RECONCEPTUALISING WASTE:
AUSTRALIA'S NATIONAL WASTE POLICIES

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Waste is often overlooked in climate policy agendas. This all changed when China implemented what was effectively a ban on foreign waste imports in 2018, sending shockwaves throughout the global waste exporting industry and shifting waste management to the forefront of global climate debates. It is often underappreciated that transitioning to renewable energy can only address 55% of current global greenhouse gas emissions. The remaining 45% will require a transformation in the volume and method of resource extraction, production and disposal (Ellen MacArthur Foundation 2019).

In a world with finite resources and a limited capacity for waste absorption, infinite growth in waste generation is incompatible with ecological limits. The global extraction of resources has tripled since 1970, and at current rates is predicted to reach levels far beyond the Earth's biophysical capacity by 2060 (IRP 2019). With 100 billion tonnes of produced material entering the global economy every year (Circle Economy 2021), there is an urgent need to transform the way we extract, produce and dispose our material throughput.

This is particularly the case in Australia, where annual waste generation is growing at double the rate of population growth (Spring 2017). Australia first took a national policy approach to waste in 1992. It renewed the policy in 2009 to take account of rapidly changing waste streams. In 2018 the policy was changed once again as a crisis response to China's waste import ban which sparked national political debate and industry discontent. This article critically analyses these three successive national waste policies. The analysis is informed by an ecological political economy perspective

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that combines ideas from Clive Spash's social ecological economics and Jason Moore's world-ecology approach, which are outlined in the opening section. A critical analysis of each Australian policy stage then follows. The implications for future waste governance are presented in the conclusion in an attempt to contribute to changing the discourse and policy approach affecting waste management.

Framing the issue

What is waste? Historically, an abstract understanding of its political economic character has derived from, among others, Karl Marx, Thorstein Veblen, Paul Sweezy, Paul Baran and Zygmunt Bauman. These scholars conceptualised waste in terms of the way capitalism values or disregards both things and people based on capital accumulation rather than social need or happiness (O'Brien 2008). In the context of the growing urgency of climate change, research has more recently turned to a physical view of waste as material rubbish and is an increasingly popular topic of study in both the physical and social sciences. The study of waste has also featured more prominently in popular literature and media, with a strong focus on the international waste trade and the global social inequity that has accompanied growing waste volumes.

This article seeks to re-frame debates around waste management through an analysis of the strategies employed by Australia's national waste policies with a focus on municipal solid waste, organic waste, e-waste and the concept of the circular economy. Embedded in the policies is an ontological perspective that primarily treats waste as a moment of disposal with no prior history. In other words, the policies have framed waste as the 'disposed' as opposed to the 'produced'. It is difficult to reduce the volume of disposed waste, however, without also reducing its moment of *production*. This link may seem obvious, yet environmental governance overwhelmingly treats waste and products as ontologically separate.

Focusing on the production of waste shifts attention to the current imperative for infinite economic growth. The connection between waste and overall economic growth is not fixed. Sustainable production methods can – and have – resulted in a *relative* decline in the waste generation associated with economic growth, i.e. the dematerialisation of production. Yet, it is an *absolute* decline that is needed to stay within ecological limits, and these efficiency improvements are yet to achieve an absolute reduction

in waste which remains coupled to economic growth (Jackson 2017). This article calls for a holistic understanding of waste as embedded within the production process, recognising that it is impossible to infinitely continue extracting, producing and disposing material at current rates (IRP 2019).

Framing an analysis of waste policies can usefully draw on four theories; neoclassical environmental economics, new environmental pragmatism, Spash's social ecological economics and Moore's world-ecology perspective. The former two can be seen as influencing Australia's national waste policies, while the latter two provide the basis for a critique and inspire the central message in this article – that waste should not be abstracted as a separate entity to production.

Environmental economics and new environmental pragmatism

Environmental economics is a branch of mainstream neoclassical economics that developed in the 1960s with the emerging concern for the environment. It conceptualises the environment as a separate sphere to the economy in which environmental pollution is described as a negative externality to the market, given the cost of pollution is traditionally not included in market prices (Cato 2011).

Environmental economists frame environmental problems as market aberrations, for example describing climate change as 'the biggest market failure the world has seen' (Stern 2008: 1). Casting environmental problems as market failures has resulted in prescribing market solutions where the logic of market economics is not interrogated, as pollution is considered *external* to otherwise well-functioning markets. The standard policy response is to internalise negative externalities by including social costs of pollution in market prices, for example through carbon pricing mechanisms such as a carbon tax or emissions trading scheme (Cato 2011).

However, these market-based solutions must be framed in the context of an environment on the brink of collapse. While many economists claim scientific authority on the theory of carbon pricing mechanisms, relying on price signals and voluntary market action has not delivered *absolute* emissions reductions on a meaningful scale in practice (Bryant 2019). Despite the growing number of carbon pricing initiatives being introduced as key policy tools to limit global warming to 1.5 degrees Celsius above pre-industrial levels, greenhouse gas emissions have continued to rapidly rise. Annual global emissions have risen from 53 billion tonnes to 55

billion tonnes of carbon dioxide equivalent during the past five years since the establishment of the Paris Agreement (Systemiq 2020).

Australia's national waste policies have not applied such traditional carbon pricing mechanisms to waste, yet they are similarly underpinned by an environmental economic faith in the market that does not challenge ever growing volumes of waste. Seeking relative declines in the continual growth of waste does not reflect the urgency of environmental degradation. While climate policy typically targets the energy transition, 45% of global emissions reductions will need to come from the way we make, use and dispose of products (Ellen MacArthur Foundation 2019). The volume and method of material extraction, production and disposal therefore play a key role in addressing climate change.

'New environmental pragmatism', although not synonymous with environmental economics, shares similar limitations. It differs from the philosophical school of American pragmatism based on empirical validation. Rather, the basic principle is that 'success is to be measured by political reaction': questioning the physical outcomes of politically acceptable actions is dismissed as idealist, utopian or unrealistic (Spash 2013: 354). This approach can be seen to have partly influenced Australia's national waste policies which guarantee economic growth over absolute waste reductions. New environmental pragmatism embraces simple discourse without deeper philosophical foundations (Spash 2013), mirroring the policies' emphasis on waste management after the fact at disposal without deeper interrogation of reducing material throughput from the point of production.

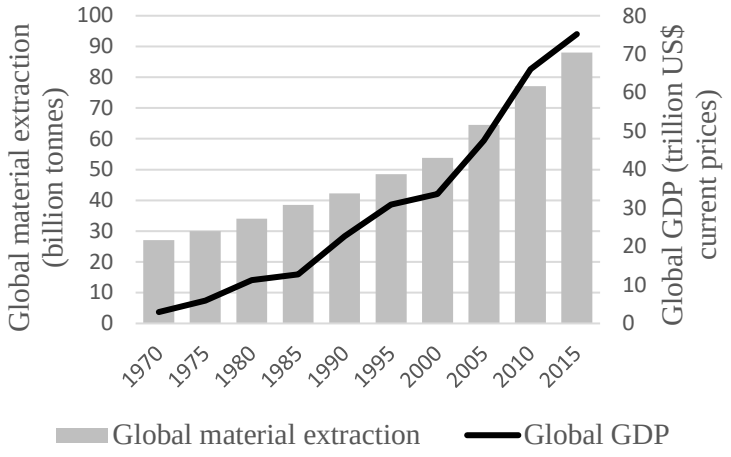
Social ecological economics

What is the alternative? A political economy approach can usefully draw on *ecological* economics as a powerful alternative to the mainstream *environmental* economic theories currently underlying the policies. Ecological economics has its foundations in physical ecology rather than market economics. In contrast to mainstream environmental economics, it places the economy as embedded *within* the environment rather than a separate sphere in which pollution is considered an externality. It is concerned with ensuring that the economy's energy and material throughput remain within a level that respects the Earth's finite *biophysical* limits, rather than internalising environmental pollution into

abstract market logic (Costanza *et al.* 2014). It regards infinite economic growth as incompatible with a materially finite Earth.

Mainstream economists argue that GDP refers to growth in monetary value and hence does not necessarily entail growth in material throughput (Krugman 2014). Indeed, the dematerialisation of production processes is gaining traction and, over time, each unit of economic output has required less energy input: global energy intensity has decreased by about 25% since 1980 (Jackson 2017: 88). However, from an ecological economic perspective, what matters is whether these improvements in production efficiencies translate into an *absolute* rather than *relative* decline in material throughput. The debate over the relative versus absolute decoupling of economic growth from material throughput is long lived. In the 1970s, Kenneth Boulding, a pioneer in ecological economics, famously testified before the U.S. Congress that 'anyone who believes that exponential growth can go on forever in a finite world is either a madman or an economist' (U.S. Congress 1973: 248).

Figure 1: Global extraction of materials and global economic growth, 1970 – 2015



Source: IRP (2019), World Bank (2019).

In terms of Australia's national waste policies, advances in waste recovery and sustainable production methods have not reduced absolute waste volumes. An absolute decline would require the rate of material production efficiency gains to be greater than the rate of growth in production itself. This has neither occurred on a global, nor national level (Jackson 2017). Globally, the rate of extraction, production and consumption of resources has rapidly grown alongside economic growth. Figure 1 above shows this relationship, indicating that economic growth is yet to be decoupled from growth in material extraction.

The extraction of resources has tripled since 1970 and is predicted to reach levels that far surpass the Earth's ecological capacity by 2060 at current rates (IRP 2019). As the material requirements of economic growth continue to grow, the Earth's capacity to absorb waste is diminishing (Spash 2017). Responding to this mounting crisis, many ecological economists advocate a 'steady-state economy', limiting energy and material throughput to a level that respects the environment's finite biophysical limits (Spash 2017). However, many are reluctant to reject mainstream market economics while pursuing a steady state economy, given its pervasiveness in policy making. Differentiating between positions like these, leading ecological economist and former CSIRO climate scientist Clive Spash coined the term *social* ecological economics to define the stream that is unapologetically oriented to unorthodox heterodox economics.

The notion of the 'circular economy' illustrates the distinctly different positions of mainstream and social ecological economists. On its surface, a circular economy represents the ecological economic principle of a steady state economy. It posits an end to the linear flow of materials ('take-make-use-dispose') and a transition to a circular material flow in which repairing, re-using, re-manufacturing and sharing keeps products in use as long as is materially possible, in the attempt to design out waste and pollution. The circular economy concept emerged in academia in the 1960s and has more recently been incorporated into policy making, as will be explained in analysing Australia's 2018 waste policy. While mainstream ecological economists embrace its political popularity, *social* ecological economists caution against its co-option and watering down by industry and government. It has in some cases led to superficial rhetoric with an emphasis on commodifying waste as cheap input for further increased production volumes.

World-ecology

Social ecological economics can usefully be combined with the heterodox analysis of ecological Marxist scholar Jason Moore. Most ecological Marxists characterise capitalism as having a destructive impact on nature, but Moore opposes this dominant narrative. Instead, he argues that nature does not exist as a singular object external to society or economic activity (2015). In challenging the dichotomy of *the environment* and *the economy*, he argues that capitalism and nature are not ontologically separate and are in fact 'world-ecology' (2015). Economic activities are themselves ecological in that they use and produce the environment, as opposed to negatively acting upon it. In other words, cities are no less 'the environment' than is a national park.

This world-ecology viewpoint has implications for the social ecological economic focus on material throughput. Rather than a view of material throughput being a linear process from resource extraction to waste disposal, the emphasis is extraction and disposal necessarily being embedded within one another. Moore's dismantling of the dichotomy between nature and the economy informs this article's dismantling of the dichotomy between waste and product. It challenges the common view that products are part of daily life, while waste is somewhere 'out there'. Just as sociologist Phillip McMichael says that we have 'food from nowhere' (2010: 612), in that we are alienated from – and oblivious to – the origin of ingredients within processed food products, our waste also 'goes to nowhere' as we are similarly alienated from the fate of our waste after it is disposed of – out of sight and out of mind.

Reconceptualising waste as the production process itself leads to a reimagining of waste management. It raises questions over where to draw the line between when a product becomes classified as waste, illuminating the inherent connection between production and disposal. The combination of *social* ecological economics and this world-ecology perspective provide the theoretical lens for this article's conception that the production of products *is* in fact the production of waste.

The 1992 Waste Strategy

The *1992 National Waste Minimisation and Recycling Strategy* was Australia's first national approach to waste. It was part of the *1992*

National Strategy for Ecologically Sustainable Development, which was developed at a time when sustainable development was becoming increasingly popular in international environmental governance. Sustainable development had by that time been transformed from its original 1970s anti-growth intent to a pro-growth decarbonisation approach that has been described as allowing corporate leaders and politicians to claim green credentials for economic growth agendas (Paton 2008: 95).

The term sustainability had its roots in the steady-state economy, with its focus on reducing material throughput to *respect* the Earth's limits, before it was gradually embraced by government and industry to signal *conquering* the Earth's limits through technical innovations that *sustain* economic growth and its associated consumption patterns (Paton 2008). In the context of limited local council kerbside recycling systems, the *1992 Waste Strategy* focused on recycling as the solution to overcoming the environment's finite capacity for waste assimilation while maintaining growing consumption.

One of its key targets was to divert 50% of landfill waste (on 1991 levels) to recycling facilities by 2000 (CEPA 1992: 4), a target that proved unsuccessful in practice as the landfill diversion rate reached 52% only as late as 2006-07 (EPHC 2010). Improving kerbside recycling was certainly an important development for waste management. Yet, targeting consumer disposal behaviour offered a straightforward policy approach, being the most commonly visible part of the waste process and least challenging to sustained growth in production. The strategy of isolating waste policy at the point of consumer disposal had major shortcomings, as the following two examples of packaging and consumer education show.

The National Packaging Covenant

The *1992 Waste Strategy* set a target to reduce packaging waste by 50 kg per capita by 2000 on 1991 levels (CEPA 1992: 32). This involved voluntary agreements with packaging industry associations which developed into the National Packaging Covenant (NPC). The NPC, now known as the Australian Packaging Covenant, is a public-private partnership that aims to share the responsibility of reducing environmental impacts from packaging. It was established in 1999 as the target year of 2000 was nearing and little had been achieved.

The governance structure of the NPC did not promote industry action. An NPC Council oversaw the management and implementation of its operations, with unanimous Council agreement required to make any amendments. The NPC Council was disproportionately made up of powerful industry representatives, including only two local government members (Boomerang Alliance 2004). Furthermore, half of the Council membership was made up of industry members who had a history of campaigning against producer responsibility reform as part of an industry group that had collectively been labelled the 'Waste Club' by environmental activists (Boomerang Alliance 2004). These Council members included the Beverage Industry Environment Council, the Australian Retailers Association and the Australian Food and Grocery Council (Boomerang Alliance 2004). For example, the Beverage Industry Environment Council stalled the New South Wales State Government's attempts to introduce a beverage container deposit scheme for three decades in exchange for modest funding for litter reduction campaigns (White 2015). This type of behaviour was representative of the NPC Council membership, which strategically excluded consumers and environmental groups (Boomerang Alliance 2004). Its industry-dominated structure allowed it to target packaging waste at its point of disposal at the expense of taking responsibility at its point of production.

Drawing on Moore's world-ecology perspective helps to illuminate the NPC's conception of packaging waste as consumer litter rather than industry-produced waste. One of the core foundations of the NPC was the notion of 'shared responsibility', as opposed to industry responsibility (NPC 2005), resulting in a shifting of accountability away from industry and onto consumers. This can largely be attributed to the *1992 Waste Strategy's* conception of waste as a moment of disposal abstracted from production. Moore (2015) argues that framing pollution as separate to the economy entrenches the singular abstractions between the economy and the environment. This ontological separation results in detaching environmental actions from infinite economic growth.

A link can be made between this framing of pollution and the NPC's framing of packaging waste as consumer litter. It resulted in the principle of 'shared responsibility' being implemented as 'consumer responsibility'. Action plans and targets were left to producer discretion, which meant that producers who set harsher targets risked being put at a commercial disadvantage relative to other NPC members. Therefore, producers strategically set action plans that provided vague commitments, using

unspecific language such as ‘encourage’, ‘promote’ and ‘as appropriate’, and focused on encouraging consumer recycling instead (Boomerang Alliance 2004: 26). This has been a long-standing approach of the packaging industry – for example, the *Do the Right Thing* campaign of the 1980s which targeted consumer littering behaviour. Ironically, that campaign was launched by the packaging industry that was responsible for the ever-increasing production of excessive packaging it was encouraging consumers to reduce (Four Corners 2003).

Education campaigns

In its strategy to address municipal solid waste, the *1992 Waste Strategy* deployed government-led consumer education campaigns. It was asserted that a ‘lack of consumer information about waste minimisation and recycling’ was one of the key barriers to waste reduction (CEPA 1992: 14), which can be seen as underpinned by a mainstream environmental economic approach. The solution prescribed was consumer behavioural change campaigns. While this was a valuable action in itself, its overemphasis on consumer responsibility sidelined the importance of addressing the supply-side of waste generation, such as the staggering growth in production of single-use products emerging at the time.

From an environmental economic perspective, demand signals in the market are seen as the most efficient way to reach sustainable outcomes, assuming there are correct price signals and sovereign consumers have full information. The *1992 Waste Strategy’s* education campaigns aimed to passively manipulate consumer demand for recyclable products and thereby influence producers to alter supply. This is often referred to as consumer ‘nudging’. Nudging is a method favoured by environmental economists as it attempts to change consumer behaviour without ‘command and control’ government intervention (Spash and Dobernig 2017).

However, neoclassical environmental economists fail to see the ‘sovereign’ consumer in the context of institutional power and societal norms. From a *social* ecological economic perspective, producer power can generate demand often more powerfully than consumer demand can generate supply. Business ‘nudging’ has historically been more powerful than government ‘nudging’ because businesses occupy a culturally dominant position in consumer behaviour. This position includes large

marketing and consumer research departments dedicated to consumer 'nudging', with far reaching tactics such as subtle product placements in media entertainment (Spash and Dobernig 2017). While government-led consumption campaigns did have an impact, passively competing with highly funded industry campaigns alone did not address the rapidly increasing production, consumption and disposal of municipal solid waste.

The education campaigns were executed in the manner of 'new environmental pragmatism' that presented recycling as a simple solution. For example, suburban Sydney's local government Kogarah Municipal Council implemented the *1992 Waste Strategy's* education campaigns with its new waste service in 1999. The new service included fortnightly bin collection of co-mingled recycling, which replaced the previous recycling crates that were one quarter the size. The education campaign came in the form of a video delivered to 14,000 households featuring famous Australian actor Michael Caton (Planet Ark 2005). The campaign used simple and entertaining messaging intended to raise awareness, thereby framing growing municipal solid waste as a problem to be fixed through consumer behavioural change. The annual collection of recyclable waste per person in the Municipality of Kogarah increased from 75 kg in 1998 to 108 kg in 2000, which the Council attributed to the 'success of the multi-media campaign' (Kogarah Municipal Council 2005: 3). What was not widely communicated was the fact that increased recycling rates were offset by increased total municipal waste generation.

This local case study reflects the broader national impact of the *1992 Waste Strategy's* education campaigns. In spite of the increase in landfill waste diverted to recycling facilities, absolute waste generation rose over the policy's lifespan, with a particularly rapid increase in single-use material consumption. The first *National Waste Report* found that by 2006-07 municipal solid waste was contributing more to landfill than commercial and industrial, or construction and demolition waste (EPHC 2010).

The 2009 National Waste Policy

The *2009 National Waste Policy: Less Waste, More Resources* was established in an effort to renew the momentum in taking a national approach to waste. The *1992 Waste Strategy* had contributed to the establishment of local, State and Territory waste legislation which amounted to a patchwork of various approaches lacking national cohesion.

The 2009 policy aimed to set a clear 10-year national direction for waste management. However, it did not set a specific waste reduction target and, over the policy's lifespan, absolute waste volumes increased from 53.7 Mt in 2009-10 to 74.1 Mt in 2018-19 (ABS 2013; BEC 2020).

This second iteration of national waste policy took into account the material changes of Australia's waste stream. Two types of waste that were targeted were e-waste and organic waste. E-waste had become Australia's fastest growing waste stream, growing three times faster than the rate of standard municipal solid waste (EPHC 2010), while organic waste presented an opportunity to incorporate waste management into climate policy (EPHC 2009).

Despite the new momentum, there was a continuity with the previous policy in targeting waste at its point of disposal. The title of the policy signalled its reluctance to reduce the ever-increasing material throughput; 'Less Waste, More Resources' (EPHC 2009) implied that waste was to be reduced (less waste) while sustaining growth in production volumes (more resources) via material recovery and recycling for re-manufacturing. The following two examples of the policy's approach to e-waste and organic waste demonstrate this ontological continuity in the policies from 1992 to 2009.

The Mobile Muster product stewardship scheme

Product stewardship was the key strategy employed to target e-waste. It is an approach which relies on all actors involved in the entire lifespan of a product taking shared responsibility for its environmental impact. Just like the NPC, this took the form of shifting responsibility away from producers and onto consumers. The outcome of this strategy was the *2011 Product Stewardship Act*, which had three types of product stewardship arrangements: mandatory, co-regulatory and voluntary. To date, there are no mandatory arrangements (DAWE 2021), demonstrating a lack of enforced producer responsibility.

Mobile Muster is an accredited voluntary arrangement for mobile phone recycling (DAWE 2021). It is managed and funded by the Australian Mobile Telecommunications Association, which is made up of major handset manufacturers, service providers and retail outlets such as Optus, Telstra, Samsung and Apple (Mobile Muster 2018). It provides recycling boxes for used mobile phones with about 3,500 drop-off points across the

country. Once the mobile phones are collected, they are recycled by Mobile Muster's partner True End to End IT Lifecycle Solutions, a global e-waste recycling company with facilities across Asia, Europe, the United States and Oceania.

Mobile Muster increased its number of collected mobile phones and batteries from 250,000 in 1998 to 1.2 million in 2018, which seems like a clear-cut success (Mobile Muster 2018: 7). However, when framing e-waste as production itself, it becomes evident that these collection rates were synonymous with larger volumes of mobile phone production and purchases. For example, mobile phone penetration in Australia's population jumped from 76% to 91% from 2014 to 2019 (Deloitte 2019). Mobile Muster cites that there are currently about 25 million unused mobile phones being stored in homes across Australia, and of that, only 5 million are actually broken and no longer functional (Mobile Muster 2020).

Rather than exploring why 20 million functioning mobile phones are not being used, criticism is levelled only at the fact they have not been delivered for recycling. This does not challenge the underlying cause of millions of functioning mobile phones remaining stored and unused, which can largely be attributed to the high turnover rate in mobile phone consumption encouraged by Mobile Muster members. For example, the strategic regular release of newer models often with slight upgrades or new charging cables, or Apple openly admitting to deliberately decreasing mobile phone lifespans by slowing down the processors in older iPhone models as their batteries wore out (McMahon 2017).

Not only is increased mobile phone recycling connected to increased mobile phone production, but the former may actually encourage the latter. By drawing on Moore's emphasis on how nature works *for* capitalism rather than what capitalism does *to* nature (2015), a link can be made to the way e-waste works *for* mobile phone production rather than simply being its by-product. Mobile Muster's recycling drop-off points may actually increase sales, and hence work *for* mobile phone production. Drop-off boxes are spread across 2,000 retail stores and 400 local councils (Mobile Muster 2018) – a strategic disproportionate placement that is conducive to increasing store sales.

Mobile Muster's advertising is centred on romanticising consumer recycling, thereby negating feelings of guilt associated with new mobile phone purchases. This is demonstrated by its website heading; 'Do good

for tomorrow, recycle your old mobile today' and the accompanying introductory video that closes with: 'so next time you're getting a new phone, don't forget the old one' (Mobile Muster 2020). This overtly encourages people to dispose of old mobile phones on their way to purchasing new ones. The simple messaging represents 'new environmental pragmatism' in its approach to e-waste which does not consider the environmental implications of simultaneously increasing recycling rates with production and sales rates.

Consumer psychology experiments have demonstrated the causal link between increased access to recycling and increased wastefulness due to reduced feelings of guilt. For example, one well-known experiment found the average daily usage of restroom hand paper towels increased by half a paper towel per person within the presence of a recycling bin (Catlin and Wang 2013). Behavioural findings like these caution against initiatives that solely emphasise the benefits of recycling without also addressing the need for absolute reductions in consumption.

The Landfill Gas Method

In 2009, organic waste accounted for almost two thirds of all waste sent to landfill (EPHC 2009), raising concerns over its effect on greenhouse gas emissions, given its release of methane when decomposing in the anaerobic environment of landfills. The *2009 Waste Policy* combined organic waste management with climate policy in its strategy to include landfill emissions in the then-proposed Carbon Pollution Reduction Scheme (EPHC 2009). Although the scheme did not eventuate, the 2009 policy created the momentum for the *Landfill Gas Method* in 2015.

The *Landfill Gas Method* sits under the Emissions Reduction Fund which developed in 2015 as a voluntary scheme providing incentives for industry to reduce emissions. Fund participants earn Australian Carbon Credit Units (ACCUs) per tonne of carbon dioxide equivalent reduced or stored, which can then be sold to generate income or meet environmental compliance requirements. The *Landfill Gas Method* credits projects that eliminate methane gas generated by the anaerobic decomposition of organic waste in landfills. These projects collect and transport methane gas to combustion devices via a system of embedded landfill pipes. There are currently over 130 landfills in Australia capturing and combusting

methane to generate electricity for sale in the grid (Clarke and McCabe 2017).

From the physical perspective of social ecological economics, it is important to note that these landfill capture and combustion projects result in the generation of carbon dioxide. The combustion of methane does not eliminate greenhouse gases but converts methane into carbon dioxide. Indeed, methane has 25 times the global warming potential of carbon dioxide (EPHC 2010) and its emissions from landfill have led to some countries such as Sweden and Finland banning organic waste from landfills all together (KPMG 2018).

However, the *Landfill Gas Method* rewards the generation of energy from landfill methane and does not include incentives for reducing absolute organic waste to begin with. Registered projects can claim ACCUs for their abatement and earn income in a policy tactic that has commonly been described as paying polluters to pollute less. Abatement assumes the waste already exists and merely seeks a relative decline in emissions. This approach arises from abstracting waste from its moment of production and reducing it to a moment of disposal with no prior history.

In the absence of measures to reduce absolute volumes of organic waste, landfill capture and combustion projects achieve a *relative* decline in the growth of emissions from organic waste. Solely scaling up the number of landfill capture and combustion projects alone does not require any reduction in total organic waste (Boomerang Alliance 2019). It may even secure continued rates of organic waste being disposed at landfills, as projects must secure long-term feedstock contracts which require ongoing access to large amounts of organic waste to maintain viability. Meanwhile, one fifth of bought food continues to be thrown out in Australia each year (Food Bank 2021).

The 2018 National Waste Policy

The third iteration of national waste policy, the *2018 National Waste Policy: Less Waste, More Resources*, was largely a crisis response to China's ban on its waste imports. After previously importing and recycling about half of the world's total paper and plastic waste (de Freytas-Tamura 2018), China announced its *National Sword Policy* comprising a set of strict contamination thresholds on imported waste (Downes 2018). Given the difficulty in meeting the new thresholds, they materialised as bans. For

example, the contamination threshold for paper and plastic was reduced to 0.5% which is a level of purity that is currently almost impossible to achieve, requiring every plastic bottle to be lid- and label-free prior to export (Downes 2018).

The ban affected the annual 1.27 Mt of waste Australia was exporting to China, including 29% of kerbside collected recyclable paper and 36% of kerbside collected recyclable plastic (BEC 2018a). It resulted in the mass stockpiling of waste by recycling operators who lacked sufficient physical capacity and funds to process or sell the waste (BEC 2018b). Many operators closed their doors to local councils such as Queensland's suburban Ipswich City Council that temporarily diverted all of its collected kerbside recyclable content to landfill (Hyam and Roe 2018).

In response to the changing global waste trade, the *2018 Waste Policy* and the subsequent *2019 Waste Action Plan* provide a guiding waste management framework up to 2030 and signal a policy shift that 'embodies a circular economy, shifting away from take-make-use-dispose material flows' (COAG 2018: 3). Unlike the preceding national waste policies, the 2018 policy can be viewed as a step in the right direction in taking a more holistic approach to waste, i.e. applying circular designed products and methods of consumption that involve extending the material longevity of products, and introducing business models that shift away from single-use ownership to sharing platforms. While it is too soon to assess the policy's outcomes, it is important to develop an analysis of the policy's use of the circular economy concept, recognising that its adoption without clearly defined environmental goals or scientific foundations can lead to the risk of superficial rhetoric without substantive action (de Jesus and Mendonça 2018). The following sub-sections of this article probe these concerns.

The circular economy as the international waste trade

The framing of China's waste trade has important implications for waste policy. A popular narrative that has prevailed is that official waste exports were being dumped onto an unwilling China. For example, media reactions to China's ban included *The New York Times* referring to China as 'the world's garbage dump' (de Freytas-Tamura 2018) and *Al Jazeera* observing that it 'has left nations scrambling to find new dumping grounds' (Thomas 2018).

Notwithstanding its environmental and ethical consequences, the entire waste trade should not be regarded 'dumping' as this dismisses the fact it is a *trade* that has an intimate connection with the trade of products. The physical flow of materials - as both goods *and* waste - crosses geographical boundaries. An illustrative example of this comes from Donald Trump blaming China for waste that floated into the west coast of the United States (Parker 2018). Solely assigning responsibility to China for this waste generation overlooks the fact that the U.S. is the largest importer of goods *from* China and the largest exporter of waste *to* China (Minter 2013: 8). This circular flow of materials is no coincidence.

The circular economy can ironically be seen as the international waste trade from which the *2018 Waste Policy,* with its new waste export ban, is ostensibly trying to become independent (COAG 2019). The history of China's waste trade embodies an international circular material flow that utilises waste recovery as an input for expanding production and further waste flows. China's waste imports grew in tandem with its manufactured exports in the 1980s, serving as more cost-effective production inputs than virgin material imports (Minter 2013). For example, imported waste metal accounted for 22% of China's copper production in 1980, 38% in 1990 and 74% in 2000 (Minter 2013: 78). Over time, increasing volumes of China's exports came back in the form of waste imports that were in domestic demand for recycling and re-manufacturing.

This circular movement of waste and products is further illustrated by the location of manufacturing and recycling hubs within China. Some of the world's largest manufacturing hubs are strategically located near some of the world's largest recycling hubs in Guangdong Province. For example, the cities of Shenzhen, Guiyu and Mayong have been described, respectively, as the 'world's factory', one of the biggest e-waste recycling hubs, and one of the biggest manufacturing hubs for recycled cardboard (Minter 2013). This spatial proximity enables efficient transportation from recycling facilities to factories for re-manufacturing in a circular material flow. In fact, Australia's recyclable waste exports were already shifting away from China before the implementation of its ban, as they were moving in tandem with the shift of many manufacturing hubs outside of China (Greenpeace East Asia 2019).

As Australia's top trading partner, China accounted for 24.5% of Australia's total imports in 2018-19. (DFAT 2019). Being a major importer of manufactured products, simply banning the export of recyclable waste

without addressing imported material will not reduce Australia's absolute waste volumes. In order to achieve truly circular material flows policy attention should also be paid to imported material, for example through minimum standards and specific material prohibitions.

The physical limits of recycling

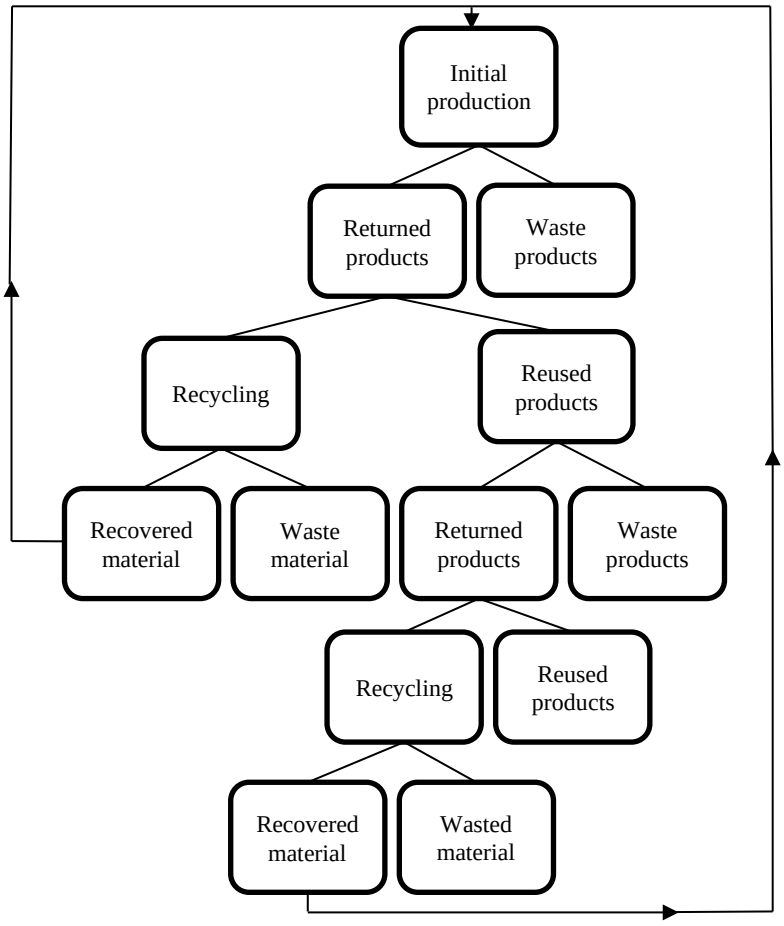
The *2018 Waste Policy* positions recycling as a key component in its circular economy approach. While recycling has come to signal environmental sustainability, its non-environmental origins still remain present today and have contributed to its common over-emphasis as a sole solution. Expanding recycling is certainly a valuable policy tool, yet it is critical to simultaneously pay attention to the overall material throughput of the economy. Historically, recycling has largely been economically driven (Minter 2013). The *2018 Waste Policy* can be seen to adopt the circular economy in a way that connects production and waste via profit, through seeking to commodify recycled waste as input for increased production volumes. In this way, the historical roots of recycling continue today.

The recycling industry did not originally have an environmental image. In fact, the word *recycling* was only invented in the 1920s, although its history stems much further back (Minter 2013). Its origins lie in the actions of waste pickers driven by an economic motive for income, and factories driven by the cost savings offered from recycled inputs used in manufacturing. In the British colonial economy of nineteenth century Australia, leftover waste was often dumped at sea or in dumping grounds such as Sydney's now Moore Park, the city's first communal dumping ground (EPHC 2010). Waste pickers went through dumping grounds and offered recovered waste material to factories for re-use in what was known as 'grubbing' rather than recycling (EPHC 2010). This practice continues today, particularly but not exclusively in waste importing countries. Self-employed waste pickers were, and are, mostly driven by a need for income rather than environmental concern.

Perpetuating a solely 'green' account of recycling misses some significant grey areas in terms of how effective recycling actually is. Firstly, almost nothing is 100% recyclable (Minter 2013). Almost all recycling results in some amount of waste; valuable parts of products are recycled while non-valuable parts are discarded, for example specific valuable materials in

electronic devices. This is downplayed in the *2018 Waste Policy* which refers to a 'circular economy that eliminates waste' (COAG 2018: 7).

Figure 2: Realistic representation of a circular economy



Source: Figge and Thorpe (2019: 64).

From an ecological economic perspective, what matters is the resulting total material waste in the ecosystem. Figure 2 above represents a more accurate representation of a circular economy, with wasted material occurring throughout the circular flow. For a circular economy to reduce absolute waste, a simultaneous reduction in the initial production stage of the economy would need to occur.

Secondly, most materials cannot be recycled infinitely. For example, most paper can be recycled up to six times and most plastic up to three times (Minter 2013) due to the occurrence of polymer degradation causing long fibres to break down into shorter and less useful fibres (Göpferich 1996). In this way, recycling can be considered a form of 'down-cycling' into less and less recyclable material. The finite recycling of resources is emphasised by ecological economics. Kenneth Boulding famously said that 'we cannot turn pots back into clay' (Cato 2011: 75). This is not to disregard the benefits of recycling, but to caution against its exaggeration as a fix-all solution.

With its grounding in the physical outcomes of environmental policy, social ecological economics draws on thermodynamics, which is a branch of physics that deals directly with the transformation of energy and matter. The key implications of thermodynamic laws for waste management and the circular economy are that the environment's natural resources are finite, that what has already been extracted and produced cannot be removed from existence, and that all real processes cannot be reversed (Mayumi 2017). With 100 billion tonnes of material entering the global economy every year and only 8.6% of it being cycled back into production processes for a finite number of times (Circle Economy 2021), increased circular material flows must be coupled with absolute declines in excessive production in order to respect ecological limits.

However, the 'new environmental pragmatism' implicit in the way that the *2018 Waste Policy* adopts the circular economy seems to ensure the sustainability of infinite growth in production and consumption. The policy proposes that a 5% increase in the material efficiency of production could contribute $24 billion to Australia's GDP (COAG 2018). This prioritises political validation over significant waste reductions, connecting production and waste in a way that, in fact, supports sustained growth in accumulation. Evidence suggests that increases in the material efficiency of production are unable to outpace the material growth in production required for an absolute decline in waste (Jackson 2017). For

example, the increased recycling rate from 52% in 2006-07 to 60% in 2018-19 was swamped by the increase in absolute waste generation from 43.8 Mt in 2006-07 to 74.1 Mt 2018-19 (EPHC 2010; BEC 2020).

While it is true that circular economy principles may achieve a *relative* decoupling of resource consumption from economic growth, they do not aim for an *absolute* decoupling. The Australian Government's position on decoupling has been articulated by current Prime Minister Scott Morrison who claimed that 'we don't believe we have to choose between our environment and our economy' (Mason and Butson 2019). In fact, the lack of evidence for absolute decoupling suggests that not prioritising policies' environmental outcomes over physical economic growth leads to ever-increasing volumes of waste.

While the circular economy is a step in the right direction towards unifying production and waste, it is often co-opted by governments as a 'workable' approach emphasising waste recovery as a means for sustaining economic growth, rather than a 'disruptive' approach that challenges the increasing material growth of the economy (de Jesus and Mendonça 2018: 75). Just as carbon trading markets provide profit-making opportunities and have been described as 'accumulation by decarbonisation' (Bumpus and Liverman 2008: 142), the Australian waste policy's circular economy rhetoric may be described as 'accumulation by recycling'.

Conclusion

Environmental governance too often targets waste after the fact at its point of disposal, rather than addressing producers at the point of production. Within a materially finite environment, infinite growth in resource extraction and waste generation is incompatible with ecological limits. Domestic waste volumes have grown rapidly over the course of Australia's three national waste policies, from 32.4 Mt in 2002-03 to 74.1 Mt in 2018-19, which is enough physical waste to fill over 130,000 Olympic swimming pools (EPHC 2010; BEC 2020).

The policies have sought a relative rather than absolute decoupling of economic growth from waste generation. Historical evidence shows that the relative dematerialisation of production alone has not led to absolute declines in material throughput on any meaningful scale in practice (Jackson 2017). Reckoning with this has political implications for the pursuit of infinite economic growth. Reconceptualising the production of

valued products as the simultaneous production of what will eventually become waste will inevitably generate opposition from within the structures of capitalism that create its economic growth imperative.

Calls to end the pursuit of infinite economic growth are commonly labelled utopian. Mainstream economists readily admit the environmental shortcomings of the current model of growth, yet often argue there are no viable alternatives and offer relative decoupling as a solution. However, this would be the equivalent of 'an engineer who admitted their bridge was clearly defective, and also prone to collapse, but argued you should still use it because there is nothing better available' (Spash 2017: 7). The absence of evidence for absolute decoupling in practice implies that absolute waste reductions are incompatible with what environmental activist Greta Thunberg has called the 'fairytale of eternal economic growth' (Chasan and Wainer 2019).

As the resources required for continued economic growth become scarcer, the Earth's capacity to absorb and withstand waste is diminishing. This article has offered an alternative conceptualisation of waste as an act of production as opposed to an act of disposal, thereby attempting to dismantle the ontological separation between waste and product. This holistic understanding of waste as embedded within the production process is grounded in the understanding that it is impossible to infinitely continue extracting, producing and disposing material at current rates.

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