Submission on a new Climate Act and a new Climate Action Plan for Tasmania

7 May 2021

Climate Tasmania is a group of concerned professionals who have a diverse range of expertise, spanning scientific, legal, economic, health, energy, social and policy aspects of climate change. Our aim is "To provide timely, independent and authoritative advice to Tasmanian business, government and community leaders on climate change and appropriate policy responses."

Details of the members of the Climate Tasmania board and expert advisers are available at www.climatetasmania.org/members/

Postal: PO Box 3199 West Hobart, Tasmania 7000
Email: climatetasmania@gmail.com
Telephone: 0427 355 951
Web: www.climatetasmania.org

Summary

Context

This submission provides a combined response to the two separate but related consultation processes being run by the Department of Premier and Cabinet at the moment:

- Review of the Climate Change Act including the Discussion paper by Jacobs
- Developing a New Climate Change Action Plan for Tasmania and the associated Opportunities Paper.

Summary of key points and recommendations

- Climate Tasmania has consistently argued that effective climate action in Tasmania requires a tri-partisan approach from Parliament that provides continuity of action across changes of government.
- Climate Tasmania has developed a detailed set of Drafting Instructions which set out the requirements and arrangements for an effective Climate Act.
- Detailed work on a Climate Action Plan should be guided by an updated and strengthened Climate Change Act.
- Emissions and sequestration should be accounted for separately.
- Any legislated total emissions reduction target for Tasmania should exclude sequestration from forestry (i.e. it should not be based on net emissions) backed by realistic sectoral.
- Sectoral and fuel specific targets, with interim targets, are necessary for an effective approach to climate action.
- All sectors should aim to individually reach zero emissions by 2050 (ie not rely on sequestration from other sectors or purchased offsets). Some sectors will reach zero emissions earlier (eg electricity) but this should not be used as an excuse to avoid planning a trajectory towards zero for each sector.
- To be able to be seen as part of the solution, rather than as part of the problem, **the slowest** Tasmania should reduce its emissions is the rate identified in the IPCC's SR15 report as being required to keep warming to 1.5 °C. To be seen as a leader, Tasmania's emissions reduction trajectory needs to be faster than this.

Responses to questions in the Climate Change Act review

The Climate Change Act & State Government response to climate change

1. To what extent should climate change considerations (e.g. greenhouse gas emissions, climate change impacts, climate resilience) influence policies and decisions by State government agencies and government business enterprises?

All major Government decisions should include consideration of climate change, both the impact of the proposed change on emissions, and the impact of the changing climate on the facilities or systems subject to the decisions. Sections 9 and 11 of Climate Tasmania's Drafting Instructions for a new Climate Change Act contain more detail about the processes we envisage as being necessary.

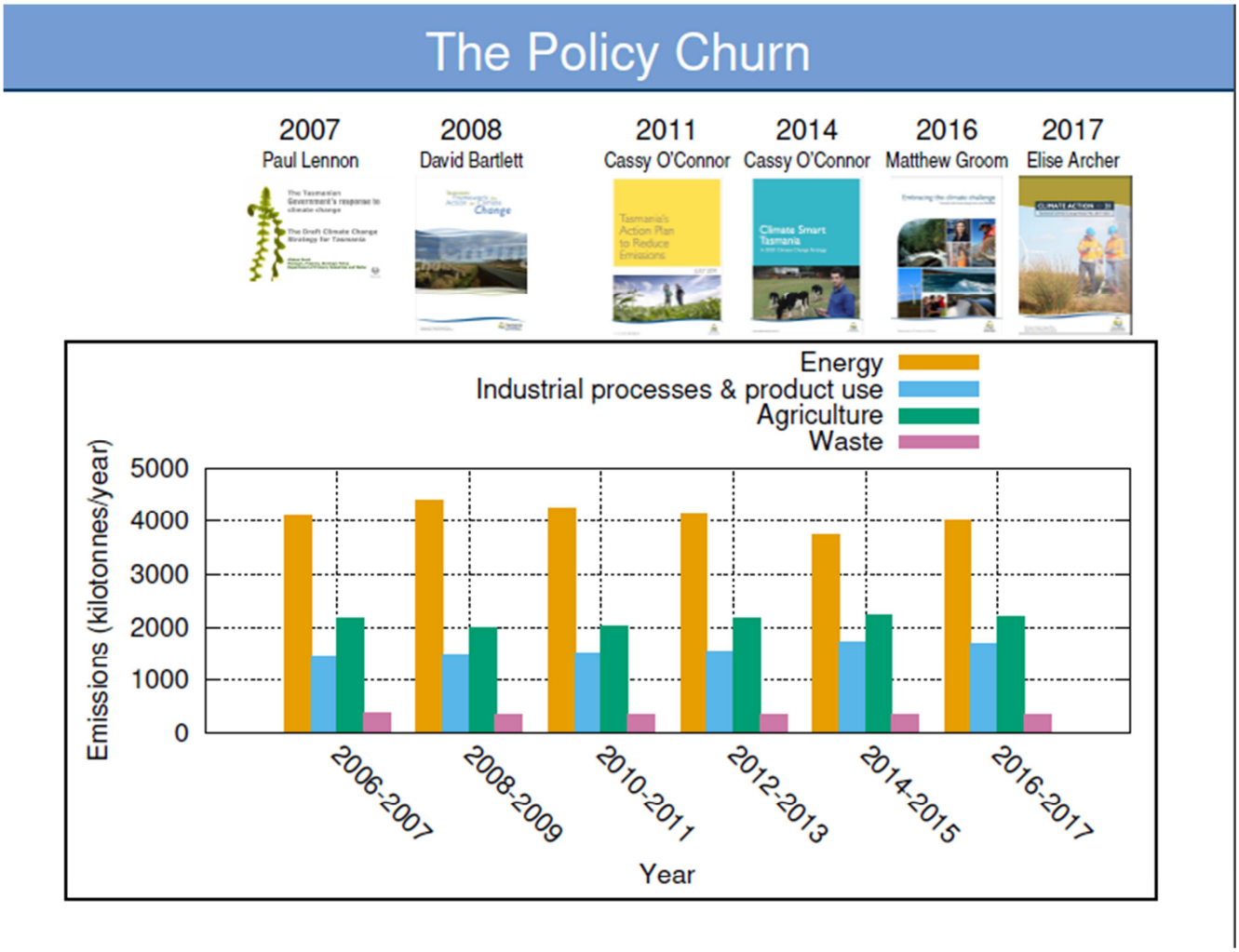
2. How important is it to you that the Tasmanian government systematically assess and disclose the main risks associated with projected climate change?

Broad public understanding of the risks to Tasmania from climate change are essential in order for the public, and industry sectors, to accept and support the need for rapid action to reduce emissions. The state government needs to play a leading role in providing authoritative information and making it available and accessible to the public.

3. How might the Act provide you with confidence that successive State governments will continue to act to contain/reduce Tasmania's emissions and build climate resilience?

The process by which the Act is revised is as important as the end result. Tackling climate change requires consistent action that has tri-partisan political support and continues across changes of government.

The following graphic illustrates that frequent revisions to Tasmania climate action plans have had little impact on emissions (excluding LULUCF).



4. How might the Act drive further decarbonisation of the Tasmanian economy (e.g. via setting/legislating targets for sectors of the economy, potentially including interim targets)?

See the section on setting sectoral and interim targets (p.10).

5. If the Act were to espouse principles that would guide consideration of climate change by government, its agencies and business enterprises, what might they be?

Proposed objectives for a new Climate Act are set out in the Climate Tasmania Drafting Instructions.

Global Climate Action & Tasmania

6. Within the context of global agreements to action to reduce greenhouse gas emissions, what do you consider to be the main roles of the Tasmanian government and how effective do you believe the government has been?

The state government needs to provide leadership in positioning Tasmania's actions as at the leading edge of coordinated global response informed by science in tackling the challenges of climate change. As shown in our answer to question 3, although there have been many Tasmanian Government climate plans, these have been largely ineffective in actually reducing emissions.

7. What would Tasmania be like in 10 years' time if it was a national or international leader in climate change responses?

If Tasmania developed, ***and implemented***, an effective response to climate change along the lines we have proposed, then in 10 years time Tasmania would be:

- A more resilient community in which more of the population were actively engaged in building more supportive social infrastructure , including strong local communities with high social cohesion and levels of trust in government both local and state.
- A healthier community because of:
    - reduced air pollution
    - more use of active transport
    - less climate-related anxiety, especially in the young.
- A more prosperous place because of:
    - money previously leaving the state for purchase of imported liquid fuels being replaced with cheaper, locally produced electricity
    - new industries being developed such as bio-diesel and low emissions cement.
- Internationally recognised as a leading jurisdiction in addressing climate change.

The final report of the Premier's Economic and Social Recover Advisory Committee (PESRAC) documents a detailed engagement with the Tasmanian community on the future they desire for the island. Environmental sustainability features strongly in their findings.

The findings include that:

> - Tasmanians see the environment as essential for their health, well-being and prosperity.
> - Tasmania's environmental credentials are a centrepiece of Tasmania's broader sustainability credentials as well as its brand and competitive advantage.
> - The world is paying much closer attention to environmental sustainability credentials aligned with the United Nations Sustainable Development Goals, and other places are stepping up efforts to becoming more sustainable.
> - Tasmanians told us that Tasmania can't rely on the sustainability 'head start' it has relative to other places thanks to our natural environment and history. Decisive action is needed across a range of fronts to build Tasmania's sustainability credentials.
> - We are calling for the development of a bold and comprehensive sustainability vision and strategy for Tasmania. (PESRAC 2021, p.62)
>
> "*Tasmanians told us of their concern that Tasmania's environmental credentials don't truly stack up when a close look is taken. Their concern was that unless we have bona fide sustainability credentials to back up our brand, Tasmania's reputation and competitive advantage are at risk because other places are increasingly stepping up their environmental policies and approaches to broader sustainability.*" (PESRAC 2021, p.63)

Emissions Targets

8. What would you consider to be an appropriate long-term greenhouse gas emissions or emissions reduction target for Tasmania (in terms of date and level of emissions or emissions reduction)?

A zero emissions target by 2050 would be appropriate **provided** that:

- it excludes sequestration from forestry
- it is backed by realistic sectoral and interim targets.

9. What (if any) value do you think targets for specific sectors of the economy would offer, including for the sector itself? If you agree with the concept of sectoral emissions targets, which sectors should have emissions targets? Why?

All sectors should have detailed analysis and development of targets (including interim targets). This is necessary so that trade-offs can be made between sectors where higher targets are achievable early compared with hard to abate sectors while keeping within an overall emissions reduction trajectory. The co-benefits of emissions reductions in specific sectors are described in the section on sectoral targets (p.10).

10. What key factors should influence Government decisions to set State, sectoral and/or interim targets?

The Discussion Paper sets out a good framework for determining suitable targets:

- Ambition
- Achievability
- Cost and economic benefit
- Aligned with science.

To this we would add:

- Extent of social co-benefits (as well as economic)
- Sectors in which Tasmania has an advantage.

Low Carbon & Economy & Society

11. What do you consider to be the main risks and opportunities for Tasmania as it continues to transition towards a low/zero carbon economy and society? What risks and opportunities may arise if Tasmania transitions more slowly/more rapidly?

See the detailed sections below on opportunities (p.10) and risks (p.11).

12. What do you consider to be the main roles for State government in supporting Tasmania's low/zero carbon transition?

The state government has a number of key roles in supporting this transition:

- communicating the need for urgent action to all stakeholders
- setting an overall emissions reduction trajectory for the state
- providing accurate and timely information on Tasmanian emissions by sector and fuel source (see page 12)
- acting to facilitate coordination between stakeholders in each sector to develop realistic sectoral plans with interim targets and plans for achieving these targets
- managing the transition to ensure as much as possible that individuals, organizations and communities are assisted where necessary and are not left behind.

Climate Resilience & Adaptation

13. What do you consider to be the main roles for State government in supporting Tasmanian communities, infrastructure, economic activities and environments in becoming more resilient to projected climate change?

- developing and implementing statewide plans for responding to the increased risk of 'natural' disasters made more likely by climate change (including fires and floods)
- supporting and coordinating action by local government (which is likely to be the main agency for developing plans and action for local climate resilience).

Response to questions in the Climate Action Plan opportunities paper

Mitigation

1. What do you think are the key opportunities to reduce Tasmania's emissions?

- **Opportunity 1** is to phase out the use of fossil fuels as quickly as possible. Our answer to Question 3 has multiple policy suggestions for how that might be achieved. While some sectors are harder to abate than others, progress can be made in many sectors.

- **Opportunity 2** is to minimise methane emissions from all sources, including enteric emissions from livestock. The methods used to control methane emissions will vary from source to source, but for stationary sources, the traditional air pollution control tools of measure, regulate, evaluate are fit for purpose.

- **Opportunity 3** is to improve the scientific basis for and the societal acceptance of carbon sequestration in Tasmania's terrestrial and in-shore marine environment. Climate Tasmania has been very critical of the Government's use of negative LULUCF emissions to subtract from greenhouse gas emissions. Our criticism is based on:

    1. The large difference in timescales between the lifetime of carbon dioxide emissions in the atmosphere from the burning of fossil fuels and the probable lifetime of carbon sequestration in Tasmania's forests.
    2. The uncertainties in sequestration estimates, as evidenced by the frequent and at times significant variations in updates to historical estimates.
    3. A lack of agreement on the appropriate baseline to use for forestry emissions/sequestration. There is an argument, for example, that changes should be measured as variations from Tasmania's soil and biomass stocks as they stood when Europeans arrived to settle the island.

However, Climate Tasmania recognises that even when humanity manages to stop the atmospheric concentration of carbon dioxide from increasing, we will then need to reduce it, as a concentration of the order of 350 ppm appears to be necessary for the long-term stability of the climate. Therefore, carbon sequestration in soils, biomass, marine ecosystems and other natural systems needs to be understood so that our management of those systems can maximise the sustainable sequestration of carbon in them. We therefore see this opportunity as consisting of:

- Identifying the knowledge gaps and developing a research program to fill the gaps,
- Explicitly addressing the ethical and philosophical questions associated with the choice of baseline for LULUCF changes and the admissibility of subtracting a short-term sequestration from a much longer term addition of carbon dioxide to the atmosphere. These questions could be addressed by a Citizens Assembly process.

2. What do you think are the key gaps in Tasmania's current efforts to reduce emissions?

1. Lack of local expertise and public transparency in understanding the source of our emissions. We rely on national statistics that are slow in being produced, involve assumptions that are opaque and do not have the detail we need to develop local strategies.
2. Lack of detailed sectoral plans and interim targets.
3. There is no mechanism to transparently provide scientific oversight and advice to the Government, the Parliament, and the Tasmanian community. The Tasmanian Government has done well by following scientific advice with respect to Covid-19, but there is no public, independent, transparent mechanism for scientific advice on climate change.

3. What do you think are the main opportunities for Tasmania to transition to a low carbon economy?

1. Developing an integrated plan that addresses all sectors and provides a model for other jurisdictions. Tasmania is well placed to do this because of small size, the benefits of being an island, and the advantages of expertise and natural resources.
2. Establish an online database into which Government Departments, GBEs and other government controlled entities are required to report their use of fossil fuels every quarter. The intention is to use fossil fuel quantities as surrogates for Scope 1 emissions: reporting fuel use in the measurement units used for trade is simple, direct, and easy to understand. Allow non-Government entities to also report their fuel use into the public database on a voluntary basis.
3. Require the Government entities who report into the database established in 2 above to reduce their fossil fuel use year on year, and develop reports from the database so any person can see how each entity is performing with respect to this requirement in absolute terms, and relative to other reporting entities. Make fossil fuel use reduction achievements a factor in salary and bonus calculations for executives.
4. Institute an annual Awards Night hosted by the Minister for Climate Change to celebrate the achievements of Government entities and others in reducing their fossil fuel use as reported into the public database.
5. After a notice period, require larger contractors and suppliers to the Tasmanian Government to voluntarily report their fossil fuel use into the database in 2 above. Make their fossil fuel usage reduction achievements a factor in assessing the award of future contracts.
6. Provide additional staffing and equipment to the Tasmanian EPA to equip it to measure methane emissions from stationary sources in Tasmania. Update the EPA's legislation and other instruments so the EPA can enforce requirements to reduce methane emissions.
7. Provide the TIA/Agriculture Department with the necessary staff and expertise (including a measurement capability) to allow it to provide extension services to livestock owners wishing to reduce their enteric methane emissions. Include measurements of the productivity benefits of those emission reductions in the service offered to farmers.
8. Add a category for livestock farmers who have done the best in reducing the enteric methane emissions of their livestock in the Awards Night in 4 above.
9. Provide half the capital cost of new electric vehicles to fleet operators, where each grant is the first use of that category in Tasmania (e.g. first electric rubbish truck, first bus of 20 seats or less), and where the recipient is required to publicly disclose their operating experience with the vehicle, including charging infrastructure costs, operating and maintenance costs, and differences between the operating and maintenance costs with those of the ICE vehicle in their fleet providing the most similar service.
10. Provide half the capital cost of new equipment that will provide renewable heat to a commercial or industrial user of pipeline or bottled gas (or some other fossil fuel) over a range of use categories such as maximum heat rate, temperatures required, the medium being heated, etc. As in 9, require grant recipients to publicly disclose their experiences, changes in costs, etc with the chosen renewable heat technology.
11. Commission detailed advice on the preferred minimum provision of EV charging in new residential, commercial and industrial developments. The advice needs to be of a standard and specificity for ready inclusion into planning schemes and other building regulatory documents. The advice should include charging capacity for immediate deployment and appropriate wiring infrastructure for adding additional charging capacity.
12. Commission a detailed study of barriers to much greater ebike usage in Tasmania, with a focus on the road infrastructure, safety, provision of parking, the need for public charging, public attitudinal issues, etc.
13. Commission a second ebike study in parallel with that in 12 which very specifically looks at the ebikes available and their suitability for Tasmania's hilly terrain, the age structure of its population,

the fitness and disability levels of Tasmanians, etc. In other words, the study in 12 looks at infrastructure and "software" style issues; this study looks in some detail at the ebike hardware. Amongst other questions, this study should review the impact that current power and other restrictions on ebikes have on their suitability for Tasmania's environment and population. If the study finds the restrictions are reducing the uptake of ebikes, then it needs to be able to generate a case for change. One of the outputs of this study should be a set of ebike specifications that are optimised for Tasmania.

14. Using the specifications resulting from the study in 13, carry out a pilot bulk ebike purchase in a Tasmanian population centre to test if a significant purchase price reduction can be achieved by such a process.

15. Carry out a feasibility study for renewable diesel production in Tasmania. The study should consider a small to medium scale renewable diesel production plant in an agricultural area in Tasmania, with the feedstocks being waste vegetable oils, oil from purpose grown vegetable oil crops, water, and electricity from the grid or a dedicated solar farm. Some renewable diesel plant manufacturers in the US are now selling plants with standardised capacities to enhance learning effect cost reductions from that standardisation.

16. Convene a Citizens Assembly on the transition from fossil fuels. In particular, the assembly should study in detail questions about the pace of the transition and the Tasmanian Government's role in it. Should the Government attempt to influence the speed of the transition, or just let it happen? Given the costs, benefits and risks associated with the transition, is it better and safer for Tasmania to plan to lead the transition (speed it up), or should it lag the transition (try to slow it down)?

Adaptation

1. What aspects of Tasmania's projected future climate most concern you and why?

A drier Tasmania: The impact of a drying climate will probably not be as severe as it will be across most of southern Australia, but parts of Tasmania are projected to become significantly drier over coming decades. Equally concerning is the potential for "flash drought", which ANU climatologists have identified as a developing phenomenon in Australia's weather. Flash droughts are defined as rapidly intensifying drought conditions occurring within a month, in which continuous high temperatures, low humidity, and windy and cloudless days cause moisture to be lost completely from topsoil.

2. Which parts of Tasmania (for example locations, industries, communities) do you think are most vulnerable to a changing climate?

Agriculture, including tree farming, are clearly most vulnerable in the immediate and long-term future. The main impact is likely to be water availability, but warming winters and nights are also significant issues. Other vulnerabilities, mostly long-term, include coastal management from rising sea levels and storm surges, and residential land subjected to wildfire and flood.

3. What do you think are the key opportunities to help Tasmania adapt to a changing climate? Please choose your top three.

- Preparing our agricultural sector for drier, warmer conditions, including the onset of flash droughts and flash floods.
- Preparing for worsening bushfire conditions in warmer months with greater resources put into year-round fire management, drawing on Indigenous fire knowledge.
- Preparing coastal managers for inundation and erosion due to rising sea levels and increasing storm events.

Setting an emissions reduction target

The necessity for ambitious global targets

In 2018 the IPCC advised that In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO_2 emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range)….Limiting warming to 1.5°C implies reaching net zero CO_2 emissions globally around 2050 and concurrent deep reductions in emissions of non-CO_2 forcers, particularly methane (*high confidence*).…..Such mitigation pathways are characterized by energy demand reductions, decarbonisation of electricity and other fuels, electrification of energy end use, deep reductions in agricultural emissions, and some form of carbon dioxide removal with carbon storage on land or sequestration in geological reservoirs. Low energy demand and low demand for land- and GHG-intensive consumption goods facilitate limiting warming to as close as possible to 1.5°C.

The Tasmanian context

State government policy assumes significant growth in population to 650,000 by 2050 and increasing the value of the agricultural sector to $10 billion by 2050. Both policies have major implications for emissions projections in Tasmania. These include the likely increase of methane emissions in the case of agriculture. As noted above, the IPCC has identified the need for deep cuts in non-CO_2 forcers such as methane. Emissions from a number of sectors in Tasmania have increased in recent years and there is still almost total reliance on fossil fuels in sectors such as transport. The impact on emissions from the COVID 19 pandemic is likely to be short lived.

The global move away from fossil fuel use (particularly oil and coal) is occurring rapidly and Tasmania risks being left behind as a desirable place for innovative investment in this transition and with significant stranded assets (industrial and transport).

These are only some of the obvious considerations in looking at the development of climate policy in Tasmania and are not really addressed in current climate policy or the review of the Act process. It is generally agreed that without significant changes to the approach to mitigation and adaptation, there will be disastrous impacts on the Tasmanian economy and the Tasmanian community in the near term, e.g. exposure to fire, extreme weather events, food insecurity, dislocation, and health impacts (physical and mental). In the longer terms, future generations face irremediable harm.

The case for separating emissions and sequestration

The often repeated claim that “Tasmania was the first Australian jurisdiction to achieve net zero emissions, and did so in 2013, 2015, 2016, 2017, 2018 and 2019” has the effect of creating a complacency about the size of the emissions reduction challenge facing Tasmania.

As described in our Fact Sheet and additional resources, the reliance on offsets from sequestration in the forestry sector is not a good basis for a climate policy. In brief:

1. Estimates of LULUCF are very uncertain and the methodology is opaque.
2. It is unclear which parts of LULUCF are natural and which have human causes.
3. Carbon dioxide can move from forests to the atmosphere relatively quickly (for example, during a forest fire).
4. The present draw-down of carbon dioxide is not permanent and will reduce as regrowing forests mature.
5. The present draw-down of carbon dioxide is a direct result of decades of logging, during which Tasmania had among the highest per-capita emissions in the world.

Is 'net zero' the appropriate measure?

Whether or not achieving net zero emissions by 2050 is ambitious depends on the definition of "net zero emissions", and in particular what sequestration is used to subtract from the actual emissions. If the only sequestration that is counted is sequestration which is highly likely to remain contained for many centuries, then perhaps a target of net zero before 2050 might be acceptable. The problem is that net zero targets which ignore the persistence of the sequestration are highly misleading.

Broadly, Climate Tasmania's view is that the State's targets should be based on science (such as the IPCC Special Report SR15 and more recent advice) and the Paris Agreement's target of limiting warming to 1.5 °C. If Tasmania is to be a leader in the energy transition, then the **slowest** it should reduce its emissions is the rate identified in the IPCC's SR15 report as being required to keep warming to 1.5 °C. This is the minimum rate of change needed to be able to be seen as part of the solution, rather than as part of the problem.

Emissions reduction targets should be set in absolute emissions of CO_{2e}, not per capita or per unit of GDP. The latter are misleading as only an absolute reduction in release of greenhouse gases can reduce global heating.

The case for sectoral and interim targets

There should be separate targets for emissions and for sequestration, and both should have interim and sectoral targets. For sequestration, it is necessary to differentiate between different types based on their 99% probable half lives of sequestration. For example, sequestration pathways could be classified as short term (half life 99% probability of 20 years), medium term (half life 99% probability of 100 years) or long term (half life 99% probability of 500 years).

Interim targets are essential, because otherwise governments could ignore the issue for a parliamentary term. The Tasmanian Government has already legislated renewable electricity targets, but with no legislated mechanism to achieve those targets. The advantage of sectoral targets is that allows the Government to apportion reductions between easy- and hard-to-mitigate sectors.

Interim targets should be set for five-yearly periods, aligning with the timing of UNFCCC COP meetings. As noted in the Discussion Paper, this is the approach taken in Victoria, New Zealand, Denmark, and the United Kingdom.

Sectoral opportunities and challenges

Opportunities in lower temperature applications

Smaller to medium scale, lower temperature uses of natural gas and LPG are relatively easy to replace. Where heat pumps are able to achieve the output temperatures required, they are highly likely to be cheaper (or much cheaper) to run; if heat pumps are not available then a clean burning renewable fuel made from waste biomass (such as wood pellets from waste sawdust) is likely to be cost competitive on operating costs.

Opportunities in land transport

Land transport provides the largest opportunity, potentially followed by anything powered by a diesel engine. Battery electric vehicles will certainly dominate the light duty passenger car segment, and should also dominate the smaller delivery vehicle segment. Tasmania, with its relatively short cargo movement distances and only a few major routes, is ideally suited to vehicle electrification. Electric buses are already one of the fastest growing electric vehicle types worldwide. The rate of heavy vehicle electrification will depend on continuing reductions in battery costs and improvements in their energy density. Unmodified diesel engines can run on renewable diesel, which can be made in Tasmania. Diesel engines which can run on ethanol have been available since the 1920s, and technology is also being developed which may enable internal combustion engines to run on ethanol, sustainable ('green') hydrogen or sustainable ammonia, or mixtures of these fuels.

An opportunity for land transport in urban areas involves changing planning and urban design approaches to make active transport (walking, cycling, etc) safer and more attractive. The increased use of active transport in Tasmania is a major opportunity for health gains and reductions in social inequality.

Because of its compact size and small population, Tasmania can serve as a test bed for very widespread transport electrification. This will build on our existing clean, green image and develop a market for consulting, training and demonstration services off island, as well as enhancing tourism. Tasmania should be the go-to place for people to see how to phase out fossil fuels successfully.

Opportunities in marine transport

Marine transport has some opportunities: Short run ferry routes (such as that contemplated for Hobart) can be battery electric. Longer runs with diesel engines can use renewable diesel; hydrogen fuel cell ships are also a possibility.

Opportunities in land use

The land management sector has several potential benefits from a low carbon approach. Regenerative agriculture offers increased sequestration together with improved soils, improved biodiversity and improved drought resilience. Reducing methane emissions from ruminant animals offers increased productivity.

Methane emissions

Methane emissions, whether fossil or biogenic, (apart from those from ruminant animals) can be addressed by considering methane as an air pollutant and using air pollution regulatory approaches to minimise leaks and releases. Work is underway on reducing methane from ruminant animals. Land management should have a unified focus on reducing emissions and increasing sequestration.

Risk analysis

Risks to Tasmania from Climate Change impacts

Direct threats are those from extreme weather, bushfires, heat, drought, sea level rise, marine temperature changes, etc. These direct threats will adversely impact our economy, community, and economy. Tasmania is no different to any other jurisdiction in regard to threats to the community. In particular climate change is already adversely affecting the lives of the least advantaged members of society. Recently published data demonstrates an increase in demand on public hospital services by 5% during high heat events in Tasmania.

Tasmania also has a significant proportion of the population living in coastal communities. There will be a threshold where local and state governments cannot afford the adaptation methods to protect vulnerable coastal communities.

Risks to Tasmania from a poorly managed transition to a low carbon world

In addition to the direct risks from climate change, there are transition threats which could, if unmanaged, materially add to the disruption caused by the direct threats. In brief, the transition threats include:

- Stranded assets, which in Tasmania are likely to be on the fossil fuel demand side – primarily equipment which relies on petroleum. Tasmanians are continuing to buy such equipment in the expectation it can be used for its economic life, and we need a clear and unequivocal policy signal that fossil fuels are to be phased out to help Tasmanians to avoid continuing to purchase assets which are likely to be stranded.
- Shifting skills demands. For example, the move to electric vehicles is likely to reduce the need for motor mechanics and reduce the incomes of the service departments of car dealerships. There will be increases in other areas to compensate. Climate Tasmania's proposed Energy Transition Authority would work with TAFE Tasmania to identify such changes in skills demand as far in advance as possible, as well as working with the employers in the industry to help manage the transition.

- The largest transition risks are likely to be related to the petroleum supply industry. Tasmania's fuel supply will increasingly come from places like Singapore and Japan. The oil majors are already suffering some financial difficulties, and to expect this large international industry to perfectly maintain a consistent, but dwindling supply of quality fuels to all parts of the world over a 10 to 20 year time horizon marked by steadily reducing sales of most (but not all) products, is crazily optimistic. Tasmania is a very small fuel market a long way away from major fuel refineries. Fuel supply disruptions are a definite transition risk.
- Site environmental contamination is another petroleum transition risk. Do service station owners and fuel distribution companies currently post bonds against site clean-up costs for when their sites are closed down because their sales have dried up?

Developing an information base

The Discussion Paper states that "The Act includes provisions for regulation, measurement and reporting of emissions". The reporting of emissions on the Tasmanian Climate Change Office's website consists only of figures taken from the national State and Territory Greenhouse Gas Inventories: 2019 (the latest figures).

This is not an adequate basis for informing policy development in Tasmania because of:

- the delay in collating data
- the fact that it is not possible to see emissions resulting from particular fossil fuel sources (oil, gas and coal) by state or for individual sectors
- the fact that LULUCF figures, which form by far the biggest component of the claimed net zero emissions for Tasmania, do not allow an analysis of what role particular forestry areas and management practices contribute to the calculated sequestration and how this will change over time.

While consistency with national and international reporting is important, Tasmania should develop an independent capacity to analyse and report on use of fossil fuels and emissions from particular sectors and industries as a basis for developing sectoral targets.

Stranded assets

Stranded assets are assets on either the fossil fuel supply side, or on the demand side, that cannot be used to their full economic value or lifetime because of the imperative to manage climate risks. Stranded assets can range in size from oil or gas fields, mines, production facilities, pipelines, refineries, distribution terminals, etc, to cars, trucks, tractors, ships, aircraft, gas hot water heaters, gas home heating systems, etc.

A recent Carbon Tracker report (Carbon Tracker 2020) has sought to quantify the stocks and flows of the fossil fuel system on both the supply and demand side in order to give some dimensioning to the potential size of the stranded assets problem.

Kingsmill Bond, Carbon Tracker Energy Strategist and report author, said:

> "*We are witnessing the decline and fall of the fossil fuel economy. Technological innovation and policy support is driving peak fossil fuel demand in sector after sector and country after country, and the COVID-19 pandemic has accelerated this. We may now have seen peak fossil fuel demand as a whole. This is a huge opportunity for countries that import fossil fuels which can save trillions of dollars by switching to a clean energy economy in line with the Paris Agreement. Now is the time to plan an orderly wind-down of fossil fuel assets and manage the impact on the global economy rather than try to sustain the unsustainable.*"

Carbon Tracker's research found that the stock of demand side fossil fuel infrastructure is larger than the stock of supply side fossil fuel infrastructure. Thus the analysis of the potential economic impacts of the stranding of fossil fuel supply assets may be missing an even larger impact from the stranding of demand assets. Carbon Tracker's research also found that trying to delay the transition from fossil fuels will ultimately be futile, and will cause additional direct economic harm as well as harm through increased climate disruption.

References

Climate Tasmania publications

Tasmanian State Election – climate facts, 20 April 2021
Webpage linking to a series of Fact Sheets prepared for the State Election, associated media releases, and longer versions of related content.
https://www.climatetasmania.org/

- Fact sheet #1: Does Tasmania have 100% renewable energy?
- Fact sheet #2: Is Tasmania a world leader in mitigating climate change?
- Fact sheet #3: Stranded assets – why are they important?
- Fact sheet #4: Will Tasmania's 200% renewables target reduce emissions?
- Policy Paper: Why there's a need for an independent Climate Commission.

Climate Change Act Review, 2 March 2021
Climate Tasmania's initial response to the review of the Climate Change Act
https://www.climatetasmania.org/climate-change-act-review/

A new Climate Act for Tasmania
Climate Tasmania webpage with links to various resources including Drafting Instructions for a new Climate Act
https://www.climatetasmania.org/a-new-climate-act-for-tasmania/

Other references

Carbon Tracker 2020, *Decline and Fall: The Size & Vulnerability of the Fossil Fuel System*, Carbon Tracker, 4 June 2020
https://carbontracker.org/reports/decline-and-fall/

IPPC 2018, *Global warming of 1.5°C*
An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
https://www.ipcc.ch/sr15/

PESRAC 2021, *Final Report*, Premier's Economic and Social Recover Advisory Committee, March 2021
https://www.pesrac.tas.gov.au/reports

TasGov2008, *Climate Change (State Action) Act 2008*, Tasmanian Government
https://www.legislation.tas.gov.au/view/whole/html/inforce/current/act-2008-036

Appendix 1: Emissions reduction policy proposal

See following pages.

CLIMATE TASMANIA

Independence, knowledge and commitment to climate action

An emissions reduction policy proposal for Australian States

1. Introduction.

Australian State Governments are currently showing greater interest in responding to the climate emergency than is the Federal Government. This paper:

1. Discusses the precise objectives of emissions reduction policies;
2. Looks at broader societal and economic issues relevant to emissions reduction policies;
3. Explores some possible policy approaches which State governments could implement via legislation; and
4. Describes a specific policy proposal in more detail.

The "specific policy proposal" has been developed by Climate Tasmania as a component of a set of drafting instructions for a new, ambitious, comprehensive and detailed Tasmanian Climate Change Act[1]. This paper provides the background to the emissions reduction components of those drafting instructions.

2. Criteria for State emissions reduction policies.

Australia has had a very varied experience with formal, legislated, emissions reduction policies, particularly at the federal level. This less than optimal experience leads us to suggest a set of criteria for State policies. Successful legislation that achieves lasting change needs to be capable of acceptance by most of the population, and this requirement also informs our criteria, which, in no particular order, are:

1. *The objectives and mechanisms of the policy approach must be clear and easy to understand.* Australia's previously enacted policy – an emissions trading scheme with an initial fixed price period – was not clear and easy to understand, and this enabled it to be successfully mischaracterised (as a "carbon tax") and to be made the subject of a scare campaign ("$100 lamb roasts!").
2. *Non-monetary approaches are to be preferred over monetary ones*. The success of the "carbon tax" scare campaign has made it very difficult to prosecute a policy based upon payments, despite a legion of economists pointing out the wisdom of taxing things we want people to do less of. This paper is about policies that can be enacted by State governments; it would be challenging to enact a wide-ranging payment based approach that applies to just one State.
3. *People and entities that emit the most should need to do the most under the legislation*. It costs money to emit carbon dioxide, so those who emit the most are more likely to have the resources to reduce their emissions.
4. Equity and protection of the most vulnerable members of our society must be a central feature of the policy approach. A "just transition" needs to be built in to the policy approach.
5. *Where possible, emitters should be free to choose their own approach to reducing their emissions*. However, this freedom should not be at the expense of the wider stability and advancement of the State's economy as a whole. Box 1 contains a hypothetical example of a situation where there could be value in restricting this freedom.

[1] See https://www.climatetasmania.org/wp-content/uploads/Drafting-instructions_-Climate-Change-Bill-V1-18-Sep-19.pdf for the drafting instructions.

6. *Transparency with emissions reduction processes and achievements (or their absence) is essential*. Entities required to make changes should be able to see that others are also required to make changes to reduce emissions. This transparency should include the sharing of successful approaches and the public celebration of achievements and innovation.
7. *The policy must allow individuals and groups to publicly commit to voluntary emissions reductions*. One of the features of previous national schemes was that their design negated the benefits of voluntary emissions reduction efforts: such voluntary reductions made the emissions reduction tasks of those required to make reductions less stringent, thus potentially negating the reductions achieved by the volunteers. This weakness in the design of the former schemes had the potential to seriously weaken the ethos of "we are all in this together" and thus reduce broad community support for the policy.
8. *The policy must be flexible*: if climate science, our lived experience, and community expectations require faster reduction in emissions, the policy must be able to be adjusted to suit. Another reason for flexibility is the availability (or otherwise) of low emissions technologies. Currently there are sectors (e.g. aviation) and processes (e.g. cement making) for which low emissions technologies are still in the early stages of development. There may have to be lower expectations of such sectors in the short term, and increased expectations as suitable technologies become available.

Box 1: a hypothetical example for Criterion 5.

Here is a hypothetical example of a situation where the freedom for emitters to choose their own emissions reduction methods may need to be restricted.

Suppose that large users of diesel in a State have identified three available biofuel options to use as a bridging fuel to allow their existing equipment to continue to operate, but with lower emissions. All three options look roughly equally attractive from the environmental and cost perspective. However, if all the State's major diesel users choose equally between the three options – leaving each biofuel with one third of the potential market – then the State's demand for each fuel could be too small to make the production of the fuel in the State economic. In this situation, there could be an excellent case for the State government to push the users towards the fuel that can most economically be manufactured in the State, and for the State government to assist with the development of a production facility for that fuel. This outcome would restrict the freedom in Criterion 5, but would improve the State's economy as well as the State's resilience.

3. Emissions reductions – what needs to be reduced by whom?

3.1 Emissions reduction targets.

This paper does not discuss reduction targets; its focus is on mechanisms for reducing emissions. Targets are important, because reduction efforts need a yardstick against which to judge how hard people need to work to reduce emissions. Climate Tasmania's drafting instructions include the establishment of a science based independent statutory body to advise on targets and to review the rate of progress with emissions reduction.

3.2 Greenhouse gases.

Our planet is heating because we humans have been adding greenhouse gases to its atmosphere. There are several such gases which trap heat which would otherwise leave the planet, but carbon dioxide (sometimes shortened to "carbon") is the main greenhouse gas of concern because it is the largest part of greenhouse gas emissions. Carbon dioxide is followed by methane in the emissions volume stakes. Methane is a significantly more potent greenhouse gas than carbon dioxide, but is chemically transformed into carbon dioxide over several decades in the atmosphere. Another important group of greenhouse gases are the artificial refrigerant gases. These are produced and emitted in much smaller quantities than methane, but can be highly potent greenhouse gases.

The emissions which need to be reduced in order to slow down global heating are of the greenhouse gases, with carbon dioxide and methane the most important of those because of their larger volumes and wider range of sources.

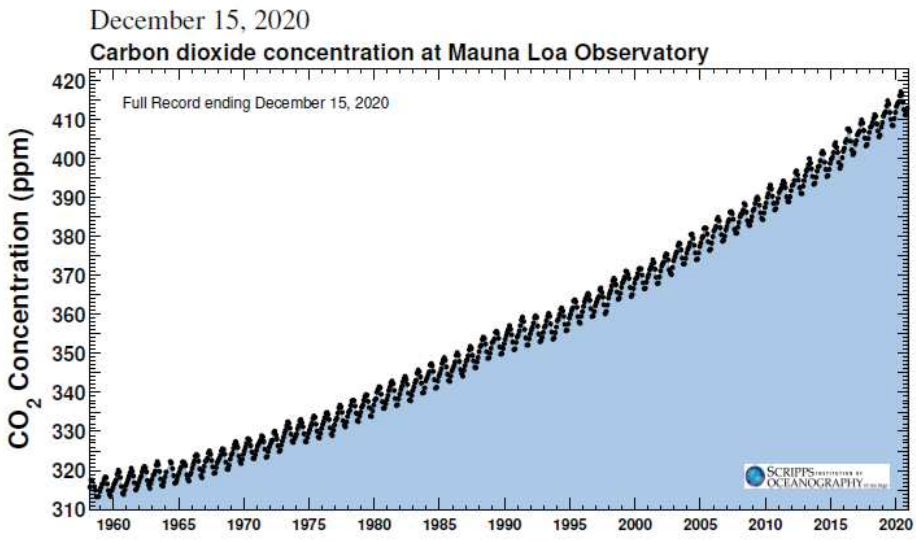
3.2 What are the greenhouse gas emissions we need to reduce?

Carbon dioxide. It is useful to distinguish between "slow carbon" and "fast carbon". "Fast carbon" is the emission of carbon dioxide from sources that have only recently (in geological time) taken up the carbon. An example is that animals (including us) breathe out carbon dioxide which we generate when we "burn" food as fuel to keep our metabolisms going. This food was previously either a plant – and thus took carbon dioxide out of the atmosphere as it grew – or an animal whose food originated in plants. The take-up of carbon dioxide from the atmosphere by trees as they grow and its emission as trees decay after death or when burning in a fire is also fast on a geological timescale, and can also be regarded as "fast carbon".

Figure 1 is the Keeling Curve – the measured concentration of carbon dioxide in the atmosphere at Mauna Loa, Hawaii – which shows an annual cycle of concentration changes superimposed on a steady increase. The annual fluctuations are a reduction of carbon dioxide in the atmosphere because of carbon take-up by the Northern Hemisphere's forests in Spring and an increase caused by leaf fall and decay in Autumn. These are fast carbon changes. The steady increase from around 315 parts per million (ppm) in 1958 when measurements started to around 410 ppm at the end of 2020 is caused by humanity's burning of geological stores of carbon, commonly known as fossil fuels – coal, oil, and gas. This is slow carbon, and the climate emergency is as a result of our use of these fuels.

Because the climate emergency has been caused by the use of fossil fuels, we need to phase out those fuels to address the emergency. We also need to slow down our release of fast carbon, and to speed up our uptake of fast carbon, as all efforts need to be made to slow down, stop, and ultimately reverse the increase in atmospheric carbon dioxide shown in the Keeling Curve. We need to turn the Keeling Curve around, and phasing out coal, oil, and gas is central to doing that.

Figure 1: the Keeling Curve



Methane. Methane is the simplest hydrocarbon, and is the main constituent of natural gas. It is therefore a fossil fuel, but it is also generated by various biological processes, such as the decay of organic matter in the absence of oxygen. Methane is commonly emitted from sewage systems, landfill waste, manure ponds, etc. Methane is also emitted by ruminant animals – cattle and sheep – as part of their digestive processes. Methane from waste and from ruminant animals is collectively referred to as biogenic methane – methane of biological origin. Because of its increased potency as a greenhouse gas (compared with that of carbon dioxide), methane is an important contaminant to control in order to reduce global heating. Therefore, whether the methane is biogenic or comes from ancient deposits of coal, oil, and gas, there is a need to limit methane emissions as much as possible.

Refrigerant gases. Because the Federal Government has legislated to control emissions from refrigerant gases, they are not considered further in this policy paper or included in our drafting instructions.

Industrial processes. Three important industrial processes release significant amounts of carbon dioxide which are not primarily the result of the use of fossil fuels. They are:

- Cement manufacture. The high temperature roasting process used to make cement is intended to bring about a chemical reaction in the feed minerals. That chemical reaction releases carbon dioxide to the atmosphere, and this release is independent of how the high temperatures are achieved.

- Aluminium smelting. The standard electrolytic process used to convert aluminium oxide to aluminium metal involves the use of a sacrificial anode made mostly of carbon. The carbon in the anode reacts with the oxygen in the aluminium oxide to form carbon dioxide, which is released into the air. This release is independent of the source of electricity used in the process.

- Steel making. Iron ore is mainly iron oxide, and this is converted to iron metal in a blast furnace by using coke – coal that has been roasted in the absence of air – to react with the oxygen in the iron oxide to form carbon dioxide, which is released to the atmosphere. Some of the coke is burned to generate the high temperatures needed in the process.

These three processes are of importance in the industrial economy and are significant sources of emissions. Tasmania has one cement plant and one aluminium smelter, but no blast furnaces for steel manufacture. However, the drafting instructions do not grapple with the issue of the emissions from cement manufacture and aluminium smelting. This is because these are "hard to abate" processes; while alternative processes are under development, they are not yet in general use.

Land use. The way land is managed has an impact on both emissions from the land and the sequestering of carbon in plants, soil, and other biomass. This is a complex area: emissions can arise from deforestation, wildfires, tilling practices, fertiliser use, ruminant animals, and from the management of organic wastes. Conversely, sequestration of carbon can arise from growing trees and other biomass and the subsequent use of the biomass in a way which locks the carbon out of the atmosphere. Sequestration can also arise from regenerative agricultural practices, from improved wildfire management, and from the use of biochar as a soil improver. Another complication is that not all sequestration is equal: the likely lifetime of the carbon's sequestration is extremely important.

Summary. From the perspective of policies capable of being legislated by an Australian State, reducing emissions involves:

1. Phasing out the use of fossil fuels: coal, oil, and gas; and
2. Controlling methane emissions; and
3. Continually increasing the long term sequestration of carbon from land use, land use change, and forestry, while decreasing the emissions from land use, land use change, and forestry.

3.3 Who are the largest users of fossil fuels?

The available data on this question is mixed, and is most complete for the 883 corporations required to report under the Australian Government's National Greenhouse and Energy Reporting (NGER) Scheme[2]. These 883 corporations are responsible for an estimated 60% of Australia's total emissions. The main conclusions available from the data are:

1. The largest emitters are all corporations (companies), not individuals; and

2. The largest emitters contribute proportionally more to the total. For example, in 2018 – 2019 the top 10 emitters (of the 883) contributed 50% of the emissions of the group.

The current systems do not provide a ranked list of the emitters in each State, which means that State legislation seeking to achieve criterion 3 would need to separately gather the data required to generate such a ranked list. Further, the current emissions reporting system (in Commonwealth legislation) contains confidentiality provisions which render some information unavailable.

In the absence of specific data it seems very likely that some kind of 80 – 20 rule applies to the distribution of fossil fuel use: that the top 20% of fossil fuel users are responsible for around 80% of the use, and therefore of the emissions. If true, this distribution is important for policy development, as it means that a legislative approach that applies to the largest emitters will capture most of the emissions. In other words, the policy should be able to reduce emissions effectively without directly involving the smallest users of fossil fuels, such as individuals, families, and small business people.

[2] http://www.cleanenergyregulator.gov.au/NGER/Pages/Published%20information/Data%20highlights/2018-19%20factsheets/Australia%27s-10-highest-greenhouse-gas-emitters-2018-19.aspx

4.0 Policy considerations.

4.1 Emissions OR fossil fuel use + methane + land management?

Policy criterion 1 is "*the objectives and mechanisms of the policy approach must be clear and easy to understand*". Policy which focuses only on "emissions" does not meet this criterion, as the link between the behaviours of individuals and corporations and their emissions is not immediately obvious. Box 2 considers the situation of a user of diesel who, having measured his or her annual use of diesel, wants to calculate their greenhouse gas emissions from their use of diesel. Clearly, focussing on emissions (as measured in carbon dioxide equivalent emissions) is not a "clear and easy to understand" policy approach.

Box 2: Calculating emissions from diesel.

Scenario: I am a user of diesel, who wants to calculate my emissions from that use, so I can track them over time. I monitor my diesel usage, and find it to be 14,385 litres in the last year. How do I calculate my emissions from that use of diesel?

1. Somehow navigate to https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2020 and open or download the 84 page document. (It helps to somehow know the key phrase "NGA factors" to find this publication.)
2. Go to section 2 of the publication and find out that there are separate sections for the stationary (section 2.1.3) or the transport (section 2.2) use of liquid fuels. Interestingly, a machine that is not registered for road use is regarded as being "stationary". Thus the emissions calculations to be used for a farmer's tractor will depend on whether or not the farmer has registered the tractor. This detailed example will assume it is all transport use.
3. Section 2 (page 16) contains the formula to be used:

$$E_{ij} = \frac{Q_i \times EC_i \times EF_{ijoxec}}{1\,000}$$

, where the meaning of the symbols is given as:
Eij is the emissions of gas type (j), carbon dioxide, methane or nitrous oxide, from fuel type (i) (CO_2-e tonnes).
Qi is the quantity of fuel type (i) (kilolitres or gigajoules) combusted for transport energy purposes
ECi is the energy content factor of fuel type (i) (gigajoules per kilolitre or per cubic metre) used for transport energy purposes — see Table 4.
If ***Qi*** is measured in gigajoules, then ***ECi*** is 1.
EFijoxec is the emission factor for each gas type (j) (which includes the effect of an oxidation factor) for fuel type (i) (kilograms CO2-e per gigajoule) used for transport energy purposes — see Table 4.
4. Our example has only one fuel type, so we can ignore the *i* subscript. Our diesel usage was 14,385 litres, which is 14.385 kilolitres, so Q = 14.385
5. Table 4 (page 17) gives us an energy content factor (EC) of 38.6 GJ per kilolitre.
6. Table 4 is particularly complicated for diesel, and the exact numbers to be used depend on whether the vehicle is a post-2004 vehicle, and if it is a heavy vehicle, whether or not it conforms to the Euro i, iii, or iv design standards. Fortunately, none of these complications change the calculated carbon dioxide emissions – they change the calculated methane and nitrous oxide emissions only. For the sake of this example, we will assume all vehicles are post-2004 light or medium vehicles. Our values of the emissions factor, EF are:
carbon dioxide: 69.9
methane: 0.01
nitrous oxide: 0.5
7. Putting the values we now have into the formula, we get the following emissions in carbon dioxide equivalent tonnes:
carbon dioxide: 38.8 tonnes
methane: 0.005 tonnes
nitrous oxide: 0.278 tonnes

This gives us the grand total of **39.1 tonnes carbon dioxide equivalent** (rounded to one decimal place). The summing of the three components is not shown in the formula given in the handbook, but is shown in its worked examples.

As a comparison, if we had used the Table 3 stationary source values our rounded total would have been 39.0 tonnes carbon dioxide equivalent.

Policy Proposal #1: Treat the three main emissions areas – fossil fuels, methane, and land use – separately.

The advantage of the separation is that "clear and easy to understand" approaches are available for each of these three areas separately. Instead of requiring emitters to understand the terminology and calculations required in each of the areas to bring them to a common measure, the legislation and the regulatory processes it establishes can do that integration.

4.2 Reducing fossil fuel use.

The example in Box 2 is important, as it shows that while calculating emissions from known fossil fuel use is definitely not "clear and easy to understand", the only number that varies over time is the volume of each fuel used. All the other numbers are constants which are used in the calculation. Therefore, the fuel quantities can be used as a proxy for emissions. This leads to the following important policy proposal:

Policy Proposal #2: Regulate and track fossil fuel use directly, rather than the emissions from their use.

This means using the quantities of each fuel used as the amounts to be tracked and reduced over time instead of the emissions from those amounts of fuel. As far as State climate change legislation is concerned, the priority is to reduce emissions over time, not to measure them exactly.

The proposal is therefore to track each fossil fuel (coal, natural gas, petroleum fuels) using the units those products are measured in for trade. This means that the quantities to be tracked can be taken directly from invoices for the products, thus making the tracking much easier to do.

4.3 Transparency and public accountability.

One of the reasons that responding to climate change is seen as a wicked problem is that since the first use of fossil fuels, humans have been using our shared atmosphere as a common sink to receive our emissions. All of us are therefore impacted by the actions of each one of us.

Policy Proposal #3: No emissions to atmosphere should be confidential; all must be public or potentially public.

Another way of saying this is that if an individual or corporation seeks the right to keep their use of fossil fuels private, they should be told they can do so only if they have their own private atmosphere into which to discharge their emissions.

The "potentially public" phrase above is a recognition that, as discussed in section 3.3, the smallest users of fossil fuels may not be impacted by the proposed legislation. Such users have no fundamental right to fuel use confidentiality; they are merely not directly impacted by the policy.

Policy Proposal #4: Public reporting of fossil fuel use and public accountability of reductions over time is to be used to drive reductions.

The proposal is that all significant users of fossil fuels be required to publicly report their usage every three months, and that all such reports be available on a public database. The legislation should contain the expectation that all users will reduce their use over time, and so the public database will contain a graphing function so that each reporting entity's change in usage over time can be seen. In addition, each reporting entity's performance in relation to its peers in its industry class should also be easily found on the database.

This proposal is intended to have four impacts:

- It makes the need to phase out fossil fuels totally clear.
- It will emphasise that almost everyone has a responsibility to reduce their fossil fuel use.
- It will provide both public and peer pressure on fossil fuel users to reduce their use.
- It enables any individual or entity considering purchasing goods or services from a reporting entity to see how they are performing and to incorporate that knowledge into their purchasing decision making.

It should be noted that this proposal just requires the public reporting of totals of each fuel. Matters such as from whom the fuel was purchased, what price was paid, how the fuel use was distributed across the reporting entity's various operations, and so on would not be reported.

4.4 Administration and enforcement: reducing fossil fuel use.

The public reporting of fossil fuel use (Policy Proposal #4) will need to have an administration and enforcement body.

Policy Proposal #5: Energy Transition Authority.

The proposal is to create a new, independent statutory authority – an Energy Transition Authority (ETA). This Authority would manage the transition from fossil fuels by administering the relevant sections of the Climate Change Act. The various State Environment Protection Authorities would be models for the ETA. However, the ETA would have a limited life, and would be disbanded when the phase-out of fossil fuels is effectively complete.

The drafting instructions have a significant amount of additional detail about the proposed structure, functions, and powers of the Energy Transition Authority. One of the ETA's important powers would be to set trigger levels for the mandatory reporting of fossil fuel use. These levels would be changed over time to track the phase-out.

4.5 Speed of reduction in fossil fuel use.

One of the main features of our climate predicament is the urgency of change. Emissions need to be reduced very quickly. The State legislation needs to be capable of controlling the rate of change. This ability also satisfies criterion 8, which requires flexibility.

Policy Proposal #6: Mandatory Energy Transition Plans.

The Energy Transition Authority must be able to control the rate of change. The primary tool proposed for them to be able to do that is a requirement for the largest users of coal, oil and gas to prepare draft Energy Transition Plans in which they spell out their plans to transition away from fossil fuels, with more detail in the first five years of the plan. The draft Plans are to be submitted to the Authority for approval. If the Authority is not happy with the proposed rate of change in the draft Plans, it can require improvements prior to approving the Plans. Approved Plans will be published on the public database, along with the entity's quarterly reports of fossil fuel use. Penalties will apply for not submitting a draft Plan by a set date, for not having an approved Plan by a set date, and for not complying with an approved Plan.

The users required to prepare, have approved, and comply with Energy Transition Plans would be:

- A sub-set of the entities caught by the public reporting requirement of policy proposal #4, being the highest users of each of the fossil fuels. The trigger levels for the Transition Plan requirement would also be set by the Energy Transition Authority and be subject to change over time.
- All Government (State and Local) bodies and government business enterprises, regardless of the scale of their fossil fuel use. This is an important community leadership provision, and these government entities would be treated the same as the non-government entities whose use exceed the trigger levels.

Box 3 contains a mock-up of a possible report from the public database mentioned in policy proposals #4 and #6. The example used is of a real organization, but the data shown in the example is not real.

4.6 Control of methane emissions.

Policy Proposal #1 is to treat methane emissions separately from the treatment of fossil fuel use, and from the treatment of land use changes. If methane from ruminant animals is considered to be a land management issue, then all remaining human mediated methane releases are from leaks from the fossil gas system and from biogenic methane, with waste operations being the largest sources potentially amenable to control.

Policy Proposal #7: Treat methane as an air pollutant.

Each State has an Environment Protection Agency (EPA) or its equivalent. These regulatory bodies already control the release of air pollutants through well developed mechanisms. The proposal is to:

- Where necessary, amend the legislation administered by the EPA to ensure that methane is treated as a priority air pollutant; and
- Ensure that the EPA is adequately staffed and equipped to be able to control methane emissions, including having the ability to make independent measurements of methane emissions.

Box 3: A mock-up report from the public database.

Tasmanian Energy Transition Authority *Fossil Fuel Users Database*

Summary Report for a Single User of Fossil Fuels

User Name: / User Category:	Metro Tasmania / Government Business
Fuel most used:	Diesel
Size of use rank for this category:	1 (see Note)
Size of use rank for all Tasmanian fossil fuel users:	24 (see Note)
Quarter first reported:	3Q 2018
Energy Transition Plan?	Yes [Link to plan]
Fuel use reduction achievement:	5th place in State

Other fuels:	Petrol, LPG
Usage data:	[Link to fuel use data]
Changes over time:	[Link to fuel use graph]
All reports up to date?	Yes [Link to reports]
Transition Plan progress reports?	Yes [Link to progress reports]
Fuel emissions last 12 months:	8,921 tonnes $CO_{2\text{-}e}$

Note: The rank of fossil fuel user shows how their fossil fuel use compares with others in their category, or across the whole State. The largest user has rank = 1, the next rank =2, and so on. The ranking is based on the emissions from all the fuels used by each organization or person.

4.7 Land Use, Land Use Change, and Forestry (LULUCF).

This discussion is based on land management and its opportunities, which have been the focus of study for some time. More recently, similar opportunities are being studied in marine environments, particularly in shallower waters adjacent to the coastline. While these so-called blue carbon opportunities are not specifically mentioned in what follows, our intention is not to exclude them, but to establish a framework which could be extended to include these marine environments.

The land management sector is unique because it allows for a two-way flow of fast carbon: some land use practices can result in greenhouse gas emissions, while others can result in sequestration in soils and biomass. Not all sequestration is equal: sequestration in which the risk of the sequestrated carbon being re-emitted in the next several centuries is preferable over sequestration in which re-emission is likely or even guaranteed within a few years. Further, practices which sequester carbon in soils can improve the soils, increasing yields and drought resistance. Similarly, reducing the production of methane in ruminant animals can also increase yields.

Land managers also have access to payments for sequestering carbon, through the creation and trading of Australian Carbon Credit Units (ACCUs). Most of the sequestration purchased by the Australian Government through its Emissions Reduction Fund has involved the land sector. The Australia Government's Technology Investment Roadmap includes the objective of greatly reducing the cost of soil carbon measurement.

Policy Proposal#8: Improve the performance of the land sector by advice, encouragement, and peer pressure.

The proposal is to develop a centre of excellence in soil carbon measurement and management in the State agriculture department that covers all of the emissions and sequestration issues associated with land management. The centre of excellence would include a number of extension officers located around the State whose job it would be to work with land managers and other stakeholders to reduce emissions and increase sequestration. The extension officers would, for example, help farmers change their practices to increase the carbon in their soils.

The "peer pressure" in the title of this policy proposal would come from celebrating the achievements of farmers and other land managers who show outstanding achievements in reducing their emissions and in long-term sequestration of carbon. This should include an annual awards night to cover both this policy area and the fossil fuel use reduction area.

Mapping policy criteria against policy proposals.

Criterion	Where addressed
The objectives and mechanisms of the policy approach must be clear and easy to understand.	Policy proposals #1 (separate fossil fuels, methane and land use) and #2 (regulate use of fossil fuels directly)
Non-monetary approaches are to be preferred over monetary ones.	Policy proposals #1, #2, #3, #4, #5, #6, #7 and #8 – all of the approaches.
People and entities that emit the most should need to do the most under the legislation.	Policy proposals #4 (public reporting by higher users), #5 (Energy Transition Authority), #6 (highest users to develop and gain approval of Energy Transition Plans)
Equity and protection of the most vulnerable members of our society must be a central feature of the policy approach.	Policy proposal #5 – this will be a key responsibility of the Energy Transition Authority
Where possible, emitters should be free to choose their own approach to reducing their emissions.	Policy proposal #6 (highest users to develop and gain approval of Energy Transition Plans)
Transparency with emissions reduction processes and achievements (or their absence) is essential.	Policy proposals #3, #4, #5, #6 and see Box 3. Annual awards nights to celebrate highest performers.
The policy must allow individuals and groups to publicly commit to voluntary emissions reductions.	Not discussed in this paper, but Energy Transition Authority will support voluntary efforts – but results to be public.
The policy must be flexible	Energy Transition Authority can set and change trigger levels and can require changes to draft Energy Transition Plans.