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THE DEFENCE OF AUSTRALIA: A BLUEPRINT FOR THE NEXT GOVERNMENT

PAPER 5: Fixing Defence infrastructure and energy vulnerabilities

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The Defence of Australia: A blueprint for the next government
PAPER 5: Fixing Defence infrastructure and energy vulnerabilities

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Overview

The Defence of Australia: A blueprint for the next government.

Australia is facing its most challenging security environment since the Second World War.

Defence planners and political leaders of both major parties agree that Australia no longer has the luxury of the once operative ten-year warning time before we need to be ready for a major conflict in our region.

Yet we are unprepared for such a crisis. For at least the past decade governments of all persuasions have struggled to translate changing perceptions into decisions and action. It is time for a reboot built on a sense of urgency. The lead up to the 2025 Federal Election is an opportunity for the Australian public, the defence community, and elected representatives, to drive that change.

To aid this process the Institute of Public Affairs, an organisation dedicated to securing the freedom, security and prosperity of Australia, is partnering with Strategic Analysis Australia to produce a blueprint for what the next Australian government needs to do to ensure that Australia can help deter a major conflict in our region and/or defend our national sovereignty if deterrence fails. In a six part series the main components of the blueprint will be mapped out:

1. National security and Australia's Northern defence
2. How to build an Australian Defence Force that meets Australia's strategic requirements
3. Right here, right now: Unleashing Australian know-how to build military power fast
4. Funding the defence of Australia
5. Fixing defence infrastructure and energy vulnerabilities
6. Northern Australia and what is required

Strategic Analysis Australia is an independent strategic consultancy with decades of combined experience at the highest levels of defence and national security policy and implementation in Australia. This collaboration between the IPA and SAA will produce recommendations that are practical, achievable, and about which decisions can and should be made in the next term of government. The focus is on dealing with the challenges we face right now. Long-term planning is always needed, but in the window of vulnerability Australia is in, long-term capabilities might not materialise in time.

This series intends not only to inform defence policy makers and all Australians of the immense security challenges we face but, just as importantly, to demonstrate that something can be done about them if we start with a bias towards action, and act with resolve.

Foreword

The paper you are about to read is a rational and methodical analysis of the current situation and thoughtful recommendations for change, as you'd expect from the highly qualified team at Strategic Analysis Australia (SAA) with whom IPA is partnering in this Defence of Australia research series.

But in some ways, this is an inappropriate tone for what is truly a crazy state of affairs in which Australia's national priorities have become unmoored from any informed sense of our geopolitical reality and the very real possibility of conflict in the region. For example:

- We have enough liquid fuels onshore to last approximately one month, should our supplies from foreign refineries be interrupted;
- We should be learning lessons from the Israelis about Iron Dome, in our search for a system that protects key Australian military and civilian targets from drone and missile attack; and
- When our entire military apparatus operates on either diesel, petrol or gas, our Federal Government has proudly produced and disseminated a "net zero" strategy for our defence forces.

The current situation arises from, first, a complacency which ignores national security and, second, when forced to confront the issue, by a conception of national security which is wholly inappropriate.

The first great metaphor for complacency comes from Homer's *Odyssey*, wherein the hero and his crew find themselves on an island amongst the Lotus-eaters, who by consuming that narcotic fruit live their lives in plenty but also complete apathy.

Such was the situation in which Australians found themselves in the long peace that followed the end of the Cold War, but particularly in the period since the accession of Xi Jinping to the leadership of the CCP and hence China—and the rapid militarisation he initiated.

This is an apathy we can no longer afford (go back to our first paper in the Defence Blueprint series if you need reminding of our strategic realities). And it is why, for Paper #5, we asked SAA to examine the challenges from the perspective of energy, logistics, and our military and civilian assets in the north.

With regard to the second factor, here are two quotes which haven't aged well:

- "The Albanese Government wants to make climate change a pillar of the Alliance. Because it is clear climate change is a national security issue." Richard Marles, Minister for Defence, 12 July 2022.¹
- "Forward-thinking leaders should embrace the transition away from carbon-intensive energy as a means to resolve pressing global problems rather than as just an end in itself. Focusing only on the target of net-zero emissions by midcentury, as stipulated in the Paris Agreement of 2015, would be aiming too low. The energy system is deeply entwined with geopolitics, and the effort to overhaul it is a chance to address more than just climate change."²

As I write, these quotes can be read in light of the first steps of the second Trump administration, in particular notification of intent to withdraw from the Paris Accord (again), and declaring a national energy emergency. A key justification for the latter move was this:

1 Richard Marles, 'Address: Center for Strategic and International Studies (CSIS)' (12 July 2022).

2 Meghan L. O'Sullivan and Jason Bordoff, 'Green Peace How the Fight Against Climate Change Can Overcome Geopolitical Discord' (*Foreign Affairs*, July/August 2024).

Energy security is an increasingly crucial theater of global competition. In an effort to harm the American people, hostile state and non-state foreign actors have targeted our domestic energy infrastructure, weaponized our reliance on foreign energy, and abused their ability to cause dramatic swings within international commodity markets. An affordable and reliable domestic supply of energy is a fundamental requirement for the national and economic security of any nation.

The integrity and expansion of our Nation's energy infrastructure—from coast to coast—is an immediate and pressing priority for the protection of the United States' national and economic security. It is imperative that the Federal government puts the physical and economic wellbeing of the American people first.³

This should be recognised as a fundamental break with the wishful thinking embedded in the two quotations given above. It suggests that in Australia it is time to completely repudiate the framing and the thinking of advisers to the federal government such as the Australian Security Leaders Climate Group which operates under the aegis of Admiral Chris Barrie, former Chief of the Defence Force (Retd).

What is happening in the USA is not just part of the swings and roundabouts of national priorities vis-à-vis climate change: it is a sign that national security is not just the first duty of the nation, it should not be confused with or captured by secondary agenda.

A timely warning of this tendency was given by Professor Daniel W. Drezner, Distinguished Professor of International Politics at the Fletcher School of Law and Diplomacy at Tufts University, who in Foreign Affairs last year described *How Everything Became National Security*:

Labelling something a matter of 'national security' automatically elevates its importance ... there appears also to be a ratchet effect at work, with the foreign policy establishment adding new things to the realm of national security without getting rid of old ones...But if everything is defined as national security, nothing is a national security priority. Without a more considered discussion among policymakers about what is and what is not a matter of national security, Washington risks spreading its resources too thin across too broad an array of issues. This increases the likelihood of missing a genuine threat to the safety and security of the United States.

Now I must admit that having read that, I am led to providing somewhat of a *mea culpa*. Back in 2023, working with Professor Stephen Wilson, I published a report which we titled *Energy Security Is National Security*.⁴ The 'is' in that title is clearly working very hard, maybe too hard. But here's the thing, once you read and consider the finding of this Paper #5 in our Defence Blueprint series, you will at least be convinced that without energy security we cannot maintain national security. We literally could not defend ourselves. Whether the fabled electric tanks⁵ materialise but find themselves stranded for want of anywhere to recharge, or the real existing tanks that actually operate in global militaries come to a shuddering halt for want of fuel, the effect is the same.

3 The White House, 'Declaring a National Emergency' (Executive Order, 20 January 2025).

4 Stephen Wilson, *Energy Security Is National Security: A Framework For Better Energy Outcomes In Australia* (Institute of Public Affairs Research Report, November 2023).

5 Fabian Villalobos and Joshua Simulcik, 'Do generals dream of electric tanks' (*Rand*, 7 August 2023): <https://www.rand.org/pubs/commentary/2023/08/do-generals-dream-of-electric-tanks.html>.

In World War Two, Hitler's Germany—bereft of domestic petroleum resources—relied heavily on synthetic liquid fuels produced from coal via the Fischer-Tropsch process.⁶ Its inability to meet the burgeoning needs of the military machine was a key factor in the otherwise unfathomable decision to drive east, towards the oil production hub of Baku in the then Soviet Union (now Azerbaijan). That push failed at Stalingrad, with dire consequences for the Third Reich.

So, *mea culpa* notwithstanding, this is yet another example of 'history restarting'. We should revert to making our energy plan fully compatible with our actual national security needs. A plan designed for the world we live in, not the one the elites and the activists would like it to be.

Stripped of delusion, Australians will no doubt recognise the need to focus as never before on our home island and the other islands under our sovereignty (see also the discussion on the northern island chains in Paper #3). As the authors of this report put it, we would not in the case of a hot war only be fighting "away", but "Home and Away".

This also means urgently investing in the defence of our major military and civilian assets, in an age of missiles and drones. This is very well laid out in the text of this paper and its recommendations, and I will not expand further on those arguments in this foreword.

I commend the work to you, and once again thank the many thousands of members of the Institute of Public Affairs who, by their support, make possible our continuing existence as an independent source of research and of advice to government. As the Defence bureaucracy seeks to stifle the voices of those outside the confines of the Canberra bubble,⁷ our work becomes more vital than ever.

Scott Hargreaves

Executive Director

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January 2025

⁶ Matthew Karnitshnig, 'Germany's e-fuel fetish ain't new. Just ask the Führer' (*Political*, 28 March 2023): <https://www.politico.eu/article/the-nazi-roots-of-germanys-e-fuel-fetish-olaf-scholz-christian-lindner-german-politics-climate/>.

⁷ Andrew McLaughlin, 'Government's 'Kill ASPI' review recommends scaling back funding for think tanks' (*PS News*, 12 January 2025): <https://psnews.com.au/governments-kill-aspi-review-recommends-scaling-back-funding-for-think-tanks/152085/>.

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Executive summary

In 2025, Australia's military has some clear vulnerabilities that will affect its ability to sustain operations during a conflict involving major powers in our region. These vulnerabilities must be addressed if we are to play a part in deterring conflict and, if deterrence fails, succeed in protecting Australia and Australians by achieving our national military objectives in war.

The vulnerabilities of our military bases bring out a wider public policy issue around national security in Australia. We face some uncomfortable questions about strengthening our security because our once remote geographic location no longer protects our home territory from attack. Given the proliferation of long-range weapons and high endurance drones capable of reaching Australia from distant locations, Australian defence policy now needs to have a homeland defence element.

Since World War Two, Australians and their governments have got used to thinking of our defence force, if they thought of it at all, as something deployed to distant places and supported from a home industrial base not directly involved in these conflicts. That led to any practical defence measures – like air and missile defence – being purely about protecting ADF personnel and equipment when they are deployed.

That's not what a major war in our region would be like. A major Indo-Pacific war would involve adversaries with the ability and willingness to strike Australian territory to disrupt military operations, intimidate our government and population, and damage our economy. War in the 21st century will not be an 'away game' for Australia. Instead, it will take its title from a popular TV show and be both 'Home and Away'.

This type of conflict allows no clean division between defence industry and other parts of our industrial base. All parts of the broader economy will have roles to play. There will be no sharp line between military and civilian targets in a likely adversary's mind – as we see in the wars in Ukraine and the Middle East.

Homeland defence is now a reality for Australians. We need a public conversation about this, led by the federal government.

Homeland defence must go beyond protecting military bases and establishments. It will be simply unacceptable during a time of conflict for the Australian population and broader economic infrastructure to be defenceless while our citizens watch our military remaining secure in its bases. A secure military but a vulnerable population is an unacceptable defence posture.

Our region has been experiencing the largest expansion in military power since World War Two. China has strengthened its military over the last 30 years to the extent that it is now capable of long distance power projection across the domains of air, maritime, space and cyber. This threatens regional security and also threatens any military forces operating out of Australia's bases and defence establishments.

Largely as a result of this growth in aggressive Chinese power, our security agencies have recognised that Australia's distance from potential adversaries no longer protects Australian territory. Our population faces direct risks. This a new element in our security outlook which must be addressed, anticipating the growing risk of a major regional conflict.

Investments must be made urgently in an expanded and layered air and missile defence program to protect bases and key civilian infrastructure. These systems need some capacity to be sited at key population centres to meet evolving threats.

Defence is currently spending up to \$8bn over the next ten years on a unique software system for an 'integrated battle management system' to control air and missile defence capabilities, while

making almost no investment in actual working interception weapons. There is, in effect, no bang for a lot of bucks. The spending priority should be reversed so that Australia rapidly acquires existing defence systems known to be effective. Building more elegant and networked software systems to orchestrate how an air-defence system operates must be a later and second order priority, after some actual defensive capabilities are acquired.

Recommendations

This report makes six recommendations setting out actions that need to be developed in the next term of government. The recommendations' numbering follows from previous reports.

RECOMMENDATION 25: Government must develop a homeland defence strategy to protect key civilian population centres and critical infrastructure against enemy long-range strikes. The strategy must advance a layered air and missile defence capacity to protect against evolving risks.

Billions of dollars have been spent by successive Australian governments to upgrade defence establishments and bases across Australia. These upgrades replace degraded and aged-out buildings and facilities, and accommodate the needs of next generation ships, aircraft and vehicles. While necessary, these habitability and functional upgrades have not involved hardening bases to withstand missile and drone strikes that can disable bases and destroy expensive weapon systems like ships and combat aircraft.

RECOMMENDATION 26: The next federal government must urgently harden our military bases against attack.

Hardening our military bases is an essential step given the threat environment in our region. This requires shifting the current priority for defence facilities budgets from a habitability focus to protecting key military assets.

RECOMMENDATION 27: Government must develop a mobilisation plan with industry to harness Defence use of national critical infrastructure in wartime.

Defence must identify private sector entities that own and operate civilian ports, airfields and other infrastructure that the ADF and our allies will use during war. We must train and exercise with these civilian partners to understand how to strengthen the security of our infrastructure.

RECOMMENDATION 28: Government must make key commercial northern port and airfield facilities capable of military operations during a crisis.

To survive in, and sustain, combat operations during a credible major conflict, Australia and allied forces operating out of Australia must also be able to use civilian ports, airfields and facilities, to complicate adversary targeting and to draw on the significant latent capacity in Australia's civilian infrastructure. There must be a particular focus on turning existing facilities that support our mining and resource sectors in Australia's north into military and civilian "dual-use capable" facilities. The locations and the scale of these non-defence facilities – ports, airfields, fuel storage systems – are significant latent enablers of military operations.

RECOMMENDATION 29: Government must build onshore national fuel reserves.

The federal government must end decades of gestures and half measures, which have failed to build national strategic fuel reserves, and invest in credible levels of onshore storage and refining. If Australia's tiny liquid fuel reserves and limited refining capacity are not remediated, Australia could be brought to a standstill within weeks by an enemy blockade or attacks on commercial shipping bound for Australia.

Our focus remains on Australia's defence needs. We must maintain significant onshore stocks of diesel and aviation gasoline – to support the ADF in high-tempo military operations and to enable the functioning of Australian society during conflict.

Energy is a key enabler of military operations. Despite the rise of alternative energy sources in Australia's energy system – particularly in electricity generation – the Australian Defence Force is a liquid fossil fuel-powered force. All its major platforms – ships, aircraft and armoured vehicles – burn fossil fuels and this will remain the case for at least the next three decades given the force structure now and the planned future force (with the exception of eight planned nuclear powered submarines).

RECOMMENDATION 30: Government must devise a plan to disperse fuel stocks widely across our Defence bases, particularly in the north.

As the ADF will remain a fossil-fuel powered force until at least the 2050s, the places and bases our military will operate from during a conflict must have expanded diesel and aviation gasoline storage and be supported by transport infrastructure allowing their rapid resupply in crisis situations. This will involve significant new spending on fuel storage as well as investments in road and rail transport networks, particularly for Australia's northern bases, ports and airfields.

Ensuring the supply of liquid fuel to our military is essential no matter what other steps are taken to enable Australia's military to sustain combat operations.



Introduction

Three propositions are foundational for this report.

1. The Australian Defence Force, along with the Defence Department and supporting defence industry cannot operate in isolation from the broader Australian economy. Defence is designed to, and must, be able to rely on the broader economy, energy system and critical infrastructure (water, electricity, waste services, communications and data centres), no matter how large the force and its dedicated defence industrial base might become.
2. Expectations that, in a time of crisis or conflict, the federal government can simply requisition or control whatever Defence needs are inaccurate and create complacency. In wartime, 27 million Australians will demand that their needs are met, including continued access to many of the 'consumables' that power our military, like fuel, energy, food, operational ports, communications, data storage, and logistic services.
3. There are wider policy, investment and political issues involved in the national energy debate in Australia, but the defence and national security aspects of this issue cannot wait for national priorities to be set and challenges resolved. Much must be done now while the national debate swirls. This report sets out what needs to be done to enable an effective Defence Force.

5.1 Distance no longer protects Australian cities or people from long-range attack

As the Albanese government's National Defence Strategy (NDS) recognises, Australia's long distance from sources of likely conflict once provided a security buffer for our population, but this is no longer the case.

This is not about the vulnerabilities from inter-connected global economies and supply chains, although this brings plenty of problems and constraints (some addressed from a defence perspective in the third report of this *Blueprint* series). Here, we refer to the physical vulnerability of military and civilian infrastructure in Australia. The Australian landmass is now within the range of conventional and even nuclear armed missiles launched from North Asia (China and North Korea). As the NDS puts it:

Technology has already overturned one of Australia's long-standing advantages—geography. Geography cannot protect Australia against new long-range missiles, space and cyber-attacks, disinformation, supply chain disruptions and the erosion of global rules and norms.¹

The federal government must recognise a new need to protect critical civilian infrastructure required to keep our economy operating during a conflict, both to support our military's operations and to provide core services to Australia's 27 million people.

This is not just about buildings and machinery. It will be untenable to only protect our military from long-range missile and drone strikes during a conflict while the military watches undefended civilians in urban centres, and power and water supplies, be targeted and damaged by an adversary.

This vulnerability does not arise from a risk of a credible invasion by enemy forces. Rather, the risk stems from an adversary in a major conflict using long-range weapons available now, which can target Australian military bases, and the ports, airfields, and other facilities we and our allies need for our defence.

Beyond attacking our military deployed into the region, the same weapons can now reach our forces at home and can also be used to intimidate our people and government. Population centres can be subject to symbolic strikes, the threat of which creates a type of deterrence to political action. An adversary equipped with long-range missiles and drones can target those critical functions (like civil power, water, communications and data centres) that enable the wider economy and support our military during war.

With these new facts known and acknowledged in formal government policy, it is beyond strange that even previous plans to acquire a limited, layered system of air and missile defence to protect our military have been cut and delayed. This poorly timed decision has been taken in the Albanese government's Integrated Investment Program, as Defence responds to the twin constraints of:

- a top line budget stuck around 2 per cent of GDP, planned to grow marginally to 2.4 per cent over the decade; and
- the cashflow demands of paying for the Hunter frigate and AUKUS submarine programs.

¹ Department of Defence, *National Defence Strategy* (2024) 15.

We argued in *Blueprint* paper four that Defence spending needs to rise to at least 3 per cent of GDP, reflecting something closer to what Australia spent on Defence during the Cold War. Without that lift in funding, we will maintain only a small military force able to make niche contributions to coalition operations—as we did for decades in the Middle East. Regrettably, that more benign strategic period is over. With the risk of conflict in the Indo-Pacific growing, the Defence force needs to be rebased in order to be able to survive and prevail in high-end conflict closer to home.

Currently, government is trying to deliver the impossible: achieve an expansion of Defence capabilities; develop AUKUS submarines and establish a domestic missile production base among many priorities. All this with only token increases to defence spending. To deliver this plan within current spending levels Defence has been forced to cut a range of current military assets. One mystifying decision about investment priorities relates to air and missile defence.

Defence has retained a developmental \$8 billion dollar software project to build the world's most complex air and missile defence command and control system, but has taken the decision to not acquire any actual counter missile weapons that such a system would direct. Questioned in Parliament about this in 2024, a senior official said that Defence was waiting for the counter missile technology to settle before buying anti-missile weapons. The irony here is that the missiles that are needed to intercept incoming missiles and armed drones are the most tested and proven parts of air and missile defence systems globally.

Some missile interceptors, like the US AMRAAM missile, have been in production for decades, as have THAAD, Iron Dome, and Patriot interceptors. The risky developmental element where the technology is in flux is the more complex command and control system that Defence has chosen to keep investing billions into (as the lead international customer carrying the risk), at the expense of actual interceptor weapons that could protect key facilities.

Without weapons, a command and control system is just expensive junk.

What should the next government do to address the vulnerabilities of our military around energy and critical infrastructure so that the ADF can fight a sustained war against credible threats now and in coming decades?

A critical step is to reverse recent decisions to stop investing in the protection of key bases and facilities from missile and drone attack. The Integrated Investment Program needs to be changed to fund a rapid acquisition of air and missile defence systems that can provide layered protection around key bases beyond the limited current investment in the NASAMs medium range air defence system that is being acquired to protect deployed military forces.

Contrary to recent statements by Defence officials, effective air and missile defence systems can be built using existing technologies. There is no need to wait for interception technologies to 'settle'; the types of systems used by the Ukrainians and the Israelis so effectively being the obvious benchmarks.

Australian companies making counter drone systems for other customers, including the Ukrainians, must be contracted to supply these systems to meet ADF needs both for homeland defence of bases and to protect deployed forces. Orders must be placed for Australian counter drone systems, and for longer lead systems like the US Patriot missile defence system. Rapid negotiations are needed to bring successful Israeli systems like Iron Dome and Arrow to Australia, where they can address real protection needs.

We need to stress that there is no missile defence system on the market that can protect large population centres against incoming intercontinental ballistic missiles. Australia's needs are quite different from those of Israel, for example, which needs to defend its population from the relatively simple and slow missiles launched from Gaza. We need some creative thinking applied to this problem, using existing technology and working with allies to develop new capabilities. The one thing Australia should not do is ignore the problem because solutions are too complex or too costly.

(We note, parenthetically, that there couldn't be a worse time for Canberra to be reducing defence cooperation with Israel. Here we have a close friend with some of the best missile defence technology in the world and our government's overwhelming instinct is to cut defence ties. Bizarre!)

More effective and lower cost systems are becoming available to protect against armed drones and missile attack, including interceptor drones, and directed energy and electronic warfare 'soft kill' systems. These can be added to the layered defence systems already available, addressing the problem of defensive systems being saturated with multiple threats. Australian companies like DroneShield, DefendTex and EOS are already providing defensive systems to other militaries, including Ukrainian forces.

An urgent investment in layered air and missile defence for defence facilities will close a gap between the intelligence and strategic policy acknowledgement of growing domestic vulnerability

to attack, and the need to keep Defence facilities operational to face credible threats.

Australians must adjust their thinking to accommodate the reality that we live in a world where, during conflict, our cities, population and economy can be targeted to cause casualties, damage our ability to function as a society, and intimidate our government and people. Since the end of World War Two we have become used to deploying our military to distant theatres while feeling secure at home.

We have watched a massive increase in military investment and the acquisition of long-range strike weapons in our region over the last three decades. But this hasn't changed what our security and military agencies are doing in response. Defence plans for air and missile defence still focus on protecting deployed ADF forces, without investment in medium range air defence systems for the small number of key ADF domestic bases. Wars in the Middle East and Ukraine show state and non-state forces using missile and drone technology to attack civilian populations. China is building a huge arsenal of long-range weapons. Through all these developments, our autopilot approach to only considering the protection needs of our military when it is deployed away from Australia persists.

This failure to recognise the vulnerability of our population centres and critical infrastructure amounts to gross policy negligence. One reason for this is a failure of imagination—an inability to think through the consequences that flow from the massive military buildup in our region and the experience of recent wars. Another reason is the Defence organisation's reliance on outdated assumptions about our security environment, military technologies, and the way conflict is changing. A final reason for not engaging with the new threat to our homeland and our people is the sheer difficulty and expense involved in mounting a credible protection for population centres in the face of new threats.

Difficult challenges must be faced. It is now time for the Australian Government to invest in at least



a limited capacity to protect our urban centres and critical infrastructure from credible attacks during war. We are not calling for a ‘Star Wars’ defensive umbrella over the continent of Australia, nor siting large numbers of missile defence systems in our major cities. We are saying that government should choose to learn from the Ukrainian and Israeli experiences of homeland attack and join these dots with the known missile and drone inventories of potential adversaries in our region.

The Ukrainian government has been forced to make difficult ‘rationing’ choices about where, when and what to protect in its war with Russia. It has made these choices well, balancing narrower military defensive needs against the obligation to protect the Ukrainian people and the nation’s electricity generation and distribution system, all of which have been priority targets for Russian attacks. Australian must invest in mobile air and missile defence systems that go beyond the capabilities needed to defend our military and its bases, and acquire at least a limited civilian infrastructure and population defence capacity.

Choices will still need to be made about which places, bases and facilities to protect and to what extent, but that is better than the current situation where almost all bases and facilities and our population centres are equally, extensively vulnerable. No government will agree to use all defensive systems to protect military personnel and bases when the civilian population and broader national infrastructure are also at risk. But choices about what to protect—and what not to—must be made in ways that involve the Australian public and are not just the product of secretive official meetings. This leads to the first, and most important, recommendation of this report:

RECOMMENDATION 25: Government must develop a homeland defence strategy to protect key civilian population centres and critical infrastructure against enemy long-range strikes. The strategy must advance a layered air and missile defence capacity to protect against evolving risks.

5.2 Securing Defence bases

Looking more narrowly at our military's ability to continue to operate during a time of major conflict, it's unfortunately the case that our military's bases and facilities are insufficient for our needs during wartime and are largely unprotected. This is not a problem that comes from a lack of funding over recent decades. It comes from poorly prioritised expenditure of that money when it comes to Defence facilities.

Defence's growing budget—now \$55.7 billion and potentially set to grow to over \$100 billion over the next ten years—includes a facilities investment program within the larger Integrated Investment Program.² This is committed to upgrading and expanding defence bases and establishments across Australia to operate the planned future forces of our Army, Navy and Air Force. The approach defines the additional facilities needed to operate each new ship, aircraft or vehicle coming into service at the facilities it will operate from.

This is a form of 'just in time' supply, which minimises expense by meeting the specific needs at specific bases as they occur. The infrastructure program supporting our F-35 fighter aircraft is a good example, with specialist facilities built at RAAF Tindal in the Northern Territory and at RAAF Williamtown, outside Newcastle, NSW.³

Naval facilities—like the port infrastructure at Sydney's Garden Island base, HMAS Coonawarra in Darwin or HMAS Stirling in Western Australia—are scoped to support the current and planned future fleet, and the same is true for Army bases in Darwin, Townsville, Brisbane, and other key locations.

Defence investment into its bases and facilities has been reasonably lavish over the last 20 years. However, the focus has been on the specific operational needs of new capabilities, combined with replacing substandard and decayed accommodation, facilities and utility services like power, water, and sewerage systems that were well past their design life. Barracks and on base housing in several locations, for example Puckapunyal in Victoria, were decrepit and becoming uninhabitable.

Some key problems flow from this currently planned—and budgeted—approach.

Make room for allies and partners

The first is that Australia is becoming a place that more of our security partners and allies are seeking to use for exercising and peacetime deployments, but potentially also as an operating location in a time of conflict. The challenge here is to counter China's rapid moves to build military dominance in the Indo-Pacific region and to reduce the capacity of America and its allies to operate safely in the region.

The United States and Japan are the two most obvious partners whose forces are spending more time, in more numbers, exercising and operating out of Australian facilities, but so are other defence partners, including Singapore, India, the United Kingdom, and other regional forces. It suits Australia's interests to partner with like-minded countries that share similar strategic outlooks. One of our natural strengths as a democracy is the ability to form trusted partnerships with others. Enabling the access of our allies and partners to Defence facilities enhances our security and builds a deterrence framework in our region.

² Department of Defence, *Integrated Investment Program* (2024).

³ Australian Defence Magazine, 'Williamtown F-35 facility to expand' (2 January 2024): <https://www.australiandefence.com.au/defence/air/williamtown-f-35-facility-to-expand>.

Defence's Integrated Investment Program has between \$14-18 billion allocated to northern bases and infrastructure over this and coming years.⁴ Despite what sounds like a large number, the scale of the current and projected Defence facilities across the land, air and maritime sectors is simply not designed to cope with this larger user demand.

The only limited accommodation of this growing allied demand comes from the Gillard-era Force Posture Initiative which is expanding facilities in the north—for example barracks in Darwin, and the runways, aprons, and fuel services at RAAF Tindal near Katherine in the Northern Territory. This will accommodate rotations of US forces, whether the US Marine Corps or US Air Force platforms. There is also an expansion underway of HMAS Stirling in Western Australia to support rotations of US and UK nuclear submarines before Australia acquires its own.

Australia's defence planners are building bases and facilities that are just sufficient for our known peacetime needs but which are clearly insufficient in volume and scale in the event of major conflict. Strategic guidance says that the prospect of major conflict is significantly increasing. Should a conflict eventuate we know that our forces will make greater demands on repair and maintenance facilities, and our allies and partners will seek to base forces out of our facilities.

Our plans and investment in bases and facilities need to follow our strategic policy: we will always fight as part of a collective defence effort, so we must have sufficiently large and numerous bases and places for our own forces and the forces of our partners and friends to take advantage of our geography. That means building larger and more wharves, additional drydocks, hangars, aircraft maintenance facilities, and armoured vehicle sustainment capacity than we currently have. This will cost money.

Our domestic bases are soft targets

Before that happens, we need to acknowledge that the small number of defence bases and facilities we have are becoming a source of major vulnerability. An adversary with long-range strike weapons, such as missiles, long-range drones or aircraft, or armed drones launched from vessels closer to Australia could disable our key military and maintenance facilities. This would paralyse key parts of Australia's military.

The submarine and naval ship base at HMAS Stirling is one obvious critical bottleneck, as are the Australian Submarine Corporation facilities near Adelaide in South Australia, along with the chain of northern Australian bases and facilities like the Army base in Townsville, RAAF Tindal and the naval and commercial port facilities in Darwin Harbour.

Planned habitability and functional upgrades are not designed to harden bases and facilities against attack. Defence estate plans do not include any need to have layered air defence of bases to protect them against attack by drones, missiles or aircraft launched ordnance. The logic of Defence estate planning has lagged the intelligence and strategic policy assessments that Australia's location no longer protects our homeland, our population, or the military and key civilian facilities located here.

There is also little evidence of plans to be able to continue military operations if key Defence bases are disabled. One bright spot in an otherwise grim picture is reinvestment in the Air Force's 'bare bases' in the north, such as Queensland's RAAF base Scherger and WA's RAAF bases Curtin and Learmonth. Some of the works are similar to plans across the broader Defence estate – replacing aged utilities and facilities. More importantly, some work is driven by the increased presence and exercising tempo of Australian and US military personnel under the Australia-US Force Posture initiative.

⁴ Marcus Hellyer, 'The 2024 Defence investment plan's key changes - or "The Subs that ate the ADF"' (Strategic Analysis Australia: <https://strategicanalysis.org/the-2024-defence-investment-plans-key-changes-or-the-subs-that-ate-the-adf/>).

Australian military history shows the risks in not having hardened facilities to protect bases during war. Two highly destructive Japanese attacks on Darwin on 19 February 1942 killed approximately 250 people, sank eight ships in harbour and destroyed three Catalina flying boats and some 20 combat aircraft, all but one on the ground, along with the destruction of hangars, ammunition and workshop facilities. The attack happened despite intelligence warnings foreshadowing a likely attack, and after warnings from earlier Japanese attacks in places like Singapore and Malaya that showed the need to disperse military assets and better protect bases.

In a more recent example, from August 2024, a Russian Kilo-class submarine was badly damaged while being repaired in a shipyard in Sevastopol and later sunk while at anchor in occupied Crimea.⁵ The Ukrainian attacks on the Russian submarine involved a combination of cruise missiles and drones. Air defence systems were in place, but these were attacked and rendered ineffective, and the submarine was in an open dockyard for the first attack and later at an open anchorage.

In contrast, Chinese military planners have taken the threat to submarines at their bases seriously, constructing protected facilities like the underground submarine pens at the PLA's Hainan Island base.⁶ This is not a novel concept: German U-boats were protected by thick concrete submarine pens at ports in occupied France during World War Two.

Facilities at key Australian defence bases must be hardened to withstand credible attacks even when appropriate defensive weapons systems are in place. Hugely expensive and difficult to replace weapons like submarines or F-35 fighters are currently tied up at open wharves or in lightly built hangars designed for climate control and weather protection, with limited thinking about protecting them from missile or drone attack.

We are in this position because of decades of under-investment in defence and a strategic assumption that direct threats would never manifest. The world has changed. Concrete is considerably cheaper than a nuclear submarine or a Joint Strike Fighter. Now is the time to make investments in hardened facilities for key defence assets.

While our focus here has been on the risks of missile and drone attacks, we note in passing that the threat to Australian infrastructure, cities, and defence bases is, in reality, much broader. We are already under relentless cyber attack and cannot dismiss the risk of cyber and human-enabled acts of sabotage designed to disable critical infrastructure or damage defence facilities. We acknowledge these areas are being addressed to some degree by Australia's intelligence and security agencies, but we believe much more work needs to be done to strengthen our society in the face of this emerging (in fact: "re-emerging") dimension of warfare.

RECOMMENDATION 26: The next federal government must urgently harden military bases against attack.

⁵ Matt Murphy, 'Ukraine says it sank Russian submarine in Crimea' (BBC News, 4 August 2024): <https://www.bbc.com/news/articles/c4ngvg1ygg0>.

⁶ Tyler Rogoway, 'Image shows chinese submarine entering mysterious cave facility at South China sea base' (The Warzone, 19 August 2020): <https://www.twz.com/35837/image-shows-chinese-submarine-entering-mysterious-cave-facility-at-south-china-sea-base>.

5.3 Defence and Australia's northern commercial infrastructure

Hardening our military bases is an essential step given the threat environment in our region. However, to survive in and sustain combat operations during a credible major conflict, Australian and partner military forces operating out of Australia must also be able to disperse to civilian ports, airfields, and facilities, to complicate adversary targeting and to draw on the significant latent capacity of Australia's civilian infrastructure.

Dispersal of combat and support forces is a classic way to complicate an adversary's calculations and protect your own forces. Dispersal is one of the key approaches America's military is taking in the Indo-Pacific, in a shift away from the decades long strategy of focusing large concentrations of US military assets in Japan, South Korea, Hawaii, and on Guam.⁷ This is a driver of the increased US rotational force presence in Australia.

Dispersal from a small set of easily identified military bases and facilities in Australia will help support the footprint created by the ADF and allied and partnered military forces that may seek to operate from Australia at a time of major conflict. Dispersal and mobility make it harder for even a well-equipped adversary to destroy or damage forces.

The Port of Dampier, Port Hedland, and the Port of Ashburton are three of the key ports across Australia's north handling enormous volumes of iron ore and natural gas exports. They provide berthing and support facilities for some of the largest bulk and gas carriers on the world's oceans. These ports and the mining and resource industries they serve are also supported by airfields and airports, and are connected by transport networks and power systems. The mining operations supply much of their own power, have considerable fuel storage capacity and are investing in additional electricity generation, including through renewables. There is considerable engineering and repair capacity associated with all

these commercial operations. And all this industrial and transport infrastructure has obvious dual use capacity to support our military during times of crisis.

This reverses conventional Defence thinking and planning around Australia's mining and offshore oil and gas operators, turning their facilities from problems to be protected against terrorism and other dangers into invaluable places to operate and sustain forces when an international crisis or conflict requires this.

There must be a particular focus on turning existing facilities that support our mining and resource sectors in Australia's north into dual use capable locations that can be used by our military, because the locations and the scale of these facilities—ports, airfields, fuel storage systems—are significant latent enablers of military operations. This must be done in partnership with the owners and operators of these facilities, and with the state government agencies with authority over road and other transport infrastructure.

Our view is that the growing risk of regional conflict later this decade means that Australia no longer has the luxury to plan "green fields" developments of airfields and Naval ports as the solution to increasing ADF and allied challenges in northern Australia. We need to look at existing civil capabilities and to optimise these for Defence use.

Defence planning creativity is required: the long, straight roads in our north can be considered potential airstrips and runways. Making this existing road infrastructure properly 'dual use' capable – and therefore enabling sophisticated aircraft like F-35s and F/A-18F Super Hornets to use them as secondary airstrips—will require additional engineering and construction on particular sections. That is not a new idea: Switzerland does this now with its road network and Australia and America used such temporary airstrips during the Second World War.

⁷ Stacie Pettyjohn, Andrew Metrick and Becca Wasser, 'The Kadena Conundrum: Developing a resilient indo-pacific posture' (War on the Rocks, 1 December 2022): <https://warontherocks.com/2022/12/the-kadena-conundrum-developing-a-resilient-indo-pacific-posture/>.



We cannot wait for a conflict to start before thinking about when and how the ADF might need to make use of civilian owned and controlled critical infrastructure. Government must begin an urgent conversation now with the private sector about this issue. There are indications that Defence is thinking through these issues, but they are doing so behind security classifications and are reluctant to engage industry. This cannot be a one-sided conversation. Defence must identify private sector entities that own and operate civilian ports, airfields and other infrastructure that the ADF and our allies will use during war. We must train and exercise with these civilian partners to understand how to strengthen the security of our infrastructure.

We call for a mobilisation plan—not to produce mass conscription armies like Australia did in the First World War, but rather to build a shared approach with industry. We must agree on what needs to be done to strengthen national defence and civil capabilities to withstand the shock of

direct attack and to give our military the best chance to prevail and win a conflict. Inevitably this will require some investment to make commercial facilities capable of being used by military forces. Many countries do this. Australia has used the luxury of decades of peace to avoid this conversation. Our view is that the private sector and the wider Australian community is up for the conversation with government about what we need to do to strengthen our national security.

RECOMMENDATION 27: Government must develop a mobilisation plan with industry to harness Defence use of national critical infrastructure in wartime.

RECOMMENDATION 28: Government must make key commercial northern port and airfield facilities capable of military operations during a crisis.

5.4 Fuelling the Defence Force – and fuelling Australia

Taking advantage of the latent capacity to support military operations out of large-scale facilities used by our highly successful mining and resource sector operators could increase the resilience and scale of military operations out of Australia. This highlights another blind spot in national and defence planning—around the central role that liquid fuels will play in a time of conflict or crisis.

Beyond the needs of war, Australia's economy relies on diesel fuelled vehicles and locomotives to move all the essentials of life across our continent, and has a similar dependence on aviation fuel for air freight and passenger transport. Whatever the future shape of Australia's energy system, we need to think about the capacity of current and emerging fuel systems to operate during times of conflict, including over the remainder of this decade.

Despite a growing awareness of the fragile supply chains that support Australian fuel needs, there has been limited government and corporate action to address this fragility. Instead, Australian refineries capable of producing these essential fuels have been closing, leaving only two refineries in operation.⁸ Measures to increase storage and distribution capacity for these key fuels have been marginal. In 2020, the previous government directed some \$94 million to buy oil that is held in the United States as a gesture towards strategic fuel reserve building, and also commissioned some \$260m in additional storage in Australia.⁹ There have only been limited further steps to increase domestic fuel holdings.

Chris Bowen, Minister for Climate Change and Energy, set out the bleak facts around Australia's domestic fuel reserves in November 2022. He announced increases in required baseline levels of petrol, diesel, and jet fuel:

From 1 July 2023, the Minimum Stockholding Obligation requires Australia's two refineries, and our major importers of refined fuels, to hold baseline stocks of:

- petrol; 24 days, increasing to 27 days in 2024 for importers.
- diesel fuel; 20 days, increasing to 32 in 2024 for importers.
- jet fuel; 24 days, increasing to 27 days in 2024 for importers.

Refiners and importers will be required to report stock levels fortnightly, then weekly from 1 July 2024.¹⁰

The Minister cast this as 'providing greater energy security for Australian households and businesses impacted by global and domestic challenges to supply lines', but these levels are still below our international obligations (set for peacetime conditions) and they mean that Australia could only operate for one month at normal levels of activity if our fragile import supply lines were disrupted.

8 Renju Jose and Sonali Paul, 'Australia to pay last two oil refineries up to \$1.8 bln to stay open' (*Reuters*, 17 May 2021): <https://www.reuters.com/business/energy/australia-prop-up-its-last-two-refineries-with-up-179-bl-2021-05-16/>.

9 Michael Doyle, 'Australia boosts oil reserves, but how many barrels does \$94 million get?' (*ABC News*, 24 April 2020): <https://www.abc.net.au/news/2020-04-24/explainer3a-australia27s-oil-purchase/12177060>; Angus Taylor, 'Expanding Australia's diesel storage to boost long-term fuel security' (Media release, 15 July 2021): <https://www.minister.industry.gov.au/ministers/taylor/media-releases/expanding-australias-diesel-storage-boost-long-term-fuel-security>.

10 See Department of Climate Change, Energy, the Environment and Water, 'Australia's fuel reserves boosted to strengthen resilience and supply' (14 November 2022): <https://www.energy.gov.au/news-media/news/australias-fuel-reserves-boosted-strengthen-resilience-and-supply>.

Our view is that the federal government must end decades of gestures and half measures which have failed to build national strategic fuel reserves, and invest in credible levels of onshore storage and refining. We must maintain significant onshore stocks of diesel and aviation gasoline – not just to support the ADF in high-tempo military operations but to enable the functioning of Australian society during conflict.

RECOMMENDATION 29: Government must build onshore national fuel reserves.

We need also to realise that our operational Defence Force will remain powered by fossil fuels for decades to come.

The big picture for our Defence Force over the next four decades is already known as far as its major equipment—ships, planes, armoured vehicles and submarines—is concerned. The ‘future force’ continues the current force structure albeit with ‘next generation’ replacements, with the noteworthy change from six diesel electric Collins submarines to plans for eight nuclear powered submarines between now and the mid-2050s.

The rest of the ADF will, however, remain a fossil fuel force. The Air Force’s planes – from the F/A-18F Super Hornets, to the P-8 maritime patrol aircraft, Wedgetail early warning and control aircraft, F-35 fighter jets, and various transport aircraft like the huge C-17s and the workhorse transport fleet of C-130Js – use liquid fossil fuels for power. While there is the prospect of fossil fuels being supplemented by ‘sustainable aviation fuel’ (SAF) alternatives such as fuels made from biomass, the Air Force over coming decades will remain one largely based on burning fossil fuels.

The same is true for the Army’s combat vehicle fleets whether that is the Abrams M1A2 main battle tank, Redback Infantry Fighting Vehicles, Boxer reconnaissance vehicles, Bushmaster Protected Mobility vehicles or ‘long-range fires’ systems like the self-propelled howitzers and HIMARS rocket launching vehicles that have been made famous by their use in the war in Ukraine.

The Navy’s current and projected fleet—ANZAC frigates, Air Warfare Destroyers, Hunter frigates, general purpose frigates, patrol boats, and Offshore Patrol Vessels, along with the two big amphibious ships (the Landing Helicopter Docks, or LHDs) and the supply ships that support the fleet—is fossil fuel powered, largely using diesel or CODOG—combined diesel and gas turbine engines. The large Army landing craft fleet now planned to be built in the later 2020s, both medium and heavy types, will also use diesel fuel.

So, the Navy and the Army’s planned landing craft fleet will continue to burn diesel and fuels similar to aviation jet fuel.

Smaller systems like drones, potentially used for surveillance, small-scale resupply and armed drones, are almost certain to be powered by high performance batteries, but long duration unmanned systems like the Triton maritime surveillance drone use aviation fuel, just like their traditional manned counterparts. The energy needs of such small and smart systems, even in large numbers, are negligible compared to energy-hungry high-performance ships, combat aircraft, and armoured vehicles. (Of course, drones have to power their batteries from mains electricity supply.)

There are obvious logistical and operational benefits from deployed forces able to help sustain facilities and functions like lighting, heating, cooling and water supplies using small-scale renewable systems; much like remote farms and smaller settlements.

That means that remote bases like those used in the ADF deployments to Afghanistan may have the option to use renewable power to reduce the need for vulnerable and expensive fuel resupply,¹¹ but Defence is unlikely to do away for the need of diesel generators any time soon. Renewable use for deployed forces is a marginal although potentially useful power source when set against the fuel hungry equipment used in war.

Whatever transition Australia's wider economy, government agencies, companies and household might make to new energy forms – in whatever combination of coal, solar, thermal, hydro, gas or nuclear – our Defence Force's path is set on a predictable trajectory. It will need diesel and aviation jet fuel in quantities to train and exercise in peacetime and at considerably higher volumes in a time of war.

The reasons for this are:

- the energy density of fossil fuels that enables high performance of military systems;
- the portability of liquid fuels;
- the fact that the designers and builders of military systems continue to invest in developing current-technology engine systems; and
- the sheer legacy provision of liquid fuel infrastructure that enables international military deployments.

The Australian 2024 Defence future energy strategy and the Defence Net Zero Strategy released on the same day have these big facts as background to them.¹²

The net zero strategy talks about electrifying Defence's commercial vehicle fleet and investing in efficiency and sustainability initiatives across Defence's bases. The strategy will also use non-fossil liquid fuels if the market and supply of these develops over time. The energy strategy parallels this, highlighting graphs of fuel substitution scenarios where fossil fuels are replaced by hydrogen and sustainable alternatives from around 2040. The reality is that these scenarios depend on quite ambitious assumptions about successful research and development and the resulting changed energy market available to Defence over this period. However grand the words in these two strategies might sound, Defence's liquid energy future looks much like its energy present.

Having eight nuclear powered submarines makes little difference to this picture, although they do require Defence and its supporting industry contractors to acquire skills and systems for operating and handling nuclear reactors, components and fuel, including during construction, operation and disposal of these submarines. This is about being able to manage the nuclear fuel cycle that supports the submarines. To the extent that there are nuclear skills available from the larger economy (or able to be imported from overseas), this can make Defence's workforce and skills needs easier to meet. Developing a nuclear skilled workforce in Defence for the submarines concurrently with a nuclear skilled workforce in the civilian economy may add competitive and poaching pressures to both.

The level of demand for fuel for peacetime military activities is small relative to national energy demand. Defence has told parliament that its peacetime fuel needs are about 300-320 megalitres per annum, with some 215 megalitres of this being for aviation fuel.¹³

11 'Afghanistan: Taliban bomb destroys 22 Nato fuel tankers' (BBC News, 18 July 2012): <https://www.bbc.com/news/world-asia-18882247>.

12 Department of Defence, *Defence Future Energy Strategy* (October 2024); Department of Defence, *Defence Net Zero Strategy* (October 2024).

13 Joint Standing Committee on Foreign Affairs, Defence and Trade, Commonwealth, *Inquiry into the Department of Defence Annual Report 2019-20* (2021) 41.

The Defence Future Energy Strategy projects that use to grow to 487 megalitres (487 million litres) by 2050. This is peacetime figure; it does not take into account the orders of magnitude greater fuel use if the ADF were deployed on full time operations.

As an illustration, Exercise Pitch Black is a large air force exercise between the RAAF and the US Air Force conducted out of RAAF Tindal. One million litres of aviation fuel are estimated to be required, for each 24-hour period, by the large-scale combat aircraft participating in this exercise.¹⁴ Senior planners have been quoted as saying that a high-intensity combat aircraft mission operating out of Australia could require a 'significant multiple of what was consumed during Pitch Black'. These figures are supported by earlier data from the Gulf War: a single squadron of combat aircraft operating for three weeks then used almost five million litres of fuel when flying combat missions.¹⁵

Unfortunately, Scherger, Curtin, and Learmonth only have a fuel storage capacity of around two million litres each.¹⁶ On historical data, that's about 1.5 weeks supply at each base for a single squadron of aircraft flying combat missions. And resupply of a base like Learmonth has to be done by road from Perth, over 1,600km away.

America's military has realised the shortfalls in fuel supply and storage in Australia, and northern Australia in particular, and unlike our own government and military, has acted to address its own needs.¹⁷

It has taken around two years for a capable US company, Crowley, specialising in remote construction to build a large new aviation fuel storage facility near Darwin harbour and set it to work.¹⁸ This speedy project shows what is possible if there is a will to act, and undercuts arguments about how long construction and engineering must take to address military needs in regional Australia.

RECOMMENDATION 30: Government must devise a plan to disperse fuel stocks widely across our Defence bases, particularly in the north.

As the ADF will remain a fossil-fuel powered force until at least the 2050s, the places and bases our military will operate from during a conflict must have expanded diesel and aviation gasoline storage and be supported by transport infrastructure allowing their rapid resupply in crisis situations. This will involve significant new spending on fuel storage as well as investments in road and rail transport networks, particularly for Australia's northern bases, ports and airfields.

In our sixth and final paper in this series we consider the impact of the election of Donald Trump and what this means for the Australia-US alliance going forward. We round out our assessment of Australia's northern defence challenges by considering the position of the Port of Darwin and we consider options for further cooperation with Papua New Guinea. Finally, we consider how well suited the Defence organisation is to address the major changes proposed in this series.

14 Martin White, 'Crude at latitude: fuel supply and force projecting air power' (2023) 1(1) *Contemporary Issues in Air & Space Power* 6-7.

15 Ibid, 8.

16 Ibid, 3.

17 Melissa Mackay, 'Work begins on \$270 million US fuel storage facility on Darwin's outskirts' (ABC News, 19 January 2022): <https://www.abc.net.au/news/2022-01-19/work-begins-on-us-jet-fuel-facility-outside-darwin/100764194>.

18 Ferm Engineering, 'Bulk fuel facility under construction': <https://ferm.com.au/bulk-fuel-facility-under-construction/>.

APPENDIX

National survival and Total War

Wars can be distinguished between those that are 'limited' and those that are 'total' wars. The latter are no-holds-barred contests to the death, whereas in a limited war one or more of the combatants restrains itself, whether in terms of the weapons it uses, the geography it is willing to wage war over, or the methods and techniques it is willing to deploy.

In reality, this 'limited' versus 'total' distinction is more of a continuum than a strict binary. The intensity of a war can range across everything from counter-insurgency and similar policing and peace keeping operations, to civil wars, to international conflicts, to global conflagrations like World Wars I and II. And no conflict, not even the World Wars, has been truly 'total'. Even the Nazis in World War Two respected some rules of war, at least when fighting against the Western Allies, and held back from using some weapons – most notably, both sides were deterred from using gas or chemical weapons during World War II despite having large stockpiles of them.

Nothing approaching a total war has been waged since 1945. Some conflicts have been savage and involved ethnic displacement or even genocide, such as some of the India and Pakistan conflicts, the wars fought upon the breakup of the former Yugoslavia, and some conflicts in Africa such as that fought in the Democratic Republic of Congo. But the combatants in these wars were limited by the means at their disposal and the wars were limited in geographic scope.

In other post-1945 wars one or more of the combatants had substantial means at their disposal but chose to limit themselves. This precedent was most notably set during the Korean War in 1950-53. Once the United States and its allies joined the war on the side of South Korea, and communist China joined on behalf of the North, given the substantial airpower available to the United States (including nuclear weapons), military logic would dictate that China should be attacked directly. In particular, Chinese airbases north of the Yalu River (the border between China and North Korea) seemed militarily sensible targets, given they were being used to launch attacks on American aircraft.

But political considerations restrained both sides. There was a fear that the war might escalate, with the Soviet Union entering the conflict directly, the war spreading to Europe or elsewhere, or nuclear weapons being used. The United States chose to limit its aerial bombing to only the Korean peninsula south of the Yalu River, and not to attack China directly. The communist forces in turn never attacked American bases in nearby Japan. Nor were nuclear weapons used, by either side. This exercise of mutual restraint was much to the chagrin of the Allied military commander, General Douglas MacArthur (who was eventually sacked because of his reluctance to limit the conflict in this way).

International conflicts have followed this precedent ever since, being limited in terms of methods, geography, and objectives.

In contrast, a total war is characterised by a lack of limits and restraint. The objectives are absolute, and so the means used are tailored to such absolute goals. But the defining feature of total war is not so much the tactics or weapons that are deployed, but that such forces are not directed only at the armed forces of the enemy, but at its very war making potential. This can generally take one of three forms, or a combination of each.

The first is to cut off an enemy from international trade and therefore deprive its military of overseas supply, and deprive its economy of the goods, food, and raw materials needed to operate a war economy. This is usually done through naval blockade.

The second method is to attack a nation's war making facilities directly, such as munitions factories, shipyards, oil refineries, and transportation networks. Since the development of airpower in the early twentieth century, this has most commonly been attempted via aerial bombing.

The third is to attack the civilian population directly; to kill or demoralise them so they cannot service that nation's war making industries, and to undermine popular support for the war effort.

Such methods greatly increase the destruction and harm wrought by waging war. In a total war, almost anything becomes a legitimate target, and civilian infrastructure is generally not designed to resist military attack. Such methods also lead to cycles of escalation, as an attack on the civilians or homeland of one side inspires a desire for revenge. The terrible bombing of German cities by British and American bombers during World War II, such as the firebombing of Hamburg and Dresden, were felt justified, in part, by the previous German bombing of London and other cities.

But the principal reason that total war methods drive wars to be far more destructive is that they make such wars existential conflicts. If a nation's trade, factories, raw materials and civilians are under attack, the very existence of the nation is at risk. Which in turn justifies methods of war that would seem unfathomable at other times. The mass conscription of soldiers and workers, rationing, enormous defence spending, and the deployment of all the resources of the state to wage war all seem legitimate if national survival is at stake. This increases the resources that are available to wage war, meaning wars that are longer, more destructive, and more brutal.

Has this form of warfare been relegated to history, or might it recur in the future?

The outbreak of war in Ukraine in 2022 has challenged many historical assumptions. There had not been a major international war in Europe since 1945. Indeed, the invasion of one sovereign nation by another has become an increasingly rare event in world affairs. And along with the return of major international conflict to Europe was a return of the more brutal methods of warfare used in a previous era.

Russia and (to a lesser extent) Ukraine have launched aerial attacks on the war making capabilities of their foe, including oil refineries, bridges, and electrical power generation facilities. Both sides have also resorted to blockade in some form. Russia attempted

a naval blockade of Ukrainian ports on the Black Sea coast, and Ukraine's supporters have imposed the more modern equivalent against Russia – trade sanctions. Some of the most severe international trade sanctions ever adopted have been applied against Russia. Such methods are intended to limit the war fighting potential of the belligerent parties but have a clear impact on the civilian population as well.

Both Ukraine and Russia are also adopting increasingly controlling methods over their own populations in order to bolster the war effort. Most notably mass conscription is being used to maintain military manpower, but also extensive fiscal, monetary and trade controls have been imposed on the civilian economy.

The reality is that after nearly three years of brutal, grinding combat, both nations have now completely adapted their societies and economies towards supplying the needs of their military forces.

But to be clear, the Ukraine war is not a total war. Both sides have limited themselves in terms of weaponry, methods, and geography in ways that are familiar from the era of the Cold War. Ukraine's supporters are not providing military personnel or 'boots on the ground' in Ukraine; their support is limited to equipment, advice, intelligence and funding. During the Cold War the two superpowers worked hard to avoid directly fighting each other, to avoid the risk of escalation and nuclear confrontation. The Soviet Union in the Korean and Vietnam conflicts, and the United States in the Afghanistan war in the 1980s did not send combat forces that might come into direct conflict with the forces of the other superpower. The unwritten rule was that if a superpower was directly involved in a war, the other superpower could provide material support to the enemies opposing them, but not combat forces.

Foreign supporters of Ukraine have also placed limits on how their military aid can be used, in particular restricting (until recently) the use of Western supplied weapons from being used to launch attacks into

internationally recognised Russian territory, which Ukraine had complied with. For its part, Russia has also refrained from attacking territory outside of Ukraine, even though military equipment is being supplied to Ukraine from neighboring countries like Poland. And of course, Russia has resisted using any nuclear weapons, although it has made implicit threats to do so.

But such limits are only respected because, in the case of Ukraine, it is reliant on Western support so will comply with any restraints that are imposed on it, and in the case of Russia because it does not want to provoke the direct involvement of the United States and its NATO partners. But what might happen in a war if neither side were reliant on the support of a superpower, and the fear of provoking a superpower was moot because it had already been provoked and joined the war?

Previous papers in this series have looked at the growing risks of confrontation in our region. How or when a war might break out in our region cannot be known precisely, but if it does it is highly likely that, unlike in the Cold War when the two superpowers circled each other but never directly came to blows, today's current giants – China and the United States – will directly clash. The risk of superpower conflict has not been this high since the Cuban missile crisis of October 1962. And should that occur, it is doubtful that the restraints that have applied to international conflicts since 1945 will be respected. The gloves will be off.

And that means each side is likely to adopt at least some total war methods, such as bombing and blockade, to target the war making potential of the enemy.

A superpower war in this region would have profound consequences for Australia. As an ally of the United States, we will be fair game. China has invested heavily in long range missiles and other systems that could be used to attack us, against which we are defenseless given the government has cancelled

the acquisition of anti-missile defence systems. Our air and naval bases will be prime targets, and if the war becomes protracted and Australia continues to resist, attacks on our war making potential might eventuate as well.

Even if Australia tries to stay out of such a conflict, total war is no respecter of neutrality. In World War II, even the Western Allies breached the neutrality of various nations. Winston Churchill as First Lord of the Admiralty ordered the mining of the territorial waters of neutral Norway in 1940 to prevent the shipment of iron ore to Germany (but Hitler beat him to the punch by invading Norway shortly before the mining started), and the Allies invaded the neutral nations of Iceland and Iran because it suited their war aims.

Australia is host to American communications and intelligence gathering bases and is a potential base for other American combat forces. At a minimum these bases will be potential targets for attack. In addition, such a war is likely to grind international maritime trade to a halt. The United States will almost certainly seek to blockade China and cut it off from outside sources of supply and to prevent it from selling its goods to market. Given China's enormous share of international trade, this alone will be disruptive. In a combat environment, any movement of shipping in our region will be risky, let alone if China actively seeks to impose a blockade of its own against our maritime trade. As an island nation this would greatly test our national resilience.

And there will be other disruptions as well, whether we choose to fight or not. Space based surveillance, communications, and guidance systems are playing a huge role in the war in Ukraine. They are a crucial part of the effectiveness of Western supplied systems like the HIMARS rocket system. It would likely greatly help the Russian war effort if it could disrupt these space-based systems, but those systems are generally Western owned and operated. It would be a huge escalation to attack them, assuming Russia had the means to do so.

But in a total war environment between superpowers, no such restraint would be shown. Whether through cyber attacks or kinetic systems, GPS, satellite communications, even the internet itself might all be disrupted, greatly impacting daily life and imposing enormous costs on the civilian economy.

Could Australia survive such direct and indirect attacks on our war making potential and civilian economy?

There is an open debate as to whether total war tactics such as bombing, blockade, and the targeting of civilian infrastructure and populations is actually militarily worthwhile. Some critics suggest that targeting an enemy's war making potential, rather than its military forces directly, has proven ineffective and even counterproductive. They can point to Germany in World War II which, despite enduring an increasingly powerful bombing campaign, managed to actually increase munition production during the war. 35,000 tons of bombs were dropped on Germany in 1941, which increased each year until 1,188,000 tons were dropped in 1944. Yet Germany quadrupled its production of aircraft (as just one example) from 10,250 in 1940 to 37,950 in 1944.

Further, Germany's attempts to blockade and starve Britain via a U-boat campaign against its shipping during World Wars I and II not only failed each time, but in the case of World War I backfired badly as it resulted in the United States joining the Allies due to the sinking of some of its ships.

One supporter of this thesis is American author Robert Pape. He argues in *Bombing to Win – Air Power and Coercion in War* that attacks on civilian infrastructure and populations are generally ineffective. "The modern nation-state is not a delicate mechanism that can easily be brought to the point of collapse." He claims that nations in wartime conditions make adaptations to deal with economic disruption caused by bombing and blockade and so their war making capabilities are never completely destroyed from these means alone, and that nations have a remarkably high tolerance for civilian

suffering in wartime. He concludes that it is not until a nation's military forces are defeated or threatened with defeat that it will succumb.

As evidence he identifies how bombing did not make Germany or Japan surrender until their military forces were defeated or close to defeat and their homelands occupied or threatened with occupation. He also uses Korea and Vietnam as examples where bombing alone could not force concessions; only military success on the battlefield could achieve this. Likewise, the bombing of Iraq in 1991 did not force Saddam Hussein's hand; coalition forces had to launch a ground invasion.

It is true that bombing and blockade alone have not forced a nation to surrender, and the military benefits of attacking civilians directly is dubious, but the question should not be whether bombing and blockade are alternatives to direct attacks on an enemy's military forces, but whether they can help defeat those military forces.

The arguments in favour of the bombing and blockade campaigns during World War II are well articulated in Phillips O'Brien's book *How the War Was Won – Air-Sea Power and Allied Victory in World War II*. He argues that allied bombing may not have destroyed the ability of the Axis to produce munitions, but limited what it could produce (in other words, the increase in munitions production would have been much higher without the bombing campaigns). He also notes how airpower and attacks on transportation networks limited the ability of the Axis powers to transport their munitions from the factories to the fighting fronts (an enormous amount of finished product was destroyed or lost in transit). It has also long been recognised that Germany in particular devoted substantial efforts to countering the air campaign, which meant that aircraft and anti-aircraft guns deployed to defend Germany were not available at the front line. But perhaps most crucially, the targeting of German and Japanese oil production meant that the military forces of both nations lost all mobility, making their ultimate defeat much easier.

Australia can learn some important lessons from this. First, even when allied to a nation like the United States that has considerable air power, this is unlikely to be enough on its own to achieve an easy victory against a powerful foe. The lesson of total war is that once the entire resources of a nation are deployed to wage war, it is necessary to grind that nation down through a war of attrition in order to bring it to heel. We must, therefore, look to our own staying power in time of war.

In this regard Australia is potentially blessed. We have abundant natural resources that we can draw upon even if cut off from friends and allies. We should be able to feed ourselves and still support a considerable war effort.

Part of what made the blockade and bombing campaigns against Germany and Japan so effective was that those nations had limited domestic sources of fuel, particularly oil. Between the United States, Soviet Union, and the British Empire, the Allies in World War II controlled the vast majority of global oil supplies, which proved a considerable strategic advantage.

Given that both sides of politics claim that Australia is facing the most challenging strategic environment since World War II, the wilful decision by Australian policy makers to shut down our own sources of energy and replace them with so-called 'renewables' that are primarily manufactured in, of all places, China, is frightfully reckless. There are other reasons to object to this policy; the ineffectiveness of wind and solar energy in providing baseload power, the dubious environmental benefits given how resource intensive the manufacture of solar panels, wind turbines, and batteries is, and the fact that Australia produces a tiny percentage of global carbon emissions whilst China steadily enriches itself by pumping out as much as it likes. But the fact such a policy risks national survival in the event of a highly foreseeable crisis should have been enough on its own to quash such a self-destructive idea.

Such an outcome arises by virtue of making decisions based on single factor analysis. If all you care or worry about is potential future harm from carbon emissions, and disregard all other costs and considerations, then of course shutting down coal and gas mines and power plants will result. But there are many more issues to worry about, including existential threats, than just climate change.

The long period since 1945 in which international wars have been limited and fought with restraint may have blinded policymakers to the calamitous costs and horrors of another form of warfare – total war. If the missiles start flying in a fully-fledged superpower conflict in our region, Australians will not thank our leaders for the priorities they have chosen to pursue. Australia has chosen to prioritise the highly speculative, potential harm from climate change, a harm that will not eventuate for many years in the future and one that Australia can have no meaningful influence over. All this has been pursued at the expense of prioritising Australia's national survival in the event of an international war, a risk that is very real and immediate, and the outcome of which can be directly influenced by decisions Australia makes today.

John Storey is the Director of Law and Policy at the Institute of Public Affairs and the author of *Big Wars – Why do they happen and when will the next one be?*

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Our analysts bring different perspectives and insights – so we can and do disagree.

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About the authors

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John Storey is the Director of Law and Policy at the Institute of Public Affairs. John is a lawyer, author, and military historian. John has been a practicing lawyer for two decades. He was a partner in a large national law firm and founded and managed his own law firm as managing director. His recent book *Big Wars – Why do they happen and when will the next one be?* looks at global historical trends in military technology and tactics and what they can tell us about how warfare will look into the future.



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