Australian Government
Defence

DEFENCE NET ZERO STRATEGY

Defending Australia and its national interests in order to advance Australia's security and prosperity

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Acknowledgment of Country

Defence acknowledges the Traditional Custodians of the lands, seas and air in which we live, work and train. We pay our respects to their Elders past and present. We also pay our respects to the Aboriginal and Torres Strait Islander men and women who have contributed to the defence of Australia in times of peace and war.

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FOREWORD

Climate change is a national security issue. If climate change accelerates, it poses risks to Australia's national interests and could impede Defence's ability to achieve its primary objective of defending Australia.

As the Australian Government's largest landholder and highest energy user, Defence has a responsibility to take action to minimise the effects of climate change. This is part of a global transition to clean energy and will enhance our national and Defence resilience by strengthening energy security and reducing our reliance on fossil fuels.

In 2022, the Australian Government, through the *Climate Change Act 2022*, legislated emissions reduction targets. Australia's interim target is a 43% reduction on 2005 emission levels by 2030 and net zero by 2050.

Defence is committed to meeting these targets.

The Defence Net Zero Strategy outlines the actions Defence will take to reduce our emissions, and minimise our contribution to climate change.

The Defence Net Zero Strategy is complementary to the Defence Future Energy Strategy, and together these accelerate our transition to clean energy as agreed by Government in the Defence Strategic Review.

The Defence Net Zero Strategy sequences activities to decrease risk and cost focusing on opportunities to reduce emissions across the Defence estate in the period to 2030. The Defence Net Zero Strategy will deliver practical actions: shifting to renewable energy to power our buildings and infrastructure, improving energy efficiency, and transitioning to electric white fleet vehicles. Over time, Defence will progressively adopt low emission alternative fuels.

By sequencing these actions, Defence will ensure it does not adversely impact its capability or capacity to respond to threats arising from a deteriorating strategic environment, should they emerge. This approach also allows Defence to benefit from increased sovereign industry capability, interoperability with key allies and partners, and improvements in energy resilience.

The Defence Net Zero Strategy is an important step on the net zero pathway to realising an adaptive and resilient Australian Defence Force.

Greg Moriarty
Secretary
Department of Defence
28 Aug 2024

David Johnston, AC, RAN
Admiral
Chief of the Defence Force
28 Aug 2024

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EXECUTIVE SUMMARY

Context

As the Australian Government's largest landholder and energy user, Defence has a significant role in achieving emissions targets. Estimates of total Commonwealth Government emissions show that Defence represents approximately two thirds of Australian Government emissions.

Defence funding of over $53 billion this Financial Year includes investments in capability, infrastructure, management of the Defence estate (Estate) and partnerships with defence industry. These investments can facilitate national emissions reduction efforts and drive wider action across the economy in renewable energy, energy efficiency and innovative technology. The long lifespan of investments highlights the need to integrate emissions reductions considerations, while continuing to enhance capability.

The transition to a resilient, low-carbon Defence force requires innovation and agility to respond to technological advances as they arise. Decarbonisation activities will be sequenced to manage risk and cost, and to ensure alignment with sovereign industry development and interoperability with key allies and partners. Defence will also collaborate across portfolio agencies including the Australian Signals Directorate, the Australian Submarine Agency and Defence Housing Australia, and with other departments to reduce emissions and build resilience.

The world is undergoing rapid change in the global transition to net zero. Global impacts of climate change are being experienced in a time of economic and geopolitical uncertainty. Significant supply chain vulnerabilities and disruptions have emerged, prompting a re-think of extant systems. Limiting the global temperature increase to 1.5°C above pre-industrial levels is required in order to mitigate the worst impacts of climate change.[1] Net zero greenhouse gas emissions by 2050 are the minimum to ensure that the world has a chance of staying below the 1.5°C threshold.

The 2024 National Defence Strategy and Defence Strategic Review recognise climate change as a national security issue. The effects of climate change will heighten challenges for Defence, including harsher conditions within which to operate, and increased humanitarian assistance and disaster relief at home and overseas.

Under the *Climate Change Act 2022*, the Australian Government legislated a national interim target of a 43% reduction on 2005 emission levels by 2030 and net zero by 2050.[2] The Government's intention is that, in line with the Australian Public Service (APS) Net Zero in Government Operations Strategy, security agencies, including Defence, will set targets that incorporate as much of their activities as possible, without compromising operational or capability requirements.[3]

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1 United Nations, The Paris Agreement 2015, Article 4.
2 Australian Government, *Climate Change Act 2022.*
3 Australian Government, Department of Finance, APS Net Zero 2030.

The NDS commits Defence to adopt climate adaptation strategies and energy resilience.[4] The Integrated Investment Program (IIP) commits Defence to accelerate its transition to clean energy.[5]

The Defence Corporate Plan includes a clear climate commitment.[6] Defence supports the Government's climate agenda and is committed to reducing greenhouse gas emissions, accelerating its transition to clean energy, and building national and regional climate resilience.

The Defence Future Energy Strategy (DFES) sets out the plan for the transition of operational Australian Defence Force capabilities to resilient and secure forms of energy that maintains or improves capability and preparedness. It addresses the mitigation of emissions associated with operational liquid fuel use, which account for approximately half of Defence's emissions.

This Strategy, alongside the DFES, focuses on minimising our emissions, enhancing climate resilience through securing our energy requirements, improved infrastructure durability, adaptive operational practices, and disaster readiness, thereby charting a robust pathway to contribute to a carbon-neutral future and bolstering the resilience of our defence capabilities against environmental changes.

Defence must act now to enhance energy resilience and capability. Effective action will reduce long-term costs and strengthen collaboration with allies and partners while meeting obligations to reduce emissions. Inaction is a risk to more than emissions targets, it undermines defence capability and the confidence of the Australian people.

The Way Forward

The Defence Net Zero Strategy is our emissions reduction plan that provides an actionable pathway to support net zero targets and accelerate Defence's transition to clean energy. Defence will contribute to whole-of-Government action to reduce emissions and achieve net zero emissions by 2050. This Strategy ensures that our accelerated preparedness, operational effectiveness and capability requirements remain uncompromised, even as we strive for sustainability and resilience.

The transition to net zero by 2050 will commence with an Estate-led pathway to achieve the 2030 interim emissions target focusing on reducing emissions through use of renewable power and reducing emissions across the Estate. This will allow time for development of sovereign industry capability, including the production of low-carbon fuels and emerging energy technologies to address harder to abate emissions.

Four strategic aims have been defined to implement the Defence Net Zero Strategy. The plan will drive change and evidence-based decision making to support emissions reduction considerations, including through the One Defence Capability System and IIP.

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4 Australian Government, National Defence Strategy 2024.
5 Australian Government, Integrated Investment Program 2024.
6 Australian Government, Defence Corporate Plan 2023-2027.

FOUR STRATEGIC AIMS

1. Accelerate emissions reductions with renewable electricity

Defence will prioritise sourcing 100% renewable power via its utility electricity contracts or direct contracting with renewable energy generators as well as incorporating on-base renewable energy systems.

2. Transition current fuels to low emissions alternatives

As outlined in the DFES, Defence will manage an orderly transition to low emissions fuels, electrification and emerging clean energy technologies to increase energy independence and enable sovereign supply chains.

3. Increase energy efficiency and investigate carbon sequestration on the Estate to reduce emissions and costs

Defence will increase energy efficiency across the One Defence Capability Systems, including ADF operations, the Estate, and ICT technology and infrastructure. Planning, design and whole-of-life costs will consider emissions as part of business-as-usual decision making. Defence will reduce emissions sources to the largest extent possible and investigate opportunities for carbon sequestration on the Estate.

4. Embed a unified and integrated approach to achieving net zero with enabling functions and resources

Defence will amend its internal processes, enhance skills and provide training and tools across Defence to enable effective implementation, consistent with the objectives of the DSR, NDS and the IIP.

Defence Future Energy Strategy

The DFES provides the framework for energy transition activities. The DFES provides Defence with a critical decision process to consider how capability and interoperability can be maintained as energy transition activities occur.

The DFES energy assessment has identified Renewable Diesel, Sustainable Aviation Fuel, and Electrification for land capabilities as likely alternative energies over the short to medium term, with the potential for hydrogen or electrification for selected Air and Maritime domain applications as long-term alternative energy sources.

The DFES will work in tandem with this Defence Net Zero Strategy to achieve net zero emissions by 2050.

INTRODUCTION & MEASUREMENT

Introduction

Defence is committed to meeting the legislative obligations set out in the *Climate Change Act 2022* while continuing to enhance capability outcomes in line with the Government's direction set out in the NDS.

As we modernise our bases and military platforms, low-carbon synthetic fuels and renewable energy will be critical to making Defence more resilient while meeting the Government's emission reduction targets and boosting the production of clean energy throughout Australia.

Achieving net zero requires a whole-of-organisation change to the way Defence conducts its business, not just across energy sources but also in how we procure, operate and sustain capability. Defence has hard-to-abate capabilities. Reducing emissions to meet net zero comes with complex answers. These will require significant investments, targeted leadership, governance and workforce upskilling, education and training.

The Defence Net Zero Strategy is a framework for Defence to reduce its emissions through the adoption of clean energy, whilst increasing national resilience and reducing dependence on vulnerable supply chains.

What is Net Zero?

Net zero broadly refers to reducing greenhouse gas emissions through a combination of energy efficiency, renewable energy and other measures, and usage of offsets.[7] This can be achieved by a combination of renewable energy, energy efficiency, electrification and other measures including the use of offsets such as tree planting or changed land management practices.

Limiting the global temperature increase to 1.5°C above pre-industrial levels is required in order to mitigate the worst impacts of climate change.[8] Net zero emissions by 2050 are the minimum to ensure that the world has a chance of staying below the 1.5°C threshold.

Global action is underway. 151 countries have published a plan to achieve net zero, accounting for 88% of global emissions, 92% of global GDP and 89% of the global population.[9]

The net zero by 2050 target, together with interim targets, are set through a commitment to the United Nations under the Paris Agreement and referred to as Nationally Determined Contributions (NDCs).

The Australian Government's intention is that security agencies, including Defence, will set net zero targets that incorporate as much of their activities as possible in the 2030 target, without compromising operational or capability requirements.[10] Defence is committed to reporting progress against the target. The Department of Finance is leading APS Net Zero 2030 implementation.

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7 Australian Government, Net Zero in Government Operations Strategy 2023.
8 United Nations, The Paris Agreement 2015, Article 4.
9 Climate Watch's Net Zero Tracker, 12 September 2023.
10 Department of Finance, APS Net Zero 2030.

What is Measured?

Emissions are calculated using national accounting standards and measurement approaches.[11] The Department of Climate Change, Energy, the Environment and Water (DCCEEW) publishes national emissions inventory which covers whole of economy emissions.

The measurement of Defence's emissions uses the same calculation approaches, with emissions reported in the following emissions categories:

Scope 1 – Direct emissions. Defence fuel combustion and other direct sources of emissions. This includes gas and liquid fuels (aviation, maritime, land, white fleet, diesel power generation).

Scope 2 – Indirect emissions. These relate to emissions from purchased electricity.

Scope 3 - Wider indirect emissions. This includes emissions from procured services up and down stream, such as emissions from commercial airline travel. Reporting requirements and inclusion of scope 3 emissions will continue to evolve in line with Government policy and an economy-wide transition.

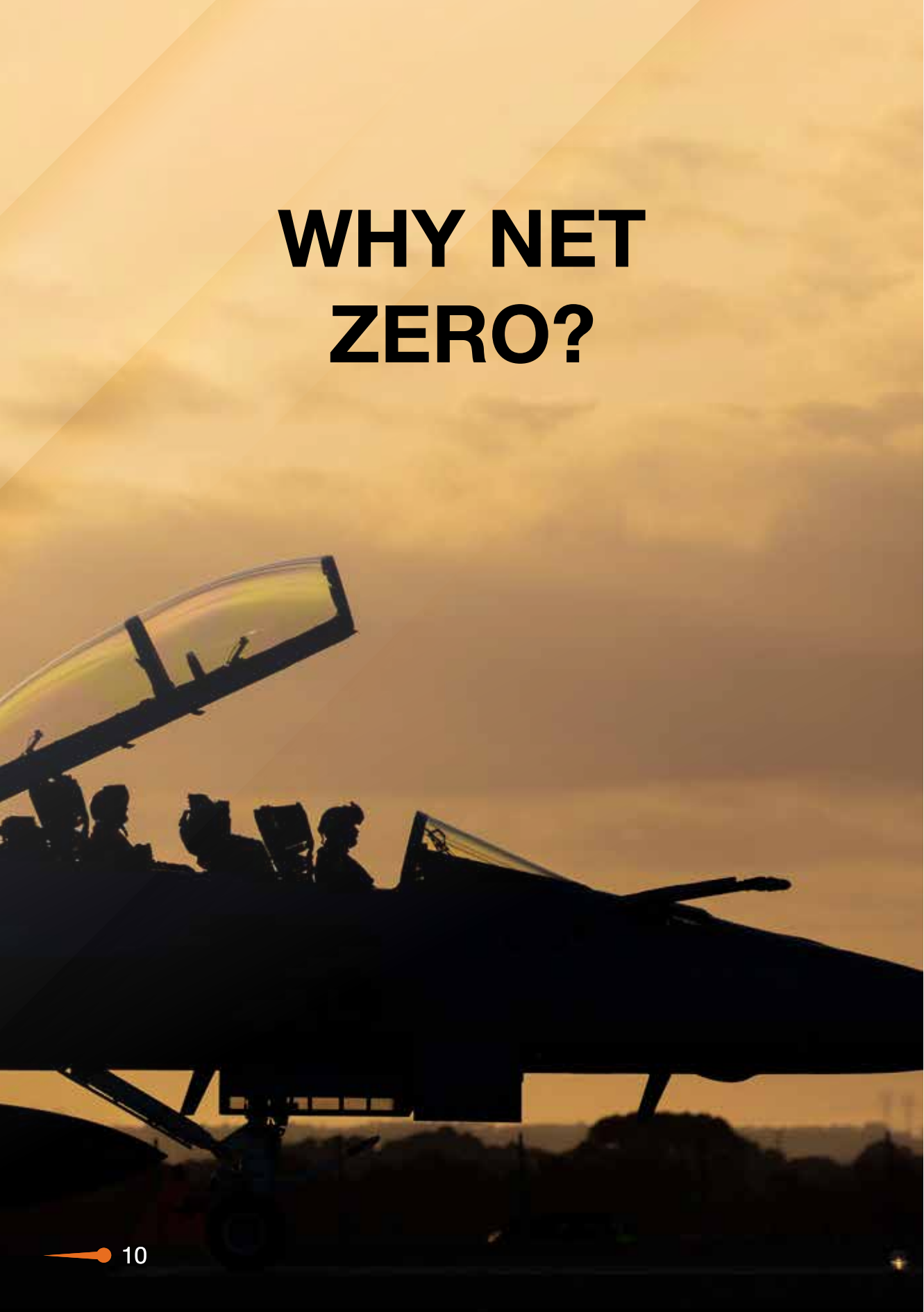
11 Clean Energy Regulator, National Greenhouse and Energy Reporting Scheme.

Sustainable Aviation Fuel

Sustainable Aviation Fuel (SAF) and SAF Blends act exactly like conventional mineral fuel yet reduce greenhouse gas emissions. Defence is trialling drop-in Royal Australian Air Force (RAAF) aircraft. A public display of RAAF Pilatus PC-21s fuelled with a drop-in SAF blend took place in late 2023. The fuel has been supplied by Defence's strategic fuel partner Viva Energy Australia.

CASE STUDY

WHY NET ZERO?



National Climate Change Action

The Australian Government has legislated climate change action in accordance with international agreements. It has also adopted a leadership position in reducing emissions associated with Government operations ahead of the trajectory set for the rest of the economy. Defence has an obligation to contribute to this climate change action as a significant component of Government operations. Enhancing military capability and protecting the nation may mean some elements of Defence cannot reduce all emissions, and these emissions will need to be offset.

Defence is committed to reducing its emissions in line with the NDC emissions reduction targets[12] under the *Climate Change Act 2022,* while maintaining and enhancing capability.

Defence's emission reduction targets are in line with the NDCs[13] which are:

- 43 per cent reduction from 2005 levels by 2030 (interim target)
- Net zero emissions by 2050.

Australia will develop a mid-term target which will further accelerate emissions reduction action across the economy.

Sovereign Supply Chains, National Resilience and Australian Industry Benefits

The financial benefits of the global just-in-time supply chain are outweighed by the loss in economic resilience in times of crisis, as evidenced through recent events such as the COVID-19 pandemic, the invasion of Ukraine and blocking of the Suez Canal. Defence's reliance on global supply chains has created vulnerabilities and strategic challenges. Australia is well positioned, both geographically and environmentally, to reposition our economy by taking advantage of emerging clean energy technologies. Investing in sovereign capability will diversify supply and minimise supply chain risk while building national resilience.

The Government is committed to building a resilient defence industrial base across multiple sectors that can support the energy transition. Defence has an important role in supporting the increased focus on Australian industry capability including in renewable energy production, energy storage and critical minerals sectors that can support the energy transition. Defence can leverage its purchasing power to drive investment and preference the procurement of Australian products to enhance ADF self-reliance and preparedness.

12 Australian Government, NDC 2022 Update Letter to the United Nations Framework Convention on Climate Change (UNFCCC).

13 Australian Nationally Determined Contribution (NDC) Targets included in the *Climate Change Act 2022.*

Climate Change, Climate Impacts Increase Demand and Risk to ADF

The DSR and NDS identify climate change as a national security issue for Australia and the Indo-Pacific, especially our Pacific Island partners and allies facing severe climate related disasters. These challenges, such as rising sea levels and temperatures, pose significant geostrategic risks, including to Defence infrastructure in places like the Cocos-Keeling Islands.

As climate change intensifies, it threatens to escalate regional risks such as mass migrations, increased peacekeeping demands, and potential conflicts. The stability of Pacific Island nations, severely affected by these impacts, is critical to Australia's national security interests. Our regional relationships and influence hinge on our commitment to achieving net zero emissions.

Australia's Defence, as the Government's largest emitter, has both a social and strategic responsibility to reduce its environmental impact. By leading in sustainability, Defence not only protects the environment but also strengthens Australia's national security and enhances our standing in the indo-Pacific.

Energy Resilience and Security

The Estate requires a diversified and resilient energy supply to operate effectively during circumstances of disrupted energy supplies, increased threat levels or conflict.

Greater emphasis must be placed on planning to enhance the resilience and readiness of energy sources available for Defence. Planning for resilience needs to focus on the likely obsolescence of energy supply chains and propulsion systems in coming decades.

An intentional and planned transition to clean energy will strengthen resilience and support national defence outcomes, reducing the likelihood of supply chain disruption and assuring energy supplies for the Estate and capability. The surety and availability of energy supply will support national defence outcomes, for example domestic renewable production and microgrids can help meet energy resilience requirements.

Interoperability and the Global Transition

Our partners and allies are transitioning to net zero. In order for Defence to retain the ability to operate as a part of a joint and interoperable force we must also undergo an energy transition. This transition needs to be orderly and coordinated with partners. Availability of energy sources to power platforms will need to be actively managed.

As Defence retires legacy capabilities and brings new capabilities into service, international partnerships and information exchange to enable a managed and sequenced transition will be critical. Enabling infrastructure across the Estate must also be in place to support new capability.

Defence's capability is founded in its people. New technology will require new skillsets and a different skill mix compared to our current workforce. For example, the introduction of more electric vehicles, equipment and batteries will require changes to the skills needed for safely operating and maintaining equipment. Planning for this change and preparing the required workforce is part of our transition.

Economics

There are strong economic reasons for Defence to take proactive action to achieve net zero. Inaction comes with potential financial consequences for Defence, including potential pricing premiums, avoidable asset refit costs, and carbon offset costs.

Investing in clean energy now offers significant long-term economic benefits for Defence. Taking proactive steps towards achieving net zero is not only strategically advantageous but also financially practical. Inaction could lead to substantial financial consequences for Defence, including potential pricing premiums on fossil fuels, costly asset refits required to comply with future environmental regulations, and escalating carbon offset expenses.

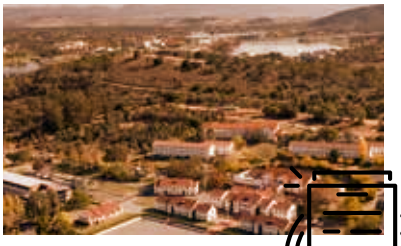
In this changing landscape, a long-term proactive approach to clean energy adoption ensures that Defence avoids unnecessary expenses, positioning itself as a leader in the economic efficiency and enviromnental responsibility.

Energy Efficiency

Defence is committed to investing in further energy efficiency measures across its Estate in support of its net zero targets.

Sustainability initiatives such as implementation of LED lighting, upgrades to plant room equipment and installation of electric vehicle charging infrastructure are being implemented across the Estate. In the 2023-2024 financial year, 20 Defence bases received upgrades which will save energy, lower maintenance costs and reduce emissions.

These include bases such as Holsworthy Barracks, RAAF Base Williamtown, RAAF Base Townsville, Lavarack Barracks, Gallipoli Barracks, RAAF Base Amberley, HMAS Cerberus, HMAS Kuttabul, RAAF Base Edinburgh and Robertson Barracks.



CASE STUDY

KEY DOCUMENTS & OVERVIEW OF DEFENCE EMISSIONS

Key Documents & Relationships

The Defence Net Zero Strategy is part of a wider suite of policies and strategies that guide and cohere Defence's energy transition objectives. The below diagram provides a visual presentation of these relationships.

- Defence administrative policies on environment and climate change provide a unified approach in order to comply with legislation and Government policy. These policies set out the key accountabilities across Defence and reflect Government direction in response to the NDS and IIP.
- The Defence Net Zero Strategy is a unified pathway to meet legislated emissions targets, whilst maintaining and enhancing capability.
- The DFES focuses on the transition of operational ADF capabilities to resilient and secure forms of energy that maintains or improves capability and preparedness and contribute to the Government objective of lowering carbon emissions.

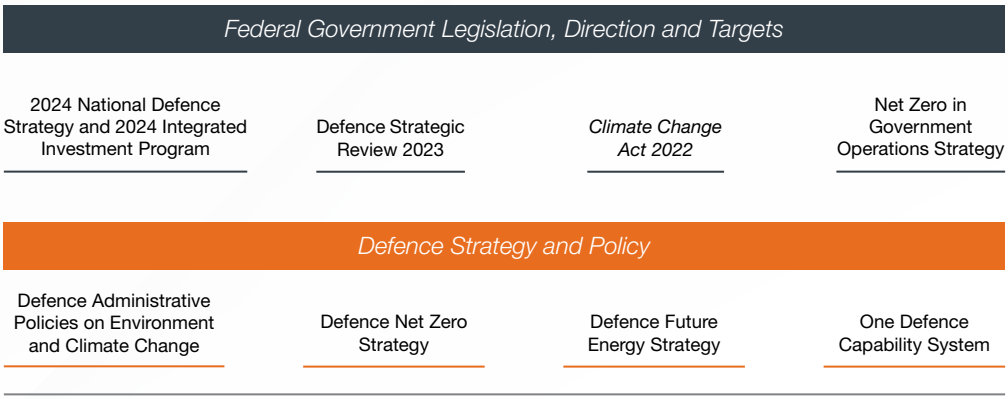


Figure 1 - Key documents and relationships

Electric Bushmaster

A prototype for electric Protected Mobility Vehicles (ePMV) was launched in 2022. The electrified variant replaces the traditional diesel engine and gearbox with a pair of lithium-ion batteries and an electric motor driving each axle. This variant is lighter, quieter and has a lower thermal footprint.

CASE STUDY

Overview of Defence Emissions

Defence has tracked its major energy use emissions since the introduction of the Energy Efficiency in Government Operations (EEGO) Policy in 2006. The baseline year for calculating emissions is Financial Year (FY) 2005/06, at which time Defence's emissions were 1.9 million tonnes of carbon dioxide (t CO2-e).[14]

The five primary emissions sources are:

1. *Electricity* – Accounts for Defence's scope 2 emissions, it includes all electricity purchased from the grid.
2. *Gas* – Includes natural gas and liquid petroleum gas (LPG).
3. *Aviation Fuels* – Includes jet fuel and aviation gasoline.
4. *Diesel* – Includes naval and land operations, Green fleet (Military vehicles) and diesel power generation.
5. *Petrol & Diesel Passenger Vehicles* – Includes white fleet.

To provide a representative emissions profile for Defence, a 5-year average was calculated, from Financial Year 2018/19 to Financial Year 2022/23.[15]

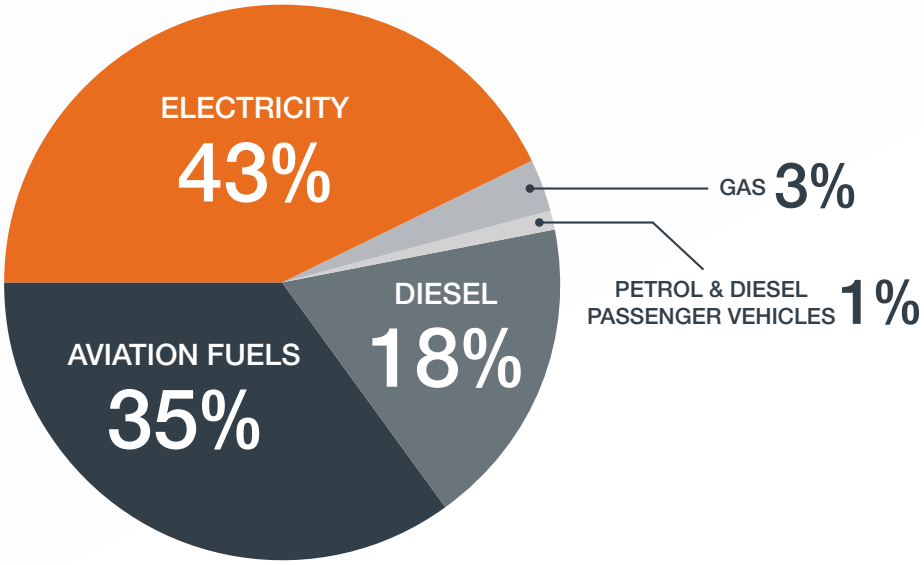


Figure 2 - Defence Emissions Profile: 5-year Average (July 2018 to June 2023)

14 Source: Defence Annual Emissions Reporting under Energy Efficiency in Government Operations (EEGO).
15 Source: Defence Annual Emissions Reporting under Energy Efficiency in Government Operations (EEGO).

Approach to Net Zero

Implementing Defence's Net Zero Strategy will require flexibilty and agility to account for Government policy, global interdependencies and technological advancements from now until 2050. Climate change mitigation and the transition to clean energy is rapidly evolving and Defence must remain adaptive to efficiently achieve our goals and enhance capability.

To achieve net zero, an active approach is required to support the Government targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050. To do nothing may expose Defence to increasing supply chain, interoperability, resilience and financial risks.

A controlled, planned transition to new ways of doing business is required. Defence is not transitioning to a net zero business operating model in isolation. Our entire operating environment, from logistics supply chains to national critical infrastructure, industry, allies and partners are also transitioning. Government policy settings are driving a shift to a net zero economy and seeking to take advantage of the opportunities that this transition offers Australia. This is leading to rapid innovation and emerging technologies, which provide both risks and opportunities to Defence.

Defence must remain aware of the changing industrial environment and its capacity to support the sustainment and maintenance of platforms, plant and equipment from acquisition to disposal.

An agile approach, which allows for emerging low and zero emissions technologies will be adopted to position Defence to take greater advantage of the industrial change.

Collaboration and alignment with industry

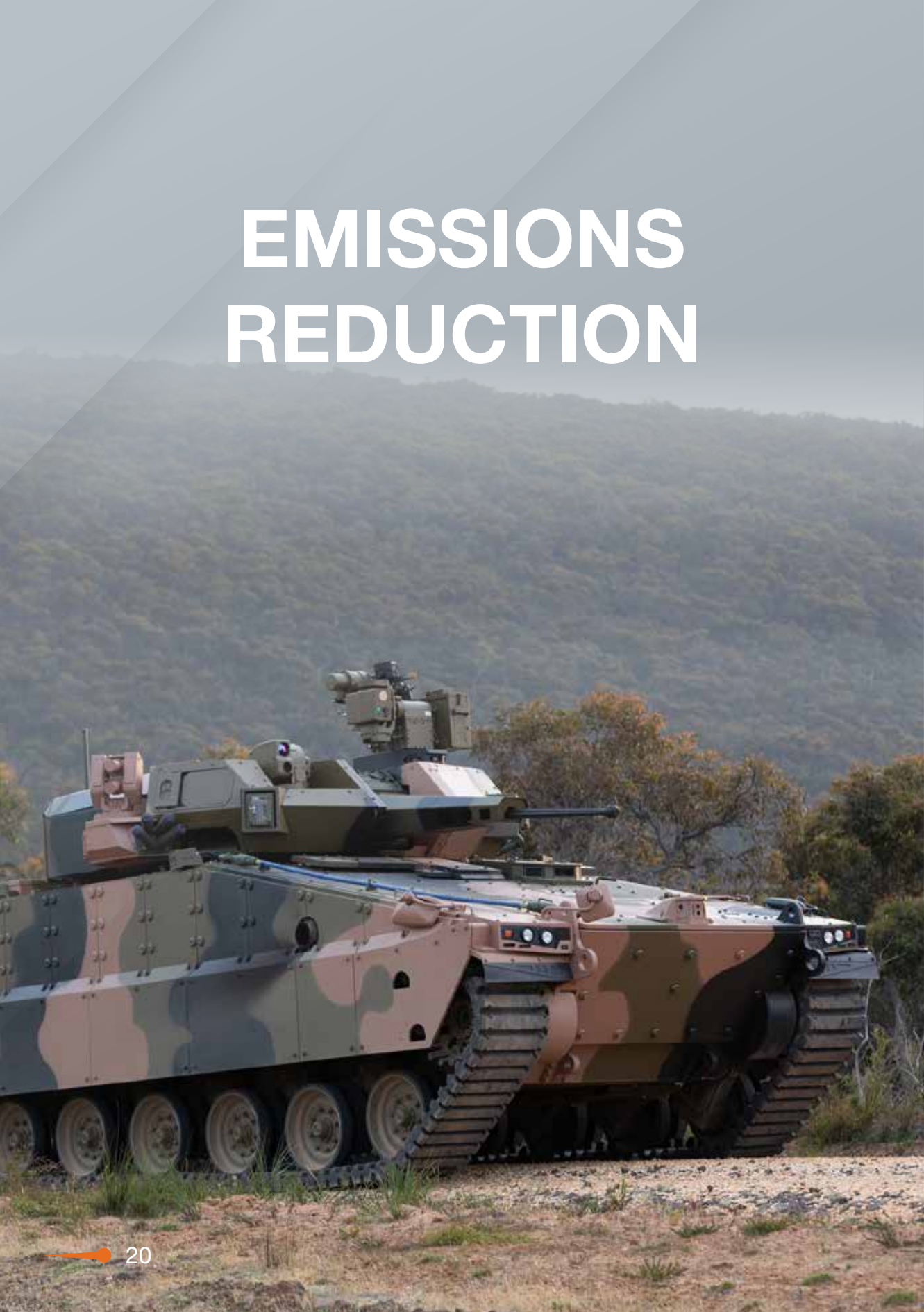
Defence and industry can support the transition to net zero together. The transition to net zero is occurring across the globe. For example, the aviation industry is working to transition towards the use of sustainable aviation fuels and large businesses have enhanced corporate reporting and disclosure requirements for greenhouse gas emissions and climate risk management.

Where practical, Defence will use industry standards and benchmarks (e.g. NABERS, Green Star), and disclosure and reporting requirements that align with those required by the private sector.

Defence purchasing can deliver emissions reductions where this meets value for money criteria and does not compromise accelerated preparedness, operational and capability requirements.

CASE STUDY

EMISSIONS REDUCTION



Emissions Reduction Trajectory

Since 2005, there has been significant growth and change to Defence, ADF platforms and capabilities.

Over this period the estimation of emissions has focused on major energy use. Scope 2 emissions (electricity) show reductions due to energy efficiency and renewable energy investments. Scope 1 emissions (liquid fuels and gas) are more variable due to the scale and frequency of the activities, such as military operations, training exercises and disaster response support.

To meet net zero and interim targets Defence needs to reduce emissions rapidly while maintaining or enhancing capability.

The 43% reduction 2030 interim target will largely be met through deep reductions in Scope 2 (grid electricity) emissions by 2030. An Estate-led clean energy transition represents the lowest risk, is cost effective and provides tangible benefits to Defence including strengthening national resilience.

This approach allows time for technological improvements in propulsion and power systems while also meeting the legislated targets. It also allows time for Defence to signal to market its commitment to the clean energy transition allowing investment in sovereign supply chains for the production of low-carbon fuels.

NET ZERO DEFENCE STRATEGIC AIMS

Net Zero Defence Strategic Aims

The net zero transition is Estate-led with emissions reduction on the Estate concentrated in the pre-2030 period. Emissions reduction activities associated with the ADF Air, Maritime and Land Domains will develop and take place over the entire period out to 2050 enabled by significant technological and market development that are required to decarbonise ADF platforms.

The decarbonisation of Defence will be achieved through four strategic aims. These are prioritised to maximise benefits to Defence, increase energy resilience, decrease risk and ensure adaptability to an emerging energy market.

1. Accelerate emissions reductions with renewable electricity

Defence will prioritise sourcing 100% renewable power via its utility electricity contracts or direct contracting with renewable energy generators as well as incorporating on-base renewable energy systems.

2. Transition current fuels to low emissions alternatives

As outlined in the DFES, Defence will manage an orderly transition to low emissions fuels, electrification and emerging clean energy technologies to increase energy independence and enable sovereign supply chains.

3. Increase energy efficiency and investigate carbon sequestration on the Estate to reduce emissions and costs

Defence will increase energy efficiency across the One Defence Capability Systems, including ADF operations, the Estate, and ICT technology and infrastructure. Planning, design and whole-of-life costs will consider emissions as part of business-as-usual decision making. Defence will reduce emissions sources to the largest extent possible and investigate opportunities for carbon sequestration on the Estate.

4. Embed a unified and integrated approach to achieving net zero with enabling functions and resources

Defence will amend its internal processes, enhance skills and provide training and tools across Defence to enable effective implementation, consistent with the objectives of the DSR, NDS and the IIP.

1. 1. Accelerate emissions reductions with renewable electricity

Defence will prioritise sourcing 100% renewable power via its utility electricity contracts or direct contracting with renewable energy generators as well as incorporating renewable energy based systems.

Rationale

Secure and reliable electricity is a key enabler of Defence capability. Defence is a significant consumer of electricity with grid electricity accounting for 43% of emissions. In addition, remote off-grid Defence sites and deployed force energy requirements are supplied by diesel generators, contributing to Defence's scope 1 emissions.

Decarbonising electricity is low complexity with proven technologies. It's the first step towards net zero 2050 and enables time to develop options for decarbonising ADF platforms and capabilities.

Priorities

- Retail electricity contracting to provide 100% renewable electricity by 2030

  To achieve the 2030 target, Defence will contract for 100% renewable electricity from the grid. Through this approach, Defence can accelerate additional investment in the national grid, uplifting grid resilience particularly in northern Australia.

  As we approach 2030 there is likely to be increased demand for renewable retail contracts. Planning and transitioning to long-term renewable energy retail contracts in a sequential approach (2025-2030) will reduce price and carbon market risk exposure.

  This will significantly reduce Defence's electricity emissions footprint with low complexity and no impact to capability.

- Fixed renewable energy generation and energy storage on bases where energy security is paramount

  Defence will target key sites to increase on-base renewable energy generation and energy storage. This will increase energy security by reducing reliance on the grid and improving autonomous operation time without fuel resupply for emergency power. Electricity costs will also be reduced, however the transition will involve upfront investment.

  Remote off-grid sites currently rely on diesel generators for electricity, consuming significant amounts of diesel. By replacing diesel generators with renewable energy based systems and transitioning any remaining diesel systems to renewable diesel, emissions and sustainment costs will be significantly reduced. This will result in increased energy resilience with an increase in autonomous power generation and a reduction in reliance on fuel supply chains.

  Defence will include renewable energy and energy storage in the IIP and Estate Works Program, across base planning, delivery and refurbishment activities. These programs are under significant funding pressure and it will be necessary to carefully consider energy investments alongside other high priority capabilities.

- Mobile renewable energy generation and energy storage in support of regional Australia energy security, base surge, humanitarian aid and disaster relief, and Defence assistance to civil community

  Renewable technologies are improving in portability and are able to integrate into mobile microgrids. These systems will reduce diesel consumption and noise signatures, and reliance on fuel supply chains at often remote or difficult to access locations. Defence will investigate and trial mobile renewable-based systems to support forward operating bases, surge requirements, regional Australia energy security and civil assistance functions to improve operational self-sufficiency.

  Clean energy technologies are also an opportunity for Defence to progressively improve energy supplies to support capability. New technology may help with more flexible and scalable energy production and greater Australian regional and national energy security to support changes to force posture directed by Government in response to the DSR. For example, rapid deployment of capability to Northern bases will require significant movement of supporting energy supplies, which may be supported by on-base renewable energy generation, strategic energy reserves in the form of long-term energy storage or similar technologies.

2. Transition current fuels to low emissions alternatives

As outlined in the DFES, Defence will manage an orderly transition to low-carbon fuels, electrification and emerging clean energy technologies to increase energy independence and enable sovereign supply chains.

Rationale

Liquid fuels are currently Defence's primary operational energy source and account for more than half of Defence's annual emissions. They are also the most vulnerable to global supply chain risks with 91% of Australia's fuel supply relying on imports.

Defence will seek to partially decarbonise its operations by adopting low-carbon fuels (i.e. sustainable aviation fuels and renewable diesel), and alternative propulsion systems such as electricification and fuel-cell technologies, where it does not adversely impact capability.

The DFES articulates how Defence will support the Government's commitment to reach net zero greenhouse gas emissions by 2050. Defence will adopt cleaner energy for operational capabilities while maintaining capability and interoperability and ensuring that no unnecessary risk or complexity is introduced into Defence's operational supply chains. The DFES addresses the mitigation of emissions associated with operational liquid fuel use, which account for approximately half of Defence's emissions. Defence's 'white fleet' of passenger vehicles accounts for only 1% of total emissions.

Collaboration with industry will be required to adopt and secure access to low-carbon energy sources, enhance resilience through diversified, secure energy supplies, and reduce reliance on imported and domestic fossil fuels.

A transitioning energy market brings with it innovation and emerging technologies which can be leveraged to enhance Defence capability. Understanding the emerging options to retrofit in-service platforms and design new platforms will be critical to Defence achieving a cost-effective transition.

Priorities

- Orderly transition to low-carbon and sustainable energy options through the DFES

  Defence's liquid fuel demand is expected to grow by up to 23% over the next 30 years compounding the requirement to accelerate adoption of low-carbon fuels to meet the legislated net zero targets. The DFES sets out a roadmap for Defence's future operational energy mix.

- Electrify Defence white fleet, contractor fleet and support vehicles

  Passenger vehicles account for 1% of Defence's emissions. Electrification of large portions of the white fleet, contractor fleet and support vehicles is low complexity and achievable by 2030. Defence will provide adequate charging infrastructure and investigate options for driving additional uptake of electric vehicles supporting the wider transition of the transport sector. This also allows further time for the development of alternative fuels and transitioning capability.

- Engage with industry for the development of low emissions energy types and alternative propulsion systems.

  Defence will leverage its unique position to influence the future energy industry and, in collaboration with industry, Government, allies and partners activate and scale up Australia's sovereign energy production capability. Defence is able to source its energy needs from within Australia, placing less reliance on fuel imports to meet its demand.

3. Increase energy efficiency and investigate carbon sequestration on the Estate to reduce emissions and costs

Defence will increase energy efficiency across the One Defence Capability Systems, including ADF operations, the Estate, and ICT technology and infrastructure. Planning, design and whole-of-life costs will consider emissions as part of business-as-usual decision making. Defence will reduce emissions sources to the largest extent possible and investigate opportunities for carbon sequestration on the Estate.

Rationale

Net zero and sustainability will be incorporated into the IIP and Estate Works Program across planning, delivery, operations, refurbishment/retrofits and sustainment where this does not compromise accelerated preparedness, operational and capability requirements. This will reduce emissions, energy requirements and increase resilience in a changing climate. This will also contribute to electricity grid resilience through energy management and demand response.

Energy efficiency can reduce sustainment costs and enable savings to be directed to priority investments in infrastructure and capability. The Estate will be more efficient through sustainable design, appliances, maintenance and behaviour, reducing emissions and costs.

As Defence is the Commonwealth Government's largest landholder there is potential for carbon sequestration projects. Defence will work with the DCCEEW to ensure we use verified carbon abatement methods that are in line with Government policy.

Priorities

- Energy efficient and resilient owned, operated or leased facilities

  Defence will target energy efficiency investment at the highest usage sites and bases. Base service contracts will require adequate funding and provisions for ongoing identification, management and inclusion of efficiency initiatives, including energy management and demand response.

  Energy efficiency ratings for buildings and facilities will be improved with consideration of the costs and benefits of energy efficiency enhancements.

  Data centres are a critical part of Defence operations, however their substantial energy consumption poses a challenge. Recognising this, Defence is working hard to reduce the emissions of our data centres without compromising performance.

- Reduce the use of gas across the Estate

  Gas usage accounts for 3% of Defence's emissions. The electrification of gas appliances and connections will have a simple and measurable impact to our emissions profile. Key activities include avoidance of new gas appliances/connections where appropriate, and electrification of buildings as part of the asset replacement lifecycle.

- Understand carbon sequestration opportunities

  Defence is investigating carbon abatement through land use management on the Estate, to contribute to the net zero targets. Defence will prioritise sequestration opportunities and business cases for potential implementation where they represent value for money.

4. Embed a unified and integrated approach to achieving net zero with enabling functions and resources.

Defence will amend its internal processes, enhance skills and provide training and tools across Defence to enable effective implementation, consistent with the objectives of the DSR, NDS and the IIP.

Rationale

The Government has instructed all agencies to adopt measuring and reporting of emissions and climate risks. Mandatory annual reporting of Defence's emissions will be aggregated to Whole of Australian Government (WoAG) level and progress reported publically. The requirements for scope 3 emissions measurement and mitigation are evolving. Defence's scope 3 emissions require further investigation to source identification, relative contribution and reduction potential.

This environment requires appropriate governance, resourcing, funding and enabling functions to ensure success as Defence's transitions net zero.

To keep pace with the global transition, actions will need to be undertaken concurrently across the Defence organisation.

Priorities

- Governance, performance management, funding and reporting

  Clear responsibilities, accountabilities and reporting requirements will support the implementation of the Defence Net Zero Strategy.

  Enhanced whole-of-life costing methodologies, including cost of emissions, will be incorporated into the IIP, Estate Works Program and One Defence Capability System to inform investment decisions.

- Develop a workforce to manage the transition to a net zero Defence

  Skills and capabilities, including fuel and energy expertise, engineering, procurement, financial, human resource and project management are needed to enable the transition.

- Ongoing monitoring of industry advancements in climate change mitigation

  Defence will forge strategic partnerships with industry and key allies and partners to harvest knowledge and accelerate the appropriate adoption of renewable energy, energy storage and low emission technology where it makes technical and operational sense to do so.

- Understand all emissions sources and their relative contribution

  Defence is required to annually report emissions from its operations via the Government's Emissions Reporting Framework, aligning with the increased climate disclosure requirements.

  Identification, measurement and mitigation of other emissions sources such as commercial airline travel, waste, and wastewater treatment will be required to better understand Defence's emissions profile.

IMPLEMENTATION

Implementation Plan

The Defence Net Zero Strategy is supported by a plan. It will drive evidence-based decision making across all emissions sources and incorporate emissions reduction considerations into the One Defence Capability System and IIP.

The plan provides clarity to each part of the Defence organisation on what is required providing a holistic, considered apprach to maximise enterprise outcomes.

The plan will be updated and evolve as work progresses and initial actions are completed. All groups and services may choose to add initiatives and reflect the practical actions they are taking to reduce emissions.

Implementation of the Net Zero Strategy and the DFES will deliver on the Government response to the DSR's recommendation to accelerate the transition to clean energy.

Progress and Review

Progress on implementation will be regularly reported to the appropriate internal Defence enterprise committee.

Progress against the strategic aims and annual emissions reductions will be published in the Defence Annual Report and included in the whole of APS reporting.

Renewable Energy Generation

Defence is investing in renewable energy and microgrids on the Defence Estate. Large scale solar farms have been, and will continue to be, delivered across the Defence Estate to enhance energy resilience and reduce the reliance on diesel for electricity generation, particularly at remote sites. Examples include the:

- *1.2 megawatt facility at the Australian Defence Satellite Communications Station near Geraldton*
- *10 megawatt facility at Robertson Barracks in Darwin*
- *3.2 megawatt facility at RAAF Base Darwin*
- *40 kilowatt solar and 55 kilowatt hour battery microgrid at Yampi Sound Training Area, WA*

Renewable energy is a key enabler of Defence's path to achieving net zero.

CASE STUDY