



ACT
Government

ACT'S CLIMATE STRATEGY TO A NET ZERO EMISSIONS TERRITORY

DISCUSSION PAPER
December 2017



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Director-General,
Environment, Planning and Sustainable
Development Directorate,
ACT Government,
GPO Box 158, Canberra ACT 2601.

Telephone: 02 6207 1923

Website: www.environment.act.gov.au

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MINISTER'S INTRODUCTION

Climate change is already affecting communities around the world. In the ACT, climate change means we are more likely to experience longer, more frequent and more intense heatwaves, a higher risk of bushfires and severe storms, and more variable rainfall.

We are already seeing the effects of climate change in our region. 2016 was the hottest year on record across the world, with Canberra having its hottest summer on record. This comes after a decade which has seen each year hotter than the last. To prevent even more extreme heating of the planet, and the catastrophic and irreversible impacts that will bring, we have a limited window of opportunity to reduce our greenhouse gas emissions. There is no time for delay. The science tells us the sooner we reduce our greenhouse gas emissions, the better the outcome for the environment. We must reduce our emissions as quickly as possible to avoid the worst impacts of climate change.

The ACT has a proud history of leading on climate change. The ACT Government has committed to increasingly ambitious greenhouse gas emissions reduction targets. Our current target commits the Government to achieving net zero emissions for the ACT by 2050 at the latest. This world-leading target is matched by the goals of reducing greenhouse gas emissions by 40% on 1990 levels by 2020, and ensuring 100% of our electricity comes from renewable sources by 2020. We are on track to meet both these targets.

This discussion paper builds on and expands the ACT's nation-leading work to reduce emissions, focusing on the next big challenge: achieving net zero greenhouse gas emissions as quickly as possible. Drawing on the latest science, it proposes a date of 2045 or earlier by which the ACT can reach net zero emissions. It also proposes firm interim targets to help map the path to achieve this target. It identifies the sectors where emission reductions must occur, and begins to explore the actions we need to take to achieve them.

In developing these proposals, the ACT has drawn on the advice of some of Australia's leading scientists, economists and community experts, who advise the ACT Government through its Climate Change Council.

We have also taken on board input from community representatives, provided through a variety of fora.

Our goal is to limit the risks posed by climate change, adapt to a warming climate, and increase the ACT's collective resilience. At the same time, we intend to ensure Canberra remains one of the most liveable cities in the world and, in fact, becomes more liveable. These dual goals are completely compatible. The ACT is already demonstrating how effective action on climate change is both possible and brings a wide range of benefits. For example, the innovative arrangements we have used to secure 100% renewable electricity have helped cultivate a burgeoning renewable energy industry in the ACT and helped protect ACT consumers from potential energy price spikes.

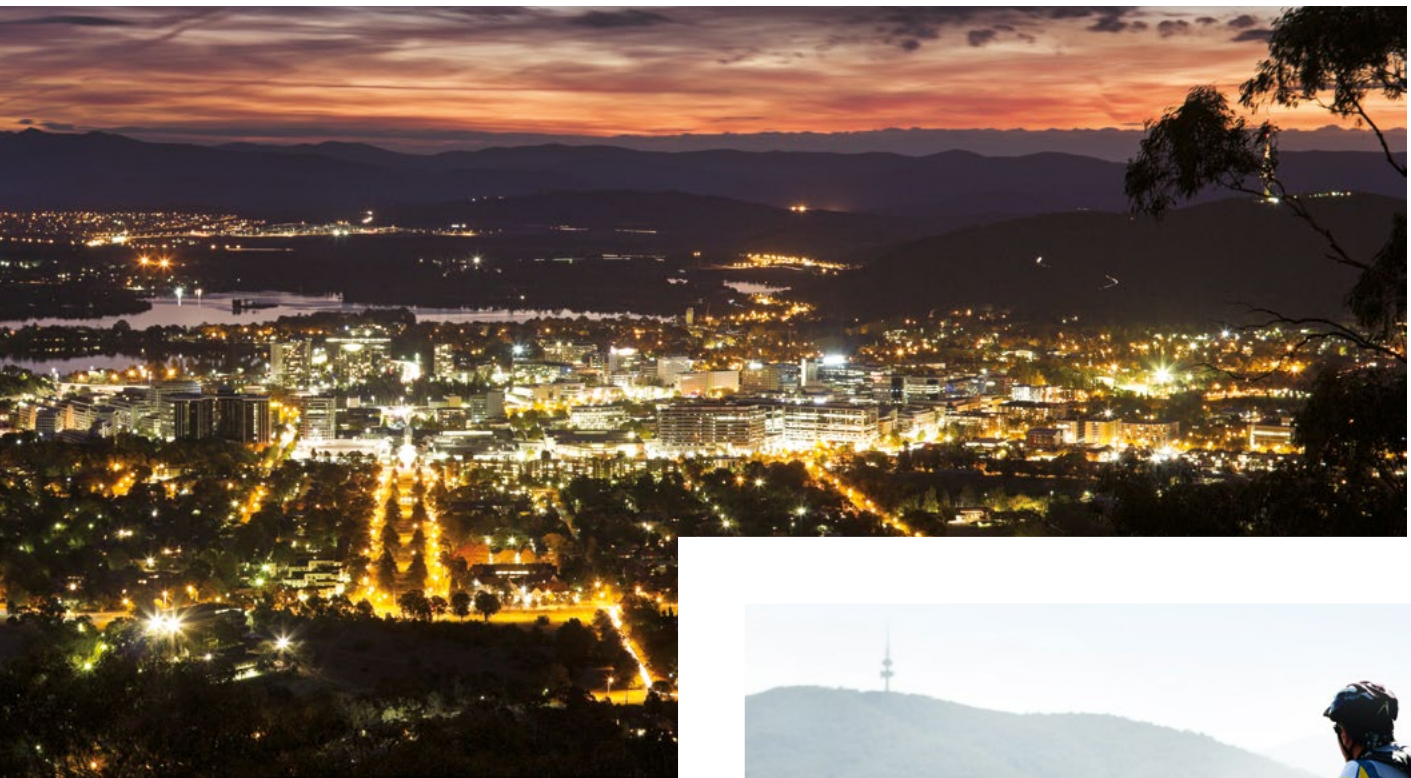
As the ACT will no longer generate any emissions from electricity by 2020, the pathway to zero emissions will need to focus on the remaining sectors, especially transport, gas, waste and land use. These sectors are likely to be more challenging, and will require greater involvement from the community.

This discussion paper is the first step on a journey to net zero emissions. It invites community members to share ideas and expertise to guide the development of this pathway. I invite you to consider this discussion paper and submit your thoughts and ideas for how we can reduce emissions and build a sustainable, prosperous and healthy future for the ACT and our region.

Shane Rattenbury

Minister for Climate Change and Sustainability





SUMMARY

THIS DISCUSSION PAPER PROVIDES INFORMATION ON THE KEY TOPICS FOR CONSIDERATION AS THE ACT TRANSITIONS TO NET ZERO EMISSIONS.

It is based on advice provided by expert scientists, economists, and community specialists from the ACT's Climate Change Council, as well as feedback from a range of community stakeholders.

**NET
ZERO
EMISSIONS BY
2045**

The paper proposes to set the date by which the ACT will achieve net zero emissions at 2045 (or earlier).

It proposes interim emission reduction targets for 2025, 2030 and 2040.

It proposes a policy approach under which the Government will not buy carbon offsets if it does not meet these emission reduction milestones—instead it will reinvest in further initiatives to achieve the necessary reductions.

The paper provides background information on greenhouse gas emissions, outlines likely climate change impacts over the coming years and decades, and provides a high-level indication of some solutions and pathways that could help the ACT reach net zero emissions.

More detailed information is available in the Technical Reference Paper, available at www.yoursay.act.gov.au.

INTRODUCTION

Climate science is now understood and accepted by the global community. Certain activities such as burning fossil fuels, clearing forests, and disposing of organic waste to landfill release greenhouse gases into the atmosphere. These greenhouse gases are accumulating, trapping more heat in the atmosphere. This is changing our climate in an effect known as ‘human-induced climate change’. The greenhouse gases already released have ‘locked in’ a certain level of change in our climate which we can already observe. The more greenhouse gases we produce, the higher the degree of warming and change we will experience.

For the ACT, climate change means longer, hotter summers with more heatwaves, increased risk of bushfires and severe storms, and changing rainfall patterns.¹

To limit the impacts of climate change we must reduce the ACT’s greenhouse gas emissions to zero, as well as adapt to the locked in changes. Addressing climate change now has a range of economic, environmental and health benefits.

The ACT is committed to the climate goals outlined in the international 2015 Paris Climate Agreement. The ACT recognises the need to reduce emissions as quickly as possible, with the aim of keeping global warming well below 2°C above pre-industrial levels. This is considered by the Intergovernmental Panel on Climate Change (IPCC) to be the maximum level of warming to avoid ‘dangerous’ climate change. It is considered that global average temperature increases of over 2°C from pre-industrial levels are likely to result in dangerous levels of change to Earth’s climate system.² The Paris Agreement also strives to limit temperatures to 1.5°C of warming; however, continued release of greenhouse gas emissions means we are fast moving past the point where we can achieve that target.

Just like we have a personal or household budget, the planet also has a carbon budget—a limit on the amount of greenhouse gases that can be emitted into the atmosphere. When this budget runs out, we can no longer release carbon emissions into the atmosphere or the planet will warm far more than we can cope with. Climate scientists estimate that, globally, we have already spent almost 70% of this budget and it’s running out fast.³

ADAPTATION STRATEGY

Due to the large amount of greenhouse gases released since the Industrial Revolution, we are already experiencing the impacts of climate change, with increased heatwaves, bushfires, and extreme weather events such as storms. To better deal with these climate impacts, in 2016 the ACT released its Climate Change Adaptation Strategy – Living with a Warming Climate. It includes 27 actions to help increase Canberra’s resilience and retain its status as a great city in which to live, work and play. The ACT Government is working to implement this strategy. It will also consider additional adaptation measures as it develops its next climate change strategy and action plan.

1 Bureau of Meteorology and CSIRO, 2016, State of the Climate Report, <http://www.bom.gov.au/state-of-the-climate>

2 Intergovernmental Panel on Climate Change, <https://www.ipcc.ch>

3 Global Carbon Budget 2016, Global Carbon Project, <http://www.globalcarbonproject.org/carbonbudget>



ACT CLIMATE CHANGE COUNCIL AND ADVISORY GROUP

The ACT *Climate Change and Greenhouse Gas Reductions Act 2010* establishes a Climate Change Council to advise the Minister on matters relating to reducing emissions and addressing and adapting to climate change. You can meet the Council members through their page on the Environment Planning and Sustainable Development Directorate website.⁴ The Council comprises some of Australia's leading scientists, economists, and community experts in the fields of climate change, sustainability policy, economics and community engagement. The members are appointed by the Minister and are tasked with considering the social, economic and environmental impact of issues relating to climate change.

The Minister has also convened a Climate Change Ministerial Advisory Group (CCMAG), made up of a range of community stakeholders. The CCMAG will consult with their respective membership bases on issues relating to the Government's net zero emissions strategy and provide input and feedback to the Government on the strategy. The CCMAG will also help educate their members and the wider community about the strategy and issues raised by the ACT's transition to net zero emissions. The CCMAG was formed to recognise the essential role the community plays in mitigating and adapting to climate change, the importance of effective engagement with the community, and the value of community-based expertise.

⁴ www.environment.act.gov.au/cc/climate_change_council

Climate Change Council members:

Professor Barbara Norman, Council Chair, Foundation Chair of Urban and Regional Planning at the University of Canberra, Director of Canberra Urban and Regional Futures (CURF) and an Adjunct Professor with The Australian National University

Professor Penny Sackett, Council Deputy Chair, physicist, astronomer and former Chief Scientist for Australia

Professor Will Steffen, Councillor on the publicly-funded Climate Council of Australia

Dr Frank Jotzo, Associate Professor, Australian National University, Director of the Centre for Climate Economics and Policy at Crawford School of Public Policy

Mr Ben Ponton, Director-General, Environment, Planning and Sustainable Development Directorate, ACT Government

Mr Toby Roxburgh, Chair, Australian Institute of Energy (Canberra Branch) and a Founding Director at Beast Solutions

Ms Karen Jesson, Community Development Officer, Communities@Work.

Founding CCMAG members:

- » ACT Conservation Council
- » Unions ACT
- » Canberra Business Chamber
- » ACT Council of Social Services (ACTCOSS)
- » Global Learning
- » Community member
- » Property Council of Australia – ACT Branch
- » Combined Community Councils

KEY PROPOSALS

The latest advice from the Climate Change Council forms the basis for key targets presented in this discussion paper. The Council recommends:

- » achieving net zero emissions by 2045 or earlier
- » interim greenhouse gas reduction targets for 2025, 2030 and 2040
- » avoiding buying carbon offsets in the event the Government misses a target
- » placing a monetary value on any emissions the ACT creates in excess of its target (based on the 'social cost of carbon') and reinvesting this money in emission reduction measures
- » reducing emissions across all sectors including transport and natural gas.

The Council also provided an update on climate impacts and the concept of 'a carbon budget'.

Given the expertise of the members of the Climate Change Council, their advice is critical in the Government's development of the next climate change strategy and action plan for the ACT.

COMMUNITY AWARENESS AND INTEREST

Community consultation to date shows a high level of awareness about—and interest in—the ACT's journey to net zero emissions.

A 2016 community survey on climate change showed:

- » 92% of survey respondents supported the ACT Government's renewable energy plans, and many residents were also prepared to invest in new infrastructure and technologies to reduce carbon emissions
- » 70% of those surveyed agreed they should personally take more action to help reduce greenhouse gas emissions
- » most people believed the ACT Government should take action on climate change urgently.

Key issues raised through initial community consultation for this discussion paper included:

- » transport solutions need to integrate safe cycling and walking, accessible and user-friendly, low carbon public transport, and low or zero emissions cars
- » increasing the energy efficiency and climate resilience of buildings is a priority
- » we are proud to be the renewable electricity capital and we need to keep energy affordable while pursuing more renewable electricity
- » solutions to reduce emissions need to be equitable and consider the needs of all Canberrans
- » reducing the use of natural gas should be a major focus
- » planting more trees in our urban areas will improve the 'bush capital' and help adapt to climate change
- » adapting to climate change impacts is as important as reducing emissions—we want a liveable and resilient city for our future and for future generations
- » shifting community attitudes and behaviours to reduce waste generation and damaging levels of consumerism should be a focus.



TARGETS FOR NET ZERO EMISSIONS

The ACT currently has some of the most ambitious emissions reduction targets in the world:

- » **Reduce** greenhouse gas emissions by **40%** from 1990 levels by **2020**
- » **Emissions per person** will **peak** by **2013**, then decline
- » The ACT will be powered by **100% renewable electricity** by **2020**
- » **Net zero emissions** by **2050** at the latest

These ambitious targets have seen the ACT recognised internationally as a leader, and we have already made great progress in implementing them.

The next step is to rapidly reach net zero emissions through the careful planning and implementation of new actions and initiatives.

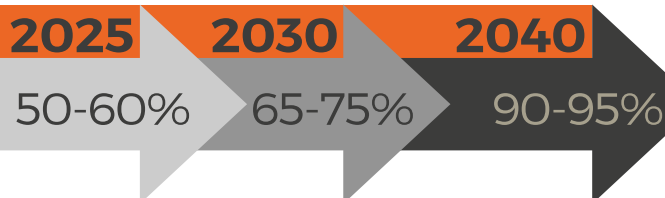
The ACT Government is seeking community feedback on the following new targets, as recommended by the Climate Change Council.

NET ZERO EMISSIONS BY 2045 OR EARLIER

The Council has recommended a net zero emissions target by 2045 or earlier. This is five years earlier than the target currently legislated in the ACT. The Council considers that the growing risks of dangerous climate change—informed by the latest scientific evidence—as well as the improving opportunities for climate change mitigation, such as through technological advancements, mean 2045 is a necessary and achievable target by which the ACT can reach net zero emissions.

Achieving this target by 2045 or earlier will require long-term commitment and a stepped approach to reducing emissions and shifting to a low carbon economy.

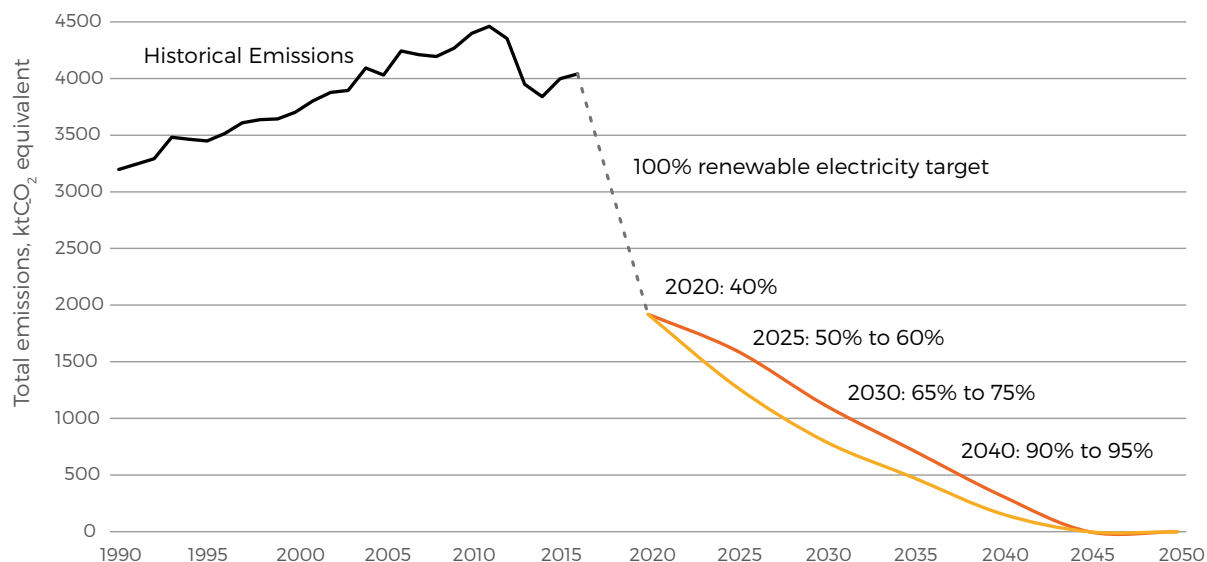
INTERIM TARGETS FOR



Question:

The ACT Government is seeking community feedback on the 2045 or earlier target.

Figure 1: . Recommended ACT emissions target range



INTERIM TARGETS

To know if we are on track to reach net zero emissions by 2045 or earlier, we need milestones and markers along the way. These markers will help send strong and clear signals to the community and business, provide investment certainty and allow forward planning. The milestones are presented as interim targets that will allow us to track and check our progress. The Climate Change Council has recommended the following interim emission reduction targets set below a 1990 base year:

- ▶ **50–60%** by 2025
- ▶ **65–75%** by 2030
- ▶ **90–95%** by 2040

Under these scenarios, and within the ranges expressed above, the ACT's cumulative emissions would still meet its carbon budget. It is assumed some emissions will remain, but these could be balanced by natural carbon sinks in the Territory's forests and grasslands.

The ACT's *Climate Change and Greenhouse Gas Reductions Act 2010* allows for interim targets to be set by the Minister.

These targets are based on several key considerations:

1. The latest **scientific evidence**, warning of **severe impacts** and **risks** of climate change globally and in the ACT
2. The ambition to **stay within** the **ACT's** share of a **carbon budget**
3. **Latest** information and **analysis** including modelling on **technical options** to **reduce ACT's emissions**
4. Judgments about **practical, feasible rates** of emission reductions
5. The **ACT's ability** to reduce emissions as a **relatively prosperous** and **well-educated region**

Question:

The ACT Government is currently considering the formal adoption of these interim targets and welcomes community feedback



GETTING TO NET ZERO EMISSIONS

Achieving a target of net zero emissions by 2045 or earlier will require long-term commitment and a stepped approach to reducing emissions and shifting to a low carbon economy. 'Net zero' means we emit as much as the planet can naturally take back in, which means we can achieve net zero even while still creating some greenhouse gas emissions.

CARBON OFFSETS

In the future there may be some areas where the shift to zero emissions is not yet fully possible (e.g. diesel fuel used in some heavy machinery). This means the ACT may still create a small amount of greenhouse gases; but these can be balanced by removal of greenhouse gases by the natural environment (e.g. forests and soils acting as carbon sinks/storage). This natural removal could occur locally, for example through afforestation in the ACT. It is also possible the ACT could purchase 'credits' for emission reductions that occur elsewhere, referred to as 'carbon offsets'.

It is necessary for the ACT to consider whether it should purchase offsets to meet its net zero emissions target, as well as any interim emission reduction targets and, if so, which types of offsets are appropriate.

The ACT could achieve 'net' zero emissions simply through the extensive purchase of offsets. However, to achieve true carbon neutrality at a global scale, and achieve the climate change mitigation measures we need, it is essential we reduce our actual emissions as much as possible.

The Climate Change Council has recommended that the ACT does not rely on purchasing carbon offsets to achieve its emissions reduction targets.

The Council recommends that instead of the Government investing in offsets to meet targets, it should calculate a cost per tonne of any emissions above the target. This amount of money should then be directed to real emissions abatement activities in the ACT region. The cost per tonne could be calculated based on the social cost of carbon (see box on page 9).

The Council has recommended this approach to ensure that actual abatement occurs in the ACT and to ensure abatement projects are within the ACT's direct control. Another consideration is that carbon stored in land is vulnerable to being returned to the atmosphere through fires and droughts. The Council is of the view that increasing land carbon through activities such as sequestration is a way of recovering previous losses as a result of deforestation and other land uses, but is not a permanent carbon offset.

Question:

The ACT Government is considering adopting the recommendations regarding carbon offsets and the social cost of carbon and welcomes feedback from the community on these issues.

SOCIAL COST OF CARBON

The social cost of carbon is an estimate of the total future economic damage of emissions. This damage includes impacts to health, infrastructure, and species loss. By pricing the cost of continuing to release emissions we can develop a suitable reference point for how much we should be investing to limit emissions.

If ACT emissions targets are not met, and if no offsets are used to meet emissions targets in the ACT, the Climate Change Council

recommends that additional public investments should be made to support a more rapid transition to a carbon neutral society. Currently, the social cost of carbon is estimated at \$65 AUD per tonne of carbon dioxide. For example, if a target is missed by 1 kilotonne of carbon (1000 tonnes) then \$65,000 should be invested in emissions reducing measures. When applied to Carbon Neutral Government, this would require an investment of \$4.55 million in 2020 and further investment each subsequent year.



CARBON NEUTRAL GOVERNMENT BY 2020

As well as setting targets for the ACT as a whole, the ACT Government also has a target of becoming carbon neutral in its operations by 2020.

Through this measure, the Government seeks to do its share and to demonstrate practical and cost-effective measures to reduce emissions that can be used by the business sector. Even while Government operations have grown, from 2012–13 to 2016–17 **ACT Government emissions fell 11%**. The ACT Government expects a further reduction in greenhouse gas emissions to 2019–20.

To October 2017, the Government's Carbon Neutral Government Fund has **supported 25 projects across** ACT Government operations to the value of **\$13.6 million**. These projects make ongoing annual cost savings that enable the loan to be repaid over time, reducing the operating costs of government facilities.

The projects also help **reduce Government's impact** on the environment, by using energy more efficiently and reducing greenhouse gas emissions.

While it has made good progress, the ACT Government is still on track to create approximately **70,000 tonnes** of greenhouse gases in 2020. This is primarily due to emissions from **transport fuels** (including ACTION buses) and the use of **natural gas to heat government facilities**. This situation could be addressed by **purchasing carbon offsets** in line with the Carbon Neutral ACT Government Framework, which would ensure the Government meets the 2020 carbon neutrality target. The Government is considering another option, recommended by the Climate Change Council, under which the Government would not purchase offsets; it would instead calculate the **social cost** of the additional emissions and **reinvest** that amount in **measures to further reduce emissions**.

IMPLEMENTATION ACTION PLANS

To reach net zero emissions by 2045 (or 2050) at the latest, and to limit the chances of the most dangerous climate change impacts occurring, we need to make significant emissions reductions quickly. The interim targets recommended by the Climate Change Council accord with this, requiring deeper cuts in the near term.

To achieve this we need staged short-term action plans as well as a long-term strategy. There is a lot of uncertainty about what will happen between now and 2050, but we can adapt by maintaining a long-term vision and making multiple shorter term action plans. Developing plans along shorter timeframes allows us to adjust our direction in light of changes and developments in technology, science or the community.

The ACT's current climate change strategy and action plan, known as AP2, sets the pathway to our target of 40% emissions reduction on 1990 levels by 2020. We have completed most actions and the review of AP2 in 2015 suggested commencing a new strategy.

To help achieve the greatest emissions reductions by 2025 and to give business, industry and the Government time to act, the ACT Government intends to have a new climate change action plan in place by 2018, covering the period 2018–2025. In the future the Government will also develop action plans for periods beyond 2025 to meet interim targets.

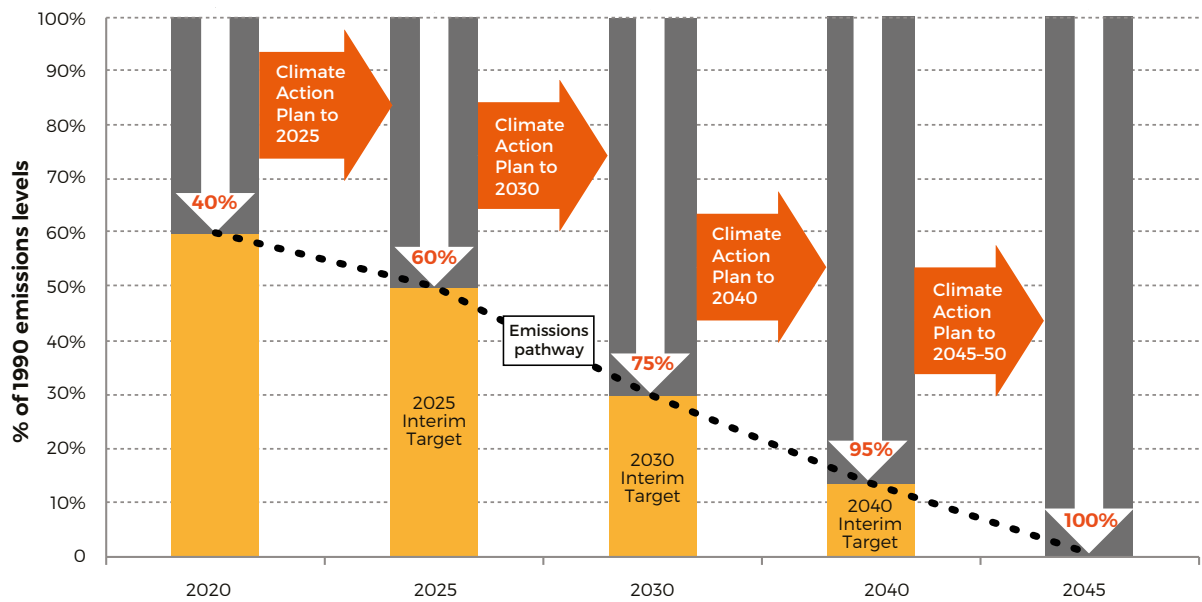
In line with current practice, at the end of each action plan we will assess our progress, as well as the latest science, and revise our targets as necessary. Collectively, the action plans will get us to our net zero emissions goal.

The next climate change strategy and action plan will also consider how we continue adapting to climate change and reducing its impacts so the ACT remains liveable and resilient.

In doing so, it will be important to consider every initiative, policy or strategy from both an adaptation and a mitigation perspective to ensure we have the best possible options available.

40%
EMISSIONS
REDUCTION
ON 1990 LEVELS
BY 2020

Figure 2: Pathway to net zero emissions showing potential interim targets and climate action plans to 2050 at the latest





KEY SECTORS TO REDUCE EMISSIONS

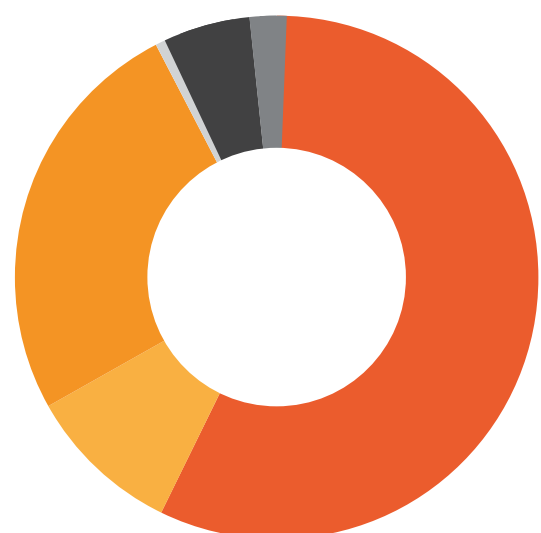
The ACT Greenhouse Gas Inventory (GGI) is used to track our emissions and show us where we need to focus our actions. By monitoring our emissions each year we can establish trends in emissions growth or reductions, and project where our emissions might go. This is how we know to focus on energy and transport emissions.

The ACT Greenhouse Gas Inventory (GGI) is published each year to report on ACT emissions. The ACT GGI reports total emissions released minus those absorbed by our environment. In 2015–16 ACT greenhouse gas emissions totalled 4039 kilotonnes of carbon dioxide equivalent (kt CO₂-e), equating to 10.27 tonnes per person. Figure 3 shows ACT greenhouse gas emissions per sector for 2015–16.

To achieve net zero emissions in the ACT, we need emission reduction measures in each of the sectors where emissions are generated. These are⁵:

- » **TRANSPORT**—fuel used in cars, buses and trucks
- » **ELECTRICITY AND GAS** used by households and businesses
- » **WASTE**—the breakdown of organic waste in landfill
- » **LAND USE**—clearing of trees and grasslands for development

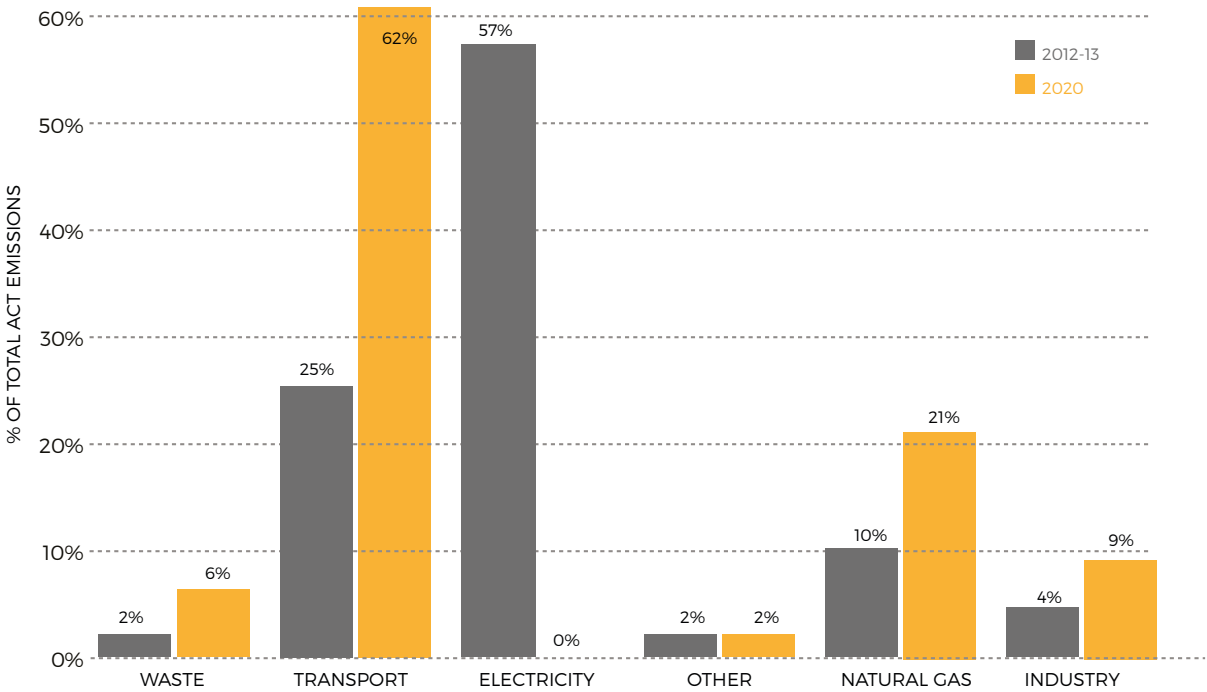
Figure 3: ACT emissions in the 2015–16 Greenhouse Gas Inventory, showing electricity and transport as the major contributors to our emissions



55% ELECTRICITY	3% WASTE
27% TRANSPORT	5% INDUSTRY
9% GAS	1% OTHER (FUEL OIL, WOOD FUEL, AND NATURAL GAS LEAKAGE)

⁵ Industry emissions are accounted for at the national level, and attributed to the ACT on a population basis. This Discussion Paper doesn't cover these emissions as policy is already occurring nationally to reduce them.

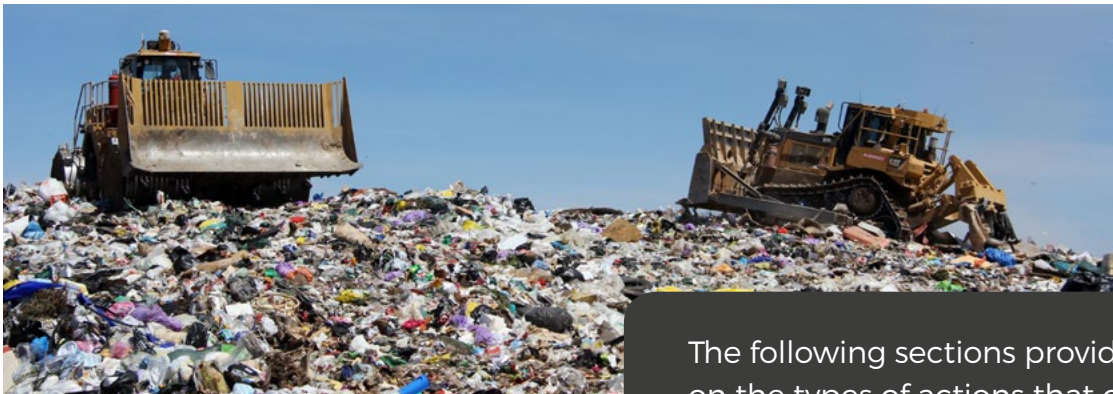
Figure 4: Main sources of emissions in 2012 compared to 2020.
Emissions will decrease by 40% on 1990 levels to around 1900 kt.



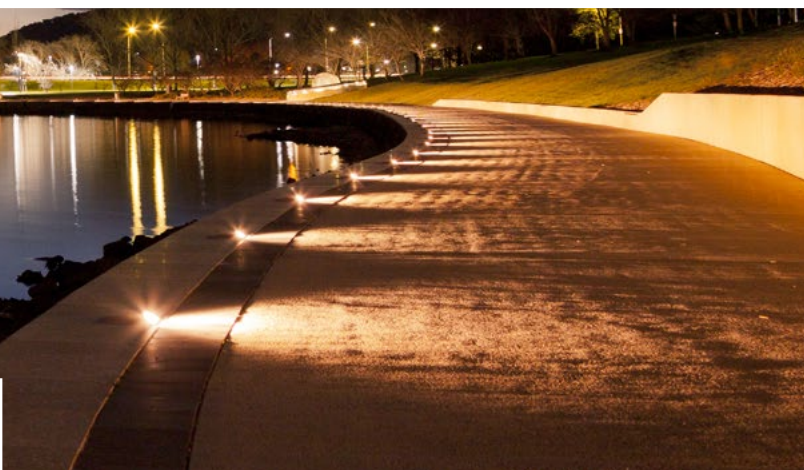
By 2020 the ACT will be powered by 100% renewable electricity, reducing emissions from this sector to zero. This means that transport becomes the biggest contributor to ACT emissions, accounting for 62% of emissions by 2020. The second biggest contributor is gas, accounting for 21%. Figure 4 shows how our emissions will change by 2020.

A number of factors will influence ACT emissions beyond 2020 including:

- » population growth
- » transport choices
- » the level of consumerism and waste generation
- » land clearing for urban development



The following sections provide high level discussion on the types of actions that could be taken to reduce emissions in the key emitting sectors in the ACT.



ENERGY

ELECTRICITY AND GAS USE

Because the majority of our electricity supply currently comes from fossil fuels (around 60% in 2017), electricity use is currently the biggest source of greenhouse gas emissions in the ACT.

By 2020 all the electricity we use in the ACT will be from renewable sources such as solar and wind. Beyond 2020, it will be important to improve the efficiency of our energy use to manage demand and ensure we continue to meet the 100% renewable electricity target as the population grows. If demand increases, the ACT will need to purchase additional renewable electricity to ensure all electricity still comes from renewable sources.

While important improvements in efficiency can be driven at the national level, such as through changes to the building code, we can take a range of important actions at the Territory level as well. Many homes and commercial buildings are inefficient and expensive to run as they use a lot of energy for heating and cooling.

Improving the thermal performance of buildings will improve their energy efficiency performance and make them more comfortable places to live and work.

By designing homes and other buildings to better suit our current and future climate, we can reduce demand for electricity, save money, keep comfortable through all seasons, and be more resilient to climate change impacts such as heatwaves and more intense storms.

For example, designing buildings for passive heating and cooling and installing adequate insulation will reduce buildings' energy use and operating costs. Using highly efficient appliances will further reduce electricity use. Using solar panels, smart metering and battery storage could help to manage demand and avoid the need to purchase additional renewable electricity.

As the proportion of our electricity from renewable sources increases, the emissions from our electricity use will decrease. As a result, natural gas, mainly used for heating and cooking, will soon be a higher source of greenhouse gas emissions than electricity in the ACT. By 2020, gas will be the second largest source of emissions in the ACT (21%). Reducing emissions from the use of natural gas is therefore a high priority. With the transition to 100% renewable electricity by 2020, and the increasing availability and cost-competitiveness of high efficiency electrical appliances for space heating, cooking and hot water, many consumers in the ACT and Australia are already switching to electrical appliances for these applications.

With increasingly hot summers as a result of climate change, more households in the ACT are installing reverse cycle air conditioners and realising these electric appliances can also be used for space heating in winter. Some developers in the ACT are also actively looking to develop suburbs with all-electric households, consisting of rooftop solar, electric appliances, space for battery storage and charging points for electric vehicles. There is also increasing interest in alternative gases, such as biogas and hydrogen, to inject into the existing gas network. The ACT Government has been advised that up to 15% hydrogen can be injected into the existing gas network without any changes to household, domestic and business appliances.



Key areas for focus in the energy sector include:

Electricity demand management:

- » efficiency upgrades of appliances (e.g. space heating, hot water, cooking)
- » embedded renewables and storage (e.g. rooftop solar and batteries)
- » deep retrofitting of housing stock
- » higher building code standards for energy efficiency and climate resilience.

Reducing emissions from fossil fuel gas:

- » transition off natural gas (through electrification and other alternatives to fossil fuel gas)
- » ongoing and faster use of the ACT's Energy Efficiency Improvement Scheme to support transition from gas.

Questions:

What are the challenges in the transition away from natural gas?

.....

What is the role of Government in the transition to zero emissions in the energy sector?

.....

Do you have a view on the role of all-electric households and suburbs?

.....

What improvements can be made to building and planning to reduce energy use and emissions?

.....

What is your view on alternative gas sources, such as biogas (e.g. gas created from organic matter in landfill) and hydrogen for energy uses, both in the home and in industry in the ACT?

.....



TRANSPORT

HOW WE CHOOSE TO TRAVEL

Transport is currently the second largest source of emissions in the ACT, but is expected to become the largest by 2020 (at 62% of emissions) once electricity emissions are zero due to our renewable electricity target.

The transport sector therefore presents one of the biggest challenges in the transition to net zero emissions. The transport sector is also diverse and complex, making the transition even more challenging. Unlike the ACT's transition to 100% renewable electricity by 2020, much of the transition required in the transport sector will require changes to behaviour.

The way we choose to travel, and how far we need to travel, is influenced by the layout of our city and the user-friendliness of different travel options. A city can be designed to encourage sustainable travel by creating: a compact urban form with short distances between destinations; a frequent and reliable public transport system; and safe and pleasant walking and cycling routes.

As Canberra grows, there are more people and more trips occurring, which means transport emissions are growing. The majority of emissions from the transport sector are from the use of private cars. Finding solutions for a net zero emissions transport sector for the ACT requires fresh thinking about how we move around our city.

Some important ideas to date are to encourage and support low carbon transport choices such as walking and cycling, public transport, car pooling as well as low and zero emissions vehicles (represented in figure 5). We also need to improve the layout of Canberra to help improve the viability of walking, cycling and public transport.

Greenhouse gases are released when we travel by car, ride a motorbike and, to a lesser extent, when we take the bus. Active travel options like walking or cycling do not burn fuel or electricity so do not result in greenhouse gas emissions. Canberra's new light rail system will also not result in greenhouse gas emissions from 2020, as it will be powered by 100% renewable electricity.

As the ACT moves to 100% renewable electricity in 2020, there is an opportunity to electrify as many transport modes (cars, buses, light rail) as possible as these will all be charged with electricity from zero emission sources. The ACT is currently conducting a trial of two electric buses and one hybrid bus in its bus fleet. Many Government agencies also use electric vehicles and hybrids as part of their vehicle fleet.

The Government is already seeking to increase public transport use by investing in an improved bus network and by using lower emissions buses. The upcoming review of the Transport for Canberra Strategy will also be the source for new policy ideas for creating a sustainable transport network in the ACT.

Key areas for focus in the transport sector include:

- » increase public transport and reduce private car use
- » greater levels of active travel
- » reduce trip needs (e.g. remote working)
- » electric vehicles for private passenger use
- » decarbonise public transport network

Questions:

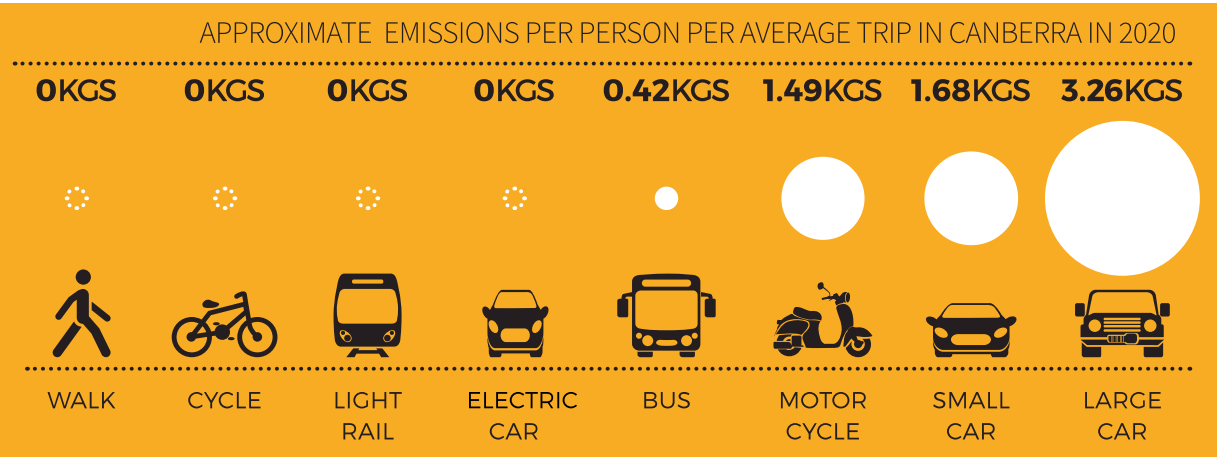
What are the main actions Government can take to reduce transport emissions?

What should Government do to see greater uptake of electric vehicles?

What incentives can be implemented to reduce private transport emissions, including greater use of public transport and active travel, and reduced personal car use?



Figure 5: Average emissions by transport mode in the ACT based on ACT transport data





WASTE

REDUCING WASTE GENERATION AND CAPTURING EMISSIONS

In the 2015-16 financial year, emissions from waste (wastewater treatment and landfill gas) accounted for around 2% of total ACT emissions. By 2020 emissions from waste are expected to account for around 6% of total emissions.

Disposing of organic material (such as garden trimmings, paper and food waste) to landfill results in greenhouse gas emissions. This is due to the breakdown of organic components in an oxygen-free environment, which releases methane—a potent greenhouse gas.

At present, a proportion of the landfill gas at the two landfill sites (Belconnen and Mugga Lane) is captured and used to generate electricity. Around 24,000 MWh of electricity is generated at these sites every year, enough to power approximately 5000 homes.

ACT is the 2nd lowest generator of waste per capita in Australia, after Tasmania.⁶ However, emissions from waste have consistently increased in recent years. As the population grows we will need to find ways to reduce the amount of waste generation.

⁶ 2016 National Waste Survey <http://www.environment.gov.au/protection/national-waste-policy/national-waste-reports/national-waste-report-2016>

The ACT Waste Feasibility Study is underway to assess options for improving resource recovery and reducing greenhouse gas emissions from waste. The findings of the study will inform future policy and technology decisions.

Diverting organics from landfill is one way to reduce emissions from landfill. The ACT Government is already introducing a third household bin for garden organics, which will play an important role in removing organic waste from landfill. It is also important to explore options for diverting food waste from landfill, including in multi-unit residential developments, and for reducing emissions from wastewater treatment. It is possible to treat collected organic waste through environmentally-friendly methods such as composting or anaerobic digestion.

Key areas for focus in the waste sector include:

Remove emissions from solid waste (landfill) through:

- » diverting organic waste from landfill including by exploring collection of food waste from households and commercial sectors, and exploring treatment options such as composting and anaerobic digestion
- » achieve higher recovery rates for municipal solid waste, construction and demolition waste and wood waste
- » best available technology landfill gas capture.

Remove emission from waste water through:

- » anaerobic digestion combined heat and power.



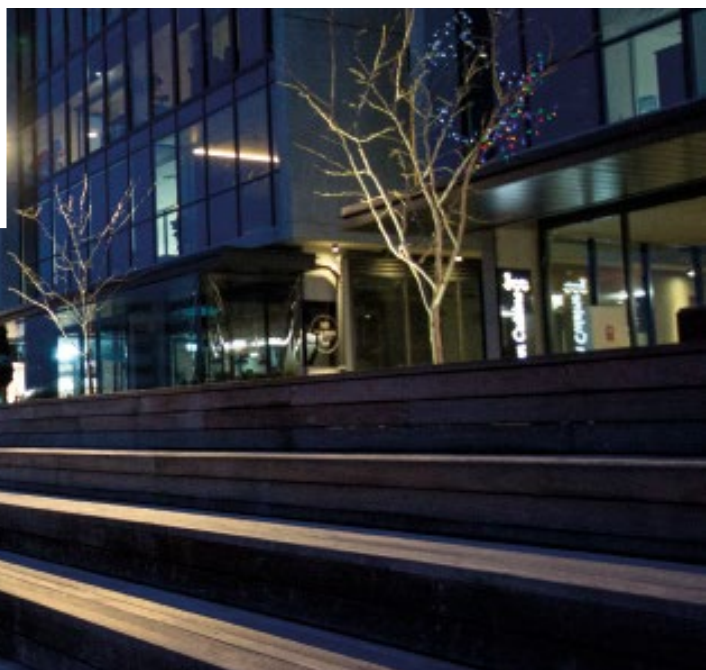
Questions:

Where should emphasis be placed on reducing waste emissions, i.e. technology or behaviour change?

What further incentives can Government provide to reduce emissions from the waste sector, including household and industry waste?

What are your views on the options for diverting organic waste from landfill?





LAND USE

INCREASING THE NATURAL UPTAKE OF CARBON

How we manage or cultivate the land determines whether it releases or absorbs greenhouse gases. Trees and healthy soils take in and store carbon. A vegetated landscape loses carbon if it is cleared, for example when we clear an area of grassland or forest to build suburbs. We can increase this store of carbon by revegetating areas or growing the size of the urban forest. Improved planning and use of the ACT's existing urban areas—for example, through quality urban infill—reduces the pressure to expand Canberra's urban footprint and to remove grassland and open woodlands.

Our national parks, nature reserves and forestry plantations are our primary stores of carbon. However, the amount of carbon stored is influenced by natural events such as fires or lack of rainfall (droughts). The Australian Government Department of the Environment and Energy models our land sector emissions each year and tracks these changes in our landscape.

Agricultural activities in the ACT account for around 1% of the ACT's greenhouse gas emissions. This is primarily from the burps of grazing animals such as cattle and the cultivation of land.

INCREASING LIVING INFRASTRUCTURE

The design and maintenance of our city can make our city safer and more liveable in a changing climate, even with the more extreme and variable weather from climate change.

By prioritising 'living infrastructure' such as trees for summer shade, open spaces with watered grass, and open water in lakes and ponds, we can keep our city cool during hot weather and reduce the damage of high intensity rain storms. Living infrastructure also facilitates active travel (like walking and cycling) and provides amenity to help keep the city highly liveable.

Canberra benefits from the legacy of investment in living infrastructure, however we need more work to maintain this. As Canberra grows and evolves to become a compact city with more intensively developed urban areas, the importance of incorporating living infrastructure into the city's form and function increases.

Living infrastructure can play a key role in the city adapting to the impacts of climate change. Benefits include reducing heat island effects, protecting homes and infrastructure from weather extremes, and helping reduce costs in power use to maintain comfort levels in summer. Other beneficial outcomes include increasing property values, improving natural resource management, and urban biodiversity.

Key areas for focus in the land use sector include:

- » limit deforestation and increase living infrastructure in urban areas
- » procure additional land for afforestation and reforestation projects in the urban environment, along river corridors, on agricultural land and on broadacre zoned land.

Question:

What types of living infrastructure or vegetation do you value and support increasing?

The degree of tree plantings and green spaces is not equally distributed across the city. A significant proportion of the urban forest is also reaching the end of its life cycle. This means that much of the urban forest is declining in health. To maintain and enhance our living infrastructure we must act and invest in its replenishment and expansion.

The ACT Government has committed to preparing a Living Infrastructure Strategy to help reduce the risks from climate change impacts. Targets are being proposed for shade from trees, permeability of pavements, use of storm water, and characteristics of building materials.

More information on living infrastructure can be read in the Technical Reference Paper.⁷

⁷ www.yoursay.act.gov.au



FURTHER STEPS

The ACT Government has completed technical modelling of possible pathways to net zero emissions out to 2050, across the energy, building, transport, waste and land sectors. The modelling uses a range of assumptions around population growth, existing and emerging technologies, and the level of ambition that could be set. The main output from this modelling is shown in Figure 6. This detailed modelling is publicly available on the Your Say website.

USING THE CONCEPT OF 'SECTORAL TARGETS' TO ACHIEVE OUR GOALS

One way to make progress towards our emissions reduction targets is to set individual targets for key sectors. The main emitting sectors after we achieve our 100% renewable electricity target are transport, natural gas, waste and land use. Sectoral targets can be defined in a number of ways, including in alignment with the draft interim targets outlined on page 6.

The Government is considering possibilities for using sectoral targets and would appreciate any community feedback on this issue.

COSTING THE OPTIONS

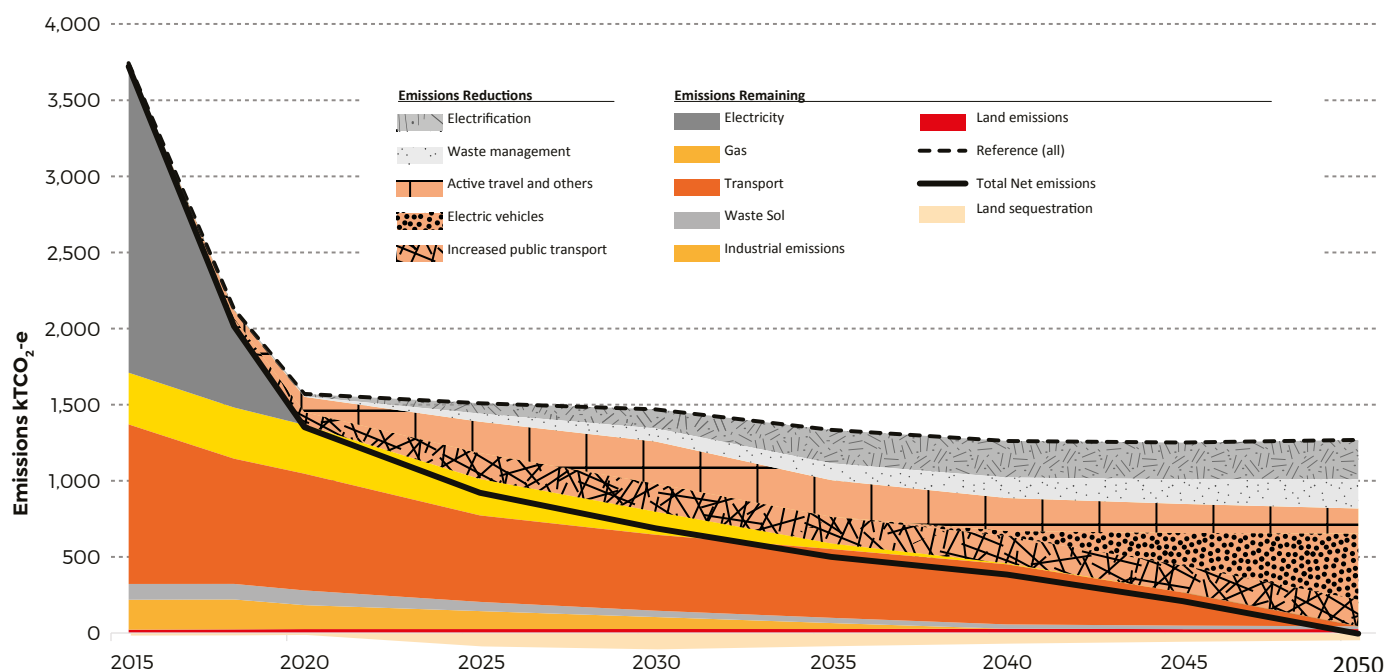
The next step is to test various emission reduction options and technical pathways for the impact they have on our economy. The cost and benefits of actions will be analysed in early 2018 and then released as extra information to the community.

Question:

Major investment in infrastructure and services will be needed to address the challenges posed by climate change. How should this be funded?

What principles should be used for setting interim targets and sectoral targets for transport, energy, land use and waste?

Figure 6: Pathways to net zero emissions by 2050 integrated model - all sectors





SHARING THE COSTS AND BENEFITS OF CLIMATE ACTION

ENCOURAGING RESILIENT, LOW CARBON COMMUNITIES

Taking action on climate change has a cost, but acting now will cost less than delaying and being unprepared for the extreme weather events caused by climate change. Being an early adopter of green technology also provides an opportunity to capitalise on the transition to a zero emissions economy. For example, the ACT's renewable energy initiatives are directly contributing over \$500 million in local economic benefits and putting Canberra on the world stage as a sustainable, dynamic and innovative place to work and live. New skills training and research possibilities have been created, with more opportunities likely to develop.

Our current climate change strategy has a strong focus on ensuring climate actions consider the costs placed on residents and fair to all members of the community.

This will continue to be a priority; the ACT is committed to ensuring any present costs to residents are coupled with cost saving measures and support for our most vulnerable.



Addressing climate change and climate impacts will help to safeguard the needs of our community's most vulnerable. Heat stress has killed more people in Australia than all other natural hazards combined, and the risk of heat-related deaths will increase as the climate warms.⁸ Improving our buildings and urban forest, reducing the heat trapped in urban areas, and planning for more frequent heatwaves will help reduce these threats.

⁸ Coates, Haynes, O'Brien and Mcaneney, 2014, 'Exploring 167 years of vulnerability: An examination of extreme heat events in Australia 1844–2010', *Environmental Science & Policy*, 42:33–44



BEHAVIOUR CHANGE

YOU ARE ESSENTIAL IN HELPING TO ADDRESS CLIMATE CHANGE

More sustainable behaviours will be a major part of a successful transition to net zero emissions in the ACT. In many cases, finding lasting solutions to reduce emissions will rely on community participation and individual choices.

Everyday choices such as how we choose to travel, use electricity, produce and dispose of waste and design our homes will make a major difference to how quickly and effectively the ACT can reduce greenhouse gas emissions and adapt to climate change. The ACT Government's strategy will encourage community participation in, and ownership of, the goal of achieving net zero emissions.



Question:

What do you currently do at home or work to reduce your impact on the environment?

What is preventing you from doing more?

Where do you see potential for community behavioural change?

What do you think is the most important action to ensure Canberra is prepared for the impacts of climate change?



HOW DO I GET INVOLVED?

SEND A SUBMISSION

The ACT Government wants all Canberrans to have an opportunity to contribute to the development of a net zero emissions strategy. We will use a range of engagement tools to make it easy to participate in this conversation.

Details of the engagement process and timelines are available on the Your Say website. There are also discussion forums on the site.

You can send an email with your ideas to **climatechange@act.gov.au** or send a letter to Climate Change Policy, GPO Box 158, Canberra, ACT, 2601 or call 02 6207 1285 for a discussion.

If you're planning to make a submission, the questions in this paper are a guide for the types of ideas and information the ACT is looking for. You are welcome to comment on any aspect of this discussion paper additional to these questions.

Please send your submissions by
Monday 9 April 2018.

EMAIL LIST

You can sign up to an email list to stay up to date with developments on the strategy and consultations at **www.yoursay.act.gov.au**

Climate Change Ministerial Advisory Group

The CCMAG will be engaging with their membership bases on the climate change strategy. People involved with these groups are encouraged to engage via their CCMAG member.

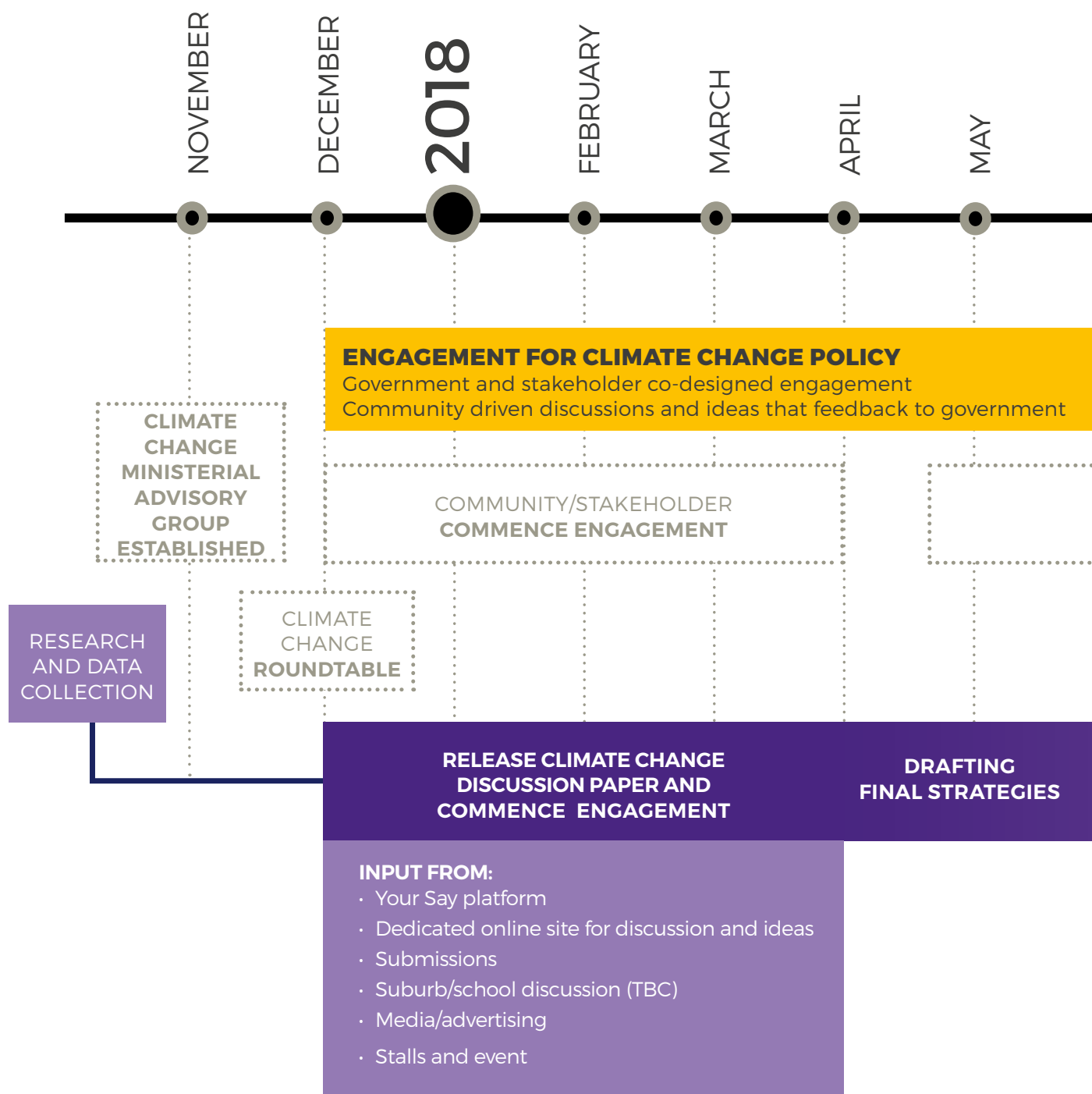
More information

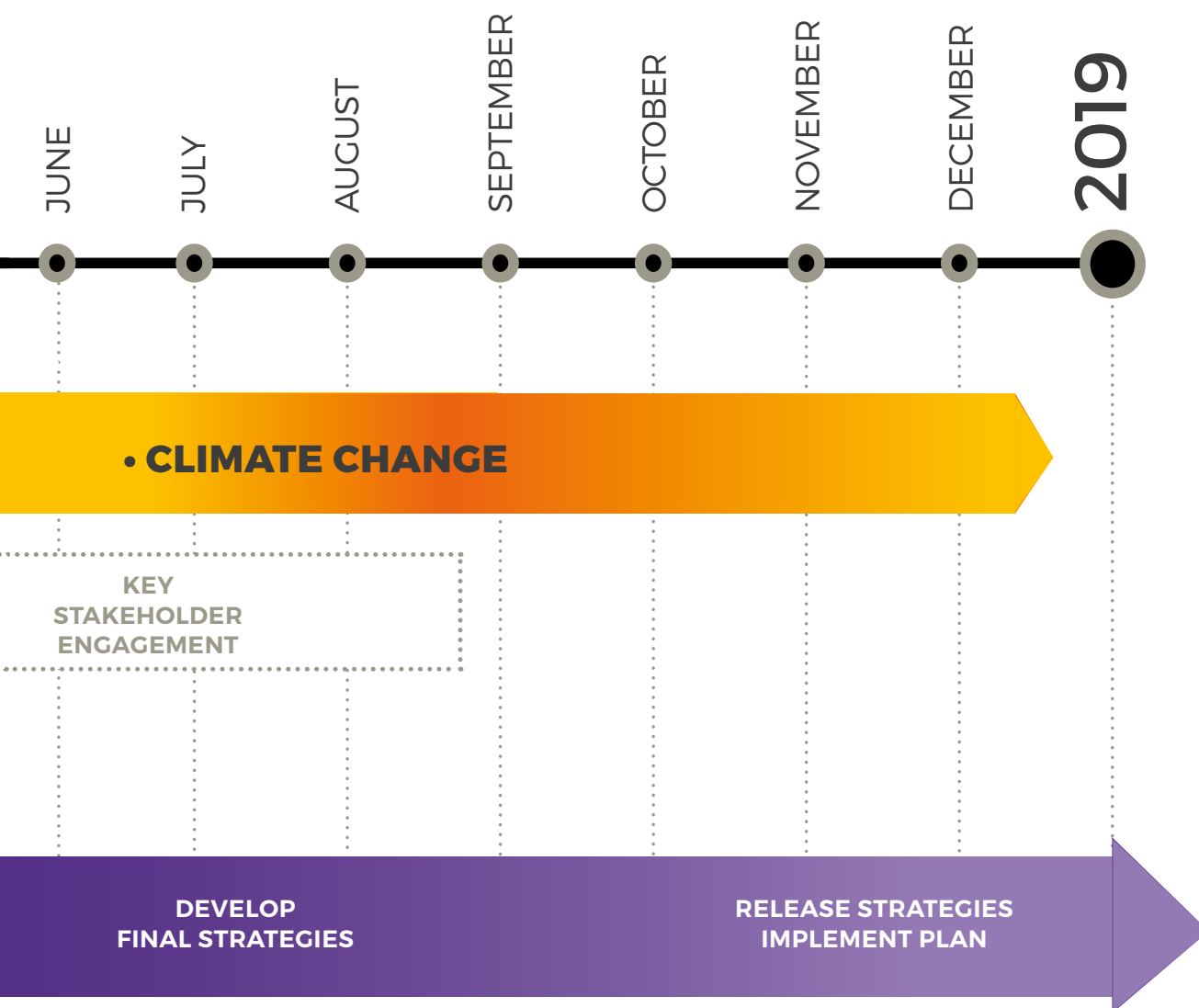
If you would like more detailed information on ACT emissions, please see the Technical Reference Paper available at **www.yoursay.act.gov.au** and Climate Change Council advice at **www.environment.act.gov.au/cc/climate_change_council**

RELATED STRATEGIES – TRANSPORT AND PLANNING

In addition to a new climate change strategy, the ACT Government is developing new strategies for transport and planning. Directorates are liaising to ensure an aligned approach to addressing climate change, planning our urban areas, and designing transport networks. These three strategies will help support the transition to net zero emissions, make our city more sustainable, and keep it as one of the best places to live, work and play now and into the future. See more information on these strategies at **www.yoursay.act.gov.au**

TIMELINE FOR CONSULTATION







GLOSSARY

Carbon

A naturally abundant, non-metallic element that occurs in all organic compounds and can be found in all known forms of life.

Carbon dioxide (CO₂)

A colourless, odourless gas that is present in the atmosphere when any fuel containing carbon is burned. It is the principal greenhouse gas. Approximately fifty percent of the CO₂ emitted today will still be in the atmosphere a hundred years from now. Roughly 3.7 units of CO₂ equal 1 unit of carbon (C). CO₂ plays a critical role in creating and regulating the earth's climate.

Carbon dioxide equivalent (CO₂-e)

A quantity that describes, for a given mixture of greenhouse gas, the amount of CO₂ that would have the same global warming potential when measured over a specified timescale (generally 100 years).

Carbon neutrality

Involves measuring all greenhouse gas emissions for which an entity is responsible, pursuing actions to reduce those emissions as much as possible and netting the emissions to zero by offsetting the remaining emissions through the use of emission offsets.

Carbon offset

Is a financial instrument representing a reduction in, or removal of, greenhouse gas emissions. Although there are six primary categories of greenhouse gases, carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO₂e). One carbon offset represents the reduction of one metric ton of carbon dioxide, or its equivalent in other greenhouse gases, based on their global warming potential.

Carbon sinks

Any process, activity or mechanism that results in the net removal of greenhouse gases from the atmosphere.

Climate change mitigation

The reduction of greenhouse gas emissions to achieve stabilisation of greenhouse gas concentrations in the atmosphere and subsequently a cessation of further warming.

Greenhouse gas

Any of the gases whose absorption of solar radiation is responsible for the greenhouse effect including carbon dioxide (approx 78%), methane, nitrous oxide and the fluorocarbons.

Low carbon

A technology or approach which results in substantially lower greenhouse gas emissions than current practices or approaches.

Net zero emissions

Achieving a balance between the amount of greenhouse gases emitted and the amount stored or offset. In the case of the ACT this is to be achieved by reducing emissions to as close to zero as possible and offsetting the remaining emissions.

Resilience

The capacity of individuals, communities, businesses and systems in a region to survive, adapt and thrive, no matter what chronic stresses and acute shocks they experience.

Scope of emissions and Accounting

The international standards for greenhouse gas accounting by jurisdictions (i.e states or territories) has three main categories:

SCOPE 1 – emissions produced and released inside the Territory

SCOPE 2 – emissions from purchased electricity (where the source is outside the Territory)

SCOPE 3 – emissions as a result of products and services used such as embodied emissions, airplane travel interstate, or leakages of gas distribution that occur outside the Territory.

Scope 1 and 2 emissions are compulsory for us to include in our reporting. Scope 3 emissions depend on the ability to count and the materiality they have on total emissions. Generally states and territories do not count Scope 3 emissions.

Emissions accounting operates within a defined boundary, in this case the border of the ACT with NSW. The ACT's greenhouse gas emissions methodologies and inventory is consistent with those of the National Greenhouse Gas Inventory and agreed international approaches under the Intergovernmental Panel on Climate Change (IPCC).

Only emissions consistent with the internationally agreed approaches are counted. For example, most emissions from air travel are not considered as the agreed approach is to count and report these emissions where aviation fuel is purchased; most aviation fuel is accounted for at a national level or within the NSW inventory.

Other emissions, such as those released in the manufacture of the goods we purchase, the building materials we use or the farming of the food we eat, are referred to as 'embodied emissions' and are currently not considered. As the ACT continues to take a strong leadership role in reducing our greenhouse gas emissions, we would like to explore opportunities to encourage emissions reductions more broadly. The ACT has a high standard of living and, with that, comes a high level of consumption and waste. Consideration could be given to greater accounting for per capita emissions, life cycle emissions, air travel and the concept of an 'emissions footprint'.

