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## 1. Introduction

Congratulations to the NT Government (NTG) for publicly acknowledging that climate change is having and will continue to have an impact on our health, our economy and our natural environment. With this progress, the focus is now “What will we miss out on if we don’t” act quickly in responding to climate change? The growth of a solar based economy and proposed plans to expand it in the Territory provides an extraordinary opportunity for economic growth, local jobs, new industries and protection of all the things we value.

As identified in the NT Climate Change Response discussion paper (ref 1) (NTG Response), the NTG has a lead role to play by providing a signal to industry, investors and the community. This signal should be clear, well defined, easy to understand and consistent with long term climate change goals. For this to occur measures to reduce climate change risks must be embedded across all NTG decision making.

In this submission we:

- provide recommendations for action including developing and enacting over-arching climate change legislation with targets for 100 per cent renewables by 2030 and net zero emissions by 2050;

- provide an examination of what is good and where significant gaps lie in the NTG Response;

- provide an overview of the greenhouse gas emission (GHG) profile of the NT and how this compares with other Australian jurisdictions;

- recognize that given the unique existing and developing emission profile in the NT, key areas that need to be addressed include the growth of the gas industry and land clearing;

- consider the question “What we will miss out on if we don’t respond quickly to climate change?” raised in the NTG Response and highlight the need for an approach that provides economic, social and environmental outcomes that both address emissions and maximises benefits to Territorians, including the need to address issues of social justice;

- emphasise that we don’t have to ‘reinvent the wheel’ as we have a great opportunity to build upon previous work undertaken by the NTG and others by applying existing technology and knowledge;

- recognise that the NTG has previously identified what needs to be done to address climate change as illustrated by the 2009 draft NT Climate Change Policy, however, in the main has erred for a decade regards addressing these needs; and

- recognise the opportunity the NTG has to fill the leadership and policy gap that is preventing meaningful action to address climate change.

We reiterate that we applaud the NTG for providing public recognition and seeking public input of both the issues and opportunities arising from our changing climate and offer an approach to policy development that maximises benefits to all the people of the Territory. Against a background of a decade of minimal

action we have three highly significant factors that provide an incentive to act quickly: human society is facing a crisis as evident by the Secretary General of the United Nations describing climate change as an “existential challenge for the whole human race” (ref 2); realisation of this crisis has increased dramatically within the NT community as climate change starts to impinge on peoples’ daily lives; and the people of the NT have been handed an opportunity to work towards a robust future by moving to a low carbon society based upon renewable energy (ref 3). A pathway to minimise long-term distress to people of the NT arising from climate change has largely been available for more than a decade, however, business as usual has prevailed. The opportunity to go solar now provides a readily defensible economic alternative for our future. Addressing the issue of climate change provides an opportunity for consultation, transparency and sharing of decision making within our communities that will empower Territorians. We all personally have a contribution to make to address climate change by the way we live our lives. The NTG are in a unique position to provide leadership and facilitate this opportunity.

## 2. Recommendations

### General recommendation

**NTG needs to move beyond discussion papers and quickly develop and implement climate change response legislation, supported by regulations, an overarching policy, strategies and management plans that are consistent with best practice environmental and sustainable development policy frameworks and work towards maximising benefits for all Territorians.**

To assist with the rapid development and implementation of climate change policy we call upon NTG to:

1. **Within the next 6 months link NT climate change action targets and related actions to the following aims:**
  - a. 100% renewable energy supply by 2030.
  - b. Net zero GHG emissions by 2050.
  - c. Net reduction in GHG emissions.
  - d. Draft targets and proposed actions will be presented for public consultation and seek submissions.
  - e. Time-bound, measurable targets with mandated monitoring and reporting programs to assess progress toward targets and/or the need to revise management plans. There needs to be short, medium and long term targets to allow action to commence and progress to be assessed and reported on.
2. Acknowledge and address the fact that many people in our society are currently and will continue to be adversely affected by climate change. Furthermore the poor and disadvantaged are particularly at risk and will require targeted actions to support a **just transition** as climate change unfolds. Aboriginal people and those who live in remote communities need to be given the opportunity for **meaningful input into devising and implementing solutions in their communities.**
3. Recognise that while the prominence of people living in small remote communities in the NT may on one hand increase vulnerability to climate change, on the other hand, Aboriginal people living on and with strong cultural connection to country provides opportunity to manage landscapes and thus manage GHG emissions. A **community led, bottom-up approach** to adapting to climate change should be a major component of addressing climate change.
4. **Develop and implement overarching climate change legislation, that builds-on existing legislation and enables the Territory to manage climate change in a way which provides economic, social and environmental benefits.**

**5. Develop guiding principles to facilitate engagement with and submissions from key stakeholders and the public; the following elements are commonly used in best practice policy development related to environmental management and sustainable development:**

- a. Climate change legislation and policy needs to be closely linked / guided by the Environment Protection Act.
- b. Legislative prescription will underpin climate change response actions unless a defensible reason for executive or Ministerial discretion have been provided to the public.
- c. The development, implementation and assessment of progress towards targets will have associated mandated monitoring, evaluation and reporting which is timely and transparent.
- d. Public and stakeholder participation in all aspects of legislation, regulation, policy and management plans is vital to the development and implementation of climate change policy.
- e. Recognised best practice sustainable development policy elements are required; a policy framework describing these elements is provided in this submission (Appendix A).
- f. It is recognised that a climate change management response needs to occur very quickly to reduce the risk of climate change tipping points being reached
- g. To be effective climate change policy and related legislation needs to sit above and guide a wide range of existing legislation, policies and planning documents.
- h. A **triple bottom line** assessment process will be used to support an **adaptive management approach**, where economic, social and environmental benefits and costs are all considered and given equal weighting.
- i. Adopt an **avoid, mitigate** and **as a last resort use offsets** to manage GHG emissions
- j. **Build-on or refine existing legislation** and policy and relevant previous work related to climate change to accelerate the development and implementation of climate change policy.
- k. Embolden and support existing or **new initiatives that protect the environmental values which underpin economic development and social needs**. This should include managing environmental threats that are known to contribute to climate change risks e.g. **fire, feral animals and weeds management** in the landscape and managing natural resources likely to be impacted by climate change e.g. water; coastal wetlands.
  - i. Focus programs on the **long-term (multi decadal)** which provide lasting benefits for all Territorians and identified key values. **Examples** include: opportunities for community ownership of solar projects; development of carbon offset and fire management enterprises in remote communities that are wanted by locals; and protecting carbon sinks that assist with management of green-house gas emissions.
  - ii. All legislation, policy and planning development should be **transparent** and include a high level **consultation** and public submissions sought and **published**.
  - iii. To be truly transparent and accountable the consultation process and public submissions, as occurred with the Fracking enquiry needs to be available to the public. The current 'Have Your Say' website is a perfect example of a carefully managed, filtered, not-transparent process which ticks the consultation box, but isn't transparent.
- l. Development in the NT needs to be **ecologically 'sustainable'**.
- m. Recognise that our understanding of exactly what risks climate change poses, its current and potential impacts and appropriate management responses is **imperfect**. Well designed, **long-term, collaborative applied research** projects will be needed to allow an adaptive management approach to occur.
- n. Strengthen / develop a '**social license to operate' guidelines (SLO)** which relates to development approvals that assess climate change risks and apply the same standards to the development of an NTG climate change policy.

**6. Engage in ongoing and inclusive community and stakeholder consultation to:**

- a. Identify clear climate change action targets (see recommendation #1) which are time-bound, incremental and measurable.
- b. Develop and implement of legislation, regulations, policy and management plans to enable climate change guide and support targets being achieved (see recommendation #3).

- c. Develop and implement a transparent monitoring and reporting process that allows progress toward climate change action targets to be accessible by all stakeholders.
7. **Reducing GHG emissions** is recognised as a priority within any climate change response policy. New developments that increase NT GHG emissions should not be supported.
- a. **No fracking** should occur in the NT due to the emissions produced and **support for this industry seriously undermines credibility** of the NT as a jurisdiction that is serious about renewable energy. **Credibility is an important prerequisite for attracting investment to go solar.**
  - b. Implement **land clearing and development approval** guidelines and policy that includes assessment of GHG emissions.
  - c. Measures needed include ways to reduce GHG emissions as well as store and offset GHG emissions e.g. carbon sinks, carbon offsets and carbon credits. In the NT this will need to consider links to fire and weed management.
8. **Accept that knowledge and policy gaps exist, but do not use this as an excuse not to act on climate change and continue with open for business as usual.**
- a. Recognise that the NT does not have all the information, skills, people and ‘tools’ (legislative, policy, management plans) to respond perfectly to climate change. But we do have more than enough to identify clear goals, set targets and put in place legislation and policy to start progressing toward these goals. This can be achieved using a collaborative, evidence based adaptive management approach. Set an example to others by embedding consideration of GHG emissions in **all levels** of decision making within the Government.
  - b. Support research aimed at addressing climate change. For example, the Indigenous Carbon Industry in the NT could never have evolved without being underpinned by scientific research.
9. Support **public investment** in developing solar and hydrogen industries in the NT.
10. Acknowledge and address the issue that a shift to a low carbon economy requires significant changes to the way we conduct our lives and do business. In the workplace there will be a need for retraining and development of new skills and that **the level of support and way in which changes are implemented will have a profound effect on the acceptance of those changes.**

The majority of these suggested actions are not new (see Box 1) and are already recognised by NTG as important for the Territory. What is required is for the NTG to work collaboratively to turn these ideas into actions. Most of these actions can build on current climate change related initiatives, NTG natural resource management systems and processes and existing internal and external collaborative relationships.

**Box 1: Extracts from Labour Healthy Strong Economy (2016) (ref 5).**

*‘...Labor understands that a healthy and intact ecosystem is the key to a sustainable economy, healthy and safe communities.’*

*‘Labour developed... a comprehensive Northern Territory Climate Change policy in 2009/10, prior to losing government in 2012.’ The CLP government scrapped this proposed policy.*

*Labour stated ‘...scrapping of the climate change policy ... damaged business confidence and investor certainty...destroyed trust in Government processes...and cost the Territory jobs and growth.’*

*‘Territory Labor Government will provide leadership across Government, the parliament and the community to ensure awareness of important environment and climate change issues is high, and that action to meet these challenges and take advantage of the opportunities they present has broad community support.’*

### 3. Examination of NTG Response

#### What is good

By drafting and seeking public comment on the 2019 Climate Change Response papers the NTG has:

1. Taken the first step - recognising climate change poses very real current and future risks to a wide range of important NT values – economic, social and environmental.
2. Recognised that all three of these elements are related and therefore responding to climate change risks and also embracing new opportunities requires considering all of these values. This is often referred to in environmental management as the triple bottom line. This represents an ideal way to support sustainable economic growth, while also giving equal consideration to social and environmental considerations.
3. The three elements already have regulatory processes (legislation, policies, guidelines and management plans) and resources (Agencies, staff, basic understanding and monitoring of key elements) in place. This makes it easier and quicker to develop an overarching climate change policy that builds on existing legislation and policy and can link it to developing and implementing a rapid response to climate change risks.
4. The NTG Response recognises the need to have a variety of key players and the public involved in responding to the challenges and opportunities. For example, the ideas from the 10 gigawatt Vision (ref 3) commissioned by ECNT is extensively referenced in the document and the carbon offsets programs operating on indigenous lands which reduce greenhouse gas (GHG) emissions by managing fire regimes.
5. In citing these examples and the need to support them and develop new innovative businesses in the NT, NTG appears to be embracing the economic opportunities that climate change can offer, and at the same time deliver social and environmental benefits. This is consistent with a triple bottom line approach.

#### What needs improvement

Unfortunately, while some progress has been made a large amount of work remains to be done. The issues we have identified in the document include:

1. There are no clear and measurable targets, goals, actions or timelines.
2. In the absence of targets etc no responsibilities for key players e.g. Government Agencies, Industry, Agriculture, Researchers, Indigenous land managers or NGOs have been identified.
3. How and when the public, communities, stakeholders and experts can be involved in developing and implementing a climate change policy is unclear.
4. Overall it appears that NTG having recognised a large problem – climate change – appears very uncertain as to how to proceed quickly with respect to policy, planning and actual on ground actions.
5. The document is more about what benefits the NT can get out of supporting existing climate change related businesses (e.g. managing fire on indigenous lands to reduce GHG emissions) and new development (10 gigawatt Vision)(ref 3), the “win:win” scenarios, rather than facing up to short-term “win:lose” scenarios. We all stand to lose very significantly if we fail to adequately address climate change, so even a short-term “win:lose” is preferable to a long-term “lose:lose” situation. Acknowledgement of short-term “win:lose” that leads to long-term “win:win” sets the scene for recognition of current practices that are unsustainable and provides a basis for consultation with those who may be negatively affected by the shift from business as usual. This sets the scene to provide the support required such as the opportunity to acquire new skills.
6. Despite being a global problem which has national, State / Territory implications there is no indication that the NTG needs to work with and learn from other jurisdictions that already have climate change related legislation and policy.
7. The document fails to utilise, build on and be consistent with existing labour policy position papers and Department of Environment and Natural Resources (DENR) policy documents:
  - It is inconsistent with the Healthy Environment Strong Economy policy position paper Labour presented to the NT public in 2016 prior to be elected.
  - DENR 2009 draft climate change policy<sup>3</sup> – which contains useful actions and targets has been ignored and delayed climate change policy development by a decade.

8. Widely recognised best practice policy and planning elements are conspicuously absent from the NTG Response. Despite its title including 'Toward 2050' the document itself doesn't actually provide any detail as to how the NTG proposes to address climate change issues in the lead up to 2050.
9. There is no recognition of or proposed measures to assess, monitor and manage GHG emissions in the NT. The need for GHG emissions reductions is recognised internationally and nationally as a key element of efforts to achieve agreed GHG emissions targets. Any NTG climate change policy needs to include a GHG emissions reduction plan supported by legislation.
10. While there is recognition of the link between social, environmental and economic outcomes, the focus on economic outcomes and paucity of attention to social and environmental outcomes needs redress.

Responding to climate change will require a wide variety of organisations to contribute to policy development. With this in mind we offer the recommendations provided above to address the issues identified in the NTG Response.

#### 4. National and NT recognition of climate change as a priority

Climate change as a policy priority that needs an urgent management response has long been recognised by climate change experts, most researchers and natural resource management professionals and a proportion of the general public. In the past few years the proportion of the general public, business, and a wide variety of professional groups (e.g. health, economic, insurance) has increased dramatically. The most recent examples of this change in general public sentiment include: Greta Thunberg inspired national and international School Strikes 4 Climate (refs 11 & 12); the formation and rapid growth of advocate groups such as Climate Action nationally and in Darwin; declarations of climate emergencies by many City Councils, including City of Darwin; and the growth of alternative sustainable energy supplies projects such as the 10 gigawatt Vision.

A recent Australia wide survey by The Australia Institute found that over 70% of Australians now see responding to climate change as a priority issue (ref 13). In Darwin it is estimated that 3500 people (students, parents and grand parents) representing 2.5% of the total Darwin population made time to attend and support the student strikes demanding climate change action from governments and their departments. On a per capita basis that trumps attendance in most other capital cities. Darwin #progressivecapitalofthenorth.

What the media didn't report was that in Darwin 2.5% of the city's population attended the School Strike 4 Climate event. On a per capita basis that trumps attendance in most other capital cities. Shame our numbers didn't even make the count in the national media.

The widespread increases in public, professional organisations and businesses concern about climate change and calls for **urgent action** is not reflected in the current climate change related policy development and action by the NTG.

#### 5. The Territory situation, emissions profile and opportunities for monitoring

Despite some good progress in 2009/10 with its draft climate change policy the NT has been left behind by other States and Territories and many other countries. Other jurisdictions have recognised the need for climate change action and have put in place legislation and policy to respond and contribute to global efforts to keep global temperature rises below 1.5°C.

NTG, as the recognised and obvious leader in mounting a climate change response, needs to urgently work with key stakeholders, experts and the community to plan, design, develop and implement a long-term, evidence based and overarching climate change policy with related legal, regulatory and management

tools which are well resourced. Responding to climate change needs to be a collaborative effort with well-defined and shared roles and responsibilities reflecting the large scale and complex nature of managing climate change risks.

Despite the delays in developing a climate change policy response NTG does not need to start from scratch. NTG, the current Government, climate change experts and other jurisdictions have already developed many of the essential policy elements and policy itself that NTG can and should use to guide the development of a NT climate change policy. The major barrier to a NT climate change policy is not knowing what to do, rather it appears to be a willingness to truly commit to acting, rather than talking about climate change.

The recommendations introduced above and expanded on below outline some of the actions NTG needs to rapidly develop and implement to avoid or mitigate the recognised risks posed to the NT's unique environment, people and economy.

### NT climate change background information

Some background information is provided below to assist in understanding what needs to be considered when developing an NT climate change policy.

#### Why do we have climate change?

To understand climate change it is helpful to understand the carbon cycle and greenhouse gas emissions. The carbon cycle is explained in Box 2.

#### **Box 2: The carbon cycle & human driven changes**

Carbon is stored in the atmosphere, the land, the ocean and fossil deposits. These are often referred to as 'stores' or 'stocks'. Fossil fuels are a very long-term (millions of years) carbon store. Carbon is always moving between the land, ocean and the atmosphere. The movement of carbon between the atmosphere, the land and sea is described as a carbon cycle. When the carbon cycle is in balance temperatures are stable. The long-term storage of carbon is sometimes referred to as carbon sequestration.

When the carbon cycle is altered e.g. an increase in carbon in the atmosphere and a reduction in the carbon in land 'stores' the climate changes. This type of change in the carbon cycle has produced climate change. Changes in the carbon cycle are related to land use e.g. agriculture and land clearing and more recently the extraction and use of fossil fuels.

A NT Climate Change Policy needs to consider all of the components of the carbon cycle that are linked to land clearing. This means consideration of greenhouse gas emissions, land stores and carbon sequestration. To be effective this policy will need to inform as well as be guided by related existing environmental, social and economic development policies and legislation.

#### NT versus Australian greenhouse gas emissions

National Greenhouse gas emissions are divided into 8 different categories for biennial reporting which summarises national and State and Territory annual results and change over time (Figure 1). Greenhouse gas emissions are assessed and reported by combining emissions from a variety of gases (carbon dioxide, methane etc), which are described as GHGe or greenhouse gas equivalents.

There are significant differences between NT emissions sources and the national average (Figure 1 & Table 1) and other jurisdictions. Some of these differences reflect the size of the NT population and industry (e.g. total emissions & energy generation emissions), but the major difference is related to land use and land use change related emissions. The importance of the land use and land use change sector is clearly shown in Table 1 with 46% of the NT's total emissions coming from the sector; the national figure for this sector is 2%.

The NT's contributions to national greenhouse gas emissions was 3.1% of the 2016 national total but on a per capita basis we have high greenhouse gas emissions. Northern Territory greenhouse gas emissions have increased by 27.6%, since 2005. Land use, which includes land clearing, is the largest contributor to greenhouse gas emissions (46% of the total) in the NT (Figure 1, Table 1). Savanna burning is the largest contributor to greenhouse gas emissions in the land use category. Land clearing contributes approximately 13% of the NT greenhouse gas emissions.

Approximately 89% of the NT greenhouse gas emissions come from three emission sources: stationary energy (power generation; 25%), agriculture (18%) and land use, land use change and forestry (46%). This emission sources pattern is very different to the 2016 national, but NT greenhouse gas emissions are low in comparison with the total national greenhouse gas emissions (Figure 2).

The 'tools' to estimate and model greenhouse gas emissions already exist and were used to generate the figures in the national report cited above. The system used is called FullCAM and was developed by CSIRO. It is available to all jurisdictions and should be used by NTG to assess current emissions and potential future emission sources e.g. land clearing or fracking. FullCAM could also be used to develop emissions targets as well as model and monitor progress toward these targets.

An NT climate change policy, that is consistent with best practice policies and national targets, will have to consider all sectors which contribute to greenhouse gas emissions. But, for the NT, it is very clear that the land use and land use change sector needs to be prioritised to reduce emissions. It is not acceptable to allow emissions to increase and focus the NT climate change response on growing the solar and hydrogen energy industries; despite these also being a key element in responding to climate change.

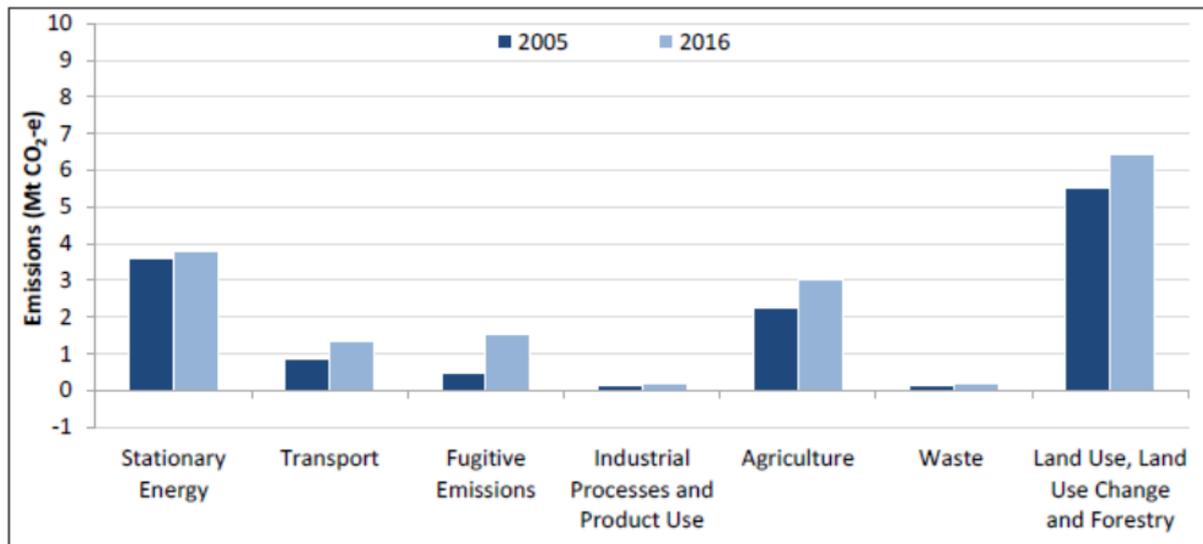
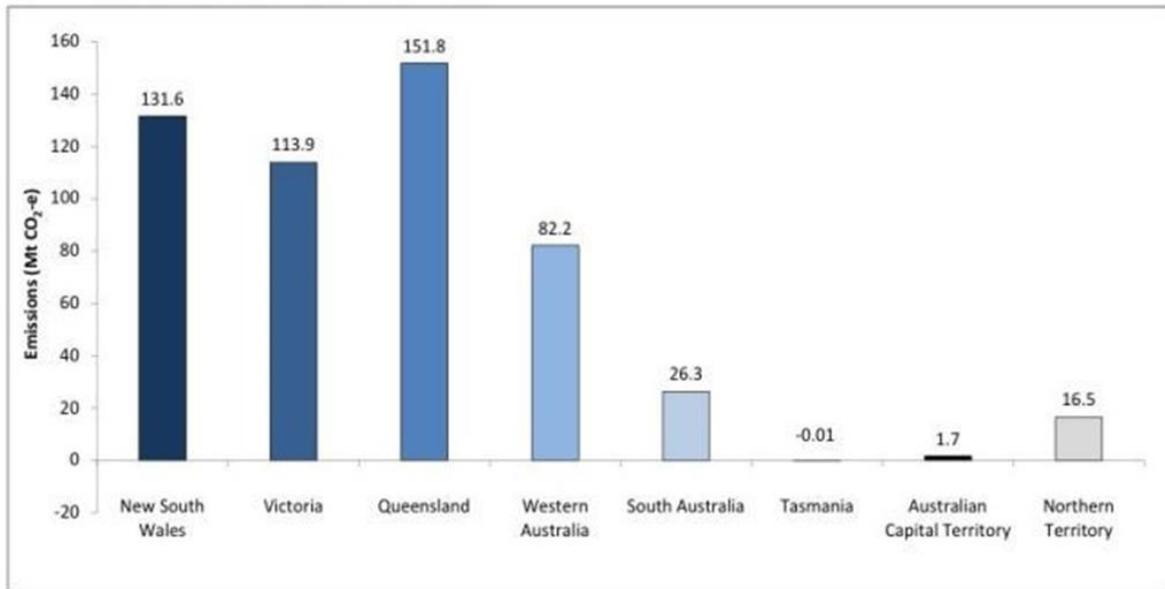


Figure 1: Northern Territory, annual emissions by sector, 2005 and 2016 (ref 10).

Table 1: Greenhouse gas emissions (calculated from data in ref 10).

Source	NT %	AUST %	Comparison
Land use, land use change and forestry	46	2	+44.00
Stationary energy	25	50	-25.00
Agriculture	18	13	+5.00
Transport	9	13	-4.00
Waste	1	2	-1.00
Fugitive emissions	1	6	-5.00
Industrial	0	5	-5.00



**Figure 2: State and Territory total emissions (including Land Use, Land Use Change), 2016 (ref 10).**

The vast amount of largely intact land (and the carbon stores and sinks contained) combined with huge potential for solar energy power generation offer a combined climate change response and development option for the NT. The adoption of a comprehensive NT climate change policy to guide and coordinate actions to both manage and mitigate risks as well as develop new industries that benefit all Territorians is urgently required to counter the increasingly negative effects we are experiencing due to climate change.

## 6. Landuse and Land Use Change: Opportunities in the landscape to manage greenhouse gas emissions?

The natural environment as outlined above plays a very valuable role in the carbon cycle and in relation to climate change greenhouse gas emissions. The land (trees, soil, mangroves), the sea all play a part in the carbon cycle. Changes to land with land changes and increased emissions, particularly the extraction and use of fossil fuels, has led to climate change.

Avoiding or mitigating negative impacts on the natural tools for managing greenhouse gas emissions is an effective way to try and reduce the risk of climate change. See examples of what the natural environment can do to assist with greenhouse emissions in Box 3.

Applying the avoidance, mitigation or offsets approach, that NTG has adopted for its environmental protection legislation to land use, land use change sector related emissions e.g. development approvals, to sites like those described above for Howard Springs, could play an important role in managing greenhouse gas emissions. It is important however, in assessing the potential of these carbon stores in managing greenhouse gas emissions, to consider disturbance factors that might alter their ecological structure and function over time e.g. fire. There is evidence to suggest fire reduces the capacity of woodlands or forests to act as carbon stores.

**Box 3: Tropical savanna as emissions management tool**

Tropical Savannas CRC research (2007) have estimated that on average tropical savanna woodlands in Howard Springs can store on average 45–55 tonnes of carbon per hectare (t C/ha). This is around two to three times as much as organic material in the soil.

Airborne radar results for woodland landscapes in the Wildman River area suggest around 70–80 (t C/ha). Dense forest landscapes might store as much as 150 tonnes / hectare.

The results from the Howard Springs sites suggest that every year, even when fire occurs, approximately two tonnes, above the amount of greenhouse gas emissions, is absorbed per hectare. This means there is a net decrease in greenhouse gas emissions at these sites.

Jacklyn, P. Savannas and the carbon storage story. *Savanna Links* (2007) (ref 9)

Another example of important carbon stores are mangroves, sandflats sometimes referred to as blue carbon. Blue carbon habitats can store carbon 35-57 times faster than terrestrial forests, and can store carbon for thousands of years. In Australia, blue carbon habitats account for ~40% of the average annual carbon storage. Given that we have lost an estimated 200,000 ha of blue carbon habitats in Australia, with an annual loss rate of 1-2% for saltmarsh and mangroves, these areas provide an opportunity for protection (avoided loss of the carbon stock) and restoration (additional carbon sequestration capacity) projects. Blue carbon is recognised as having the potential to represent an important carbon store, but there is debate about its ability to be used in the carbon market i.e. for the buying and selling of carbon credits. This uncertainty is due to the high level of rapid change in carbon stored over time periods of time - sometimes referred to as 'flux'.

To be effective the proposed policy needs to consider changes in greenhouse gas emissions, carbon stores (e.g. vegetation) and long-term carbon sequestration as a result of land clearing. This will involve estimating short and long term impacts on these components of the carbon cycle. It is expected that both emissions and changes in carbon stores and sequestration will vary across the landscape. Any proposed greenhouse gas emissions policy will have to be able to account for these spatial and temporal variations in assessing land clearing applications.

Coupled with a shift to solar energy - using existing greenhouse gas storage systems (trees, soil, mangroves) represents an opportunity for the NT to utilize what is very large amounts of - largely intact areas of undeveloped land. In addition there is existing legislation, regulations and policy that aims to protect these parts of the landscape. As such it represents a perfect possibility to build on existing policy systems and tools.

## 7. Offsets for greenhouse gas emissions

Offsets should only be used if there is residual risk after other measures e.g. avoidance or mitigation have been applied. Greenhouse gas emissions offsets compensate for unavoidable risk resulting from an increase in greenhouse gas emissions as a result of land clearing or other activity.

## 8. Allocating priorities within the development approval process

A NT climate change policy will require the scientific methods and process that allows NT emissions to be monitored, reported, and used in the development approval and environmental protection assessment process. To our knowledge no monitoring or policy and planning process that considers greenhouse gas emissions exists in the NT. These gaps in key knowledge and policy process gaps need to be urgently addressed. Recommendations related to this include:

1. Review and where appropriate adapt and adopt existing ‘tools’ e.g. FullCAM to measure and model GHG emissions. Use this tool to undertake an evidence based analyses of: current and potential NT GHG emissions at a variety of spatial scales.
2. Adopt a tool that allows **consistent assessment and reporting of GHG emissions across industries**.
3. Use tools such as FullCAM to develop and implement carbon offsets and carbon sequestration guidelines.
4. Draft and implement land clearing assessment process guidelines that incorporates assessment of greenhouse gas emissions and carbon sequestration. These guidelines should assess links to related legislation, policies and guidelines and any related changes that might be required.
5. Develop and implement EPA assessment approval triggers and thresholds (e.g. CO2 equivalent emitted due to clearing) that can be applied to the application and approval process.
6. Develop and implement guidelines to assess the **cumulative impact** of GHGe related land clearing and other developments that result in GHGe. These guidelines need to be designed to avoid large clearing and/or development activities being broken up into a series of applications that fall below thresholds/triggers for individual projects.
7. Identify and develop maps to enable high value carbon sequestration areas to be considered in the land clearing application and approval process.
  - a. A biomass map might serve the interim outcome. This could consider factors such as soils, rainfall, vegetation type for which we have broad scale spatial data.
8. Review available greenhouse gas emissions offsets and how they might be applied in the NT in relation to land clearing.

## 9. NT Gas Situation

Opening up a fracking industry in the NT will promote the release of GHG into our atmosphere. Emissions arising from fracking the Beetaloo Basin are predicted to exceed emissions from the highly controversial Adani Carmichael Coal Mine in Queensland. As global citizens we cannot afford to expand the release of GHG, especially at such a scale. To do so is to go down the path of a long-term lose:lose scenario.

Methane is widely recognised as a serious pollutant that has a disproportionately high impact on our climate compared to many other GHG. Methane levels have been rising rapidly in the atmosphere over the past decade and a recent study has proposed a link between this increase and the release of methane arising from the expansion of fracking in North America (ref 6). Fugitive release of GHG, including methane from fracking operations is widely recognised as a serious issue and there is widespread failure to adequately account for these emissions associated with fracking operations. The evidence points to a close link between fracking and exacerbation of negative human induced impacts on the climate system. Application of the precautionary principle supports the contention that fracking should not proceed in the NT based upon climate considerations alone, independent of other environmental or social concerns.

Predicted gas emissions should the Beetaloo Basin go ahead is incompatible with a safe climate future and undermines the Government’s positive steps towards a clean energy transmission. Furthermore, NTG support for fracking will undermine the requirement from industry and those investing in the NT for consistency and certainty in NTG policy. As articulated by industry representatives attending the Beyond Zero Emissions launch in Darwin in early 2019, a key consideration for investors is the commitment of the NTG to renewables backed up by a clear public demonstration of that commitment.

## 10. Existing NT work to support climate change policy development

The speed with which actions to address climate change can be developed and implemented will be enhanced by building upon previous work. Some key information is summarised below and additional related information is contained in the Appendices. Appendix C includes recommendations by Lede

(2018)(ref 8) for increasing climate resilience in the NT. Some references to further information are also provided below.

### 2009 Draft climate change policy

In the years leading up to 2009, DENR (previously DENRAS) in combination with the Chief Ministers Office drafted, but did not finalise and implement climate change policy ideas (ref 4). The failure to adopt and implement coincided with a change of government. The apparent influence of party politics highlights that **the solutions to climate change are best if bipartisan in nature and need to be supported by legislation**. The issue of climate change is too serious for the NT to be held back by party politics.

While acknowledging the 2009 document was a draft and thus does not represent previous or current NTG policy, it does contain valuable recommendations. The absence of actions and targets from recent NTG discussion papers increases the value of these headline actions and targets as steps to the rapid development of an NT climate change policy. While the dates require revision, many of the underlying ideas remain accurate and highly relevant.

The headline actions and selected targets are shown in Table 3; selected proposed targets are contained in Table 4. The full list of proposed targets are contained in Appendix B. To highlight the very limited action that has occurred the actions and targets have been colour coded based on the available evidence of action occurring or not. The assessment is subjective but based on expert advice from people familiar with NTG policy and management initiatives.

**Table 2: Draft 2009 NTG Headline Actions (ref 4)**

1. By 2018, we will ensure the Territory Government is carbon neutral.
2. By 2020, at least four million tonnes of carbon per year will be removed from the atmosphere through better land management. Working with business, landholders and the community we can become a major player in the emerging carbon economy, assisted by the establishment of new Carbon Fund arrangements.
3. The Territory will be a low land-clearing jurisdiction, protecting the 'carbon bank' in our landscape. The rate of clearing will be contained. The government will introduce native vegetation legislation to protect Territory vegetation.
4. By 2020, the Territory will be a world leading generator of renewable and low emissions power in remote communities.
5. The Territory will be at the forefront of efforts to save the best of our priceless coastal wetlands, at risk from rising sea levels – through specific interventions aimed to reduce salt water intrusion, protect fishing and save biodiversity.

**Table 3: Selected draft NTG climate change targets (ref 4)**

2.3: By 2020, develop Alice Springs and Central Australia as a world-leading solar energy centre.	<b>Key</b> No Action Some Action Action Unclear
3.1: By 2020, the Territory Government will work with business and the community to establish a carbon <u>offset industry</u> in the Northern Territory, removing four million tonnes of carbon per year from the atmosphere through	
3.4: Research emissions reduction opportunities for Northern Territory agriculture and forestry.	
3.5: Support landholders to use carbon offset markets to reduce the emissions from savanna burning by 500 000 tonnes per year by 2030.	
3.7: Immediately reduce the impact of feral camels on vegetation in arid environments and, by 2015, achieve measurable improvements in carbon sequestration.	
9.1: By 2011, develop a Territory Climate Change Adaptation <b>Action Plan</b>	
9.2: Take conservation efforts into the 21st century by partnering with landholders to create Territory Eco-link, a 1600 km conservation corridor from the tropics to the desert that will link our national parks and provide the buffer that species need as they adapt to the changing climate.	
9.3: The <b>Territory will be a low land-clearing jurisdiction</b> , protecting the 'carbon bank' in our landscape. The rate of clearing will be contained. The government will introduce native vegetation management legislation to protect Territory vegetation.	
9.4: Provide <b>leadership across Northern Australia</b> through continued <b>sustainable water use</b> planning and allocations in the Top End and Central Australia, <b>ensuring water resources are proactively managed to respond to climate change impacts</b> .	

The Target number corresponds to the Action number in Table 3. The full list of targets is contained in Appendix B.

## 11. Conclusion

It is imperative that the NTG develops a detailed plan to achieve **rapid** emissions reductions to avoid the worst climate impacts, support people and businesses to adapt, build community resilience, and ensure everyone in our community has the opportunity to participate in and benefit from the transition to a zero emissions economy. This plan should include robust adaptation strategies to address the changes already impacting the NT and legislated targets to ensure the climate action needed continues outside of political cycles.

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## Appendix A: Environment & sustainable development policy framework

<b>Detailed policy elements (Dovers &amp; Hussey 2013) (ref 7)</b>
<b>Problem-framing</b>
1. Discussion of & identification of social & environmental goals
2. Identify and monitor stakeholder concern
3. Monitoring & Evaluation of environmental impacts
4. Identify problematic environmental or social change / degradation
5. Isolate causes of change / degradation
6. Risk assessment, uncertainty, ignorance
7. Assess policy and institutional settings
8. Define policy problems
<b>Policy-framing</b>
9. Develop policy principles
10. Construction of general policy statement (intent)
11. Define measurable goals
<b>Policy implementation</b>
12. Select policy instruments /options
13. Planning for implementation
14. Planning for communication
15. Provide statutory, institutional and resourcing requirements
16. Establish enforcement / compliance mechanisms
17. Establish policy M&E mechanisms
<b>Policy Monitoring &amp; Evaluation</b>
18. Ongoing policy monitoring and data capture

19.Mandated evaluation and review process

20.Extension, adaptation OR stop policy OR change goals

## Appendix B: Draft NTG 2009 Climate Change Actions & Targets

### Draft NTG 2009 Actions and status

1. By 2018, we will ensure the Territory Government is carbon neutral.	<table border="1"> <tr> <th>Key</th> </tr> <tr> <td>No Action</td> </tr> <tr> <td>Some Action</td> </tr> <tr> <td>Action</td> </tr> <tr> <td>Unclear</td> </tr> </table>	Key	No Action	Some Action	Action	Unclear
Key						
No Action						
Some Action						
Action						
Unclear						
2. By 2020, at least four million tonnes of carbon per year will be removed from the atmosphere through better land management. Working with business, landholders and the community we can become a major player in the emerging carbon economy, assisted by the establishment of new Carbon Fund arrangements.						
3. The Territory will be a low land-clearing jurisdiction, protecting the 'carbon bank' in our landscape. The rate of clearing will be contained. The government will introduce native vegetation legislation to protect Territory vegetation.						
4. By 2020, the Territory will be a world leading generator of renewable and low emissions power in remote communities.						
5. The Territory will be at the forefront of efforts to save the best of our priceless coastal wetlands, at risk from rising sea levels – through specific interventions aimed to reduce salt water intrusion, protect fishing and save biodiversity.						

### Draft NTG 2009 Targets and status

1.1: By 2018, the Territory Government's operations will be <b>carbon neutral</b> .
1.2: <b>Reduce emissions from the Territory Government's passenger and light commercial fleet by 20% by 2014 and 50% by 2020.</b>
1.3: Greenhouse gas emissions from interstate air travel by Northern Territory Public Sector staff will be halved by 2020 compared to 2008–09
1.4: Adopt cost effective and environmentally friendly procurement and waste strategies for government.
1.5: Implement green building performance standards for all buildings leased by government.
1.6: By 2020, energy intensity in Territory Government buildings will be reduced by a third from a 2004 baseline, with progressive energy savings being achieved after this.
1.7: Make public housing more energy efficient.

1.8: Implement the Energy Smart Schools Program, which will reduce the overall energy intensity of Territory Government schools by 20% by 2015 from a 2004 baseline.

1.9: By 2020, at least five cogeneration projects will be operational, supplying smarter power for major Territory Government infrastructure

1.10: By 2012, all traffic lights on Territory Government managed roads will be energy efficient. By 2015, 70% of street lighting in the Territory will be energy efficient and, by 2020, 100% will be energy efficient, where technically feasible.

2.1: By 2020, the Territory will have replaced diesel as the primary source of power generation in remote towns and communities, using renewable and low emissions energy sources instead.

2.2: By 2020, wholesale electricity purchasers in the Territory will meet their national 20% Renewable Energy target (RET) from Territory sources.

2.3: By 2020, develop Alice Springs and Central Australia as a world-leading solar energy centre.

3.1: By 2020, the Territory Government will work with business and the community to establish a carbon offset industry in the Northern Territory, removing four million tonnes of carbon per year from the atmosphere through

3.2: Establish new carbon fund arrangements to provide financing for investment in land management, renewable energy technology and other sustainability programs in the Territory.

3.3: Territory land managers will be at the forefront of sustainable land management, running economically and environmentally sustainable businesses that are ready to grasp opportunities from carbon storage in the land.

3.4: Research emissions reduction opportunities for Northern Territory agriculture and forestry.

3.5: Support landholders to use carbon offset markets to reduce the emissions from savanna burning by 500 000 tonnes per year by 2030.

3.6: Explore the viability of developing a Territory-based biofuels industry.

3.7: Immediately reduce the impact of feral camels on vegetation in arid environments and, by 2015, achieve measurable improvements in carbon sequestration.

4.1: Develop sustainable housing and buildings policies and programs for the Territory so that by 2020, six, seven and eight star ratings for energy efficiency will be the norm in the Territory's residential and commercial building stock.

4.2: Develop Weddell as a world-class green city and a model for the future.

4.3: Plan and implement an integrated public transport system that sees a 20% increase in the use of cycling, walking and public transport across the Territory by 2020.

5.1: Phase out single-use plastic shopping bags and move to multiple-use shopping bags with a smaller carbon footprint.

5.2: Introduce Cash for Containers in 2011

5.3: Develop recycling options for the Territory.
5.4: Reduce the amount of waste being taken to our rubbish dumps by 50% by 2020.
6.1: In partnership with the private sector and Territory research organisations, such as Charles Darwin University and the Alice Springs Solar Centre, the government will encourage the development of leading edge, innovative and commercially-viable energy efficiency applications in business and industry across the Territory.
6.2: Increase the uptake of free energy audits and energy efficiency upgrades among small-to-medium sized businesses
6.3: The Northern Territory will be a leading green tourism destination.
7.1: As part of the future Jobs NT strategy, the Territory's workforce will be equipped with the skills to meet the existing and new needs of the green economy.
7.2: By 2020, 10 000 Territorians will have had training in green skills so they can participate fully in the green economy.
8.1: and governments, raise awareness of climate change issues and provide solutions for practical use in the daily lives of Territorians
8.2: Maximise the number of Territorians who access climate change rebates and grants offered by local government, and the Northern Territory and Australian governments.
9.1: By 2011, develop a Territory Climate Change Adaptation Action Plan
9.2: Take conservation efforts into the 21st century by partnering with landholders to create Territory Eco-link, a 1600 km conservation corridor from the tropics to the desert that will link our national parks and provide the buffer that species need as they adapt to the changing climate.
9.3: The Territory will be a low land-clearing jurisdiction, protecting the 'carbon bank' in our landscape. The rate of clearing will be contained. The government will introduce native vegetation management legislation to protect Territory vegetation.
9.4: Provide leadership across Northern Australia through continued sustainable water use planning and allocations in the Top End and Central Australia, ensuring water resources are proactively managed to respond to climate change impacts.
9.5: Establish community water plans for Territory Growth Towns and remote communities for the sustainable management of water supplies

9.6: By 2013, develop, test and select new methods to rehabilitate damaged wetlands and protect the Mary River freshwater wetlands and their carbon stores from the risks of rising sea levels

## Appendix C: NT Climate Resilience Recommendations

Source: Increasing Climate Change Resilience in the Northern Territory and mitigating climate risk (Lede, 2019) (ref 8).

**Table 5: NT Climate Change Resilience and Risk Mitigation Recommendations**

1. TRANSITION TO LOW-CARBON ECONOMY - Develop a comprehensive climate change policy to mitigate climate risk
2. TRANSITION TO LOW-CARBON ECONOMY - Establish an independent Climate Resilience Advisory Committee – comprised of experts and relevant stakeholders – to inform the low-carbon transition process
3. EMISSIONS REDUCTION TARGET - 1. Legislate a science-based emissions reduction target of net zero by 2050. Include interim targets and sector-specific targets
4. MITIGATION - MAXIMISE RENEWABLE ENERGY GENERATION - Legislate a science-based emissions reduction target of net zero by 2050. Include interim targets and sector-specific targets
5. MITIGATION - MAXIMISE RENEWABLE ENERGY GENERATION - Determine the potential for different renewable energy technologies to contribute to the NT's future energy mix
6. NEW ECONOMIC OPPORTUNITIES (RENEWABLE ENERGY) - Investigate potential pathways for the NT to become a net energy exporter
7. NEW ECONOMIC OPPORTUNITIES (RENEWABLE ENERGY) - Determine the feasibility of attracting new industries to the NT with the incentive of inexpensive, clean, electricity
8. NEW ECONOMIC OPPORTUNITIES (RENEWABLE ENERGY) - Explore the potential for the NT to become a world-leading research hub for renewable energy technology.
9. NEW ECONOMIC OPPORTUNITIES (RENEWABLE ENERGY) - Investigate the feasibility of establishing a renewable hydrogen industry in the NT
10. LIMIT OR AVOID NATURAL GAS - Liquid gas should not be advanced as a low-carbon bridging fuel for the transition to renewables.
11. LIMIT OR AVOID NATURAL GAS - Economic modelling; decarbonisation; and climate risk must be integrated into the decision making process when determining the NT's development pathway
12. ENERGY EFFICIENCY IN BUILDINGS - Undertake energy retrofits across the Territory's building stock to optimise energy savings. Investigate complementary strategies to increase energy efficiency (e.g. demand management).
13. ENERGY EFFICIENCY IN BUILDINGS - Mandate energy efficiency building codes to maximise emission reductions and cost savings. Ensure these are consistently updated to reflect technological advancements
14. ENERGY EFFICIENCY IN BUILDINGS - Establish the NT as a hub for climate resilient and sustainable design
15. STRANDED FOSSIL FUEL ASSETS - The NTG needs to factor the global low-carbon transition - and the subsequent risk of stranded fossil fuel assets - into government decision-making processes
16. RISK ASSESSMENT AND ADAPTATION STRATEGY - As a matter of urgency, climate change risks for the Northern Territory need to be comprehensively investigated and determined (climate risk assessment)
17. RISK ASSESSMENT AND ADAPTATION STRATEGY - An adaptation strategy then needs to be developed, taking into account both short- and long-term climate risks and differentiated impacts
18. CROSS-SECTORAL ENGAGEMENT - Implement evidence-based mechanisms to engage all Territorians in building climate resilience

