

Exploring the merits of a WARR carbon plan – towards net zero together

A collaboration between active members of the WMRR National Carbon Division, written by Julien Gastaldi and Dr Joe Pickin

The Monday, 18 May 2020 episode of *Four Corners* was a sobering reminder of all Australia has lost while the wheel of exhausting and riven climate change politics has been turning. Since then, Federal Environment Minister Angus Taylor unveiled the outcomes of his 'King Review' into the Emissions Reduction Fund (ERF), which is an attempt to kickstart a 'technology, not taxes' pathway to reducing emissions. Importantly, after a few years of investment in bush regeneration, savanna burning and avoided deforestation, the focus appears to have shifted back to reducing industrial emissions rather than increasing carbon storage through photosynthesis.

As the wheels turn again, the rules are slowly changing (once more) from a policy of using taxpayers' funds that rewards least-cost-of-abatement-on-delivery, to a program that calls on matched funding from governments as well as corporations.

Meanwhile, progress continues across the rest of the world and in the private sector, for instance:

- Carbon neutral certification under the [Climate Active](#) label has been growing exponentially
- [Shell](#), [BP](#) and [Total](#) have pledged to become carbon neutral energy companies by 2050.
- Increasingly, the finance industry requires an assessment of climate risks and use the Sustainable Development Goals as a screen to select where to allocate their capital. The regulator (APRA) has raised the profile of [managing climate risk](#) as a matter for directors to deal with in 2020, and has aligned its guidance to the global Task Force on Climate-related Financial Disclosures (TCFD).
- Record investments are being poured into renewables such as large-scale solar and batteries, pumped hydro, clean hydrogen, and renewable methane.
- The Paris Agreement has legislated an outcome of stabilising the world's temperature increase to well below two degrees Celsius, which means global GHG emissions and capture (or offsetting) must be in balance by 2050 at the latest – most likely sooner.

In short, the world has moved, climate change is here, and decarbonisation has commenced. So, where does this leave the Waste and Resource Recovery (WARR) industry?

The carbon footprint of Australian solid waste management

The GHG impact of waste and resource recovery management is complex and needs to be considered through three different perspectives: 1. Our impact on the National Inventory, 2. The Carbon Footprint within our operational control, and 3. the Life-Cycle of materials.

The **National Inventory perspective** comprises the 'end-of-pipe' emissions framework established by the Intergovernmental Panel on Climate Change (IPCC) and adapted for our national inventory and National Greenhouse and Energy Reporting (NGER). On this basis, in 2016-17, solid waste is modelled to generate 8.6 million tonnes (Mt) of carbon dioxide equivalent (CO₂-e) emissions, accounting for 1.6% of Australia's total CO₂-e emissions. Methane (CH₄) from landfills made up 96% of these emissions with the rest resulting from organics processing and incineration.

Importantly, those NGER numbers are only meant to be an estimate, made in line with international standards and based on a range of "default" parameters that seldom reflect actual emissions at the facility level. A classic example in the WARR industry is that it is quite common for well-managed landfills gas capture systems to capture much more than the NGER theoretical potential, leading to all sorts of complications and adjustments. Those numbers also do not account directly for offsets (Australia Carbon Credit Units aka ACCUs).

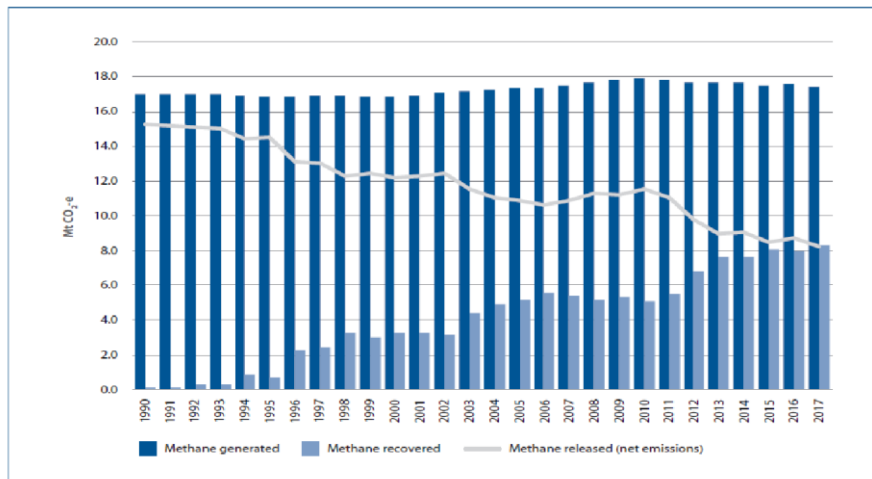


Figure 1 Trends in methane generation, recovery and emissions from solid waste disposal, 1990–2017 (Source: National Greenhouse Gas Inventory 2017)

A **Carbon Footprint perspective** expands the accounting framework to include *all* direct and indirect emissions transport and on-site use of fossil fuels and electricity. Importantly, emissions from collecting and transporting waste are relatively insignificant. Based on standard factors, depositing a 20-tonne load of municipal waste in a landfill with no gas capture (a rare case these days) produces more emissions than driving that load on a 14,000km lap of the continent. Some specific waste management operations do, however, use lots of on-site fossil fuels or electricity, including paper recycling, material recovery facilities and metal shredding.

This perspective is the most commonly used framework for carbon neutrality claims made by a corporations – [Telstra](#) for example.

A **Life-cycle perspective** adds other significant considerations related to offsets and sequestration, i.e. ‘capture & storage’. They include:

- Recycling offsets, when recovered material substitute primary material with higher energy input.
- Offsets from extracting energy from organic waste and using it as a substitute for fossil fuels.
- Carbon storage in products, vegetation, soils, landfills or mine rehabilitation, in which the decay of organic carbon is prevented or delayed.

The balance between the offsets and emissions is always uncertain. That is because offsets are always credited against a hypothetical baseline of “what would have happened to the waste in the absence of the offset project”. Often, there are many different -and realistic- scenarios of what that “business as usual” could have been.

Could there be another perspective to bring those 3 approaches together? With carbon neutrality being a global goal, could it be reasonable and practical to define a framework that recognises progress at a regional and/or an industry level?

The history of the solid waste industry and carbon policy

The 2012-2014 Carbon Pricing Mechanism was not very well-targeted at the waste industry. Uniquely, landfill emissions continue for decades after the original emissions causing activity (waste deposit), and are a rough estimate at best, all of which greatly complicated administration, contracting and pricing. To their credit, landfillers and landfill gas companies engaged strongly with the mechanism which rewarded the capture of landfill gas. This led to a jump in new landfill gas projects between 2009 and 2013, bringing the sector’s emissions down to today’s levels.

For resource recovery and recycling, little benefit materialised under the policy. Instead, increased energy costs meant some recyclers lost out to exports.

The Coalition replaced carbon pricing with the ERF (now Climate Solutions Fund aka CSF), in which abatement generates credits that can be sold to government or private buyers on the voluntary market. Performance since 2012-13 is summarised in the table below; landfill gas capture and combustion dominate the CSF with a massive 22.5Mt of contracted CO₂-e abatement, equivalent to almost three years' of emissions from the sector. Interestingly though, the total amount of gas captured annually has changed little since 2012-13 – maybe because the National Inventory perspective does not account allocate those offsets directly by the industry (to avoid double counting of emission reductions).

Low uptake of source separated organic waste under the CSF (whilst booming in practice) may suggest councils are unclear about the value of participation in the CSF or are possibly unsure how to participate. Despite being the largest pool of direct emissions and one of the highest order activities within the waste hierarchy, to date, source separated organic waste diversion has only been credited with fewer than 4,000 Australian Carbon Credit Units (ACCUs), worth one tonne of certified emissions reduction measured in tCO₂-equivalent, from two projects - Woolworths and Shellharbour City Council, while at the same time, hundreds are looking at, or adopting, the technology approach.

Projects	Kyoto Australian Carbon Credit Units issued since 2012-13 (Mt CO ₂ -e)	
Landfill gas capture and combustion	110	22.5
Alternative waste technology (diversion from landfill)	17	2.1
Source-separated organic waste (diversion from landfill)	11	0.001

Why do all the work and get none of the credit(s)?! Clearly, this is a missed opportunity.

Food waste can be collected via the food and garden organics (FOGO) bin, processed via composting, and beneficially used in agriculture to grow more food. According to the National Waste Report 2018, about 7.4Mt of municipal waste was sent to landfill in 2016- 17, of which ~4.2Mt was organics; diversion from landfill could potentially result in millions of ACCUs per year.

How might a WARR industry carbon plan help?

Despite the rush towards carbon neutrality, an industry or a company can rarely actually be ‘carbon neutral’ on its own. Rather, it contributes to the collective effort towards neutrality. The objective is not individual (such as when minimising costs under a tax or emissions trading system, or even maximising benefits under an incentive scheme), but collective. We must pull together to achieve the objectives of the Paris agreement in an effective and fair way.

Other industries have taken on the collective challenge of defining a roadmap towards carbon neutrality. For example, the Australian red meat and livestock industry has set an ambitious target to be carbon neutral by 2030 ([CN30](#)). The plan sets a clear path for the industry to capitalise on the opportunity to be a world leader in producing an environmentally friendly, sustainable, and high-quality source of protein.

A national carbon plan could help the WARR industry by:

- focusing the attention on the long-term;
- promoting consistent government policy and regulatory frameworks;

- noting the happy coincidence of climate benefit and circular economy policies;
- promoting low carbon technologies, systems, and management consistent with demand from households, businesses and investors; and
- maintaining social licence to operate landfills and other technologies.

Are there risks if the industry takes a ‘do nothing’ approach and leave it to government?

Yes.

As climate change intensifies, we could find ourselves locked into decades of landfill emissions while facing a toughened policy focus on CH₄. Because of its fierce short-term warming, methane is high on the priority list of GHG emissions cut. We could also be locking in expensive technology that is hungry for fossil fuel or plastics if we don’t design our policies correctly. CSF contracts to capture and combust landfill gas are still viewed as temporary, given that there is no plan for what happens when these projects end: with some finishing as early as 2021, we need to come up with ways to maintain the industry’s gains in the space and build on them.

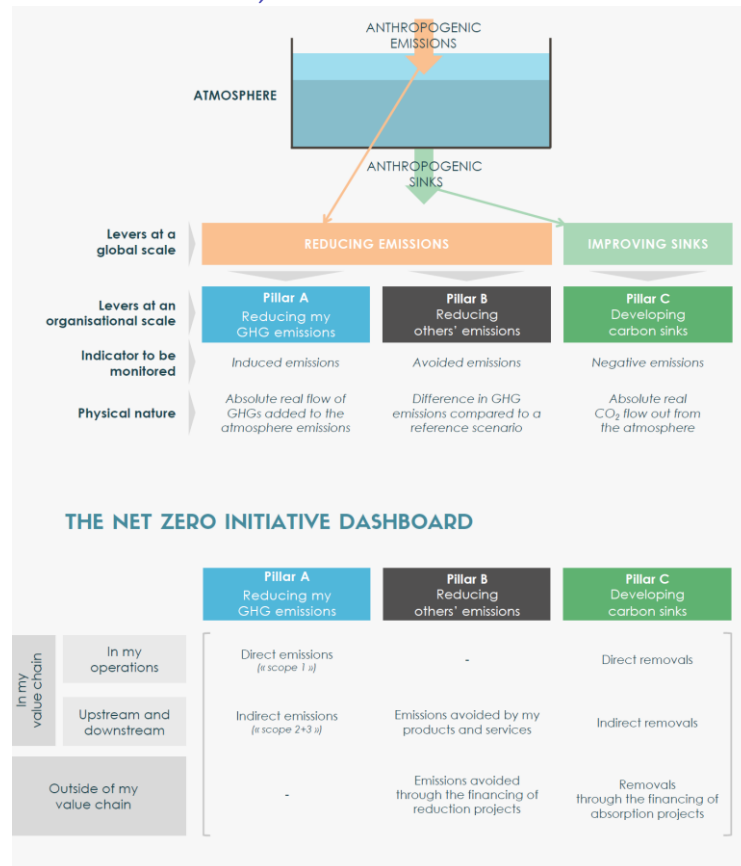
Potential scope and content of a WARR carbon plan

The Net Zero Initiative framework proposes a fresh way to look at how an industry, corporation, or council can contribute to global action in a meaningful way (see Figure 2). As such, some of the issues and elements that could potentially be included in a WARR industry carbon plan are:

- organics out of landfill by a defined date;
- industry use of the energy content of waste
- work with governments to
 - support circular economy principles including high quality recovered products
 - support use of renewable energy from waste (incl. as renewable methane from non-recyclable organics)
 - develop a nationally coordinated framework for regulating and incentivising landfill emissions post-CSF;
- support accurate measurement of CH₄ emissions from landfills; and
- a voluntary, industry-wide ambition and targets that are in line with science.

But first we need broad and deep industry support to understand what is achievable both technically and commercially. We also need to understand and agree on why we should be taking on such a challenge at a time when most of us are focused on COVID-19 recovery - perhaps the opportunity lies in marrying the recovery objective with our long-term goals. Finally, we would need to come up with a plan detailing how we propose to deliver on the promise, who might be involved, when to start, and where to focus our efforts.

Figure 2 The Net Zero Initiative - Carbone4, 2020



How to contribute?

If you have insights and ideas that could drive a WARR carbon plan forward, we would like to hear from you.

Please register your interest in attending the Waste Management and Resource Recovery Association of Australia's (WMRR) next National Carbon Division meeting by emailing info@wmrr.asn.au

Dr Joe Pickin is director of Blue Environment, an independent Australian consulting firm that is at the forefront of development of Australia's carbon policy. Joe, who is vice chair of WMRR's National Carbon Division, is also the primary author of the National Waste Report 2018.

Julien Gastaldi is director of Gaasta Pty Ltd, a sub-contracting company that provides GHG accounting, project development services, and strategic and technical advice to the carbon industry. He also chairs WMRR's National Carbon Division, and leads Corporate Carbon Advisory Pty Ltd's Strategic Development & ACCUs Origination activities.