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Thought Pieces with The Conexus Institute

A mandatory value of emissions reduction framework for super

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PROBLEM STATEMENTS

1. Introduction

The Australian super system is currently not doing enough to reduce the carbon intensity of its investment portfolios. Similarly, funds are not yet engaging in sufficiently meaningful and results-oriented stewardship to transition portfolio companies to lower carbon-intensive activities. Some super funds have been making good headway in increasing their level of investment in renewable energy and related assets. However, the current scale of these efforts is modest when compared to the size of the super system and the level of ambition inherent in the national emissions reduction targets.

In the words of the September 2024 Climate Change Authority 'Sector Pathways Review'[1],

> *'**A zero-carbon mindset must become the new normal** so that it permeates operational, policy and investment and purchasing decisions across governments, businesses and households.'*

Following this line of thought, there needs to be a parametric[2] shift in how the need for rapid decarbonisation is apprehended and acted on by APRA-regulated super funds.

The central problem, discussed in more detail below, is that much of the super sector is yet to move to a 'zero-carbon mindset' where existing investments and every new investment would then be viewed through a zero-carbon lens. This paper proposes a single policy solution aimed at reducing the carbon intensity of super fund portfolios. The proposal is for a mandatory value of emissions reduction (VER) framework for all APRA-regulated super funds and is discussed in more detail in Section 13.

A key underpinning of the policy ideas promoted in this paper are that the government of the day and the 16 million or so members of our APRA-regulated super funds have the social licence to demand a 'zero-carbon mindset' from those funds. This view assumes that in acting on that mindset funds would always comply with the best financial interests duty (BFID) in paragraph 52(2)(c) and subsection 52(12) of the *Superannuation Industry (Supervision) Act 1993* (Cth) (SIS Act). In other words, compliance with the BFID is a pre-condition to making investment decisions that include decarbonisation-oriented investment decisions, aimed at managing climate risk.

While decarbonisation is a relatively new form of risk mitigation, the necessary balancing act is very similar to the diversification of investment risk (a core concept in the SIS Act risk management covenant). In executing the diversification of investment risk, managers deliberately invest in less volatile asset classes with a lower risk premium, with a corresponding lower expected return. This is not apostasy, but a core tenet of modern portfolio theory; the 'only free lunch in finance'. This is the way to reconcile decarbonisation-oriented investment decisions, not in ideological terms, but simply as climate risk mitigation. In this way, the risk mitigation gels with the BFID just as managing other investment risks do.

[1] https://www.climatechangeauthority.gov.au/sector-pathways-review

[2] Parametric means a set of facts or a fixed limit that establishes or limits how something can or must happen or be done. Currently, super funds are dealing with the need for decarbonisation within parameters that need to be materially and rapidly expanded, while continuing to act in members' best financial interests.

2. Super and carbon emissions

At the risk of stating the obvious, the Australian super system depends on economic growth to provide the necessary investment returns to its members. The bad news is that, so far, this growth has almost always involved the release of greenhouse gases (GHGs). Super funds have been the beneficiaries of at least 30 years of economic growth during which time anthropogenic GHG emissions were released in unprecedented volumes globally. About half of the 1.5 trillion tonnes of carbon dioxide (CO_2) emitted since the start of the Industrial Revolution occurred post 1990.

Super funds themselves (ie their staff, premises, operations) only directly emit very modest quantities of GHGs (ie their scope 1 and 2 emissions). What this paper is seeking to address is the level of so-called 'financed' emissions or indirect emissions – the emissions emitted by all the enterprises in which super funds invest on behalf of their members. These financed emissions are downstream Scope 3 emissions under category 15 of the GHG Protocol[3] standards and guidance. Typically, financed emissions are measured in terms of tonnes of CO_2e per million dollars invested or lent[4].

3. Australia a very large per capita carbon emitter

Independent global climate science and policy institute, Climate Analytics, recently issued a report that calculated Australia's overall fossil carbon footprint. It measured the extent that exports such as iron ore and fossil fuels (among other materials) resulted in CO_2 emissions when processed offshore[5]. Australia is a globally significant CO_2 emitter when viewed through this lens.

Through this lens, in 2022 Australia's total fossil fuel CO_2 footprint was around 4.5% of global fossil fuel CO_2 emissions. With such large emissions and only a bit over 27 million people, Australia has the **world's second-highest per capita emissions** of GHGs at 21.75 tonnes per person according to recent European Union (EU) data[6]. This is nearly double that of China (11.1 tonnes) and more than seven times bigger than India (2.9 tonnes) trailing only Saudi Arabia on this measure.

Australia was the world's third largest fossil fuel exporter in 2021, trailing only Russia and the United States. In 2022, Australia accounted for just over half of global metallurgical coal exports at 52%, and 17% of global thermal coal exports.

4. Central problem with super and decarbonisation

The central problem is that the scope and scale of what has so far been thought of as super 'transitioning to net zero emissions' needs to be dramatically accelerated. A recent paper by David Bell and Geoff Warren at The Conexus Institute[7] estimated that targeted investment in climate-related assets represented less than 1% of assets in APRA-regulated super funds. The

[3] https://ghgprotocol.org/standards-guidance
[4] CO_2e means the number of tonnes of CO_2 emissions with the same global warming potential as one tonne of another GHG. This accommodates the fact that some GHGs, eg methane, contribute much more to global warming than others.
[5] Climate Analytics (August 2024). Australia's Global Carbon Footprint. https://climateanalytics.org/publications/australias-global-fossil-fuel-carbon-footprint
[6] GHG emissions of all world countries, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/4002897, JRC138862
[7] The Conexus Institute (2025) *Climate-related investment activity by superannuation funds*.

paper did, however, note a range of other activities that were likely to increase the rate of decarbonisation of super fund investments, such as:

- the integration of climate risk issues into the investment process;
- stewardship, engagement and voting on climate-related issues;
- reference to UN Sustainable Developments Goals in investment policies;
- sustainability reporting under Task Force on Climate-Related Financial Disclosures and then the ASRS;
- 'universal ownership' principles followed by some funds;
- membership of ESG-related local and global organisations, such as the Investor Group on Climate Change, among many others; and
- screening and dedicated investment options,

but both the current and future impact of these activities is difficult to quantify. Perhaps the new Australian Sustainability Reporting Standards, due to apply to nearly all super funds in the 2027 financial year, will shed more light on this.

5. Estimated level of investment in decarbonisation

Super funds have significantly increased their investments in renewable energy over the past decade. APRA-regulated super funds had **$231 billion (8.4% of total assets)** invested in infrastructure at June 2025[8], which is up from $30 billion (3% of assets) in 2010[9]. A portion of this includes renewable energy infrastructure (eg wind farms, solar farms, and batteries), but the total largely covers non-renewables infrastructure like roads and airports. The exact share allocated to renewables within this category is not specified, although renewable energy investments have been a growing focus.

A 2024 Market Forces report noted that Australia's largest 30 super funds had $7.7 billion invested in clean energy, compared to $39 billion in fossil fuel companies. Given the then $2.7 trillion total APRA-regulated super asset pool, clean energy investments by the top 30 funds represented less than 0.3% of total assets at that time.

A 2024 report by ASFA[10] suggests that about 10% of renewable generation capacity was owned by super funds totalling about 1.1GW in 2022[11]. According to that report, direct investment made up roughly half of this and the rest was made up of indirect investment through investment managers.

Another way to measure the scale of super fund investment in renewable energy would be to examine the extent to which super funds have co-invested in (or been 'crowded into') projects part-funded by the Clean Energy Finance Corporation and, to a lesser extent, the Australian Renewable Energy Agency. There has been some information made public by those agencies in annual reports and other releases that mention participation by super funds, but there is scant detail on these investments.

Another source of comparison are data collected by the Clean Energy Investor Group (CEIG). In July 2025, CEIG's members represented domestic and global renewable energy developers and investors, with more than 16GW of installed renewable energy capacity across more than 76 power stations and a combined portfolio value of around $38 billion. This is equivalent to

[8] APRA, *Quarterly Fund-Level Statistics*
[9] ASFA (2023) *A decade of super-charged investment in infrastructure and green energy assets*.
[10] ASFA (2024) *Superannuation and the Economy: Energy Infrastructure*.
[11] https://www.superannuation.asn.au/wp-content/uploads/2024/03/230217Superannuation-and-the-economy-Paper.pdf

approximately 1.3% of APRA regulated super fund assets. However, only one super fund (Future Super) is a member of CEIG. Thus the impressive CEIG stake in renewables projects predominantly comprises non-super investors, although some members have super funds as investors (eg Atmos).

Equally interesting is that CEIG expects that as much as 70% of future investment in the Australian renewable energy sector will come from overseas, implying that CEIG does not anticipate much investment from super funds[12]. In a submission to the 2025 Treasury consultation for the Economic Reform Roundtable[13], CEIG wrote:

> "Policy and regulatory barriers, particularly in foreign investment, taxation, and **superannuation**, are limiting capital flows into sectors critical to long-term productivity and economic resilience." *(emphasis added)*

CEIG cites a number of barriers to super fund investment in renewable energy, including the YFYS performance test and the BFID.

The super system also has exposure to renewable electricity generation (and broader energy infrastructure) via unlisted investment vehicles and listed markets. Some funds have made meaningful investments in renewable energy projects. Appendix 1 provides an analysis of some key sectors in the renewable energy industry and selected super funds based on publicly accessible information. The data are far from complete given the scarcity of reliable, consistent information available on the extent of super fund investment in renewable energy[14].

Based on these limited data, an estimate of the total allocated to targeted climate-related assets represents less than 1% of total APRA-regulated super fund assets, equating to less than $30.4 billion in total, using 30 June 2025 APRA figures.

To put these figures in context, the Business Council of Australia (BCA) recently estimated that a 70% reduction of emissions from 2005 levels by 2035 would require $530 billion of new investment[15]. The BCA's approach, based on modelling by McKinsey, assumed current technology and costs, while noting that future technological developments could impact the calculations. While not suggesting that the super sector should fund a material proportion of this capital, there is clearly room to do more.

6. What is super's capacity to invest the necessary capital?

Modelling conducted in 2018 by UTS's Institute for Sustainable Futures (ISF) estimated what **could** be invested by the super system in renewable energy assets[16] as:

- 7.7% of superannuation assets would fund a transition to 100% renewable power by 2030 (electricity only); and
- 12.4% of system assets would cover a complete energy system decarbonisation (including transport and industry) by 2050.

While these figures are now somewhat out of date, they illustrate both the dimension of the central problem and the fact that the super system has the financial capacity to supply the

[12] https://reneweconomy.com.au/big-investors-call-for-firb-super-reforms-to-keep-rivers-of-foreign-gold-flowing-into-clean-energy/
[13] https://www.ceig.org.au/wp-content/uploads/2025/07/CEIG-Submission_Economic-Reform-Roundtable.pdf
[14] Fund portfolio holdings disclosures do not provide a clear picture of the extent of these investments.
[15] *Australia 2035– Maximising Australia's Potential*.
[16] Corbell, S., Kim, Y., Dwyer, S., Teske, S., and Kelly, S. (2018). Sponsored by 350.Org and Future Super: *Supercharging Australia's Clean Energy Transition: How just 7.7% of super could fund 100% renewables by 2030*.

necessary capital. The report does not address the asset allocation and liquidity considerations of the increased exposure to this asset class. However, renewable infrastructure projects:

- tend to provide **stable, long-term cashflows**;
- match the **long-dated purpose** of super to provide income in retirement;
- are highly **competitive** with fossil fuels as costs have fallen[17]; and
- often involve **government risk-sharing mechanisms**, **subsidies** and **policy incentives**.

Thus, while the super system appears to have the **capacity** to increase investment in decarbonisation, it has so far made relatively modest progress overall in capitalising on the opportunities. The next section addresses why this might be the case.

7. Impediments to decarbonisation and possible solutions

The likely and possible causes for limited investment in decarbonisation are many. They include the tension between a view that super is purely about pursuing the 'best financial interests duty' (BFID) of trustees vis-a-vis current day members. The most robust version of this view excludes considering environmental, social or governance (ESG) issues, including carbon emissions. Another explanation is a lack of clear incentives to embrace ESG considerations strongly, including the fact that allocation to socially responsible investment options remain relatively small. The recent Conexus Institute paper expressed the view that current policy and commercial settings create little incentive to pursue decarbonisation more actively[18]:

> *'Our central message is that super funds face no compulsion, limited incentives and meaningful constraints around climate-related investment activities.'*

The paper outlined suggested changes to current policy settings, which included, among other suggestions:

- changes to the BFID;
- amending the APRA performance test to provide 'more latitude to pursue climate investment activities'; and
- an 'imputed carbon price'.

While all of those changes outlined above would be desirable, this paper focuses only on the last suggestion of introducing an imputed carbon price for all APRA-regulated super funds. It also suggests the addition of an amendment to section 52(2) of the SIS Act to include an explicit 'climate risk' covenant reflecting APRA's CPG 229 or the expansion of *CPS 220 Risk Management* to the same effect, the case for which is outlined in Section 23.

8. Regulatory guidance on managing climate change risk

There are authoritative legal opinions in Australia to the effect that super fund trustee directors must take climate-related risks and issues into account. So far, these views have not been tested in the courts. In addition, regulatory guidance such as APRA's prudential practice guide: *CPG 229 Climate Change Financial Risks* (issued in 2021) reinforces the need for trustees to take into account the effects of climate change on their operations.

[17] See, for example, the 2025 CSIRO GenCost report which found that renewables remain the lowest-cost new-build electricity generation technology.
[18] See footnote 7.

Under CPG 229, APRA expects boards and senior management of super funds to understand, oversee and mitigate climate-related risks. This includes transition risks related to moving toward a lower-carbon economy, for instance arising from shifts in policy or technologies. CPG 229 does not impose new regulatory requirements but, rather, integrates climate considerations into existing risk management and governance frameworks such as CPS 220, SPS 220, CPS 530, and SPS 530.

CPG 229 emphasises four key areas as follows:

- **Governance** – APRA expects boards to understand and oversee climate risks, setting clear roles for senior management and ensuring regular assessment within the fund's strategy and risk appetite.
- **Risk management** – APRA requires regulated institutions to identify, measure, monitor, and report climate risks proportionally to their operations, embedding these into policies and board reports. Where material, updates to risk frameworks are encouraged.
- **Scenario analysis** is highlighted as a critical tool, urging funds to develop or access capabilities to test short and long-term climate impacts, notwithstanding any data or modelling limitations.
- **Disclosure** – APRA expects super funds to be transparent to their stakeholders (members, regulators, market) about their climate risk exposures, how they manage them, and how those exposures might evolve. APRA's message is that disclosures are expected to improve over time. Early disclosures might be more qualitative or limited — but over time, more quantitative, more detailed scenario work, more robust disclosures are expected.

APRA stresses that waiting for perfect tools is no excuse for inaction. The guide avoids prescribing specific actions, leaving investment decisions to funds themselves.

The central idea behind CPG 229 seems to be that owning assets where the externalities of carbon emissions have not been fully priced in is increasingly risky. There is a large body of research and commentary to this effect[19]. The thesis is that a 'period of reckoning' lies ahead where the equity risk premium demanded for investing in high-emitting assets will drive the value of those assets down materially. The timing and extent of this 'climate risk repricing' is currently unknown.

As regulatory guidance rather than a regulatory standard, CPG 229 is not mandatory. Further, super funds still seem comfortable with material allocations to fossil fuel producers. Research by Market Forces suggests that the average MySuper option had an allocation of around 9% of its total assets to coal, oil or gas companies[20]. Of the many problems associated with this approach is the intergenerational inequity of current day members benefiting from the possibility that fossil fuel investments are currently mispriced, to the longer-term financial and environmental detriment of future members.

It is therefore unclear the extent to which CPG 229 (and the thinking embodied in it) is currently influencing super fund investment decisions.

[19] BIS Papers No 130 (2022): Pricing of climate risks in financial markets: a summary of the literature https://www.bis.org/publ/bppdf/bispap130.pdf and: Decomposing climate risk in stock markets, IMF Working Papers Volume 2023, Issue 141https://www.elibrary.imf.org/view/journals/001/2023/141/001.2023.issue-141-en.xml

[20] https://www.marketforces.org.au/campaigns/super/climatewreckersindex/

9. Super calls for ultra long-term time horizons

Super acts as an ultra-long-term saving (40 years) and spending (25+ years) vehicle for members, although not all its agents behave in line with this reality. Some perspective is needed on the time horizons involved so that the climate-related implications become clearer.

Let's take a concrete example:

- Emily is 20 years old, born in 2005;
- in 2025, she joined a super fund;
- in 2050, the year of reckoning on the Paris targets, she will only be 45 years old, with perhaps more than 20 years in the workforce ahead of her; and
- Emily will most likely still be alive in 2095 and could easily live to 2100 and beyond (unless we really do cook the planet!).

Effective decarbonisation globally will be critical to her financial future. It is in her long term best financial interests that her super fund (and all other super funds) decarbonises its portfolio in the race against global warming above the Paris targets.

But it's not just about the youngest members. A member retiring today at (say) age 67 is expected to live for a further 20-25 years and might live even longer. Decarbonisation also matters to them to the extent that it impacts on their investment outcomes over what is still a lengthy time spent in retirement.

10. Danger of invoking super as a universal panacea

We have already established that the super system has not materially **directly** contributed to the planet's GHG emissions problem. Super has certainly 'financed' GHG emissions, but even this is a debateable construct. Is it credible to think that the bulk of those emissions wouldn't have occurred if it were not for the involvement of super funds?

This paper proceeds on the basis that the super system can be called upon to do more on decarbonisation. However, there is a legitimate question whether super is the right policy lever to pull. There is a long and unattractive history of super being called upon to solve all sorts of policy problems such as the housing crisis, COVID-19 emergency cash support for the unemployed, super for cosmetic medical procedures, and so on.

On the other hand, super can do something. It manages assets that are very significant compared to the Australian economy. It has substantial economic power and responsibilities for the financial wellbeing of its members in retirement and ultra-long-time horizons, as explained in Section 9. The government has a strong social licence to intervene. The super system would not exist without government intervention and is highly subsidised by taxation concessions.

CLEARER SIGNALS FOR INVESTORS

11. Lack of clear and consistent policy direction

To invest in the solutions to address climate change, investors – including super funds – need clear signals from governments. At the very least, governments should remove as many disincentives and other barriers as is practicable. While Australia got off to a good start in the early 2000s with the introduction of the Renewable Energy Target (RET) and other measures, there were some significant backward steps in 2014 with the dismantling of the carbon price and weaking of the RET following the Warburton Review in that year.

Investors, including super funds, were faced with many years of policy uncertainty from Canberra. This changed in 2022.

12. Clearer signals now

The *Climate Change Act 2022* (Cth) committed Australia to:

a. Reduce net GHG emissions to 43% below 2005 levels by 2030 as a point target and an emissions budget covering the period 2021-2030; and,

b. Reduce net GHG emissions to zero by 2050.

Another relevant political signal was the Labor government's commitment in 2022 for 82% of the electricity grid to be powered by renewable energy by 2030.

In September 2025, the government set a national target to reduce emissions by 62–70% below 2005 levels by 2035. This target is ambitious and creates a greater sense of urgency to reduce emissions. The target was accompanied by a Net Zero Plan, which provides a clear pathway to achieve the 2035 target on the way to net zero by 2050. Six industry 'sector pathways' reports were also released, detailing the steps required to meet the target in the six relevant industry sectors.

Supporting those targets are the Powering Australia Plan, the Rewiring the Nation policy, the expansion of the Capacity Investment Scheme and the Renewable Energy Transformation Agreements, the Safeguard Mechanism, a method for calculating a VER in assessing energy projects, the Future Made in Australia legislation (FMIA) and Future Gas Strategy policies.

On the other hand, there remain a number of uncertainties that investors, including super funds, face when considering an investment in renewable energy in Australia. These include:

- the timing of closure of coal-fired power stations;
- policy uncertainty around the Future Gas Strategy;
- NEM negative pricing and the risk of curtailment as excess renewable energy hits the grid;
- social licence and planning approval issues, leading to slow grid connections;
- surging construction costs, supply chain and labour issues; and,
- political and media attacks on renewables projects (made worse by the Trump re-election).

MORE CERTAINTY FOR SUPER

13. What about a mandatory VER framework?

The new Australian Sustainability Reporting Standard AASB S2 *Climate-related Disclosures* (AASB S2), issued by the Australian Accounting Standards Board in September 2024, defines an 'internal carbon price' as a:

> *'Price used by an entity to assess the financial implications of changes to investment, production and consumption patterns, and of potential technological progress and future emissions-abatement costs. An entity can use internal carbon prices for a range of business applications. Two types of internal carbon prices that an entity commonly uses are:*
>
> *(a) A shadow price, which is a theoretical cost or notional amount that the entity does not charge but that can be used to understand the economic implications or trade-offs for such things as risk impacts, new investments, the net present value of projects, and the cost and benefit of various initiatives; and*
>
> *(b) An internal tax or fee, which is a carbon price charged to a business activity, product line, or other business unit based on its greenhouse gas emissions (these internal taxes or fees are similar to intracompany transfer pricing).'*

In practice, a mandatory VER framework for super funds would impose a method of investment analysis that adds a notional surcharge equal to the estimated present value of future CO_2e emissions to a proposed (or existing) investment. In other words, it is an estimate of the marginal cost of meeting Australia's emissions cut targets for super funds.

A VER would help with decision-making about allocating capital to make sure that the 'cost to the planet' is factored in. It would not be a real cost or a tax, nor a cost to be paid by anyone. No money is paid or transferred with a VER, which is entirely notional. But it should influence investment decisions away from high-emitting assets.

Many corporates and some super funds are already using shadow carbon prices on a voluntary basis.

A uniform and mandatory VER could also be effective in supporting the decarbonisation of APRA-regulated super fund portfolios.

However, an internal carbon price needs to be coupled with a genuine internal motivation to direct capital towards decarbonisation. Santos and Woodside both use internal carbon prices – which are significantly higher than the one proposed in this paper (US$60 and US$80/tonne, respectively)[21] – but these don't seem to be having a strong impact at guiding their investment away from fossil fuels. Clearly, fossil-fuel producers and super funds are very different entities, but the point remains that a VER will be most effective in tandem with other measures, such as

[21] <https://www.woodside.com/docs/default-source/sustainability-documents/response-to-investor-feedback.pdf> and <https://www.santos.com/sustainability/ctap/> Woodside has an internal carbon price (US $80/t) embedded across its investment and emissions management decisions. Santos applies a $70/t shadow carbon price in its Moomba carbon capture and storage evaluation and appears to embed similar internal pricing assumptions in broader project and portfolio planning.

a ‘zero carbon mindset’ perhaps complemented by some or all of the policy changes outlined in section 4.

14. What is a VER framework exactly?

A VER seeks to ascribe a monetary value to the benefit of avoiding or reducing CO_2e emissions. It represents an attempt to internalise the external costs (negative impacts) of climate change into economic decision-making. Emitting GHGs has societal costs, such as damage from extreme weather, health impacts, agricultural losses, etc. A VER tries to quantify these costs in monetary terms to help in capital allocation decisions.

A VER is akin to applying a discount for climate risk through seeking to place a value on potential future costs. In a climate risk context, a VER has the effect of reducing the present value of an investment that involves material future CO_2e emissions in proportion to the perceived cost today of those future emissions.

15. What would be an appropriate VER for super?

As recently as May 2024, the Australian Energy Regulator (AER), which is part of the Australian Competition and Consumer Commission, published its final guidance on the ‘value of emissions reduction’ (VER) from 2023 to 2050. The VER is the estimated dollar value of each tonne of GHG emissions avoided by taking a particular action. This model could assist super funds in understanding and managing the emissions intensity of their portfolios.

The AER used the 2022-23 average of the generic Australian Carbon Credit Unit (ACCU) spot price of $33/tonne of CO_2 applying a 10% pa growth rate averaged with a linear interpolation of two different UN Intergovernmental Panel on Climate Change (IPCC) abatement cost scenarios to 2050.

The AER’s recommended interim VER starts at $66 a tonne of Co_2e in 2023, rising to $135/t in 2033, and to $420/t from 2050 (all in 2023 dollars)[22]. These values are intended to be used by network businesses in their proposals and financial models as well as by the energy regulators in their work. The guidance will remain in effect unless modified or revoked. The interim values to 2050 are illustrated in Table 1 below.

[22] https://www.aer.gov.au/documents/aer-valuing-emissions-reduction-final-guidance-and-explanatory-statement-may-2024

Table 1: Interim values of emissions reduction ($/tonne CO2-e)

Year	Average IPCC & ACCU (using official IPCC) AUD2023	Year	Average IPCC & ACCU (using official IPCC) AUD2023
2023	66	2037	181
2024	70	2038	194
2025	75	2039	207
2026	80	2040	221
2027	84	2041	236
2028	89	2042	252
2029	95	2043	268
2030	105	2044	286
2031	114	2045	305
2032	124	2046	325
2033	135	2047	346
2034	146	2048	369
2035	157	2049	393
2036	169	2050	420

Source: AER

These new prices will become part of the National Electricity Objective administered by the AEMC under the National Electricity Law[23]. The VER will also be used by the Australian Energy Market Operator (AEMO) in the preparation of its Integrated System Plan (ISP), which is its 30-year blueprint for transition to a net zero electricity system, and by the Australian Energy Market Commission (AEMC) in assessing potential rule changes.

Given how widely the AER's VER will be used in the Australian energy system, it seems well placed to serve the super system as a legislated VER. Any resulting super legislation to implement the VER framework could be linked to any changes made to AER's VER in the future.

16. Australian Sustainability Reporting Standards

The use of a VER links to the new Australian Sustainability Reporting Standards. Paragraph 29(f) of AASB S2 requires disclosure of:

(i) 'an explanation of whether and how the entity is applying a carbon price in decision-making (for example, investment decisions, transfer pricing and scenario analysis); and

(ii) the price for each metric ton of greenhouse gas emissions the entity uses to assess the costs of its greenhouse gas emissions;'

The adoption of a VER framework would dovetail well with this disclosure requirement and should improve climate-related decision making across all APRA-regulated super funds.

[23] https://www.aemc.gov.au/regulation/neo

17. A bit more on VER methodology

Adopting a VER framework would require a super fund, or an investment manager acting on behalf of a fund, to integrate the cost of a portfolio's CO_2e emissions into their financial strategies and operational decisions. Several large super funds already use a VER, and it encourages a zero-carbon mindset by operationalising this way of thinking. It would be a classic example of operationalising an ESG approach.

By instituting a VER framework, a super fund prepares itself for a future where CO_2e emissions have a tangible cost and buffers the portfolio from 'climate risk repricing' by future markets. It also creates a strong incentive to decarbonise a fund's investment portfolios in line with the best financial interests of members.

These are the sort of steps that would be involved in applying a VER framework:

a) **Risk assessment**: Investment managers start by assessing the carbon risk associated with potential or existing investments. This involves evaluating how carbon emissions might impact an entity's profitability, costs, and overall business model in the short and long term. A VER framework helps manage those risks.

b) **Valuation**: The fund then uses the VER to estimate the potential costs that entities in the portfolio, or those being considered for inclusion, might incur as if they had to pay a 'market' price for their carbon emissions.

c) **Engagement**: Investment managers could also use the VER as a tool for engaging with entities on their carbon emissions and climate strategies. By articulating the potential costs of carbon, managers could encourage entities to set reduction targets and invest in sustainable practices or risk a capital drought. A VER framework also assists with engaging with other stakeholders.

d) **Scenario analysis**: Managers might use the VER to perform stress tests or scenario analyses on their portfolios. Under the proposed adoption of the VER framework, managers would be able to estimate how the portfolio would perform under the escalating price scenarios.

e) **Rebalancing**: Investment managers might rebalance the portfolio periodically to manage carbon-related risks. Investee entities that fail to manage their carbon costs in line with the manager's escalating VER could be scheduled for divestment or escalated stewardship.

18. Practical example

A super fund, Gaia Retirement Fund (GRF)[24], is considering investing in a major new manufacturing joint venture that will produce photovoltaic panels in Australia. The plant is expected to have significant energy consumption and associated carbon emissions.

Gaia conducts a standard financial analysis, projecting revenues and costs, estimating the net present value (NPV) of the investment and calculating a return on investment (ROI)[25]. The initial analysis shows a positive NPV and a promising ROI.

Gaia then incorporates a VER of $75 per metric ton of CO_2e in line with the AER price. Gaia's estimates the annual CO_2e emissions of the new plant is100,000 tonnes of CO_2e per year. Gaia calculates the annual cost of emissions using the VER as follows:

[24] An entirely fictional super fund. In ancient Greek, 'gaia' meant 'land' or 'earth'. In Greek mythology, Gaia was the ancestral mother of all life on Earth.
[25] Estimated as an internal rate of return.

Annual CO_2e Cost = 100,000 tonnes × $75/tonne = $7,500,000

Gaia adjusts the financial projections to include the annual carbon cost. This reduces the projected net cash flows by $7.5 million a year. Gaia re-calculates the NPV and ROI of the investment including the VER. The adjusted financial analysis shows a lower NPV and ROI, which might still be positive but less attractive than initially projected. Gaia also evaluates potential strategies to mitigate CO_2e emissions (and the related costs in VER terms), such as investing in more energy efficiency measures or renewable energy sources for the plant.

Gaia considers if the investment meets its criteria, including prospects for a positive NPV and how the ROI stacks up versus other opportunities. Gaia might decide to proceed with the investment unconditionally, or conditional on additional measures to reduce the plant's CO_2e emissions that reduce the notional VER impost after accounting for mitigation cost. If the adjusted ROI falls below the acceptable threshold, Gaia might decide to either negotiate for better terms or otherwise seek alternative investments.

By applying the VER, Gaia ensures that the financial analysis reflects the potential future costs of CO_2e emissions. This supports more informed and sustainable investment decisions.

This is but one example. Another example might be a super fund examining whether it was feasible to invest in a green hydrogen or green iron project. Again, assumptions about the future VER would be a material component of evaluating the project's financial viability alongside other factors.

IMPLEMENTATION ISSUES

19. Future Fund first

If the VER framework reform is to be adopted, it could be advantageous for it to be applied just to the Future Fund in the first instance. This is likely to be much simpler and quicker to apply to just one government-controlled entity than to all APRA-regulated super funds. Application just to the Future Fund could be used as a 'pilot' to iron out any practical issues before being applied more widely.

It would also be appropriate to apply a VER framework to our sovereign wealth fund, which is now directed at the 'future' rather than just to meet unfunded federal pension liabilities. The Future Fund should focus on making a satisfactory investment return, but it should also care about its contribution to the future. The cost of dealing with the adverse consequences of climate change, along with the cost of decarbonising the Australian economy, are likely to be two major economic headwinds. It would bring the Future Fund closer to its peers in the region (ie NZ Super and the Government of Singapore Investment Corporation GIC) which are exemplars in the race to decarbonisation.

20. Is the AER VER price high enough?

The AER VER is informed by ACCU pricing and IPCC costs, combined with marginal abatement cost principles worked out with State Energy Ministers. There is a view that the ACCU price (a component of the VER) is artificially capped by the government, and reflects a political compromise to make ACCUs affordable for Safeguard Mechanism participants Following this logic, using ACCU pricing as an input skews the AER to a lower figure than the true 'social cost of carbon'.

It is outside the scope of this paper to opine on the need for a different VER if it were to be applied to super funds. This question could be looked at more closely by policymakers if the VER idea for super were embraced. If it were decided that the AER VER was too low, one way to remedy this would be to apply a uniform multiplier to the AER price. For example, the AER could be increased by a factor of 1.4x for argument's sake (the appropriate multiple would have to be determined by policymakers) to preserve all the benefits of having an independent price signal created by experts not involved in the super system. This route would circumvent the need to start from scratch to create an appropriate VER for super.

21. What about super funds that already use an internal carbon price?

A small number of super funds already use an internal carbon price, although the prices used are unlikely to be pegged to the one used by the AER. It could be argued that those funds would find the adoption of a uniform VER framework easier than funds currently without one. Allowing funds that already have an internal carbon price to continue using that price (or prices) has the potential to create the very mischief that the AER was seeking to address by imposing a uniform price on the energy sector: multiple prices cause confusion and difficulty comparing investment proposals using different VER methodologies. The same would apply to a

superannuation sector with numerous different approaches to valuing the reduction of carbon emissions in a portfolio. A uniform VER for the super system also has the advantage of putting all members of super funds on a level playing field when it comes to incentivising decarbonisation.

22. One wrinkle

One issue that comes to mind in relation to a VER framework for super funds is a potential distortion where a super fund (bidder A) is bidding for a stake in, say, an airport against an investor (eg a foreign pension fund) that is subject to a lower level of carbon cost accountability (bidder B). All other things being equal, it would appear that bidder A would be at a disadvantage in that it would be forced to price in the 'carbon cost' when bidding for the investment, whereas bidder B might not.

This potential distortion could be remedied in several ways.

a) **Carbon Pricing Incorporated into Procurement Processes:**

   Entities conducting a bidding process for relevant assets could be required to include an explicit carbon price as a factor in evaluating bids or, alternatively, bidders could be required to include one[26]. This involves assessing the carbon footprint associated with the asset's construction, operation, and the bidder's broader emissions. A 'shadow carbon price' can be applied to bids from companies not currently facing a direct carbon price.

   Some organisations are starting to request suppliers to provide the carbon footprint of their products or services in tenders. This carbon footprint is then converted into a financial value using an established carbon price (eg the VER framework price) which is added to the traditional bid price for comparison. This incentivises bidders to consider and reduce their carbon emissions.

   By factoring in a carbon cost for all bidders, regardless of their jurisdiction's regulations, this approach can neutralise the advantage of those not currently paying a carbon price. Bidders not subject to sufficient carbon accountability would have a carbon cost added to their bid based on the estimated emissions of the investment.

b) Foreign Investment Review Board

   The mandate of the Foreign Investment Review Board could be updated to widen the scope of national interest considerations informing the approval process to include decarbonisation, effectively introducing a carbon border adjustment mechanism into large acquisitions by foreign entities. This is only a partial solution because a large proportion of super fund investments are made overseas. On other hand, and as time progresses, more and more jurisdictions and bidders (and vendors) will be affected by carbon pricing.

It will also become increasingly unusual for acquisitions of significant assets involving high levels of GHG emissions not to involve the use of an internal carbon price, either by the proposed acquirer or its owners or financiers. Nonetheless, there has been a pattern where high-emitting assets have been acquired by less accountable entities such as private companies, state-

[26] This is effectively what the AER has done in relation to proposals and bids in the Australian electricity system.

sponsored entities or those domiciled in non-OECD jurisdictions with limited transparency into corporate responsibility[27]. Measures like the ones canvassed above could address this issue.

23. Implementation pathways

In its corporate plan for 2025, APRA said that it planned to incorporate climate risk in the prudential framework by consulting on amendments to include climate risk in prudential standard *CPS 220 Risk Management*. The potential significance of this proposal should not be underestimated. This would be the first time that managing climate risk was an express legal obligation, as opposed to mere regulatory guidance under CPG 229.

Assuming APRA wished to do so, it could incorporate the VER framework in its proposed climate-related expansion of *CPS 220*.

Mandatory climate-related financial disclosure under the new Australian Sustainability Reporting Standards (AASB S2) starts for most super funds in FY 2027. This could also be a catalyst for further enhancing climate risk management by super funds either by 'osmosis' or regulatory intervention.

The VER framework could be implemented via:

a) legislation amending the SIS Act;

b) regulations forming part of the *Superannuation Industry (Supervision) Regulations 1994* (Cth); or

c) an APRA prudential standard (as discussed above).

The latter is the most appropriate mechanism for the following reasons:

- affected stakeholders could be consulted under APRA's normal processes for making prudential standards; and
- a prudential standard is a 'legislative instrument' under the *Legislation Act 2003* (Cth) and, as such, is subject to Parliamentary scrutiny. APRA prudential standards must be tabled in Parliament and are subject to disallowance (in part or in full) within specified time periods. This would give Parliament a mechanism to disallow or trim down, but not rewrite, a prudential standard incorporating a VER for APRA-regulated super funds.

24. Conclusion

For all the reasons outlined in this paper, the super system is an appropriate source of support for decarbonisation. The adoption of a mandatory VER framework is a globally accepted mechanism that directly aligns with, and is contemplated by, the ASRS. Making the VER framework mandatory has two key advantages: it brings all APRA-regulated super funds, including those that have so far made limited progress with decarbonisation, up to a uniform standard to the benefit of the system as a whole. It also ensures that all members of APRA-regulated funds uniformly get the benefit of a VER framework in driving decarbonisation in super.

[27] The recent, but now lapsed, proposed acquisition of Santos Limited by a US private equity fund and some middle-Eastern sovereign wealth funds is a good example of this trend.

APPENDIX 1 – SUPER FUND INVESTMENT IN RENEWABLE ENERGY

This Appendix documents investment made by super funds in renewable energy, outlining examples of investments made in specific sectors and by selected funds.

Specific sectors

Wind and solar electricity generation

Rest Super fully owns the Collgar Wind Farm near Merredin in WA's central wheatbelt. The Snowtown 2 wind farm is owned by Aware Super (33%), and by Palisade Investment Partners (67%) on behalf of other institutional investors, including HESTA.

Cbus has a significant ownership stake in the Albany Grasmere Wind Farm, the Warradarge Wind Farm and the Greenough River Solar Farm in Western Australia through Bright Energy Investments - a joint venture with Synergy, the WA government energy generator and retailer and DIF, an institutional investor.

A number of funds – including Hostplus and Brighter Super – have investments via Tilt Renewables, including in the Broken Hill and Nyngan solar plants in NSW, and the Coopers Gap and Silverton wind farms in Queensland.

Other wind and solar generation facilities with super fund investment include at Bald Hills in Victoria (Future Super), and Stockyard Hill in Victoria (Aware).

In August 2025, Atmos Renewables, an Australian renewable and storage developer, in which three super funds: Cbus, MLC and AMP Super are investors, has acquired 100% ownership of the 316 MW Hornsdale wind farm in South Australia[28].

Electricity distribution

Ausgrid is the largest distributor of electricity on Australia's east coast – supplying Sydney, the Central Coast and the Hunter Valley. The consortium of Ausgrid investors include AustralianSuper and IFM Investors, with the latter investing on behalf of institutional investors including a range or super funds.

Electricity storage

Aware Super has an investment in North Harbour Clean Energy that plans to develop and operate renewable energy storage projects with a focus on closed-loop pumped hydroelectricity and vanadium redox flow batteries.

[28] https://www.igneoip.com/australia/en/institutional/news-and-insights/press/igneo-raises-400m-to-support-growth-of-atmos-renewables.html

Renewable energy portfolios of selected super funds

ART

ART has committed to net zero emissions by 2050, with a 2030 reduction target of 43% across key asset classes. It also introduced exclusions for companies earning more than 10% of revenue from thermal coal mining and sales from July 2024. ART's investments in renewable energy include:

- **Pattern Energy Group LP:** A major North American renewable energy and transmission infrastructure firm that has a development pipeline of over **25 GW** of renewable energy and transmission projects, plus nearly **10GW** of operational and under-construction facilities.
- **Macquarie Green Energy and Climate Opportunities Fund:** An open-ended infrastructure fund to which ART has committed close to $1 billion. The fund has a portfolio of six seed investments across solar, wind, energy storage, and natural climate solutions, spanning the Americas, Asia-Pacific, and Europe representing over 17 GW at various stages of development or operation.

Aware Super

Aware Super has committed over **$2 billion** to renewable energy projects, both directly and through platforms, including:

- **Warradarge Solar Farm (WA):** Utility-scale solar project.
- **Murra Warra Wind Farm (VIC):** Direct stake across 435 MW (Stages 1 & 2).
- **Dundonnell Wind Farm (VIC):** Co-owner of 336 MW onshore wind.
- **PowAR portfolio:** Indirect exposure to large assets including Coopers Gap Wind Farm (453 MW, QLD) and other wind and solar projects.
- **Global renewable funds:** Investments via Nuveen and other asset managers in solar, wind, and storage assets in North America, Europe, and Asia.

Cbus Super

Cbus invests in renewable energy, both directly and via listed and unlisted infrastructure, including:

- **Renewable platforms:** Exposure through the Palisade Renewable Energy Fund and Intera Renewables, which hold wind and solar farms across Australia.
- **Direct assets:** Stakes in large wind and solar projects, including Hallett Wind Farm (SA), Macarthur Wind Farm (VIC), Ross River Solar Farm (QLD), and Granville Harbour Wind Farm (TAS).
- **Battery storage:** Participation in utility-scale battery projects to support renewable integration.
- **Global renewables:** Investments in offshore wind and clean energy infrastructure funds managed by international specialists.

HESTA

HESTA targets **10% of funds under management** in climate solutions by 2030. Its renewable energy investments include:

- **Limestone Coast North Battery (SA):** Backed through Intera Renewables and Palisade; due 2027.
- **Green hydrogen pipeline:** Term sheet with ReNu Energy for up to $100m co-investment.
- **Intera Renewables platform:** Co-investor via Palisade, with seed assets including Hallett 1 (94.5 MW, SA), Snowtown 2 (270 MW, SA), Granville Harbour (112 MW, TAS), Macarthur (420 MW, VIC), and Ross River Solar (116 MW, QLD).
- **Generate Capital (US):** Investor in US$1.5b sustainable infrastructure fundraise.
- **Sustainable Growth option:** 87% SDG-tilted at June 2024, with 2.13% of total assets aligned to SDG 7 (Affordable and Clean Energy).

IFM Investors

IFM Investors invests in global renewable energy infrastructure. Key investments include:

- **SQ Renewables (ERG S.p.A.):** IFM holds ~49% equity stake in SQ Renewables, which controls ~62–63% of ERG. IFM's investment was over €1 billion, with the option for an additional €500 million to support growth. ERG has a total installed capacity of about 3.8 GW (≈3.1 GW wind; 0.7 GW solar).
- **GreenGas USA (Renewable Natural Gas):** IFM acquired a majority interest in this U.S.-based RNG developer/operator. Represents IFM NZIF's first low-carbon fuels investment, though specific facility capacity or financial value was not publicly detailed.
- **Renewable-Powered Data Centres (via PPAs / Green Group AG acquisition):** IFM acquired 100% of Green Group AG, a Swiss digital infrastructure platform operating hyperscale and enterprise data centre. The deal was valued at approximately US $1.1 billion
- **Renewable Fuels Project (Brisbane SAF/Diesel Facility):** IFM, alongside Ampol and GrainCorp, entered an MOU to explore establishing a low-carbon liquid fuels facility (primarily SAF, plus some renewable diesel) at Ampol's Lytton refinery in Brisbane. GrainCorp is scaling its oilseed crush capacity to ~A$500 million, aiming to produce up to 1 million tonnes per year for biodiesel/SAF.

In late 2023, AustralianSuper, ART, CareSuper, Cbus, HESTA, Hostplus, Rest and UniSuper (together representing around $1 trillion of industry super capital) along with IFM Investors released a report entitled: *Super-powering the energy transition: A policy blueprint to facilitate superannuation investment*. This report identified policy solutions to help drive greater investment into Australia's energy transition.

Media Super

Media Super has invested more than **$1.1 billion** in wind, solar, storage and other renewable energy opportunities in Australia and overseas, and about the same amount in energy transmission and distribution assets locally. Its renewable energy portfolio includes:

- **Star of the South:** Offshore wind project off the Gippsland coast, 10% stake.
- **Centinela Solar Energy:** Solar PV power plant encompassing over 875,000 solar panels spread over a 1600-acre site in California.
- **Arlington Valley Solar Energy:** Solar PV power plant encompassing 600,000 solar panels spread over a 1160-acre site in Arizona.
- **Blue Elephant Energy**: Renewable power producer headquartered in Germany.
- **Opdenergy:** Builder and operator of solar PV, wind and storage assets.

Rest

Rest has committed **$2 billion** in renewables and low-carbon assets by 2025, including:

- **Quinbrook Infrastructure Partners (2023):** $1 billion investment split between Quinbrook's Net Zero Power Fund and co-investment in US and Australian renewable projects and green data centres.
- **Octopus Oasis Fund (2023):** $50m investment in wind, solar, and storage projects across all stages of development.
- **Collgar Wind Farm:** Owner of 222 MW onshore wind project in Western Australia, acquired 2019.
- **LOGICs Fund (Fidelity International):** Cornerstone investor in European logistics properties retrofitted to net zero, with on-site solar PV installations (capacities not disclosed).

UniSuper

UniSuper has made renewable energy a core part of its infrastructure strategy. Its portfolio includes:

- **Tilt Renewables (via PowAR merger):** Exposure to a large-scale portfolio of wind and solar projects including Dundonnell Wind Farm (336 MW, VIC) and Snowtown 2 (270 MW, SA).
- **Macarthur Wind Farm (420 MW, VIC):** One of the largest wind farms in the Southern Hemisphere.
- **Macquarie Green Energy and Climate Opportunities Fund:** Investment of over $600m
- **Other direct holdings:** Stakes in wind and solar projects across Australia, as well as renewable energy platforms managed by specialist investment managers.

GLOSSARY

ACCUs –Australian Carbon Credit Units

AEMC - Australian Energy Market Commission

AEMO – Australian Energy Markets Operator

AER – Australian Energy Regulator

APRA - Australian Prudential Regulation Authority

ASFA - The Association of Superannuation Funds of Australia

ASIC – Australian Securities and Investments Commission

ASRS – the Australian Sustainability Reporting Standard for Climate-related disclosures AASB S2 issued by the Australian Accounting Standards Board and applied to RSE licensees under the *Corporations Act 2001* (Cth)

CO_2 – Carbon dioxide

CO_2e - CO_2 plus GHGs, normalised as if they were all CO_2. CO_2e is quantified by multiplying the amount of GHGs by their respective global warming potential. The resulting number is the amount of CO_2 that would need to be emitted to have the same impact on the atmosphere

Dollars or $ – Australian dollars

GHGs – Greenhouse gases, namely: water vapour (H_2O); carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); ozone (O_3); chlorofluorocarbons (CFCs); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF_6)

GW – gigawatt - a unit of power equal to 1,000,000,000 watts or 1,000 megawatts

Mt –million(s) tonnes

MW – megawatt (1,000,000 watts)

PV – photovoltaic

SDG – UN Sustainability Development Goal(s)

t – tonne(s)

VER – Value of emissions reductions as determined from time to time by the AER