come to dominate the way of life. In Australia, there are also 1,200 deaths per year due to road crashes, and roughly the same number again due to air pollution.⁵⁴

Obesity and other inactivity-related illnesses are not uniformly distributed throughout the Australian population. To illustrate, in Eastern Sydney 49% of people are obese or overweight, whereas in Western NSW 79% of people are obese or overweight. There are similar inequalities in other inactivity-related (and more broadly car-related) illnesses.

These are significant inequalities at the core of a good life – health and longevity. Consequently, there is a strong justice-based motivation to remedy these inequalities where possible.

Possible conflict

Increasing or improving public and active transport options reduces GHG emissions and improves health. So, isn't this a case in which there are multiple reasons to improve public and active transport? In a sense, yes. But the fact that public transport is linked both to health and climate mitigation can also make our decisions about *how* to improve public and active transport more difficult.

This means that there can be conflicts between emissions reduction and health improvement. After all, it is by no means guaranteed that the most emissions-reducing public transport strategy will also be the most health-improving. Friction between the two motivations, is likely to arise when selecting a particular strategy, policy, or technology.

One likely instance of such friction concerns the inner-city/outer-suburbs divide. It is likely that providing or improving services and infrastructure in high-density, high-use areas like the inner city reduces emissions more effectively than making similar changes in lower-density, lower-use areas such as outer suburbs and rural areas. A bus or train service used by a high number of people who would otherwise drive prevents more emissions than a similar service used by fewer people.

48 National Inventory Report 2015, Volume 1, p. 2.

49 Australian Government. Department of Infrastructure and Regional Development. Bureau of Infrastructure, Transport and Regional Economics. *Urban public transport: updated trends*. Information Sheet 59. Commonwealth of Australia. Canberra: BITRE, 2014. The increase outstrips population growth, and distance travelled per person stabilised over this time, so some displacement of car use must be occurring (p. 1, 6).

50 The IPCC calls these 'co-benefits': The Intergovernmental Panel on Climate Change. *Climate Change 2014: Mitigation of Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2014 (IPCC WG3), p. 631. Lindsay, Graeme, Alexandra Macmillan, and Alistair Woodward. "Moving urban trips from cars to bicycles: impact on health and emissions." *Australian and New Zealand Journal of Public Health* 35.1 (2011): 54-60.

51 Trubka, Roman, Peter Newman, and Darren Billsborough. "The costs of urban sprawl: physical activity links to healthcare costs and productivity." *Environment Design Guide*, 85 (2010): 1-13. BITRE. Long-term trends.

52 Trubka et al, "The costs of urban sprawl: physical activity", p. 3.

53 Trubka et al, "The costs of urban sprawl: physical activity", p. 2. Pretty, Jules, et al. "Improving health and well-being independently of GDP: dividends of greener and prosocial economies." *International Journal of Environmental Health Research* 26.1 (2016): p. 17.

54 BITRE *Road Deaths Australia Monthly Bulletin*, https://bitre.gov.au/publications/ongoing/road_deaths_australia_monthly_bulletins.aspx OECD "The Cost of Air Pollution", <http://www.oecd.org/env/the-cost-of-air-pollution-9789264210448-en.htm>

Figure 11: National overweight and obesity trends⁵⁵

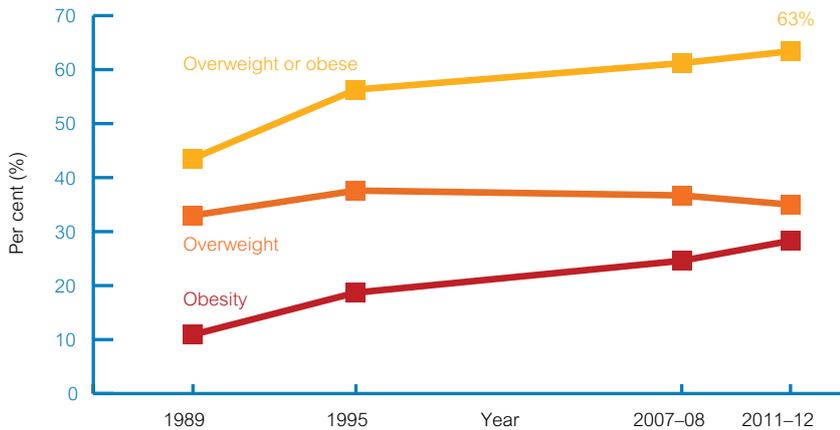
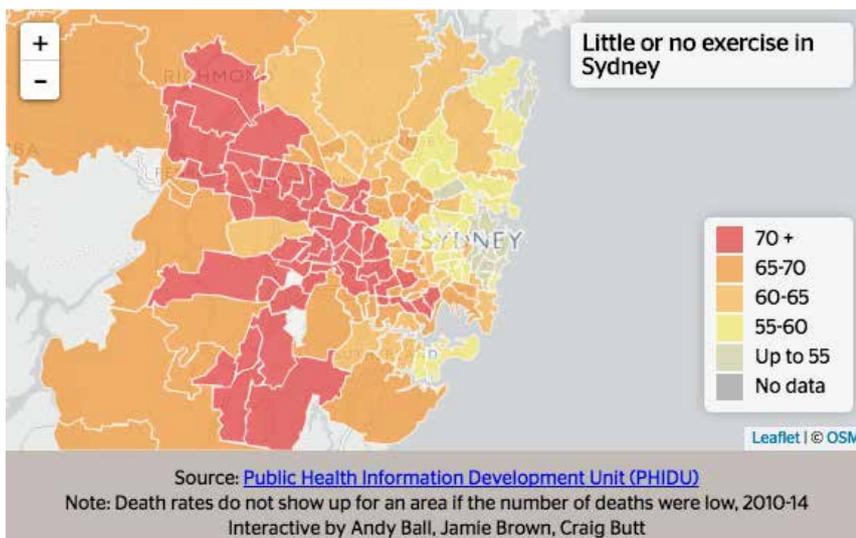
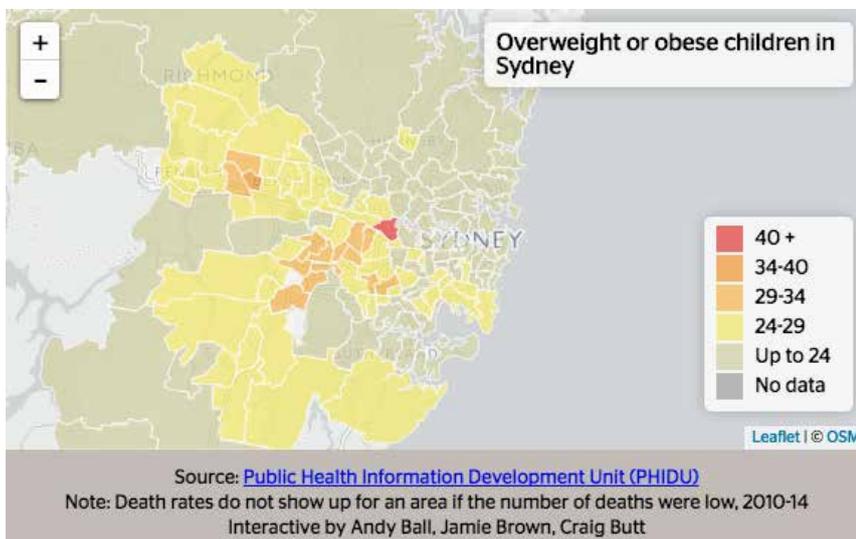


Figure 12: Maps of childhood obesity and sedentariness in Sydney⁵⁶



A further complicating factor is expense. Public transport provision is expensive, though not, perhaps, in comparison with the amount that Australians spend on cars. Cost recovery rates for Australian public transport systems vary widely, but are often well below 50%.⁵⁷

Inner-city services are also often more financially efficient than services in other areas. On the other hand, as discussed above, those most in need of feasible public and active transport options from a health perspective are often located in outer suburbs – areas where the provision of such service and infrastructure is more expensive or less effective at reducing emissions.

An isolationist emissions reduction strategy for increasing public and active transport will allocate resources so that each dollar spent will have the greatest impact on reducing GHG emissions. This will likely mean a focus on dense inner-city areas of Australia.

A unified approach will take into consideration impacts of decisions about transport infrastructure on inequalities in health, as well as other wellbeing inequalities. Among these are those concerning community cohesion, financial inequalities perhaps related to work opportunities, education inequalities, and inequalities of autonomy or independence. For example, considering the relationship between car travel and health, a unified approach will likely favour shifting focus to less dense, outer-urban areas. Increasing public and active transport in those areas may reduce emissions less effectively, but it addresses health and other inequalities between the wealthy inner city and poorer outer suburbs.

55 National Health Performance Authority, Overweight and obesity rates across Australia, 2011-12. Commonwealth of Australia. 2013. http://www.myhealthycommunities.gov.au/Content/publications/downloads/NHPA_HC_Report_Overweight_and_Obesity_Report_October_2013.pdf

56 Sydney Morning Herald. (2017). <http://www.smh.com.au/national/health/health-tracker-reveals-sydney-suburbs-with-highest-rates-of-obese-children-inactive-adults-20170427-gvtjys.html>

57 Long-term trends in urban public transport, Information Sheet 60, Commonwealth of Australia, Canberra: BITRE, 2014, p11-13.

Taking a unified approach to public transport will not only affect where services and infrastructure are provided, but will also shape the types of services and infrastructure provided. As noted earlier, public transport options that prevail in our dense inner cities – trains, buses, and trams – are not necessarily the best options for public transport in the less dense outer suburbs. In those areas it is important to consider novel modes of public transport such as on-demand buses and car-sharing. These options are becoming more varied and more feasible with technological advances of various kinds.

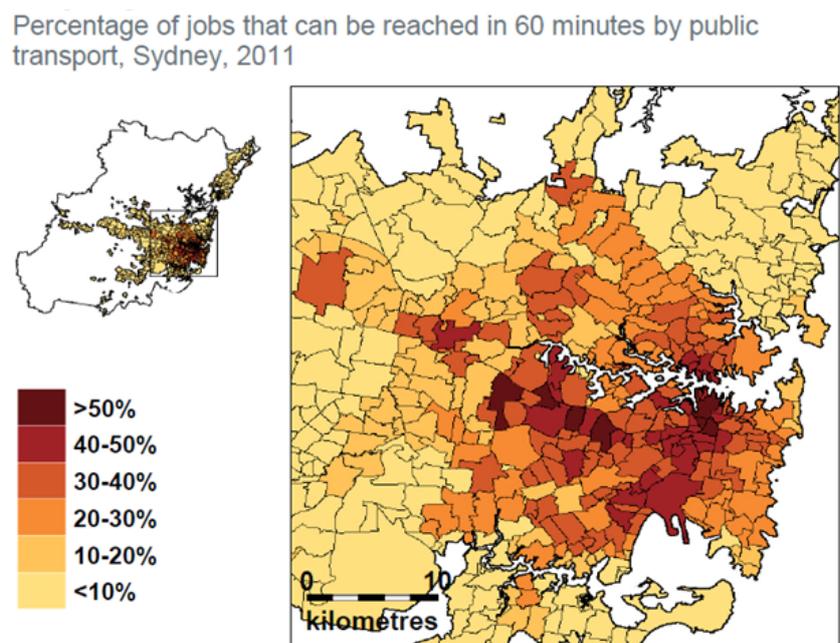
More demand-responsive, flexible options also produce lower GHG emissions per passenger km than traditional regional public transport, thus reducing the conflict between emissions reduction and inequality reduction. Again, each option should be carefully assessed to ensure it works for those who really need the services, and doesn't exclude already disadvantaged groups such as poor, old, and disabled people.

It is important to note this issue interacts with some of the interventions listed above which might be used to decrease reliance on cars. Increasing the price of owning or driving cars commensurate with the effect their use has on climate change would make public and active transport options more attractive and probably more cost-effective. A price hike would also increase the need to make access to good public and active transport options universal. Otherwise, the additional financial costs would weigh more heavily on those who are already disadvantaged financially and in terms of health.

This second case study further illustrates the role of distributive justice and concern for equality when considering details of climate transition. Without attempting to provide a comprehensive assessment of public and active transport options in Australia, the case study highlights the need to respond to climate change in a way that does not exacerbate existing inequalities, such as the health, work, education, and other inequalities between inner city and outer suburb residents.

Beyond this, there is an opportunity to reduce those inequalities. This involves carefully considering the interactions between emissions reduction strategies, along with the distribution of the goods and capacities that make people's lives go well.

Figure 13: Map of transport access in Sydney⁵⁸



58 <http://australianpropertyforum.com/topic/10133823/1/>

Conclusion and Recommendations

This blueprint argues that justice considerations should play a central role in shaping a climate transition strategy. Justice goals not only determine how quickly transition should occur, they can also guide the distribution of benefits and burdens of a climate transition.

Focusing on justice in these two respects is both desirable and unavoidable. It is desirable because it offers the opportunity to achieve other important moral goals as well as, principally, reducing inequality. It is unavoidable, because without a concern for justice individuals would be less likely to endorse a transition.

Incorporating justice-based reasons for transitions does not mean a transition will not be burdensome. Given the scale of the required climate transition and the technological, social, economic and political restructuring entailed, it will require a huge range of resources.

Additionally, adopting a justice-based approach to climate transitions does introduce further complexity and difficulty to the decision-making process. However, it also allows planners to appreciate the opportunities inherent in a climate transition.

The response that the threat of dangerous climate change requires is a great challenge. It will be costly to implement and requires Australians to change their lifestyles. Nonetheless, mitigating climate change presents the nation with great opportunities. Cities will be less polluted and roads less congested. Eventually, energy needs will be met renewably. The shift will reduce environmental damage, such as air and water pollution, which is caused by fossil fuels. There will be many benefits of this kind.

Even beyond such benefits, the need to significantly restructure and reshape societies provides an opportunity to make societies better in further ways 'while we're at it'. It offers a chance to make other things better, while fixing the problem of dangerous climate change. In this view, transition is an opportunity, not simply a challenge. Taking the unified approach outlined here helps to bring this latter view into focus. Rather than doing the bare minimum along a single dimension – climate mitigation – to avoid a looming threat, the nation should take the opportunity to create a substantially more equal society.

This blueprint closes with a series of recommendations for a justice-centred approach to Australia's climate transition.

- Australia's climate transition should be informed by considerations of justice
- A climate transition strategy should adopt the dual goals of achieving climate mitigation and reducing inequality.
- Australia should adopt an emissions reduction target more stringent than that set during the Paris Agreement, taking into account its disproportionately high share of emissions in recent history.
- Australia should attempt a more rapid transition to renewable technologies.
- Australia should ensure that any mitigation strategy addresses inequalities by: directing subsidies to the disadvantaged and, increasing the active transport (walking and cycling) infrastructure.

Royalla solar farm. Credit: CATCON, Civil & Allied Technical Construction Pty Ltd





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