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ECONOMIC DEVELOPMENT JOURNAL

The Economic Development Australia Journal is produced by EDA for EDA members. Submissions are welcome from practitioners, academics and other interested parties.

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Economic Development Australia (EDA) proudly acknowledges Australia's Aboriginal and Torres Strait Islander community and their rich culture and pays respect to their Elders past and present. We acknowledge Aboriginal and Torres Strait Islander peoples as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely. We recognise and value the ongoing contribution of Aboriginal and Torres Strait Islander people and communities to Australian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

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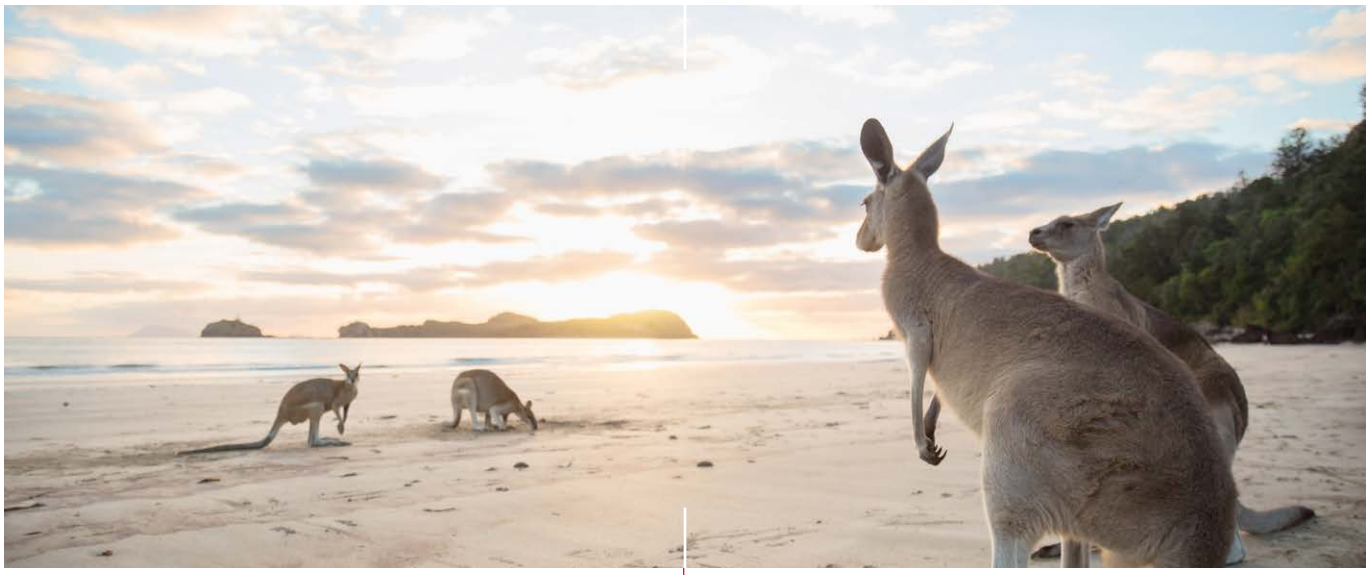

FROM THE CEO

Jacqueline Brinkman, Chief Executive Officer

As every report produced by the UN Intergovernmental Panel on Climate Change illustrates, "climate change is the defining issue of our time and we are at a defining moment". With shifting weather patterns, rising sea levels and devastating bushfires, such as the ones we experienced in Australia last summer, it is widely agreed that the impacts of climate change are global in scope and unprecedented in scale.

While climate change is of course a global issue, it is becoming more accepted that local governments and local economic development strategies can make a critical difference in efforts to mitigate environmental impacts, by embedding circular economy principles into policy levers. Local government is ideally placed to influence the use and reuse of materials in cities and regions. This can have a profound effect on the environment, health, community wealth and local job creation.

This new-look edition of the EDA journal presents the theory of circular economy, as well as a range of case studies to illustrate the power and transformative impact of local circular economy initiatives. We received a record number of submissions to publish in this EDA Journal. Thank you to all our successful authors for sharing their insights and experiences.

I recommend starting with the overview of the key principles of circular economy, provided by Dr Ian C Overton and Dr Scott V Valentine from Green Industries SA and KPMG, which provides excellent context for the range of case studies to follow.

Julie McAlpin from RDA Sydney provides an erudite article outlining the ways circular economy principles can drive production in advanced manufacturing and agribusiness.

While climate change is of course a global issue, it is becoming more accepted that local governments and local economic development strategies can make a critical difference in efforts to mitigate environmental impacts, by embedding circular economy principles into policy levers.

Using the Noosa Plastic Free Places program report, Sasha Lennon's article illustrates how local governments can implement a cost – benefit analyses to measure and report on circular economy initiatives.

Mackay Regional Council provides a fascinating overview of the sustainable economic development strategies across the Mackay Isaac Whitsunday region, and how the use of bio-precincts can drive local jobs and produce far reaching social benefits.

Churchill Fellow, Brad Mashman and Rena Dare deliver a compelling call to action for Australia to emulate the cohesive and collaborative approach to circular economy policies and system development adopted by the European Union.

RMIT Professor Lisa Farrell's article describes the wonderful, community-led initiative known as the Merrymakers Scarecrow Village. While it might be tempting to consider this case study as a 'bit of fun', I urge readers to consider Professor Farrell's advice; *"while values are not the typical domain of economists, it is increasingly important that applied economics adopt a behavioural economics framework to understand the economic and psychological based motivations of citizens."*

These are just a few of the many contributions to this bumper edition. Many thanks to all our authors, in particular to Mackay Regional Council and SC Lennon and Associates for supporting the EDA journal as authors but also our inaugural advertisers! This support will allow EDA to continue to produce quality publications and build knowledge and capacity in the economic development sector.

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DEVELOPING AN EFFECTIVE STRATEGY FOR A CIRCULAR ECONOMY

Dr Ian C Overton and Dr Scott V Valentine, Green Industries SA

ABSTRACT

There is an ever growing need, and recognition for the transition to a circular economy. Developing an effective strategy requires an understanding of the complex nature of the change required and the decision context, along with the right approach to strategy development. The economy can be considered as a complex adaptive system and therefore the transition to a new economic model requires a systems approach that considers all its interrelated elements and emergent properties. Strategy is best undertaken considering the decision context around knowledge, values and rules and applying a diversity of approaches across these areas. The strengths and weaknesses of the two more common planning approaches, top-down and bottom-up, are considered and in order to optimise efficacy and mitigate disadvantages associated with both approaches, a hybrid planning strategy is introduced that delivers a synthesised enhancement in comparison to either approach adopted in isolation.

WHAT IS A CIRCULAR ECONOMY?

The global depletion of resources continues at alarming pace with approximately 100 billion tonnes of materials being extracted each year (Carrington, 2020). From 1900 to 2015 the global rate of material extraction increased by 1,200% to 89 Gt/yr (Krausman et al., 2015). During this same time, world population increased by 460%. The security of resources for businesses and countries is becoming a critical driver underpinning the circular economy. Materials such as water, coal, oil, natural gas, phosphorous, lithium, copper, aluminium and many rare earth elements are becoming scarce (World Economic Forum, 2019).

Despite this, the global economy has been estimated to be only 8.6% circular (Circle Economy, 2020). Approximately one third of the material is added to product stock, another third is dispersed or emitted and another third is sent to waste. In Australia, our per capita consumption and waste generation is increasing. Richie (2016) found that population in Australia increased by 28% from 1996 to 2015, while waste generated increased by 170%.

Our planet cannot continue to cope with this extraction of raw materials and pollution of waste. Even in the face of the COVID-19 induced economic recession, it is estimated that we need about 1.7 planets to cover our current ecological footprint (Global Footprint Network, 2020). We have to shift to an economy that works within our planetary boundaries and regenerates our natural systems. The good news is that there is great opportunity for the nations to reduce consumption of raw materials, increase the recycling of materials and reduce material waste while growing overall prosperity.

A circular economy is one where materials are kept in use for as long as possible, reducing the use of raw materials and attenuating waste (Kirchherr et al., 2017). In this regard, it contrasts with a linear economy that is traditionally a take-make-use-dispose economy. A core tenet of circular economy thinking is to continually strive to promote high value material cycles instead of resorting to low value activities such as recycling (Ghisellini et al., 2016). Therefore, while examples of circularity can include advanced recycling methods, the pursuit of strategies around reuse, repair and remanufacturing take precedent (Kalmykova et al., 2018). All these circular solutions need to work together with water and energy efficiencies to produce a change in the whole system.

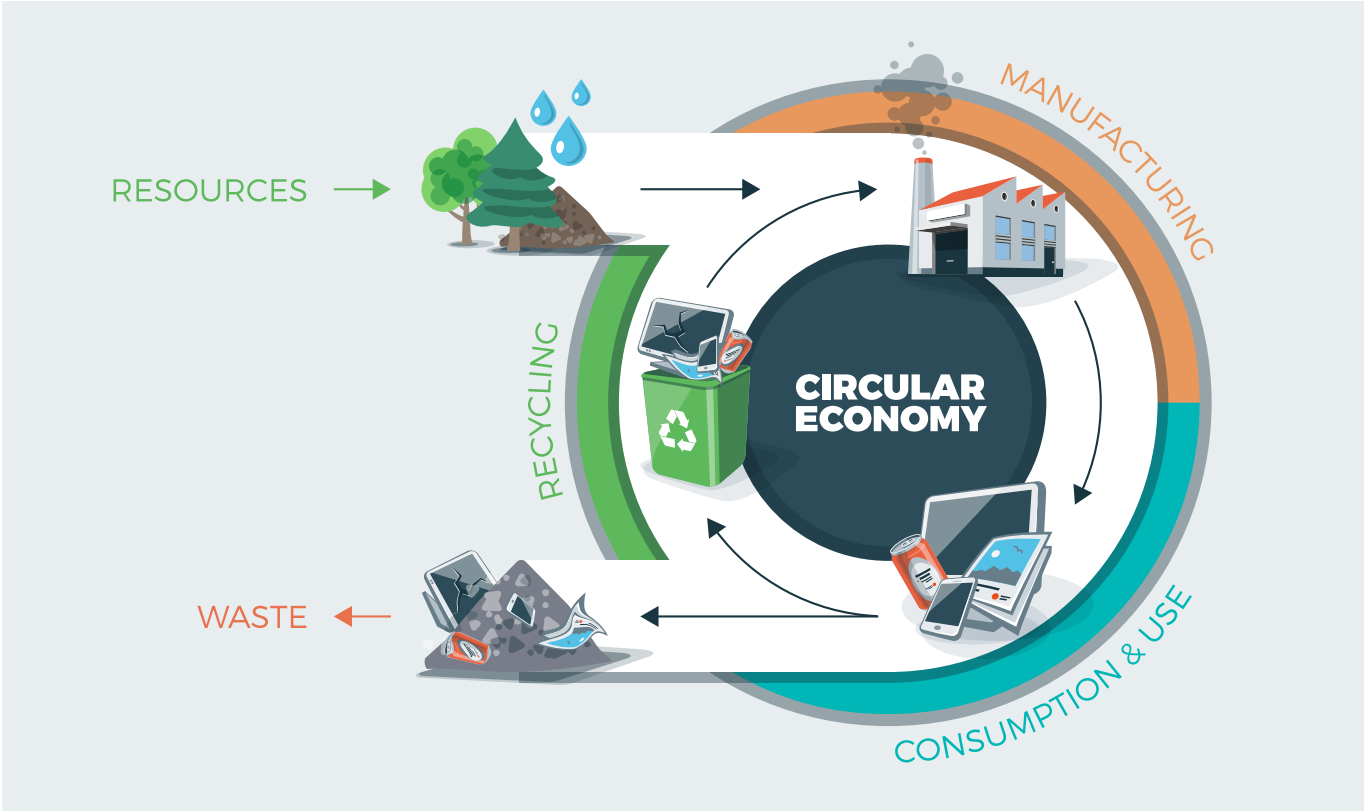
The goal of a circular economy is to live more sustainably, to value all our resources, to reduce waste and to regenerate our natural capital, when possible. These goals are not just good for the environment, but also good for our economy. 2020 has highlighted global vulnerability to unanticipated change and exposed the lack of resilience in existing economic systems. Nations can increase economic resilience to adverse environmental and global events by increasing self-sufficiency and reducing reliance on global supply chains. A greater focus on wealth creation through local productivity enhancement, rather than GDP flows, is needed.

Even in the face of the COVID-19 induced economic recession, it is estimated that we need about 1.7 planets to cover our current ecological footprint (Global Footprint Network, 2020).

Setting a circular economy vision is only the start. A commitment to reducing the use of natural resources and eradicating waste requires systematic re-alignment as our current linear economy is entrenched in current consumer behaviour, economic business models and globalisation. There is a global need to decouple economies from the consumption of natural resources and re-align business growth models from quantitative increases in sales to qualitative development of services. It is critical that a circular economy strategy is developed with open collaboration across all sectors of the economy.

PLANNING FOR SYSTEMIC CHANGE

The planning for a transitional change in the economy requires a considered approach to managing complexity. Simple problems, such as baking a cake, follow a set pattern of action and expected outcomes. Complicated problems, like sending someone into space, follow the same rules but have more steps. Complex problems, such as combating climate change, on the other hand, do not have predictable cause and effect relationships because numerous influential variables inhibit modelling accuracy (Beinhocker, 2006). In complex systems, a perfect understanding of the individual parts does not mean a perfect understanding of



the whole system's behaviour. In systems where relationships can change with feedback mechanism, the system is called a complex adaptive system. The economy is a man-made complex adaptive system and the transition to a new economic model requires a systems approach that is resilient and responsive enough to adjust to unanticipated change (Valentine et al., 2017). Being man-made should perhaps also make it easier to improve and adjust.

So how do we bring about systemic change in a complex adaptive system? A traditional change mechanism of a complicated system would define a desired future state and plan a path to that from the current state. In complex adaptive systems if you try to over-control it you will miss the new patterns emerging. 'Leaders who try to impose order in a complex context will fail, but those who set the stage, step back a bit, allow patterns to emerge, and determine which ones are desirable will succeed' (Snowden and Boone, 2007). In managing complex adaptive systems, you need to set a cluster of narratives, near to where you want the system to go, and manage for the direction and speed of change rather than for fixed outcomes (Valentine, 2013). It is also important to address multiple interventions in the system at the same time and observe the response of the system rather than only relying on traditional approaches that try to pick a few key 'winners'.

An effective circular economy strategy requires consideration of its complex adaptive nature, applying multiple interventions and flexibly manages the system as emergent properties alter development trajectories.

DEVELOPING AN ECOSYSTEM FOR CHANGE

So what are the major components of developing a governance ecosystem to support systemic change? Gorddard et al. (2016) identified three basic components of the decision context when considering change - knowledge, values and rules. These three components provide a framework for synthesising the collaborative power of numerous stakeholders. They align with the three components of the strategic triangle for creating public value: organisational capacity and productive capabilities; public value; and the authorising environment for legitimacy and support (Moore, 1995).

Knowledge includes how to do things better, the processes and methods we use, the evidence that provides the impetus for change and the strategies for measuring and improving change. Values include people's beliefs, their motivations for what is right and their world (and other) views. Rules includes the regulations and policies that guide compliance and the financial and social systems that frame economic development. These elements address: How can we do it? Why should we do it? Are we allowed to do it? When considering what is needed to support the transition to a circular economy, knowledge, values and rules, provide a framework for circular economy network development.

'Leaders who try to impose order in a complex context will fail, but those who set the stage, step back a bit, allow patterns to emerge, and determine which ones are desirable will succeed' (Snowden and Boone, 2007).

To leverage knowledge, planners and policy makers also need to tap innovation and technology to improve the way resources are used and managed and to provide the evidence for decision making. To leverage rules, they need to harness the political will to make changes and design incentives and regulations to direct development and fill network gaps. And to leverage values, they need to be inclusive and understand what motivates people, seeking consensus through consultation. A well-grounded circular economy incorporates social licenses to operate, convincing value propositions and progressive development through education.

An effective strategy for a circular economy requires strategies to integrate knowledge, values and rules, in order to optimise system integration and efficacy. Synthesising these elements establishes conditions for enhancing innovation, collaboration and responsiveness – all necessary elements for effectively managing complex adaptive systems.

DEVELOPING A CIRCULAR ECONOMY STRATEGY

Planning a circular economy strategy can be conceptualised through two opposing approaches - top-down and bottom-up. The top-down approach is characterised by a centralised hierarchy, with government planners typically at the top of the hierarchy. These planners are tasked with the process of determining who plays what role in any emergent circular economy network. Conversely, the bottom-up approach is characterised by a more organic web of stakeholder relations, where industry, not-for-profits and communities play a far more participative role in determining what elements anchor a circular economy network (Murray et al., 2009). Both of these strategies come with strengths and weaknesses.

The top-down approach has at least four key strengths (Rojas-Caldelas, 2015) that can be applied to circular economy networks:

1. It can yield more cohesive networks because government planners are able to choose which stakeholders will be involved and define the functions that each stakeholder will play in the new circular economy network;

2. It can ensure greater cohesion because planners can minimise activity overlaps that can give rise to competitive conflict between organisations.

3. Centrally planned initiatives are easier to implement because control over project management falls clearly to one overarching organisation, often the local government authority; and

4. It places government planners in a position of prime authority; thereby providing a degree of assurance that the achievement of intended goals are somewhat within the civic realm of control.

As is often the case with strategy, many of the strengths associated with the top-down approach also give rise to weaknesses in circular economy design:

1. Project development rests in the hands of comparatively few people. If those who lead the projects are not sufficiently competent, poor planning can lead to disastrous implementation;

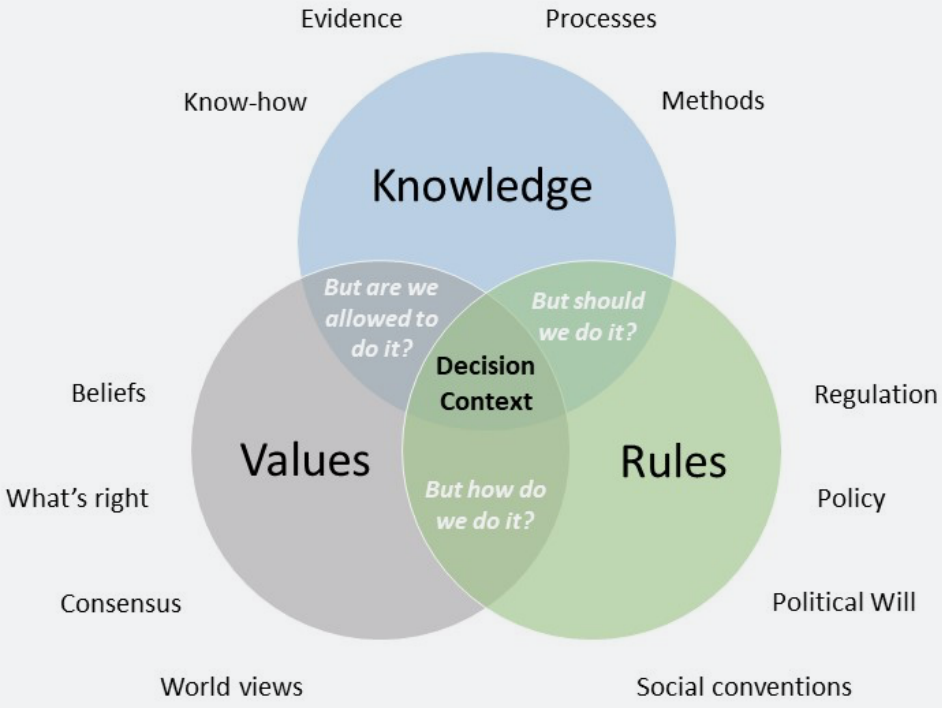


Figure 1. Ecosystem for Change KVR (Modified from Gorddard et al, 2016)

2. There is a risk of suboptimal outcomes due to only a few key decision-makers being involved, giving insufficient alternative analysis or world views;

3. Very few public, or private, organisations have the embedded competencies to effectively design networks that inclusively satisfy the vested-interests of the economic stakeholders that largely drive investment and success;

4. Plans translate into results only when businesses invest and this approach largely excludes business participation in network design and can alienate business leaders. The fortunes of investors are determined by decisions that cannot be controlled and consequently these strategies often require higher financial inducements to encourage investment.

The bottom-up approach, unsurprisingly, exhibits strengths that counter the weaknesses of a top-down approach (Healey, 1997). These elements also apply to circular economy network design:

1. It encourages participation of businesses in the creation of a circular economy network, including the companies that will ultimately create jobs and economic growth, allowing for better inclusiveness of the needs and capabilities of corporate and not-for profit organisations;

2. Competition is enhanced as businesses vie for strategic positioning within the circular economy network;

3. The organic evolution leads to a degree of overlap, enhancing competition and the resilience of the network;

4. It encourages the participation and development of local businesses, which typically have a better sense of community needs and which enhances economic returns to the community, while attenuating dissent; and

5. It builds adaptive capacity as actors learn to work together, ensuring that the network is more resilient in the face of change.

However, the bottom-up approach is far from a panacea to effective planning (Pissourios, 2014). It too has weaknesses that can be extrapolated to circular economy network building:

1. The decentralised nature is complicated by the elevated participation of stakeholders, delaying development as businesses vie for positions within the circular economy network and delay investment implementation;

2. The process can also create gaps in critical circular economy network functions. Money flows to profitable investments, so activities that are profitable can be competitively over-subscribed, with less profitable activities having less market interest or are even altogether neglected. Highly important activities such as information provision or marketplace services might not find investment support; and

3. Amidst intense competition, the seamless integration of economic activity that is necessary to support effective circular economy networks becomes more difficult to achieve.

Given both the top-down and bottom-up approaches to circular economy planning exhibit pros and cons, synthesised iterative approaches have been investigated for decades (Sabatier, 1986). In order to synthesise an effective circular economy strategy, experience and research findings suggest that three guiding principles should govern.

Firstly, include planning participation to the greatest extent possible. An ongoing developmental dialogue should take place involving industry, technology providers, academia, not-for-profit organisations, civil society and public officials. The process

commences with explication of objectives and a mapping of stakeholder capabilities and aspirations. By conducting the mapping process in this way, the 'willingness to invest' risk is attenuated because participants self-select and alliances and new innovations tend to arise.

Secondly, consolidate the emergent vision of a circular economy centrally and identify critical gaps in the network through expert panels. The initial systems mapping of the emergent circular economy should be constructed based on the input from all stakeholders. This schematic should then be subjected to expert review to optimise the components and to identify gaps. A multi-disciplinary expert panel, involving industry associations, academia, civil society, environmental groups, social groups and community members, should be enlisted to aid planners and policy makers in refining the schematic. A final process of assessment by Government planners allows a final say in coordinating the development of a circular economy network. This is important because government funding will be required to connect the network and sponsor the provision of activities that will not be provided through free market forces.

Thirdly, return to the participative planning process in order to consolidate market support. Once the system has been vetted and refined, the plan then needs to circulate back to market stakeholders. It's at this stage that stakeholders are given a final say in influencing the development of the network and given an opportunity to clarify their desired roles within the emergent system. Once this process is complete, the planning team can then begin to develop expressions of interest for Government to seed investment in requisite activity areas that the free market is not able to provide due to financial, timing or resourcing constraints.

CONCLUSION

The transition to a circular economy requires a strategy that recognises:

- The complex adaptive nature of the economy and addresses this using a systems based approach. This requires investment in not only the obvious winners but also addressing multiple points in the system at the same time while allowing emergent properties and feedback to shape its trajectory;
- That the ecosystem for change is influenced by all three components of the strategic triangle, requiring approaches that include issues with: knowledge, evidence and capacity; values and inclusive consultation; and rules and political will; and
- That there are benefits and limitations of both a top-down and bottom-up approach to planning and that a structured iterative cycling between these approaches can optimise the benefits of both.

Any implementation of a strategy requires consultation, communication, risk management, piloting, evaluation and adaptation. The last point being particularly relevant for complex adaptive systems.

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ABOUT THE AUTHORS

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Dr Ian Overton is the Deputy Chief Executive of Green Industries SA, the agency leading the transition to a circular economy, developing a vibrant zero waste environment through policy, education and innovation. He is also an Adjunct Associate Professor at the University of Adelaide with a passion for sustainability and enhancing the environmental, social and economic outcomes through strategy and implementation of the circular economy. Ian has a science background in environmental and water resource management with a Bachelor Degree and a PhD in environmental science. Ian also has an international business background in entrepreneurship and innovation with a Graduate Certificate in Management, a Diploma in Company Directorship and a Masters in Business Administration.

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Dr Scott Valentine is a senior circular economy specialist at KPMG and former Professor and Associate Dean of Sustainability and Urban Planning at RMIT in Melbourne. Scott is responsible for coordinating circular economy work within the firm and for providing expert support for projects around the circular economy. He has led major research projects in Denmark and Holland around the circular economy with an emphasis on corporate strategy and public policy design and implementation. In Australia, he leads a number of projects including the development of a vanguard online circular economy training program delivered in alliance with Hume and Kingston City Councils. Scott has over 20 years of diverse international business experience specialising in business development and organisational development.

EUROPEAN UNION CIRCULAR ECONOMICS

A RISK MANAGEMENT TOOL, A WEALTH GENERATING OPPORTUNITY AND THE MOST IMPORTANT IDEA OF THE 21ST CENTURY

Rena Dare and Brad Mashman.

Brad Mashman was a 2019 Churchill Fellowship recipient and travelled to Belgium, Sweden and the UK to study waste reduction models.

Current economic models inadequately address missed-opportunity costs arising from waste generation because determinations are made on the parts rather than the whole.

What is missing is essential systems, and systems thinking.

The role of the circular economy is to incorporate whole systems into new economic modelling, thereby establishing a new framework for value creation, which is underpinned by high level risk managements strategies.

It is a genuine economic policy challenge. The European Union (EU) worked for 30 years to incorporate sustainability and circularity principles into policy frameworks which demonstrates it is a complex public and administrative policy task. However, both the aim and outcomes are clear:

To decouple waste generation from economic growth, and to transition economic activities from primary resource extraction to materials recovery by keeping as many materials and products in supply chains and secondary markets for as long as possible whilst optimising their value/s, and minimising their environmental footprints.

In other words, to be sustainable and engage in true production efficiency where no resources are misused or misallocated.

In March 2019, The Council of Australian of Government (COAG) commenced turning its circular economic policy wheel by releasing a recyclable export ban strategy and subsequent *Recycling and Waste Reduction Bill* 2020.

The most important recommendation of our **2019 Churchill Study** investigations in Belgium, Sweden and the UK goes several rotations further and takes on the whole rather than a part:

- The Commonwealth to establish a Circular Economic Commission, with units in each state to drive substantive structural policy reform, and
- Treasury to implement taxation reform stimulating circular economic transitions.

What is evident from our investigations was all actors and practioners involved in this exciting economic transition concluded it was not fast enough. There is a genuine

sense of urgency, and competition between member EU states to decrease waste, generate new wealth and create new technological processes, reshaping the nature of the marketplace.

THE MOST IMPORTANT IDEA OF 21ST CENTURY ECONOMICS

WHY A SENSE OF URGENCY?

In the context of whole systems thinking, in the past 40 years, humans have consumed more natural resources than since we stood on two legs. According to the EU Commission, based on current resource use trends – there is simply not enough left to meet future use trends unless three new Earths are discovered!

But as those who work intimately with waste know there are millions of tonnes of materials, parts, and products in circulation that have already been invested in, comprising of valuable resources with a carbon footprint, and the potential for new economic value in the market place.

COMPREHENSIVE GOVERNMENT RESPONSE TO COMPLEX RISK

Importantly the development and implementation of the EU Commission circular economic packages of 2015, represents a cohesive response from government, industry, and civil society to eliminate and mitigate a complex variety of actual risks that have emerged -particularly as climate change impacts increase, as well as waste generation.

Current examples of poor waste management include plastic particulates in the air, ice sheets, waterways & oceans, and the human body.

Australia, US, & Russia are experiencing increasingly extended bushfire seasons resulting in high levels of resource and infrastructure loss, and all residuals being landfilled.

Regardless in Australia we continue to increase demolition and destruction of built infrastructure, products, and materials, which are known to deliver linear outcomes of irreplaceable resource depletion and extinction events.

Such outcomes are unintended consequences of 20th century linear economic policy post the Great Depression and the Second World War. The circular economic model manages complexity and is designed to deliver sovereign, commercial, human and ecosystem health risk management strategies for the 21st century.

Without prejudice, there is increasing evidence that systemic policy failure to adequately address risk, does and will continue to have a direct economic impact into the future.

For example a study produced by Plymouth Marine Laboratory, published in March 2019 titled *'Global ecological, social and economic impacts of marine plastic'*, estimates the cost of plastic pollution to global fisheries (excluding costs to other sectors i.e. tourism) at $2.5 trillion per annum.

Certain plastics/micro fibres can last for more than 100,000 + years in the environment. The economic cost and loss will be unfairly compounded over successive generations.

Circular Economic Systems thinking identifies a healthy ecosystem as essential to ongoing economic viability of the fisheries sector.

Without prejudice, there is increasing evidence that systemic policy failure to adequately address risk, does and will continue to have a direct economic impact into the future.

MACRO REFORM

The EU circular economic framework focuses on reducing high risk applicable to supply chains influenced by geopolitics,

Above: Rotor DC second-hand building materials retail outlet, Anderlecht Brussels. Rotor DC demonstrates the value of macro circular economic reform delivered through the development of Waste Directives leading to Construction and Demolition Protocols, and market realisation of higher economic value in secondary materials supply chains.

critical raw material supplies, resources, and materials, human and environmental health, consumer protection rights, and the will and needs of civil society for the benefit of future generations as inspired by the original United Nations definition of sustainability –*'meeting the needs of the present without compromising the ability of future generations to meet their own need'*.

The EU circular economy framework delivers macro-economic reform managing risk, protecting, and reshaping European manufacturing and production sectors by securing:

- internal markets for critical raw, and secondary materials supplies essential for the success and competitiveness of the manufacturing and production sectors ie. recycled plastics in Belgium flow to the car manufacturing sector, recycled metals in Sweden flow to metals producers.

- Settings for, and investment in circular innovation to secure first mover advantage for European business

- Establishing dynamic and static economic policies to ensure markets for secondary materials flows are not locked in at a low price I.e. highest value materials from the construction and demolition sectors must be prepared for re-use.

- Regional resilience by reducing the need for imports ie. increasing local suppliers and supply chain links.

- Policies to encourage European institutions and financial sectors to invest in circular economic activities.

- Certification systems that promote and build consumer confidence in the circular economic marketplace over the entire supply chain.

The EU reform is stakeholder focussed rather than shareholder focussed – it requires shifts in thinking including responsibility, participation, and cooperation. Importantly circular economic principles and definitions are well established. The world first *British Circular Economic Standard 8001:2017 Framework for implementing the circular economy an organisation's guide*, defines circular economic principles as:

- Innovation
- Stewardship
- Value Optimisation
- Systems thinking
- Transparency

To support economic transitions, the EU framework expresses clear goals and targets addressing risk and providing structural economic incentives through taxation reform to drive step process change for the manufacturer and production sectors, as well as ensuring consumers are rewarded for their economic participation in driving an authentic sustainable marketplace through reduced or no Value Added Tax rates, or refund deposit schemes.

APPLICATION OF THE HIERARCHY OF CONTROLS FROM A EUROPEAN UNION POLICY PERSPECTIVE

When the substantive EU Waste Directive framework, the centre piece of the EU Circular Economic Package 2015, is placed inside of a risk hierarchy of controls an integrated policy and practice system emerges:

Elimination: ban on prescribed materials entering landfills, landfill the last and most expensive repository for materials, ban on contamination of products destined for recycling through separate collection systems, design and prepare products for re-use and repair and highly quality recycling, requirement for longevity rather than accepting designed obsolesce, removal of single use products causing most harm and economic loss.

Mitigate: Step processes in product design phase to reduce waste outputs over entire product life span, ensure separate collection systems and processes for products and materials to optimise their secondary market value, transfer end of life management costs to producers and manufacturers through extended product stewardship requirements, investing and build recovery infrastructure as alternatives to landfilling, mandating recycled content for new products.

Review and Consult: regularly review and revise directives, application of auditable and transparent performance management systems, extensive and timely consultation with stakeholders, realistic transition time frames 1- 3 years.

Monitor: Gross and net economic value of materials re-entering the market. Number of jobs created, new enterprises, and demonstratable reduced volumes of waste and pollutants.

WEALTH GENERATION & RE-USE?

Why focus on waste? There is no better example of economic inefficiency than waste generation. All potential is lost due to the linear nature of bash, bury, burn models = end of life = end of opportunity.

Our company Recovery Tas, as owners and operators of the Recovery Shop have for 29 years recovered products and materials from the waste stream and placed them back into circulation – we are re-use and market development specialists. Daily auditing demonstrates over 40,000,000 products and parts have gone through our facility generating over $12,000,000 in new wealth. Our model has provided ongoing full-time permanent employment at a higher rate than recycling or landfill, from a Glenorchy City population base of 46,000, with an average of 157,000 visitation per annum.

Our operation is a circular economic hub.

Like all circular economic activities, the Recovery Shop operations are complex, we salvage directly from landfill, receive, pick-up, deconstruct, process and repair re-usable products and materials (waste in Australian industry terminology) into thirty three categories of sale to optimise market value, and estimate we can manage several thousand items a day – incoming and outgoing. We are just like any other retail outlet. As a circular economic hub, our outcomes are simple and measurable:

- High public participation rates and permanent gainful employment
- High volumes of audited materials, products, and parts put back into circulation
- New wealth generated
- Number of sales transactions
- Reduced landfill volume and associated cost savings
- Embedded carbon

As operators and developers of longstanding, we are envious of the EU success in driving major reform. We are not economically incentivised in any way for the high level of waste reduction we and our colleagues have achieved.

Above: A photo of Retuna

In Belgium, regional local authority settings for the re-use sector drive innovation and change. Re-use operators and retailers are paid for every kilo of material they recover and on sell back into to the market, government invests in the supportive infrastructure and disposal is penalised.

In Europe, the re-use sector is recognised as a service provider and a wealth generator, with a key role to play in the circular economy. In the Flanders region (one of three Belgium regions) €45,000,000 was generated in 2018 from 150 re-uses shops, with a base population of 5 million, employing 5,000 people. The current target is for 7 kg, per household of reusables to go to Circular Economic Shops by 2022.

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Tellingly, the most recent revision of EU circular economic packages released in March 2020, direct all activities including product design towards designing and marketing for longevity, repair, refurbishment, and subsequent reuse with low cost parts library's available for products. The EU policy directives, investment and business and society response has ensured the second hand first movement continues to grow and transform rapidly in Europe.

The photo above features Cyclup Eco-design product labelling.

Brand Belgium well understands the creative potential of the circular economy to present a heart-felt modern consumer story promoting sustainable values, as well as practically transforming discarded items into highly desirable ones, generating new wealth and new employment opportunities.

The famous Swedish re-use shopping mall Retuna, located in Eskiltuna was established by the local government investing 5 million kronor into planning and retail infrastructure, including co location of waste management infrastructure to ensure a high level of product and material interception from the waste stream . Subsequently waste diversion has significantly increased stimulating new business ventures.

Retuna has boosted tourism by attracting an additional 6000 visitors per year.

Above: Eskilstuna Tourism Brochure

The Retuna model is primarily based on private small to medium enterprises and is now firmly placed as a jewel in Brand Sweden's circular economic crown.

All re-use models including in Tasmania, Belgium, and Sweden, demonstrate that re-use represents higher economic value in the waste hierarchy, and is significantly less affected by national and international market fluctuations.

Current Australian waste management practice remains focussed on lower order activities such as recycling, land fill and emerging calls for incineration which indicates linear thinking!

WASTE LINKED TO PROSPERITY

Australia missed this opportunity in the mid 1990's. Our enhanced Tip Shop

model and others such as Revolve (Canberra) and the venerable Reverse Garbage (Sydney) were poised to develop and deliver the concepts nationally, funded by the Commonwealth and driven by new economic instruments signalling sustainable waste reform.

Unfortunately, a productivity commission erroneously determined increased waste generation was an indication of prosperity, rather than indication of future supply risks linked to finite resources, systems limits and economic loss. The roll out was stopped whereas in the EU it continued. The outcome? Australian's now throw out more than 2,700 kilo per annum, per person, (EU 800 kilos per person per annum declining) and are highly reliant upon imports.

REALISING THE GREATEST OPPORTUNITY OF THE 21ST CENTURY

The opportunities the circular economy presents for regional and urban Australia are nothing short of extraordinary. The European Union has done all the heavy lifting, and its most current frameworks can be transferred into Australian policy to ensure our systems do not need to undergo regular revisions and new and emerging business models simply replicated.

The Commonwealth Government's next circular economic rotation should be a national economic impact assessment, informing the future work of the Circular Economic Commission and its partner Treasury.

Most importantly, to maximise new wealth generation opportunities, circular economic activity should be directed towards the top end of the waste hierarchy of avoid, reduce, reuse, repair followed by lower value activities of recycle.

Without prejudice, there is increasing evidence that systemic policy failure to adequately address risk, does and will continue to have a direct economic impact into the future.

THE LAST WORD FOR A SUSTAINABLE ECONOMY

The COVID-19 and climate crisis has demonstrated high risks to the Australian economy related to imports, national production and supply capacity and loss of valuable products and materials through linear thinking. Genuine economic sustainability in a risk context works best when your production and manufacturing sectors are closest to home; and your customers can access supply within national regions, with critically important items being designed for re-use then recycling where practicable.

Both circular economic principles and economic activity is designed to mitigate sovereign, and market risk, all without comprising or impacting on the ability of earth's systems to restore and regenerate themselves, nor of humans to meet their current and future needs.

Circular Economics really is the greatest idea of the 21st Century.

B Mashman's Curchill Report is available *'A Circular Economy Blueprint - An investigation of innovative waste reduction models for dissemination in Tasmania – Belgium, Sweden and the UK* 2019' and can be accessed **here**.

ABOUT THE AUTHORS

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Rena Dare is a founding member of the Resource Work Co-operative with Brad, managing the start-up of Glenorchy and Hobart Tip Shops, as well as a start- up consultant for Mornington Park waste transfer station and is a qualified general business manager. Rena consequently worked for DPAC for 10 years in Tasmania. Rena is currently Financial Director of Recovery and specialises in operating systems, writing operations manuals, and commissioning found object art to tell the story of waste and sustainability. Rena has won multiple awards including the Queens Trust for her leading work.

BRAD MASHMAN

Brad Mashman CF Managing Director Recovery (Tas) Pty Ltd. Brad is a Churchill Fellow (A Circular Economic Blue Print-Belgium, Sweden and UK 2019) is a professional and pioneer in the circular economic waste reform space with experience and knowledge in the policy, strategic, economic and business realisation, reduction, auditing, reuse and recycling market development of all types of products and materials. Brad was previously a hydraulic engineer (shipping) and Industrial Designer.

ADVANCED MANUFACTURING, AGRIBUSINESS AND THE CONSUMER:

HOW THE CIRCULAR ECONOMY CAN DRIVE PRODUCTION AND ADD VALUE TO LOCAL ECONOMIES

Julie McAlpin, RDA Sydney

***"IF YOU EAT YOU ARE A PARTNER IN FARMING"*. A POPULAR CATCH CRY OF MANY FARMING ORGANISATIONS IN THE LATE 1980'S. BACK THEN FOOD OFFERINGS IN AUSTRALIA WERE, WELL LET'S SAY, LESS DIVERSE THAN THE RANGE OF ARTISAN PRODUCTS ON OFFER TODAY. BACK THEN QUINOA, BUCKWHEAT, AND CHIA WERE NOT COMMON HOUSEHOLD NAMES; AND SMASHED AVOCADO INFUSED WITH FINGER LIME DRESSING TOPPED WITH MICROGREENS ON SOURDOUGH WASN'T 'A THING'. YOU MAY RECALL THAT A CERTAIN DEMOGRAPHER INFERRED YOUNG PEOPLE COULD AFFORD TO PURCHASE PROPERTY IF THEY STOPPED EATING OUT AT 'HIPSTER CAFES'.**

We have come a long way since the 1980s.

The ag-tech industry, or what Austrade promotes as Agriculture 4.0, is tipped to be Australia's next $100 billion industry enabled by cloud analytics, big data and artificial intelligence. The use of drones, robotic harvesting and autonomous vehicles alongside new advances in food production and manufacturing means we are able to increase production, meet global demands, enjoy a diverse range of fresh food all year round and satisfy changing consumer trends. [1]

New modes of food production and agribusinesses are evolving from the convergence of advance manufacturing processes and smart technologies delivering greater efficiencies and adding value every step of the way.

The multiplier effect extends across every region of the country creating local jobs, contributing to place making and the social fabric and wellbeing of local communities.

Agriculture 4.0 is designed perfectly to drive a circular economy and creates a story that the community and decision makers ought to hear.

THE CIRCULAR ECONOMY & FOOD PRODUCTION SYSTEMS

A circular economy is one in which the objective is to minimise waste and extract maximum value from precious resources. In some respects, synthetic circular systems strive to mimic natural biological cycles.

Defined as a closed loop system, as opposed to a linear system, where resources are consumed and tossed away, circular systems limit waste and through recycling, or reuse keep resources in the system for as long as possible.

The waste management industry, for example is underpinned and propelled by circular economy principles. Resource recovery and the market mechanisms for recycled paper, plastic and glass are well understood; and now, interest and investment in food waste is starting to take root.

This is important because food waste is a growing problem. Around 25% of food produced is wasted before it leaves the farm costing the industry millions every year. [2]

Investment in new sustainable food production is on the rise. Smart systems of farming are being configured to design out waste and maximise productivity. This is good news because according to the Ellen

Macarthur Foundation "Changing our food system is one of the most impactful things we can do to address climate change, create healthy cities, and rebuild biodiversity". [3]

This is where Controlled Environment Agriculture (CEA) comes into the picture.

CONTROLLED ENVIRONMENT AGRICULTURE

It must be said that growing food in a climate-controlled environment is not new. Horticultural cultivars have been grown in Australian greenhouses for decades. Think protected cropping, tomatoes, zucchinis, strawberries and you get a good sense of the advantages of growing food in a controlled environment.

CEA refers to high-tech indoor food production systems enabled by new technologies and advanced manufacturing where inputs (growing substrates, light, water, heat and nutrients) are monitored and adjusted to ensure the perfect growing environment to maximise yields and eliminate waste.

CEA comes in all shapes and sizes and can utilise hydroponic, aeroponic and aquaponic growing systems. Food can be grown in converted shipping containers, repurposed warehouses, underground tunnels, car parks, roof tops and of course purpose-built facilities. As some say, "It is no longer about what you make, but how you make it". [4]

Globally CEA is big business and the examples below illustrate that confidence and investment is on the rise. Investors and entrepreneurs are looking for opportunities to establish CEA production in both rural and urban regions and it gets interesting.

Snapshot of global players[5]:

- **Plenty** is a major urban vertical farm enterprise in San Francisco. It generates revenues of around $80M and its major investor is Jeff Bezos. The company has raised $200M and in 2017 acquired an "ag hardware company" Bright Agrotech in an effort to reach field-scale production. Their farms use 99% less land and 95% less water than conventional farms.

- **Square Roots** started growing basil in 10 shipping containers in Brooklyn with annual revenues of around $20m; Kimbal Mush (Elon's brother!) is a major investor. In 2019 the company signed a deal to grow herbs in 200 warehouses owned by Gordon Food Service and the net result shortened the supply chain.

- **Bowery farming** runs two industrial sized indoor farms growing, lettuce, kale and spring onions in New Jersey. The company raised $172.5 million from leading investors and recently opened a new farm outside Baltimore city; Bowery can grow year-round without using pesticides.

- **AeroFarms** is turning local warehouses into indoor vertical farms. The New Jersey based company operates nine urban farms across the globe including in the US, Saudi Arabia, Japan and Korea. The company recently raised $500m from investors to aid its expansion.

- **Gotham Greens** in 2011 established its first local rooftop garden to provide on demand fresh produce for local cafes and restaurants in Brooklyn NYC. The company, now a network across the USA, generates annual revenues in excess of eight-figures.

- **Alesca Life Technologies** a Chinese based enterprise is turning used shipping containers and vacant urban infrastructure into highly automated, indoor hydroponic urban farms. There are now hydroponic farms in China, the United Arab Emirates and the company has signed agreements to deliver over 1000 container farms across projects in China, the Middle East, and Southern Africa.

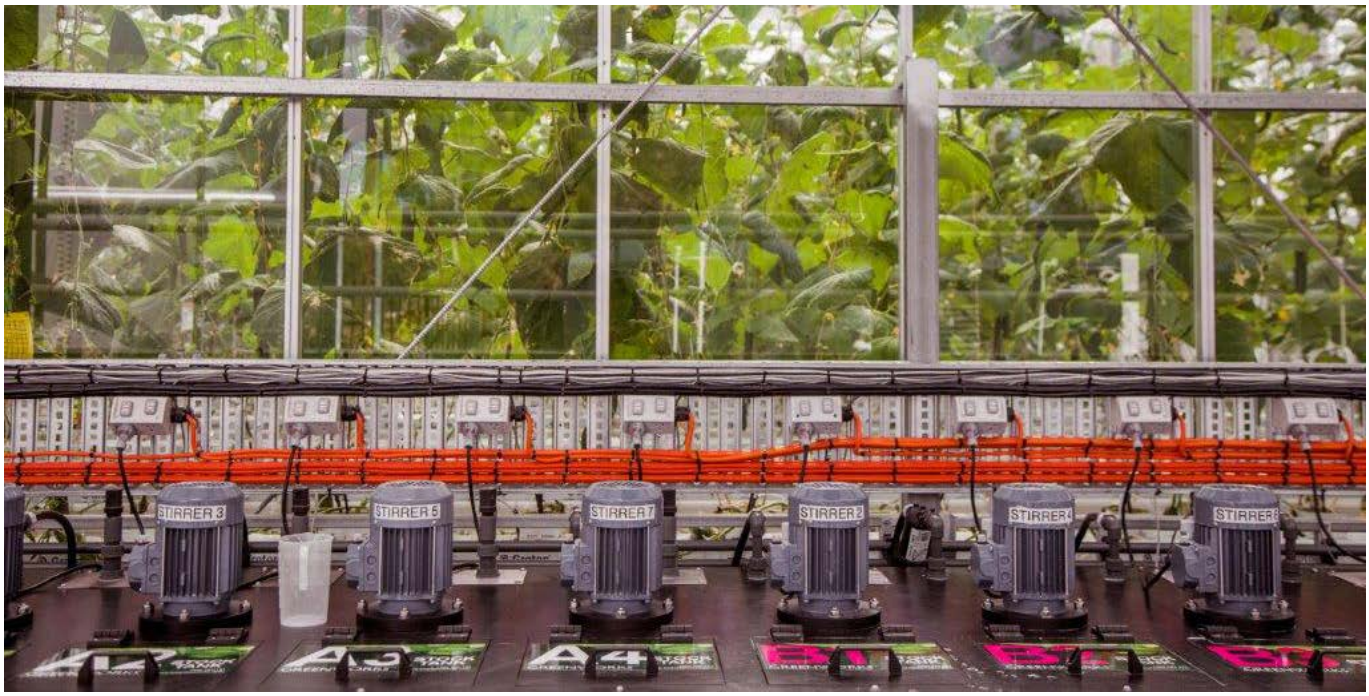

Photo credit: Western Sydney University at Hawkesbury

- **UNS farm** is an indoor facility housed in a large warehouse in the UAE's Al Quoz Industrial area. It began operating in September 2018 and harvests between 1,000 to 1,500 kg of vegetables every day supplying gourmet chefs, hotels and restaurants. The entrepreneur, Mustafa Moiz, invested $10 million in this project.

UNS Farm Distribution Model

- **SPREAD Co** was set up in Japan in 2006 in response to water shortages, the impact of natural disasters and the long-term environmental impacts of pesticide and fertilise usages. Its Keihanna farm produces 230,000 heads of lettuce per day.

Australia is a "little slow off the mark", according to Jack Ellis of *Agfunder News,* [6]. That said, local players include:

- **Green Camel** an organic indoor high-tech hydroponic farm in Cobbitty in Sydney's south west. Its production of greens totals over 130,000 kg per 0.4 ha and the farm also grows barramundi, with the capacity to produce 12,000 fish per year.

- **Sundrop farm** a $175M operation in the South Australian desert produces 350 tonnes of tomatoes each week in 20 ha glasshouses powered by a 15 ha array of mirrors and solar power; the company is now producing 10-15 % of Australia's truss tomatoes.

- **Sprout Stack** grows micro greens in recycled shipping containers in Brookvale on Sydney's Northern beaches supplying Harris Farm Markets directly. The company uses 95% less water and its organic waste is used to grow mushrooms or given to chicken farmers.

- **Modular Farm Co** is the first portable vertical farming system in Brisbane and is embedded in the Eat Street Precinct. The farm supplies local restaurants with fresh produce on demand and in doing so reduces food waste and food miles.

- **Cultivate**, a joint Mirvac and Farmwall venture, has established two urban farms in Sydney's CBD (prior to COVID). The company says their microgreens are grown naturally, sustainable and "still alive" when delivered to their expanding local customer base.

What do all these global companies have in common? A desire to be more sustainable and machination to stimulate a circular economy. With capabilities to bring food production closer to consumers CEA is also gaining popularity with consumers, urban planners and city dwellers.

SO WHAT IS DRIVING INVESTMENT IN CEA?

First, world population growth and mass migration towards the cities. The United Nations estimates that by 2050 around 68% of the world's population will be living in urban areas and this means an additional 2.5 billion people to feed. [7]

Singapore has set aside 18 ha for the Agri-Food Innovation Park at Sungei Kadu and is seeking to meet the demands of a growing world population through the establishment of indoor plant factories, insect farms and animal feed production. [8]

Second, scarcity of resources. The world has finite natural resources and access to arable land, water and critical fertilisers can be constrained. Phosphate use, for example has quadrupled in the last 50 years due to population growth and in many countries social and political events impact the availability of agricultural inputs.[9]

Third, food security, and it's not just about the production of calories and the impact

Photo credit: Western Sydney University at Hawkesbury

Blakthumb farm partner Sananbio

of extreme weather events and climate change. COVID has exposed the fragility of global supply chains and our reliance on complex food distribution systems.

Fourth, changing consumer trends are also having an impact on how we produce and what we produce and this includes growing demand for "new foods", "free-from foods", superfoods and alternative proteins.

Consumers for many years have demanded cleaner and greener food and fibre; they want to be assured that their food is produced ethically and many will pay a premium for produce that is grown sustainably.

CEA systems are flexible and cost effective to reconfigure. Supported by smart monitoring controls that can track, trace and record data in real time; inputs such as light, heat and water can be adjusted to create 'perfect' growing conditions to suit a wide range of plants. This means that farmers can respond quickly to change and grow in-demand produce including high-value foods and niche fruit & vegetables.

SO WHY SHOULD LOCAL COMMUNITIES TAKE NOTE OF CEA?

Because CEA delivers economic, social and environmental benefits; key attributes of a circular economy.

CEA uses less water, minimal or no pesticides, maximises land use, and food can be grown all year round with less waste and spoilage.

Invertigro

That said, the industry is not without its detractors due to high energy costs associated with running LED lighting and heating however this issue is being addressed with investment in solar solutions and energy from waste (EfW) conversion facilities. EarthPower is the first organic waste treatment plant in Western Sydney and investment in EfW across Australia is rising.

Fun Fact: A "30 storey vertical farm needs 26 million kWh of electricity, but it can generate 56 million kWh through solar energy and biogas digesters." [10]

In addition to greater yields and productivity gains, the economic benefits of CEA include the creation of new jobs across the entire value chain. According to RDA ACT a high-tech farm could conservatively generate up to 3,000 jobs. The Riverview Group in partnership with Sydney based startup Invertigro are investing in the region's first vertical farm at the Link in Ginninderry as part of a sustainability hub. [11]

Based on a production analysis undertaken by Perfection Fresh Australia, and supported by the NSW government, a 500-hectare agribusiness hub adjacent to the Western Sydney's International (Nancy Bird-Walton) Airport could support 2,500 new direct and 12,000 indirect jobs and generate $2.8 billion in additional revenue over a 10-year period". [12]

High-tech farming promises to create a range of jobs for IT specialists, data analysts, technicians, communications and marketing experts and of course farmer managers.

In 2019 Bayside Council partnered with UTS and RDA Sydney to investigate the feasibility of establishing urban farming systems in and around Port Botany and Kingsford Smith Airport; primarily to find a suitable and acceptable use of the LGAs disused industrial lands.

The research concluded that CEA, because of its scalability and modular configuration, was highly suited to the region and supported by local residents and businesses. The research also suggested that urban farming fostered mutually-beneficial relationships between governments, start-ups, agribusinesses, local SMEs and suppliers. [13]

It was concluded that bringing food production and supply chains closer to consumers can stimulate local economies, encourage community engagement and in doing so nurture social capital.

WHAT CAN WE DO TO FAST-TRACK CAE IN AUSTRALIA?

First, raise awareness of CAE and the benefits of growing food closer to consumers.

Second, enable investment and venture capital to feed our entrepreneurs and start-up ecosystems and companies like Blakthumb, Invertgro, Farmwall & Phyllome.

Third, encourage more collaboration between industry and our R&D sector.

Now is not the time to withdraw funding and take support away from our university sector. Leading industry groups, Science & Technology Australia and the Australian

Investment Council have been calling on Australian governments for years to invest more to improve Australia's poor commercialisation record. [14]

If Australia is to leverage its prized position as a producer of highly valued clean and green produce, and retain its social licence to operate food production systems, it should start to invest in CAE and kickstart our journey towards a truly circular economy.

And whilst there is no suggestion that CAE will ever replace traditional farming in Australia there is no reason why it can't be part of the mix.

CONCLUSION

According to NSW Circular, a government funded body that seeks to "restore our economy and remove waste from our systems", the circular economy could add $210 Billion to Australia's GDP and create 17,000 new jobs by 2030 from the creation of circular solutions. [15]

Changing our food production systems, reducing food waste by adopting new technologies and smart manufacturing processes will contribute to circular solutions. By just how much, it's unknown and may depend on de-risking investment opportunities and creating conditions conducive for better collaborations between industry, the R&D sector and government.

What we do know is that Advanced Manufacturing and Agribusiness are two key industries the Federal Government has identified as critical to the economy's recovery. Both sectors are attracting investment, driving innovation and delivering economic, social and environmental benefits.

In the foreseeable future the Commonwealth, state and local governments will be spending to stimulate the economy and we hope embrace circular solutions. It is the perfect time to invest in new clean industries including CAE. We must leverage this momentum. The time to act is now.

If Australia is to leverage its prized position as a producer of highly valued clean and green produce, and retain its social licence to operate food production systems, it should start to invest in CAE and kickstart our journey towards a truly circular economy.

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As a senior executive working with industry peak bodies since 1996 and the Higher Education Sector since 2007 my areas of expertise include organisational leadership, stakeholder engagement, partnerships, relationship management, communications, research and change management.

I have worked with NFPs, SMEs and corporates across numerous industries including, R&D, Education and Training, (dual sector experience), Primary Industries, Retail, Risk Management and Government (local, state and federal).

A keen advocate for my local community (10+ years) I am the convenor of the Charing Cross Precinct in Waverley, Sydney.

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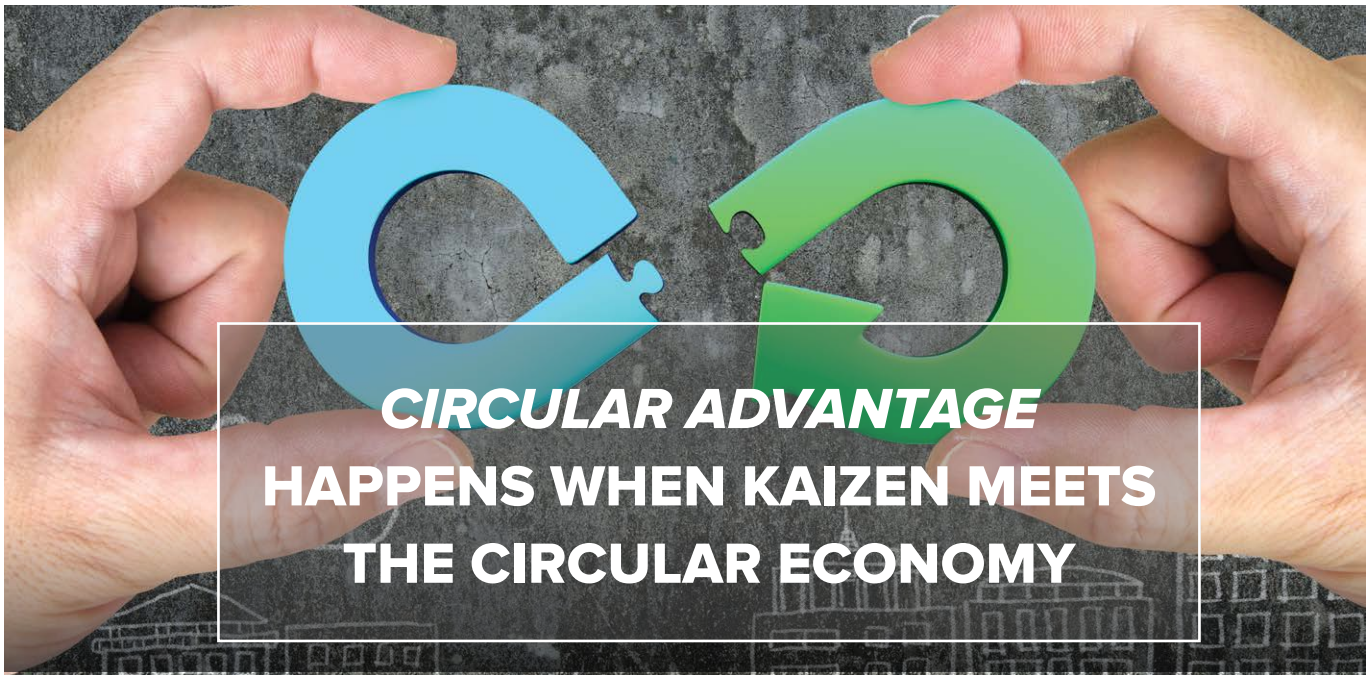

CIRCULAR ADVANTAGE HAPPENS WHEN KAIZEN MEETS THE CIRCULAR ECONOMY

Angela Stubbs, Kingston City Council

Kaizen - Kaizen is a concept referring to business activities that continuously improve all functions and involve all employees from the CEO to the assembly line workers. Kaizen is the Sino-Japanese word for "improvement". Wikipedia

The Australian economy has faced an unprecedented impact from the COVID 19 pandemic and recovery will be based on a growing realisation that globalisation has its risks. There is renewed emphasis on local manufacturing and local supply chains. In recovery, our economy will need to be more circular than ever before. A circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources.

With concern about the human impact on the environment already at an all-time high, the current linear economic model, dependent on the constant creation, usage and disposal of products, is no longer sustainable. In its place, we will see a circular economy – a model in which the value of any given product is extracted fully before the product is recycled and reused.

CIRCULAR ADVANTAGE – A PROGRAM FOR OUR TIMES

Circular Advantage is a strategic business program for our times that facilitates the move to a circular economy for local businesses. The seed of an idea was initially planted through discussions with business networks engaged in sustainability conversations at Kingston Council's Business Sustainability Network and Hume Council's Business Efficiency Network. Both councils had well established relationships with their respective business communities, particularly in the manufacturing sectors, over many years. These network groups met regularly to share information and hear from subject matter experts on a range of topics with a business sustainability focus.

With both councils declaring a Climate Change Emergency, there was considerable momentum to look at ways their business communities could reduce both carbon emissions and waste to landfill. A focus by the Victorian State Government on developing policy guidelines in 'Recycling Victoria – a new economy' also led to greater business awareness for regulatory compliance and change management regarding the use of material resources, design and what happens at the 'end of life' of the product.

The cities of Kingston in the south east of Melbourne and Hume in the west, represent high manufacturing precincts and their associated supply chains. A collaborative partnership was forged between both councils in 2019, together with leading circular economists at KPMG in Melbourne, to design a program that would enable businesses to understand the principles of a circular economy and design a strategy to make changes within their organisations to effect positive change. This partnership established the *Circular Advantage* project for a pilot group of 22, mostly manufacturing, businesses in the south-eastern and western regions of Melbourne. The project was the first of its kind in Victoria and largely centred on two business challenges – enhancing profitability and reducing a company's environmental impact.

CO-DESIGN USING KAIZEN

The first step was a call for expressions of interest in the program. Both council's business teams screened submissions to assess business "readiness" for the program. This was based on survey questions aimed at gaining information to determine if a company was at the beginning of their circular economy journey or did they have well established processes in both 'Kaizen' and environmental sustainability. Information sessions were held later in 2019 to further explain the intent of the *Circular Advantage* program and to provide an

opportunity to meet face to face with prospective participants. Site visits were also conducted with several companies pre-Covid. By January 2020 the core contingent of participants for the program was established.

The program had a co-contribution structure whereby business participants paid a participant fee and both councils contributed a cash component to subsidise the program development and delivery costs. Due to COVID-19 restrictions, collaboration could not be undertaken in face to face workshops as had originally been planned, so virtual platforms were adapted to allow for maximum 'real-time' interaction. The online program was launched in June 2020. New technologies have since been deployed to encourage business participants to challenge traditional methods of learning and to explore alternative business models. Customised modules, delivered by a team of circular economy specialists, will be completed by December 2020.

Online modules and weekly virtual discussions, webinars and forums have covered a broad range of topics and applied project work, including:

- An introduction to the Circular Economy
- Assessing Resource Development
- Assessing Process Efficiency
- Assessing and Modifying Behaviour
- Establishing Visions and Benchmarks
- Preparing your business for Success
- Design Thinking
- Establishing and Mapping Innovation Networks
- Financing a Circular Economy Transition
- Constructing a Circular Economy Roadmap.

At the start of the program, *Circular Advantage* participants were required to have a circumspective look at their own reasons for considering a circular strategy for their company;

"Working exclusively with clients internationally our greatest challenge is for them to understand our why! Through culture/language, many cannot understand why we are so enthusiastic to work with them on improving their systems through education and mentoring. So many are still hooked on the business model of growth and profit over everything else! There is a different way, and I am excited to further my knowledge in the circular economy to help our existing clients and to be able to pinpoint new opportunities with like-minded people/companies." Dirk Geleit from Meat Tender.

Reducing environmental impacts, waste and energy use, and improving the overall efficiency of products, will become non-negotiable in a world where resources are finite, and the climate emergency is pressing. In a linear model, the impact of waste caused by business processes and product disposal, including greenhouse gas emissions grows as the economy grows. The circular economy offers different solutions.

The Circular Advantage program has provided business leaders with a non-competitive space to learn, share knowledge, and initiate change in their operational practices

Exploring what a reverse logistics process for each business would look like enabled potential innovation in production and encouraged companies to consider increasing recycled material content into their products. However, recycling efforts were not prioritized. By first understanding the waste hierarchy and how it relates to a circular economy strategy, participants were encouraged to construct circular economy systems that could potentially extract maximum value from the resources they currently use. The circular economy is about minimising resource use where possible and extracting the most value from resources, when resources must be used. Product components can be designed for continuous recovery and reutilisation. The aim is to design products and materials with life cycles that are safe for human health and the environment and that can be reused perpetually through biological and technical metabolisms. The *Circular Advantage* program encouraged companies to create and participate in systems that could collect and recover the value of their materials following use.

"Working on a new project into retail in Japan where we are trying very hard to use all 100% recyclable packaging from a packaging company that is making the plastic trays from used plastic water bottles. This will convey a strong story to the consumer .... of re make, re use material and recycle." Dirk Geleit

During the challenging times of COVID-19 lockdown in Melbourne, business leaders have actively explored a broader range of virtual technologies to work around the restrictions to 'business as usual' activities. Digital technologies are powerful tools to support the transition to a circular economy by radically increasing virtualisation, de-materialisation, transparency and feedback driven intelligence. An awareness of the increasing part that digitisation is playing in business competitiveness added to participant's knowledge for developing their own company's circular strategies.

" ....a deeper level of digitisation and investment in a superior customer/user experience journey.... has accelerated our reliance on the digital network. It is profound. Tech led efficiency is no doubt a valuable part of the new paradigm. There is a huge gap across the spectrum and opportunities to harvest by way of redeploying funds, talent and resources to swiftly respond to consumer sentiments." Rita Kouchayan from Neptune Coatings.

The *Circular Advantage* program has provided business leaders with a non-competitive space to learn, share knowledge, and initiate change in their operational practices. To remain competitive today, a circular economy must feature in their strategy. The program has been designed to help businesses examine the way they operate through a strategic lens - their supply chains, manufacturing and production processes, use of resources: materials, energy, water, waste and their workforce.

"...As we continue to scale the business, I am constantly seeking areas to improve by analysing the entire business resource use from time, to people, to materials and equipment....We are not out to seek perfection but to continue to grow with innovations and cumulative improvements. We rely heavily on teamwork and personal responsibility to ensure our staff produce the quality we are known for. I like the idea of creating an improvement system that would allow all employees to anonymously contribute to perhaps a suggestion board

or box that rewards 'kaizen'. Something as simple as this would allow me to step back and prioritise solutions and focus on the right things." Aaron Reinhardt from McKinna.

Program evaluation at the time of writing this article indicates that the *Circular Advantage* journey to date, has assisted businesses to identify operational and material savings and efficiencies. Strategic planning is now underway to apply the information gained in the program to their own business model. By way of developing a unique "roadmap' for the strategic development of one or more of the initiatives identified as feasible and with a tangible return on investment, each participant is now refining a customised '*circular advantage*' for their business. A good circular economy idea is of little value if the strategy is ill-conceived or poorly implemented. Strategic fundamentals needed to be understood and applied.

Businesses in both Kingston and Hume are now considering strategic adaptations to current practices:

"Reading and reviewing this week's topic has highlighted sub-optimal use of machinery as a lost resource opportunity. As a part of scaling the business our biggest lost opportunity is idle machinery outside of regular hours. This has previously been identified but should become a focus and more prevalent area to investigate resource opportunity across our 3 factories." Aaron Reinhardt from McKinna.

"...After reviewing our use of cardboard packaging, we can make an improvement by installing a 'box on demand' machine to reduce the amount of custom size box's we have on the shelf, thus reducing waste, and improving space within the warehouse. These are just a couple of the 'high' level improvements we could be making." Peter Prodromos from Eagle Lighting Australia.

A strategy that is directed at encouraging behavioural change is a critical factor in developing sustainable kaizen approaches to resource management. There are three levels of focus; the supply chain, internal operations and customers. Often people need to be trained and incentivized to commit themselves to a higher level of attentiveness and innovation. Through discussions on behaviour change methodology, participants examined whether problems associated with resource choice or process inefficiency, had a corresponding behavioural problem, and then explored creative initiatives to influence change in their organisation.

The *Circular Advantage* program pointed participants to consider an overarching goal of striving to 'better the lives of people and positively influence our planet'. Four key focus areas were highlighted:

1. Resources: Constantly re-assess how your company can better make use of resources.

2. Processes: Commit to constantly re-assessing how your company can better re-engineer processes to enhance productivity and reduce waste.

3. Behaviours: Commit to fully engaged behaviour and elevated performance through a vision that means something to employees.

4. Innovation: Give your people the time, the direction and the incentives to play a positive role in improving products and services on a daily basis.

"...to pursue profits with total disregard for any environmental impacts, for any business, is surely at best short-sighted, at worst, simply poor practice from both environmental and economic standpoints. Finding ways to improve a business's profitability that also reduce or reverse that business's environmental impact is (to me) the best long-term action a business can take, as it takes into consideration the bigger picture, and that business's customers, their health and financial wellbeing, are part of that bigger picture." Ryan Mischkulnig from Reimaginarium.

The foundation for innovation in the circular economy centres on 'out-of-the-box' thinking. The *Circular Advantage* encouraged leaders to break free of their current approach to doing business. They needed to do this in a way that ensured decisions made played to organizational strengths, competitive advantage, business philosophy and existing competencies. A starting point was through the application of design thinking strategies. Understanding that the needs of everyone involved in the 'use cycle' of their circular propositions was essential. Consideration needed to be given to the end users or customers, but also suppliers, manufacturers, retailers and others who may reuse products or materials.

"In all my 30+ years in food production and marketing, this is one thing that irks me. WASTE. I have a passion when it comes to this and hence although it has not been on my roadmap in earlier modules where we fleshed out resources, kaizen and behavioural, I have decided that this would be my closing journey on this path and find ways to help reduce food waste. Right through from production, through to packaging, transport, retail and food service distribution to the end user and most important in our journey, the CONSUMER!" Shirley Bastian from Meat Tender.

Our local communities can also feel increasingly empowered in a circular economic model, as they will be able to see how products they recycle can be put back into the system of production, leading to an increase in recycling rates. There are plenty of innovative ways to use resources in new ways, producing new goods without depleting natural resources further.

The *Circular Advantage* program has helped deliver insights and competencies to lay the foundations of a circular approach to our local economy and to consider efficiencies and new revenue opportunities at a time of great economic challenge in a pandemic trading period.

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ABOUT THE AUTHOR

Angela has an extensive background in both private and corporate business and joined Kingston Council's business team 10 years ago. She initiated, and project managed the ASPIRE online platform for material resource exchange and is now an Advisory Board member. She also established the Kingston Council's Sustainable Business Network to raise awareness of resource efficiency initiatives available to business owners. Angela is passionate about preserving our natural resources and reducing, reusing and recycling our material resources. The circular economy has been a natural next step for Angela's professional direction.

BUILDING BACK *BETTER*

HOW A CIRCULAR ECONOMY COULD BOOST AUSTRALIA'S ECONOMIC RECOVERY

Angus Mitchell and Dr Ian Overton, Green Industries SA

THE STATE OF PLAY

COVID-19 pandemic provided the largest shock to the global economy in decades. In Australia this has been compounded by the economic impacts associated with the 'Black Summer' 2019-20 bushfires. While the economic impacts from COVID-19 are still evolving, the Reserve Bank of Australia estimates that the Australian economy will contract by about 6 per cent this year[1].

More than 300,000 Australians have lost a job in in 2020 (Australian Bureau of Statistics)[2]. Policy makers nationally are contemplating which stimulus measures could have the greatest 'bang for buck' for economic development and job creation.

Some estimates indicate a potential for an additional 230,000 new green manufacturing jobs[3], and many policy makers are bullish about the opportunities investing in the circular economy could provide in Australia.

In South Australia, COVID-19 restrictions have been less detrimental compared to elsewhere in Australia, but these have still had a significant economic impact. However, South Australia is in a strong position to recover given its leadership in the circular economy. South Australia has a long history in waste management and resource recovery since the introduction of container deposit legislation in 1977. Nationally, it has the best rate of waste diversion to genuine recycling with 83.6%. It has the best use of renewable energy outside of Denmark and has the greatest use of recycled water in Australia from water treatment and stormwater management. South Australia also has a well developed organics recycling industry and recently became the first state in Australia to introduce legislation to ban single-use plastics in Australia.

Green Industries SA is the Government agency leading the State's transition to a circular economy. Its objectives under the *Green Industries SA Act 2004* are to promote waste management practices that, as far as possible, eliminate waste or its consignment to landfill and promote innovation and business activity in the waste management, resource recovery and green industry sectors, recognising these areas present a valuable opportunity to contribute to the State's economic growth. Green Industries SA uses strategy, policy, legislation, financial incentives and education to promote the circular economy to improve the environmental, societal and economic benefits for South Australians.

SO WHAT IS THE CIRCULAR ECONOMY AND WHERE ARE ALL THESE GREEN JOBS?

In contrast to a linear 'take, make, waste' economy, a circular economy builds and rebuilds overall system health creating economic opportunities and importantly improved environmental and social benefits. By designing out waste and pollution, keeping products and materials in use, and regenerating natural systems rather than degrading them, a circular economy looks to build long term economic opportunities and jobs that are resilient to economic shocks.

A circular economy aims to avoid and optimise the use of materials used in the production of goods and services in the economy, including through reducing

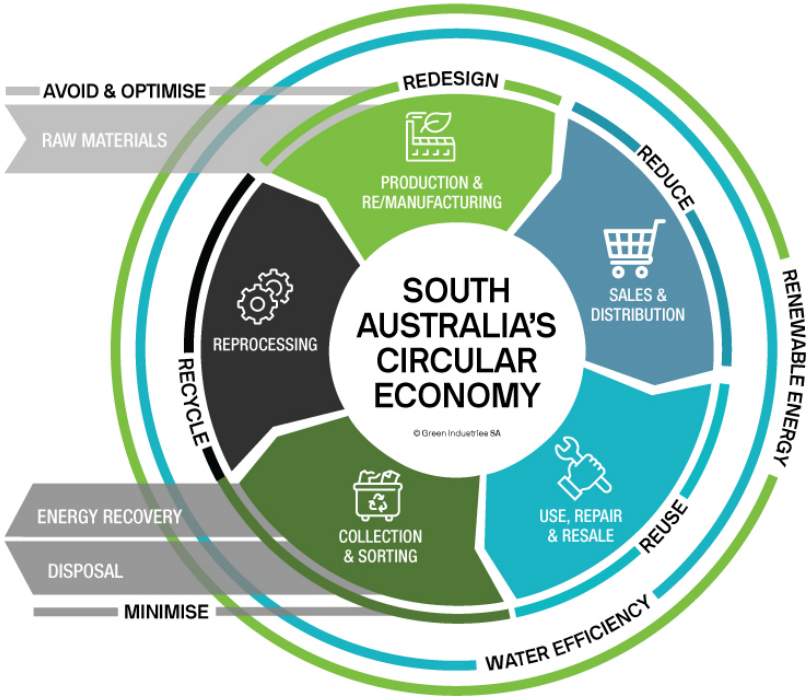

Figure 1. South Australia's Circular Economy (Green Industries SA, 2020)

the amount of materials that are used in production and distribution, reusing and repairing goods, collecting and sorting, and reprocessing and recycling, ultimately minimising the amount of disposal material, while recovering energy and materials from unavoidable landfill and reprocessing used materials into inputs for remanufacturing (Figure 1).

Many of these new green jobs are in traditional waste management and resource recovery areas such as waste collection, recovery and recycling, reuse (repair, sales of second-hand goods) and sharing (rental and leasing) activities. South Australia's waste management sector is a significant sector of the economy, with an annual turnover of around $1 billion, contributing directly and indirectly more than $500 million to Gross State Product (≈0.6% of GSP), and employing around 4,800 people across a wide spectrum of jobs[4]. Better waste management is not only good for the environment, it's good for the economy. Recycling and reusing waste creates three times as many jobs created compared to sending waste to landfill.

While increasing recycling and improving waste management systems are an important building block, ultimately a more circular economy requires changing the way we design and deliver the products and services in our economy. For this reason circular economy jobs can be found through-out the economy from food and beverage manufacturing, energy supply, primary industries to service industries such as tourism and creative industries.

WHY IT MAKES SENSE FOR AUSTRALIA

In a year of turmoil and disruption, some major indices have lost 30%-40% of their value, while many major environmental, social and governance (ESG) indices outperformed their markets[5].

Growth industries in Australia include food and wine manufacturing, creative and service industries including tourism and international education, defence and high tech manufacturing as well as health and medical industries. All of these sectors have significant circular economic opportunities as do some of Australia's more traditional industries including mining, primary industries and energy production and distribution.

In a report commissioned by Green Industries SA 'Creating Value; the potential benefits of a circular economy in South Australia' the authors found that a more circular economy could conservatively create an estimated 25,700 full time equivalent jobs by 2030 compared to a business as usual scenario, with most of the jobs in the service sectors, reflecting the need for design and technology professionals to achieve the transition, but also jobs to repair and maintain goods so that they stay in circulation for longer[6].

Precious metal mining from electronic waste

Australia discards almost 20kg per person per year of electrical and electronic goods (Global e-waste monitor 2017). While recycling rates are still relatively low, urban mining of electronic waste is starting to become a big business. Electronic Recycling Australia (ERA) is South Australia's largest e-cycling (electronic recycling) facility. The business involves the dismantling of television and computers to recover valuable materials including silver, gold, copper, aluminium and palladium.

Figure 2. Electronics Recycling Australia, Adelaide

Holla-Fresh: A carbon negative energy solution

Horticulture company and herb producer Holla-Fresh was determined to become even more efficient and sustainable, the impact is being felt beyond the boundaries of its Tantanoola property in South Australia's temperate South East.

Heat was one of its most important inputs, but it was also one of its most expensive and greenhouse gas intensive. What began with the company asking the State Government agency Green Industries SA (GISA) for help in sourcing an alternative to its oil-fired boiler for heating its glasshouses, ended with a renewable energy technology known as pyrolysis, and a high-quality and lucrative by-product called biochar. In addition to the large financial benefit through reduced costs – their process is now carbon negative – taking more carbon out of the atmosphere that they produce.

Figure 3. Holla Fresh, Tantanoola

BUILDING A RESILIENT SYSTEM

Australia's early prosperity has been built on a foundation of an abundance of land and resources. However increasingly the world is becoming smaller, and the competition for resources ever greater. With international governments also seeking resource security, there are ultimately strategic as well as economic advantages to pursuing a circular economy that boosts resource security.

The fragility of our global supply chains was highlighted in the early stages of the pandemic, particularly for those who struggled with the availability of medical equipment. Recognising the risks associated with this dependence, there has been increasing demand for local manufacturing. A circular economy focus could look at the potential costs and benefits of reducing waste and providing for remanufacture of medical grade equipment and supplies here in Australia.

Investing in a circular economy could boost Australia's immediate economic recovery but might also provide sustainable and lasting benefits in making Australia more resilient to future external economic shocks.

2020 marks the start of the Australian Government's bans on exporting certain waste streams as a result of China and other countries restricting the imports of contaminated recyclables. As of the 1 July 2020 and through to 2024, there will be bans on exporting certain types of paper, plastic, glass and tyres. Until 2018, 29% of all paper collected at kerbsides and 36% of all plastics were exported to China.

The fragility of our global supply chains was highlighted in the early stages of the pandemic, particularly for those who struggled with the availability of medical equipment.

This is expected to reduce Australian exports of 620,000 tonnes annually worth $523M and require these traditional resource streams to be processed onshore, requiring an increase in infrastructure and a greater number of jobs. Increasing recycling activities in Australia and reducing our waste will make the economy more resilient to changes in global markets and supply chains.

BENEFITS FOR FIGHTING CLIMATE CHANGE

Circulating products and materials through the economy instead of producing new ones can help cut energy demand by maintaining the energy that went into making them.

Climate change strategies tend to focus on energy supply overlooking the vast potential of the circular economy. It has been estimated that the transition to renewable or zero carbon energy supply could only reduce emissions by a maximum of 55%. The remaining 45% of emissions come from how we make and use products, and how we produce food[7].

To achieve our climate change mitigation targets, increasingly we will need to rethink and reengineer our supply chains all the way back to where our resources originate.

A report for the Ellen MacArthur foundation investigated how applying circular economy strategies in cement, aluminium, steel, plastics, and food could potentially eliminate almost half of the emissions from the production of these goods[8].

Recovering food waste is one of our biggest areas for improvement with as much as 40 per cent of the material in South Australian household waste bins sent to landfill. This could be diverted to green bins to produce valuable commodities such as compost and other products that can help sequester carbon in soils. The Intergovernmental Panel on Climate Change estimates that loss and waste of food caused between 8 and 10% of the emissions of the gases responsible for global warming in the period 2010-2016.[9]

SO HOW DO WE CAPITALISE ON THIS OPPORTUNITY?

Government, businesses and the community can accelerate Australia's transition to a circular economy.

For Governments, this transition includes a variety of levers including funding for research, market incentives for improved business processes, improved procurement approaches and improved regulatory systems to extend waste producer responsibility and promote the more efficient use and recovery of scarce resources.

For businesses, the transition involves reviewing existing production systems, assessing material and waste within these systems and using innovative solutions to prevent waste. This could be through improved design of products that are made to last and reduce waste and make it easier to repair, recycle and reuse.

From a community perspective, we can all help accelerate the transition to a circular economy – particularly in our role as consumers. Product-as-a-service and sharing models are becoming increasingly popular. For example, instead of owning a library of videos, music or books many consumers are opting for a subscription to have access to those services when they want them.

As we consider alternatives for maximising our economic recovery, we need to consider not just short term stimulus but also the opportunities to create long term resilient jobs that ultimately will improve Australia's economy while also supporting Australia's transition to a zero carbon-economy.

Green Industries SA is driving the transition to a circular zero carbon economy by delivering programs to;

- reduce the use of raw materials which reduces the emissions generated in accessing these resources;
- keeping materials in use longer which helps reduce the energy and emissions required for manufacturing, transportation, and disposal or recycling;
- reselling, repairing and reusing goods to reduce the carbon footprint of new products;
- reducing waste, which reduces the energy and emissions from wasteful products such as single-use plastics, fast fashion, product obsolescence, reducing landfill and its associated greenhouse gas emissions; and
- reducing food waste reduces the depletion of nutrients and water from over production of food and the composting and soil enhancement for a circular economy.

Recovering food waste is one of our biggest areas for improvement with as much as 40 per cent of the material in South Australian household waste bins sent to landfill.

For further information about Green Industries SA please visit http://www.greenindustries.sa.gov.au

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Angus Mitchell is an Economist with Green Industries SA and has most recently project managed South Australia's Bushfire Debris Clean-up following the 2019-20 black summer bushfires. Angus has had over 10 years' experience working as an economist in the environment portfolio of the South Australian Government including working in Tourism and Economic Development for National Parks, assessing the economic impacts associated with introducing Marine Parks and developing programs and policies to support improved recycling rates in South Australia. Angus Mitchell has a Masters of Business Administration from Southern Cross University and Economics and Arts degrees from the University of Adelaide.

DR IAN OVERTON

Dr Ian Overton is the Deputy Chief Executive of Green Industries SA, the agency leading the transition to a circular economy, developing a vibrant zero waste environment through policy, education and innovation. He is also an Adjunct Associate Professor at the University of Adelaide with a passion for sustainability and enhancing the environmental, social and economic outcomes through strategy and implementation of the circular economy. Ian has a science background in environmental and water resource management with a Bachelor Degree and a PhD in environmental science. Ian also has an international business background in entrepreneurship and innovation with a Graduate Certificate in Management, a Diploma in Company Directorship and a Masters in Business Administration.

THE CIRCULAR ECONOMY:

THE BIOPRECINCT APPROACH AND SHOWCASE ON THE MACKAY ISAAC WHITSUNDAY REGION

Stephen Cutting and Kate Large, Aurecon

INTRODUCTION

The aim of this article is to provide an overview of sustainable economic development strategies across the Mackay Isaac Whitsunday (MIW) region in Queensland. We discuss the opportunities that can take advantage of the region's natural resources through a circular economy approach. The focus of this article is to stress the need to consider all elements in the value chains that are needed to ensure sustainable bioindustries can be established for many years.

We discuss potential bioprocessing pathways and key considerations that an economic development team should consider when contending with the circular economy approach. This article will provide examples of successful bioindustries within the MIW region including sugar cane production enabling biomass to electricity generation, rum and tourism. This article also discusses emerging economic development opportunities.

REGIONAL CIRCULAR ECONOMIES

Considerable work has been completed globally by a wide cross-section of industry stakeholders, technology providers, industry facilitators and project proponents, to define circular economy pathways for proven and emerging industries. Commercialising and realising circular economy needs a solid understanding of the core market and cost drivers, including agricultural systems, processes, technologies, logistics, off-take agreements, energy, distribution methods and equipment design.

Community integrated facilities can include the sustainable processes of converting renewable feedstocks into a spectrum of marketable products and energy. A circular economy strategy needs to cover the development of a facility, a process, a plant, or even a cluster of facilities. An integrated 'bioprecinct' could include the integral upstream, midstream, and downstream processing of renewable and recyclable feedstocks into a range of platforms and products. The products can be both intermediate and final products, and include food, feed, materials, and chemicals; whereas energy includes fuels, power, and heat.

MIW REGION'S BIO-INDUSTRIES

The MIW region's key economic drivers are mining, tourism, beef, sugar and horticulture. The region is also home to a thriving Mining Equipment, Technology and Services (METS) sector and two State Development Areas - Galilee Basin and Abbot Point.

The MIW region has a heritage sugar industry complemented with emerging bioproduct feedstocks:

Heritage sugar industry

- Five sugar mills:
  - three Mackay sugar mills operated at Racecourse, Farleigh and Marian
  - two Wilmar owned mills at Proserpine and Plane Creek
- Wilmar BioEthanol in Sarina, Australia's largest producer of molasses-based ethanol, liquid fertilizers and animal feeds
- Sugar Australia's White Sugar Refinery co-located at the Racecourse precinct
- Mackay Renewable Biocommodities

Pilot Plant, a pilot scale research and development integrated biorefinery at the Racecourse precinct

- The Sarina Sugar Shed tourism facility

Emerging bioproduct feedstocks

- The Thomas Borthwick & Sons abattoir at Bakers Creek with potential tallow and wastewater by-products
- Various prawn and barramundi farms
- Potential horticultural waste from approx. 150 fruit and vegetable producers (tomatoes, capsicums, mangoes and macadamias) within the Bowen area
- Potential municipal solid waste and industrial waste

Case study - Racecourse precinct cogeneration

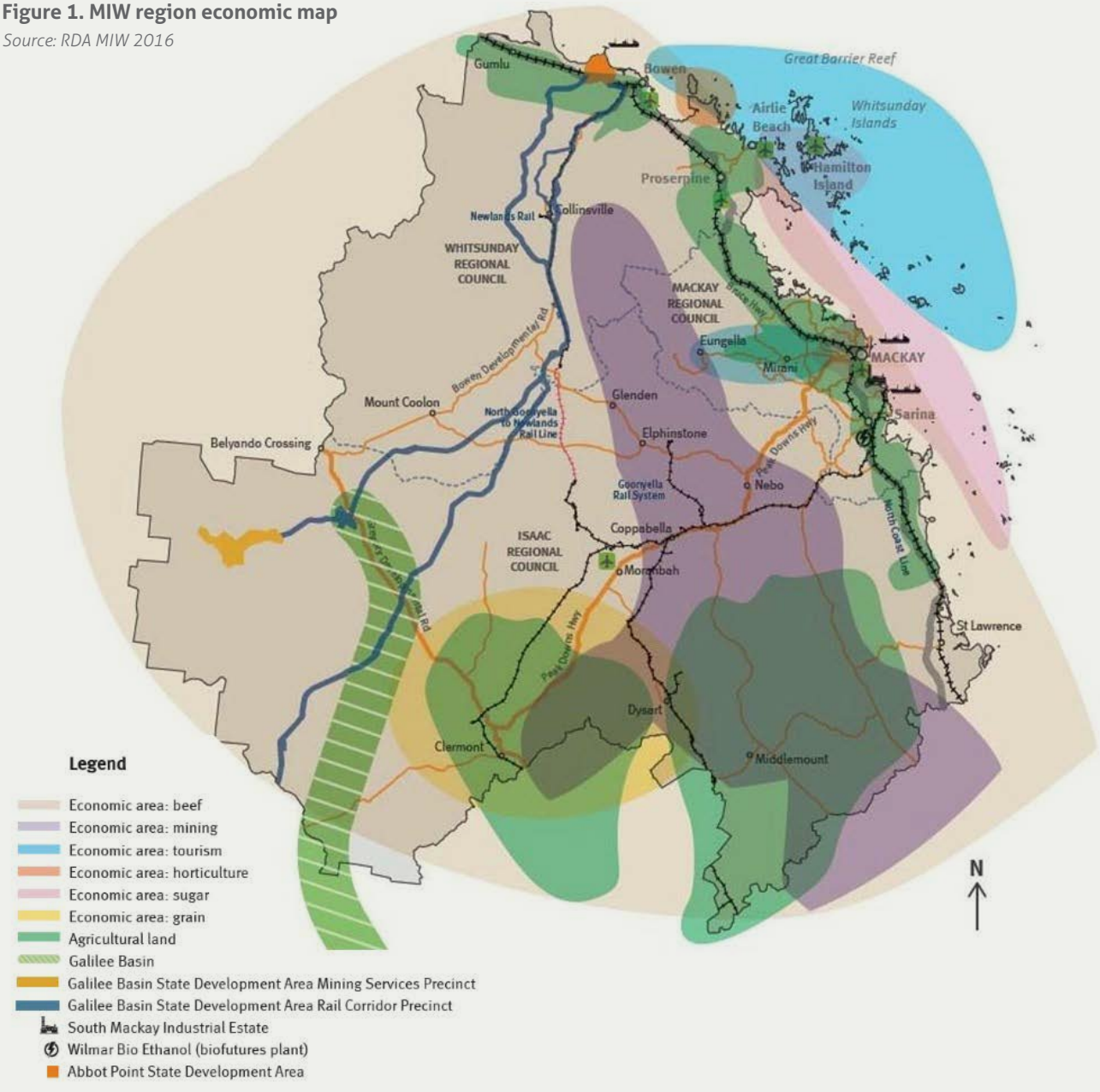
The cogeneration at the Racecourse precinct is an example of a renewable energy initiative by the MIW region's sugar industry.

From the 6 million tonnes of cane that are processed every year in Mackay, 1.8 million tonnes of bagasse fibre are left over from the milling process. The bagasse is burnt and processed into electricity which is used within the precinct, by the mill and sugar refinery, and exported. About 27 megawatts of electricity - a third of Mackay's average needs - is exported to the grid continuously. This earns Mackay Sugar Limited additional revenue as well as savings on electricity.

The bioeconomy is, and will continue to be, a substantial part of the sustainable use of bio-feedstocks in the MIW region. By accelerating the sustainable production and use of 'bioprecincts', the economic and environmental impacts will be optimised, resulting in more cost-competitive sharing of infrastructure, utilities and services. Using a bioprecinct concept approach may increase the attractiveness, benefits and synergies of co-locating biorefineries into mutually beneficial ecosystems. This approach will facilitate the commercialisation and market deployment of environmentally sound, socially acceptable, and cost-competitive bio-based systems and technologies, and to provide jobs and growth for the local communities.

Figure 1. MIW region economic map

Source: RDA MIW 2016



Case study - Sarina Sugar Shed tourism

The Sarina Sugar Shed located at the Field of Dreams Parkland, 35 km south of Mackay, is an award-winning agri-tourism attraction which features a miniature working sugar mill and small-batch boutique distillery.

It opened in 2006 in a response to tourists wanting to tour the Plane Creek Mill. They offer daily tours showcasing the cutting and crushing process, ending with tastings of their rum and food products.

It has strong relationships with local mills purchasing ethanol and premium sugar cane syrup for the rum production. They also work closely with local farm producers to supply fruit and vegetables for their range of liqueurs, chutneys, sauces and relishes.

The Sarina Sugar Shed is a member of the Greater Whitsunday Food Network, and stocks locally made produce as a distribution point for many home-based businesses.

Sarina Sugar Shed rum. *Source: Mackay Regional Council*

Biofutures industries are intrinsically connected with the growing demand for food, feed and fibre to meet emerging markets. Co-locating processing facilities is a key factor to make bioproduct production feasible given capital cost constraints in developing new processing facilities. Additionally, locating facilities near to feedstocks will reduce logistical costs. Co-location fosters technological innovation to commercialise bio-based products by linking technology companies with partners with operational expertise. Potential bioprecincts in the MIW region may offer advantages to future projects with quick-to-market site selection, supply chain, feedstock logistics, by-products and value adding opportunities.

IMPORTANCE OF UNDERSTANDING THE ENTIRE VALUE CHAIN

Primary industries, value-adding processes and manufacturing facilities can be classified based on where they fit in the circular economy value chain, technology lifecycle or commercial readiness:

- **Technological implementation status:** conventional and advanced feedstocks, bioenergy or biofuels (1st, 2nd or 3rd generation manufacturing)
- **Type of raw materials used:** agriculture operations, whole crop biorefineries, recycling operations, waste management facilities, and aquaculture or marine processors
- **Type of main intermediates produced:** natural product, recycled products, waste-based by-product, chemical feedstock or value-added final product
- **Main type of conversion processes applied:** natural, thermochemical, biochemical, mechanical or renewable processes

The key to commercial success for emerging circular economy projects relies on the ability to gain the maximum intrinsic value out of feedstocks, bioproducts, coproducts and waste streams. There are many inter-related value chains that need to be established for the development of successful bioenergy sites, biorefineries or bioindustries. In order to develop example value chain scenarios, it is necessary to make many assumptions about what typical combinations of available technologies, processes and logistics exist to create viable energy and bioproducts that provide a return on investment.

Figure 2 illustrates the overall inter-relationship of the various circular economy value chains.

BARRIERS TO DEVELOPMENT ACCELERATION

Major barriers exist for the rapid development of demand and end-use markets in Australia, particularly in the area of circular economy long-term projects. These include the need to develop process pathways that can consistently meet nationwide feedstock specifications and performance standards for by-products. Certification of production processes and quality control systems to be able to blend renewable and recycled feedstocks into current and emerging manufacturing processes, need to be well understood and developed at an industry basis to ensure feed compatibility, quality and performance. Sometimes, there are too few willing retail outlets to ensure new entrant products will compete on a level playing field with conventional materials. Considerable work is needed on demand side marketing and lobbying, to ensure that early entrant circular economy innovators can lock in off-take agreements for their recycled or manufactured products.

A major barrier is that of financial risk and instability in the current world and political environments. The capital costs required for installing biorefineries include testing and developing new feedstocks; construction of production facilities for fuels, power, and products; and infrastructure costs. With significant uncertainty remaining in the viability of new feedstocks or conversion technologies, as well as uncertainty in end-use markets, many investors are averse to making the financial investment needed. Specific barriers include the requirement to ensure there is adequate risk management

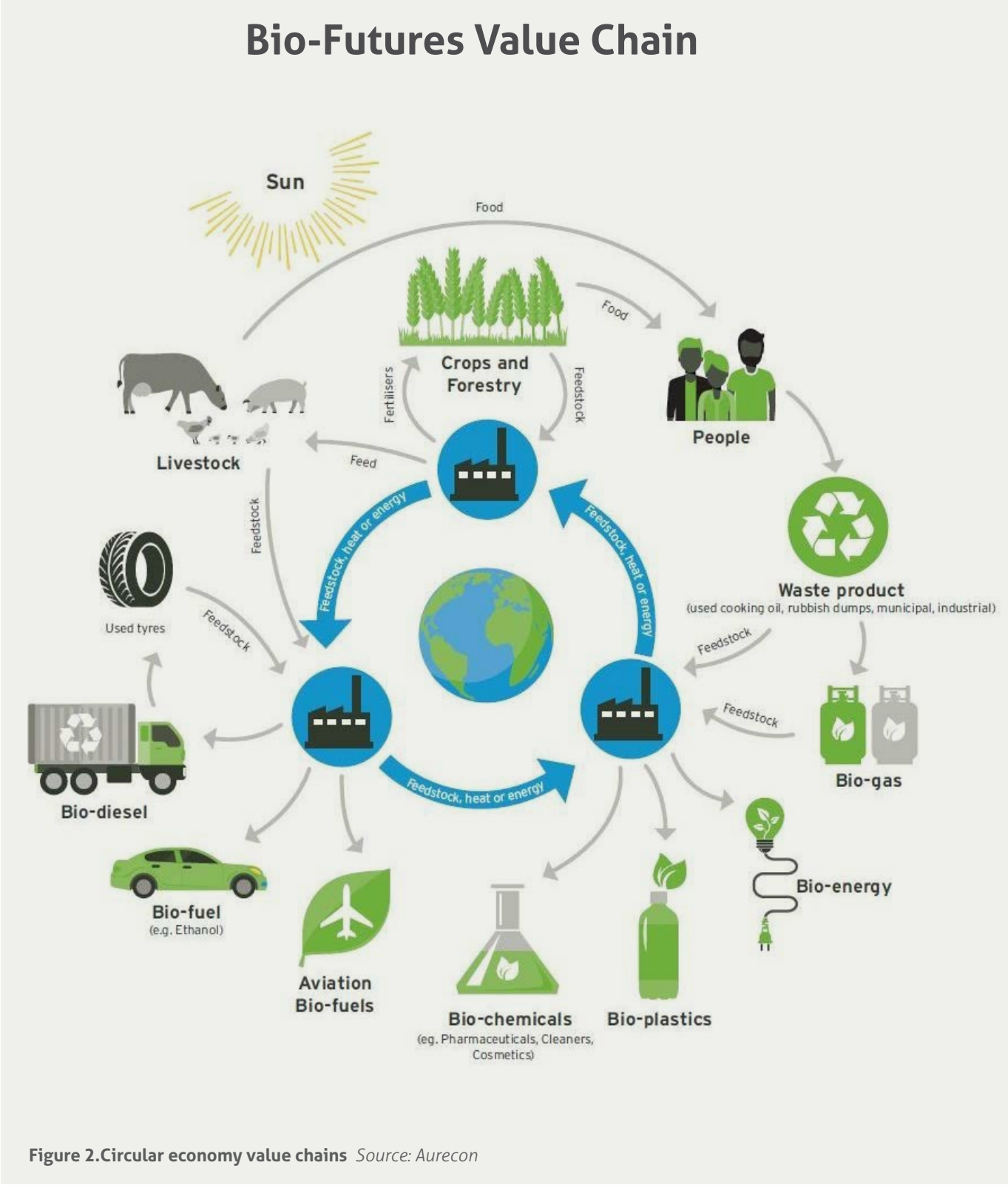


Figure 2.Circular economy value chains *Source: Aurecon*

techniques or risk sharing when forming bio-companies. Another challenge is the distances involved in Australia; the need for efficient logistics systems, which can leverage off existing infrastructure and locations, cannot be overstated.

One of the key areas of support needed is in providing mechanisms for funding to bridge the gap between successful demonstration of a new technology and commercialisation. In addition to the barriers facing manufacturing facilities construction, there are few long-term contract incentives or insurance policies for emerging sustainable feedstocks used to produce energy or renewable products. It is important that the development of feedstock supply is in pace with the processing capability development, as well as market demand and access.

However, the demand for bio-based products can change for the better very quickly, as public perceptions and purchasing preferences change, as can be seen since the COVID-19 pandemic. One of the key drivers and market movers will be when consumers begin to value and account for environmental benefits of these renewable technologies and products in consumer markets. For example, the current low purchase

price of coal makes it difficult for many alternative power generation technologies to compete on a cost basis, as does the lack of a framework or requirement for incorporating environmental factors and other externalities into purchasing decisions. Tax credits, procurement policies and other incentives could be implemented to incentivise locally produced fuel, power, and products.

MARKET SEGMENT APPROACH TO VALUE CHAIN ANALYSIS

There are many interrelated value chains that need to be established for the development of successful industries. It may be beneficial to look at the overall value chains across seven related market segments, to help identify potential building blocks for the overall bioindustries.

1. Feedstock suppliers: businesses that provide renewable, replenishable or waste feedstocks for conversion to value-added products. For example: agricultural producers, used cooking oil collectors, animal fat manufacturers, green waste collectors, timber processors, municipal solid waste, wastewater treatment plants and algae producers.

2. Product handlers, traders and processors: organisations that use natural, renewable or recyclable feedstocks and convert them to tradeable products and by-products.

3. End product, energy, feedstock materials and by-product customers: industries that purchase intermediary and end-products, energy, recycled products and by-products. For example: electricity grid customers, 'behind-the-meter' customers, trucking companies, mining companies, fuel companies, chemical processors, manufacturing companies, stock feed manufacturers and fertilizer applicators.

4. Supply chain logistics: business and authorities who are involved in the transport and distribution of feedstocks and by-products. For example, harvesting operators, trucking companies, rail operators, port operators and distributors.

One of the key drivers and market movers will be when consumers begin to value and account for environmental benefits of these renewable technologies and products in consumer markets.

5. Research and technology providers: organisations that are involved in the development of technologies for commercial applications. For example, university, chemical companies, equipment providers, Original Equipment Manufacturers (OEMs), scientific and engineering companies.

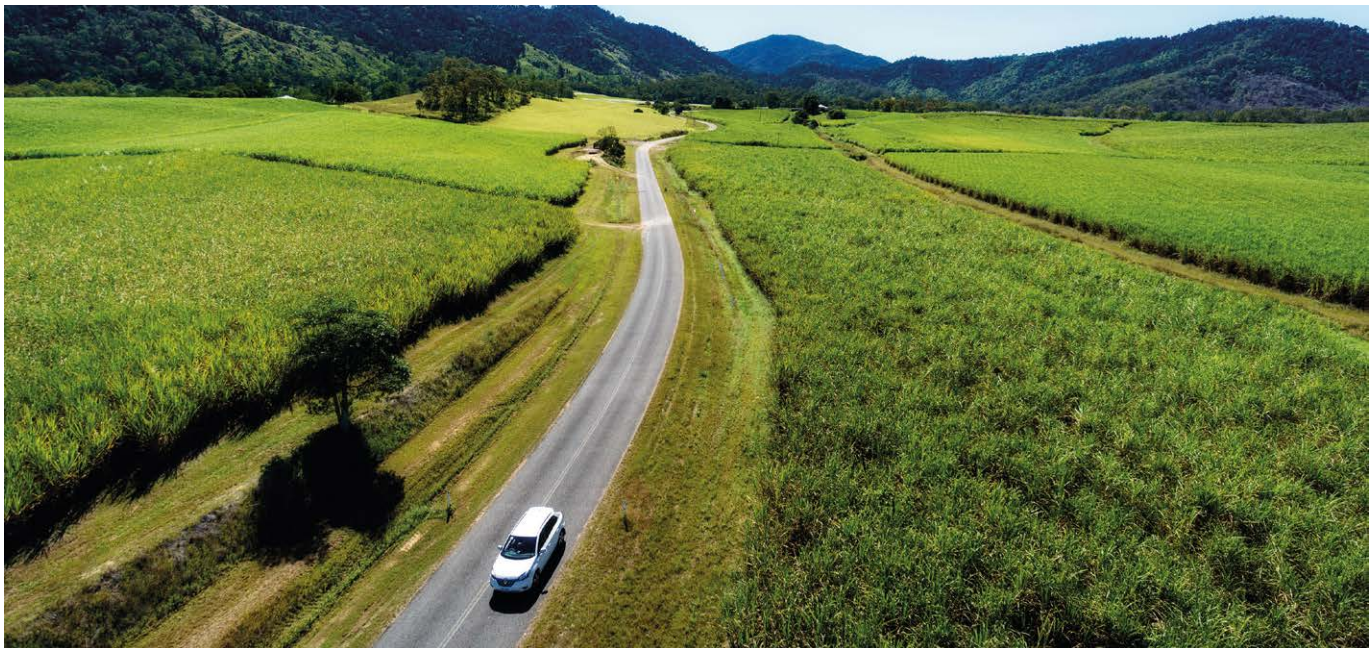
6. Industry facilitators: organisations, associations, bodies and panels that represent the waste management and by-products value chain, and who provide advocacy and facilitate development of the waste industry.

7. Investors, entrepreneurs and innovation brokers: companies and entities that provide investment, and facilitation for emerging recycling and energy/by-products opportunities.

ESTABLISHING BUSINESS CASES FOR OVERALL VALUE CHAINS

To establish circular economy opportunities, the following details will need to be investigated in order to prepare a business case:

- An input/output flow (system) diagram showing all stages and components of the production process including potential by-products and known waste streams
- A process flow diagram with assumptions on production scenarios
- Demand and markets discussion including:



  - Likely customers
  - Potential demand, seasonality and demand drivers
- Supply chain / feedstock discussion including assumed:
  - Example feedstocks
  - Tonnages required
  - Typical feedstock supply locations
  - Feedstock availability, seasonality and/or potential for supply including land area and infrastructure requirements
  - Potential feedstock aggregation points
  - Transport and infrastructure requirements
  - Key supply chain drivers, supply uncertainties and challenges
- Processing and distribution discussion including assumptions for scenarios of land and infrastructure requirements for plant
- By-products and value adding discussion including:
  - By-products or co-products that could emerge from core bioproduct production processes
  - Processing/reprocessing of waste to produce useful by-products
  - Waste to energy opportunities
  - Processes and plant required.

BIOPRECINCT BENEFITS

Using a bioprecinct concept approach may increase the attractiveness, benefits and synergies of co-locating biorefineries into mutually beneficial ecosystems. This approach will facilitate the commercialisation and market deployment of environmentally sound, socially acceptable, and cost-competitive bio-based systems and technologies, and to provide jobs and growth for the local communities.

Some of the key considerations in selecting a suitable site for a proposed biorefining production facility would require year-round supplies of the following utilities and operational elements:

- Sufficient available land for entire proposed integrated facility
- Environmental licence to operate
- Steam for processing heat and energy
- Energy supply
- Water for process, cooling and amenities
- Effluent treatment systems
- Road access
- Access to agricultural feedstocks
- Access to process chemicals
- Proximity to logistics chain, skilled staff, labour and equipment suppliers
- Access to a cargo port for export sales.

Several regions in Australia are actively pursuing the development of bioprecincts, to create a cluster of synergistic bioprocessing facilities including the New South Wales government's Special Activation Precincts. Co-locating and building a bio-based precinct can provide centralised facilities to take advantage of existing infrastructure and energy, create energy parks (steam and power) to support multiple processing facilities.

Anchor stakeholders can provide in-kind infrastructure to a bioprecinct (road, rail, electricity and water) resulting in capex reductions and additional revenue. Co-investment with industry (public-private partnerships) may assist to achieve an agreed investment payback period or lease of facilities arrangements.

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ABOUT THE AUTHORS

STEPHEN CUTTING

Steve is a senior mechanical engineer and engineering manager with Aurecon in Mackay with over 35 years' experience. Steve was born and bred in Ingham and is intimately familiar with North and Central Queensland, sugar and biofuel production. Steve has also worked in sugar mills in the Herbert, Burdekin and Ord River areas. Steve was Chief Engineer through the establishment of the Ord River District sugar industry, Chief Engineer at the Sarina Distillery ethanol plant and is a keen advocate for biofuels and renewable energy. With Aurecon, Steve has been involved in a large range of sugar, mining and bioenergy projects in design consultancies and acting as Owner's Engineer.

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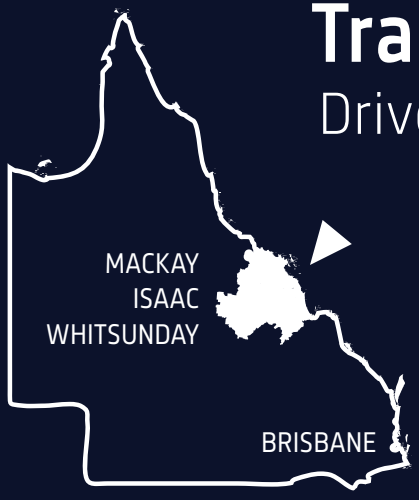
Kate is a senior environmental and urban planner with Aurecon in Mackay with over 15 years' experience. Kate has provided advice on a wide range of developments in Queensland and the Northern Territory. She is a Registered Planner with the Planning Institute of Australia. Kate has recently provided advice on a number of biofutures projects across Queensland. She has also recently led a site selection assessment for a biofutures project and developed an investor brochure for the MIW region.



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CRAFTING AND THE CIRCULAR ECONOMY:

A CASE STUDY OF THE MERRYMAKERS SCARECROW VILLAGE

By Professor Lisa Farrell, RMIT University

INTRODUCTION

It is important that improved resource allocation models are explored and implemented. The circular economy is a model of production and consumption where valuable resources have a longer life and are used and reused. It offers scope to understand models of economies that operate according to values and not just profits. With careful regulation and appropriate incentives, new solutions are possible that add longevity to our current resource stocks. One very important societal value in the circular economy framework is sustainability. To be effective, this value needs to be embedded into activities at all levels of the economy. Here we present a case study of the Merrymakers Scarecrow Village which was a highly successful community based COVID-19 call to action, based on the value of sustainability through upcycling and recycling. It is an important case study as it moves us beyond community based projects that require high levels of promotion and are costly to implement. for example, local festivals with major costs such as firework displays or live entertainment events that require extensive planning and management. Activities of this nature have a place but are resource intensive, so it is important that those responsible for economic and

community development also think more creatively in terms of community events centred on the value of sustainability.

CASE STUDY

Welcome to Hurstbridge population of 3,450 (at the last census in 2016) and in August 2020 home to over 150 plus scarecrows! Why scarecrows? Hurstbridge is home to the Wattle Festival held the last weekend in August every year but like so many things in 2020 the festival had to be cancelled due to the COVID-19 situation. The Wattle Festival is a celebration of spring when the local bushland bursts into bright yellow as the native wattle trees blossom. In the absence of a festival this year the call went out for residents to build scarecrows and place them in their front garden; in much the same way as we have seen calls for teddy bears in windows to entertain children in locked down Victoria on their daily walks or "bear hunts". Being a rural community in the heart of Nillumbik (North East of Melbourne) the idea of scarecrows was fitting and soon caught on. But the real question is not so much, why scarecrows, as it is, why did this catch on so quickly and so completely across this small rural community?

The answer to this lies in part with the alignment with the community's strong sense of belonging. Hurstbridge is a close-knit community and the Wattle Festival is an important part of its collective identity. Communities were people are well connected with high levels of social inclusion make it a fertile ground for community-based actions.

But that is only part of the explanation the real key lies in the alignment with the community's collective values. Hurstbridge is a community of 'creatives'; artists, musicians, and performers who value creative expression. One of its many famous past residents being the modern artist Albert Tucker (1914-1999). It is also home to many 'tree-changers' who value wellness, organic produce, and sustainable living. Reflecting these values, Hurstbridge was the first town in Melbourne to go plastic bag free. Being a rural village, Hurstbridge is also home to farmers and many families have called Hurstbridge home across multiple generations. This has resulted in a strong sense of place and tradition.

At a time when residents of this highly social community were dealing with the challenges of lockdown, a craft-based intervention has allowed an opportunity to reap the positive wellness rewards from making and being creative.

The concentration of creative people means that the crafting challenge to create a scarecrow played to the interests and skills of this group. The fact that scarecrows are made from reusing and recycling grabbed the interest of the tree-changers and the link between scarecrows and the famers is obvious and routed in traditional (organic) ways for tending the land. Scarecrow making meant that each of these groups has something unique to contribute.

What was especially interesting though was that the scarecrows themselves became an expression of the community's collective identity and values. The population of Hurstbridge is eclectic, yet inclusive and diverse and this was reflected in the scarecrows that were built. The traditional farm scarecrow in a checked shirt and blue denim was certainly to be found, but so were a wide range of reimagined 2020 scarecrows. There was gender equity, ethnic diversity, and young and old scarecrows – displaying the values of inclusion. There is even a parody in the form of a crafting scarecrows sitting knitting in the quiet of the native bushland. There were theatrical jugglers and clowns and several musicians including a scarecrow bush-music band. All displaying the value of creative expression. There was even a touch of the mystical world in the form of witches – displaying values of spirituality. The final set is those that fall into the category of creative works in the form of sculptures being welded or made from pipes and other recycled materials- displaying the value of sustainability.

The call to craft was also an important component in this initiative given its timing during the COVID-19 lockdown. Crafting is well known to be beneficial to mental health. Crafting is associated with wellbeing and feelings of happiness



(see for example Riley, Corkhill & Morris, 2013 and Mason, 2005). Art therapy is an accepted practice. At a time when residents of this highly social community were dealing with the challenges of lockdown, a craft-based intervention has allowed an opportunity to reap the positive wellness rewards from making and being creative. These wellness benefits were strengthened by the ability to share the endeavours of this work with the local community, through placing the scarecrow in their front yards. As you moved around the streets of Hurstbridge you saw outdoor chairs were placed next to the scarecrows as residents (known locally the merrymakers) sat proudly by their creations and enjoyed a quick (masked) conversation with neighbours out of their daily exercise. Even the term 'merrymakers' is a direct recognition of the mental health benefits of making. Further enhancing this case, was the positive psychological benefits known to be associated with recycling (see, for example, Young, 1986). Finally, spill over mental health benefits were obtained from those who may not have built a scarecrow but obtained pleasure from walking around the village during the lockdown period and spotting all the scarecrows as they appeared.

CONCLUSIONS

The 5km radius of Hurstbridge village has been far from a sleepy rural community in the slumber of lockdown in August 2020. It was alive with scarecrows all carefully crafted from a raft of recycled materials. This was a call to action routed in the values of the circular economy (recycle and reuse) but was a success because it also reflected the broader values of the community of creative expression, organic living, spirituality and wellness.

So, what lessons can we learn from the scarecrow initiative? Well one lesson that stands out clear from the Merrymakers Scarecrow Village case study is that a successfully community-based call to action works well if it reflects the identity and values of that community. The case study shows us that community level calls to action do not have to be resource intensive to be successful. Circular economy principles can be applied and be highly successful. Crafting is central to the ideas of reusing and recycling and offers immense opportunity for community-based initiatives. Obviously, scarecrows will not work in urban environments and the challenge is to find the right project for a community starting with the values of the circular economy and building in the values of the community to ensure engagement and success.

As a final point it is worth noting that while values are not the typical domain of economists, it is increasingly important that applied economists adopt a behavioural economics framework to understand the economic and psychological based motivations of citizens. Increasingly consumers are being motivated by non-monetary factors and if we are to achieve the economic and social outcomes we strive for, we need a holistic understanding of behaviour. This point is highly relevant when we turn our attention to circular economy solutions to resource allocations.

The scarecrows can be viewed online at: **https://www.facebook.com/media/set/?vanity=MERRYMAKERSSCARECROWVILLAGE&set=a.131413508422059**

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Professor Lisa Farrell is part of the Placemaker Economics Group in the College of Business and Law, RMIT University. She has an international reputation and extensive track record of academic publications in the field of Societal Economics. She has published in leading journals in economics including the American Economic Review (the most prestigious journal in her discipline). She has researched extensively on consumption behaviours, equity and diversity and cultural economics. Her external engagement includes being an Editorial Board Member for The Economic Record and the Journal of Gambling Business. She believes passionately in knowledge exchange and knowledge translation and has worked as an expert advisor for the Victorian and UK government and on an impactful behavioural change project with VicHealth among others. Her digital biography is available at: https://www.youtube.com/watch?v=1unPtZD9Zo0&t=8s

THE ECONOMIC BENEFITS OF GOING PLASTIC FREE:

THE NOOSA EXPERIENCE

Sasha Lennon, Roger Gibbins and Toby Hutcheon, ,SC Lennon & Associates

In 2019, the Queensland Government, through the Department of Environment and Science, commissioned SC Lennon & Associates to prepare and report on an analysis of the economic benefits of the Plastic Free Places program. The work was undertaken with the support of Boomerang Alliance, a not-for-profit organisation focussed on maximising resource efficiency to achieve a zero-waste society.

The Plastic Free Places Program (https://www.plasticfreeplaces.org/) is a community-based initiative run by Boomerang Alliance in partnership with the Australian Packaging Covenant Organisation (APCO) as well as local Councils and other stakeholders in a number of locations throughout Australia including Noosa, Byron Bay, Perth, Adelaide, Cairns and Townsville. There are also two trial projects currently underway in Victoria - in Mt Martha and Elsternwick. The program encourages the café and hospitality and events sectors to switch practices away from single-use plastic takeaway items. The aim is to avoid and reduce the use of single-use plastic packaging and create lasting changes towards a circular economy.

The Plastic Free Places program has demonstrated that it is effective in reducing single-use plastics, which will have a positive benefit for the local environment and natural amenity, and a positive contribution to waste reduction initiatives. However, until now, not much was known, if anything, about the economic benefits of going plastic-free.

The investigation of economic benefits focussed on the program's pilot project, Plastic Free Noosa, as a working case study. The study utilised cost-benefit analysis techniques and an assessment of estimated regional economic impacts to demonstrate the economic value of the Plastic Free Places program, to the region and to the State of Queensland as a whole.

ECONOMIC DEVELOPMENT AND THE CIRCULAR ECONOMY

A key driver of the Plastic Free Places Economic Benefits Study was a desire to better understand and articulate the connection between positive environmental outcomes and the Queensland Government's regional economic development agenda. Economic development is about encouraging investment, income and the creation of jobs. Equally, it can also be measured by improvements in education, skills, health, culture, community wellbeing, a sense of place and, of course, the environment. In this respect there are a diversity of

opportunities to bring about positive regional economic development outcomes through sustainable resource use.

Plastic, while a very useful product with many benefits in its own right, has become a huge problem for our environment because of the way we deal with it and dispose of it. Global studies have shown that 95% of all plastic packaging is used once and then discarded, often as litter, with huge (and avoidable) adverse environmental impacts. Researchers, including the CSIRO (2014) and others, estimate that if this trend continues there will be more plastic than fish in the ocean (by weight) by 2050. A more recent study by the CSIRO (2020) estimates there is 14 million tonnes of plastic on the ocean floor.

Governments throughout Australia are aware of the perils of plastic. In Queensland and in other states and territories, governments have been introducing container deposit schemes and plastic bag bans, which are effective (top down) steps to addressing the problem. To complement and capitalise on this approach, the Plastic Free Places Program, by addressing problematic single-use plastics like coffee cups, water bottles, straws and takeaway containers, takes a community-based bottom-up approach to reducing waste.

The Plastic Free Places program contributes to regional economic development through the environmental cost savings it generates, and through the opportunities it presents for industry adaptation and the creation of new high-value economic activities in a circular economy.

Simply put, a circular economy replaces the typical production and consumption cycle we are familiar with - of make, use and dispose of 'things' - in favour of one defined by as much reduction, re-use and recycling as possible. The longer materials and resources are in use in our economy, the more value is extracted from them. So, over the long-term, there are efficiency gains in the economy. Within this context the term 'new plastics economy' is coined, as shown in Figure 1.

The 'new plastics' economy has three main elements:

1. Create an effective after-use plastics economy (e.g. recycle /re-use / compost);
2. Reduce leakage into natural systems (land and marine) and other externalities (e.g. greenhouse gas emissions); and
3. Decouple plastics from fossil feedstocks (e.g. move to plant-based sources).

This framework provides the context for a grass roots approach to dealing with the plastics threat.

PLASTIC FREE PLACES – A POSITIVE GRASS ROOTS INTERVENTION

The economic assessment of the Plastic Free Noosa program was informed by a cost-benefit analysis and an assessment of the program's estimated regional economic impacts.

Cost-benefit analysis (CBA) is a technique used to identify the net benefits of a proposal relative to a 'base case' or 'business as usual'. The technique considers aggregate societal costs and benefits, with all costs and benefits expressed in dollar terms over an extended period. In undertaking the assessment of the Plastic Free Noosa program, data was sourced from direct correspondence with selected café proprietors in Noosa, wholesalers and distributors, Noosa Council, Tourism Noosa and Boomerang Alliance, together with published information.

The base case that was adopted was an 'average' café using 'all plastics' in relation to the following items:

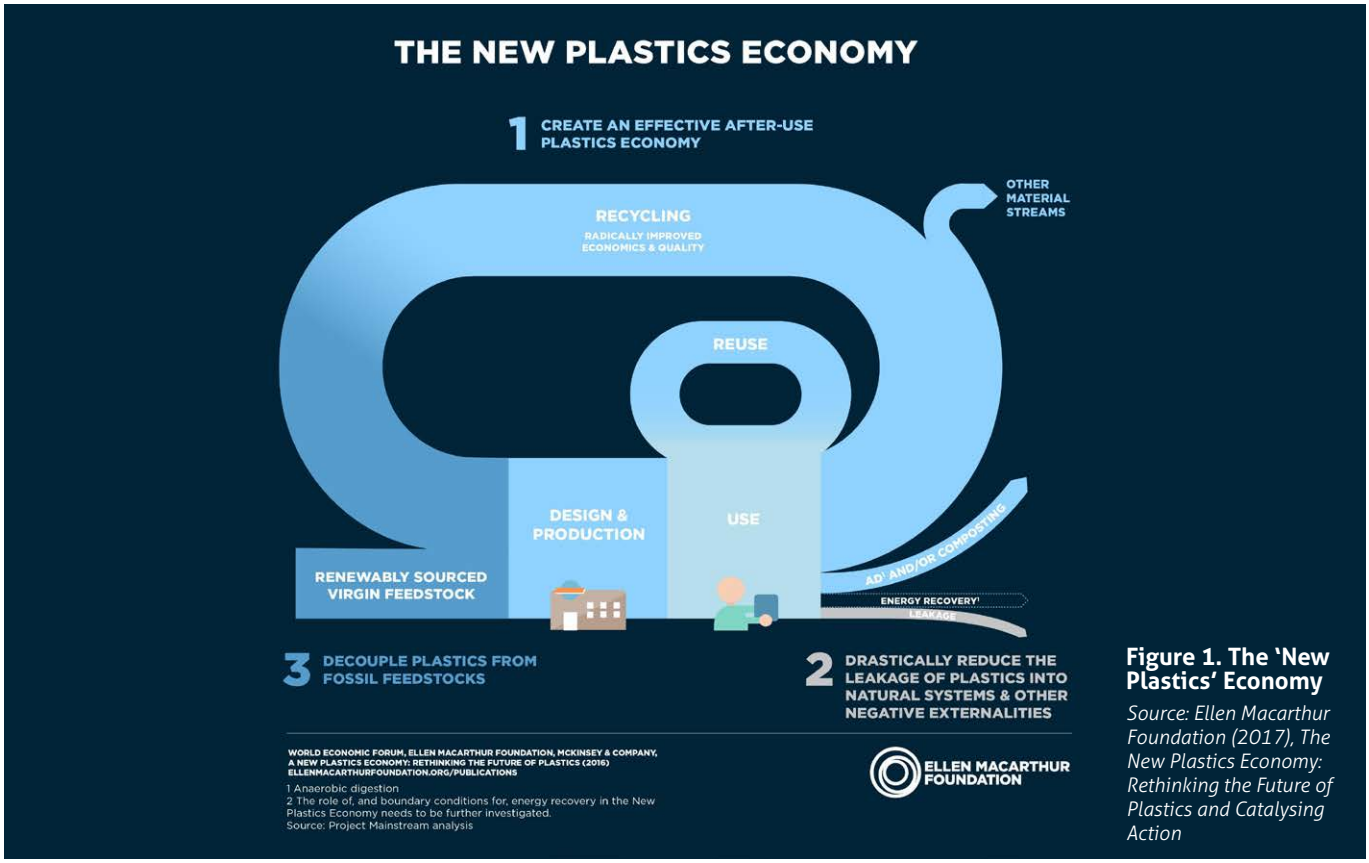

Figure 1. The 'New Plastics' Economy

Source: Ellen Macarthur Foundation (2017), The New Plastics Economy: Rethinking the Future of Plastics and Catalysing Action

Figure 2. The Broad Focus of the Plastic Free Places Program
Source: Boomerang Alliance, 2019, Plastic Free Places - Overview

- Straws;
- Coffee cups;
- Coffee cup lids;
- Takeaway containers;
- Takeaway container lids;
- Cold cups;
- Cold cup lids;
- Disposable cutlery (set of three);
- Plastic bags; and
- Water bottles.

Investigations revealed that wholesalers already make available non-plastic alternatives, including products based on:

- Bagasse (sugarcane pulp);
- Bamboo;
- Palm leaf products;
- Wood products; and
- Cardboard (and other paper stocks).

From the research undertaken, an estimate was made of the volume of the above items produced by each café and this was extrapolated to all cafes in Noosa. An estimate was made of the destination of waste generated, being 60% to landfill, 32% to land litter and 8% to the marine environment.

A 'plausible scenario' was developed through detailed investigation of the prospects for reduction at source, recycling, composting and energy recovery. It was concluded that there can be 100% substitution of plastics with commercially compostable materials and there can be 25% reduction of waste through reduction of throughput at source and that 100% of residual waste can be commercially composted.

In this scenario, the amount of litter to land and to the marine environment is minimal, and that which occurs is relatively benign. For example, paper straws will break down readily and will therefore, have limited adverse impacts in the marine environment.

THE COSTS AND BENEFITS OF POSITIVE INTERVENTION

The costs of moving to a plastics free environment were identified as:

- Program costs equate to $588 per café (but fall to zero when plastics free becomes the norm); and
- The additional cost of non-plastic items is estimated at $6,847 per café per annum (but again falling over time, as suppliers achieve economies of scale).

The benefits (per café per annum) were assessed to be:

- Benefits to plastics 'reducers' - those who assist with prevention, minimisation and re-use by purchasing re-usable items @ $937.50 - measured net of café costs and considering willingness to pay by consumers;
- Reduced landfill @ $74.22 (excluding the landfill levy as this is a transfer payment);
- Value of compost @ $5 per tonne (net of costs);
- Reduced land litter @ $9,456 per tonne;
- Reduced marine litter @ $55,592 per tonne.

There are additional benefits such as enhanced amenity from litter reduction and greater tourism appeal of Noosa and the wider Sunshine Coast region. These benefits are more difficult to value and, while they are recognised as being important, they have been omitted from the analysis.

It was found the average café produces 1.67 tonnes of plastics per annum. This enables the above values to be applied to estimate the total benefits.

It was concluded that there can be 100% substitution of plastics with commercially compostable materials and there can be 25% reduction of waste through reduction of throughput at source and that 100% of residual waste can be commercially composted.

The costs and benefits streams were 'modelled' over a 40-year period and various discount rates were applied to calculate the ratio of benefits to costs. The ratio was estimated (at 6% discount rate) to be 4.33:1. Hence, for every dollar invested in going plastic-free, the return is $4.33.

It is important to recognise that the majority of benefits are associated with reduced marine litter where a high value is attached. This reflects a very high willingness to pay by the community to address this problem that is widely documented in the literature. Sensitivity analysis was carried out on this and all variables, with the 'worst case' still returning a positive ratio of benefits to costs.

Discarded plastic is harmful to marine life, the environment, the tourism industry and the economy
Image Source: Brian Yurasits on Unsplash

Left: Compostable materials offer an environmentally and economically sustainable alternative to plastics

Above: Plastic Free cafes are also BYO-friendly

Images source: Evelina Katarzynski

REGIONAL ECONOMIC BENEFITS

Applying the results of the Plastic Free Places program economic benefits analysis to all cafes in Noosa and throughout Queensland shows that the regional economic impacts are significant. Specifically:

- Extrapolating the results for one average café to 85 cafes in Noosa (out of around 200, or just over 40% which is assessed by Boomerang Alliance to be an achievable figure after three years), increases the net present value (6% discount rate over 40 years) of the Plastic Free Places program to around $22 million. This is to say that the Noosa community would be $22 million better off in terms of the value the community places on the net benefits achieved.

- If we were to translate this into estimated employment outcomes, a $22 million boost to the Noosa economy would support an estimated 250 local jobs in Noosa alone.

- Extrapolating the results to the whole of Queensland suggests an estimated $944 million (6% discount rate over 40 years) in net benefits to the Queensland economy.

There may be other local and regional economic development benefits too. Potential value-added opportunities for investment and employment could include, for example:

- Opportunities to cater for increased demand for commercial composting;

- Opportunities for producers of compostable products used in take-away packaging;

- R&D which feeds into the development of new and superior products (including home-compostable products);

- Composting products that can be marketed for their contribution to waste minimisation; and

- Opportunities for wholesalers targeting plastic-conscious traders and consumers.

The benefit-cost ratio and the estimated regional economic benefits of the Plastic Free Places program demonstrate a strong and robust economic case for supporting the program's delivery throughout Queensland. For local governments throughout Australia looking to effect positive change for their environment, for their communities and their economies, the Plastic Free Places program is an intervention worthy of consideration.

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ASPIRE – EMPOWERING BUSINESSES TO EXCHANGE WASTE AS A RESOURCE

Susan Magi, Aspire

IMPLEMENTATION

ASPIRE was developed initially in collaboration with CSIRO, Data61 and a number of councils in Victoria to help lower local businesses waste costs, while reducing waste going to landfill. The platform also introduced circular economy principles to businesses and helped them shift from a waste hierarchy to circular behaviours.

ASPIRE's innovative software uses a sophisticated algorithm to create an online match making platform for businesses to exchange their waste as a resource. During the pilot stages of ASPIRE, 45,000 tonnes of manufacturing waste was diverted from landfill. Currently ASPIRE operates with over 400+ businesses, across 17 councils throughout Australia on the platform with savings over $210K to businesses by exchanging their resources. For many businesses, ASPIRE's matching platform provides the tools to truly "walk the talk" as sustainable enterprises.

APIRE's newly developed platform, (launched April 2020) was created with a larger footprint and looks to dramatically expand within both the government and business ASPIRE communities.

Now a commercial business, Aspire has reviewed the platform to ensure new initiatives can be implemented, while remaining true to the original concept and loyal to the founding members (stakeholders) whose collaboration and connections.

To create a clear circular economy vision, a collaborative effort is required and with this in mind ASPIRE's team works closely with member stakeholders both at a council level and within businesses directly on a daily basis.

ASPIRE OBJECTIVES

According the Australian Bureau of Statistics, Australia generates around 68.9 mega tonnes of waste per year - this number steadily projected to increase.

ASPIRE's objectives have been to create an innovative service, encouraging circular behaviours through actions and education. Aspire helps to close the loop, while diverting waste from landfill by offering localised solutions, savings on production and waste disposal. while empowering businesses to create new revenue streams.

As a consequence of this objective, the marketplace platform has also created connections and a collaborative network of like-minded businesses.

ASPIRE has assisted hundreds of businesses and communities to understand that engaging in the circular economy model, allows them to be sustainable while creating a new revenue stream (by exchanging waste with value).

WHAT'S NEXT FOR ASPIRE?

Expansion means continuing to populate the ASPIRE marketplace with new businesses. The platform will continue to support businesses actively exchange waste, reduce landfill and practice circular economy principles, resulting in business savings, localised solutions and community networks.

ASPIRE is poised to expand into new domestic and international markets. However, the support of State and Federal governments is critical in order to change behaviours and encoourage and support small and large organisations move to a circular economy model.

Mandatory waste levels to landfills, education and incentives to get this moving will be a win for us all.

ASPIRE's story is a short one to date with a big passion for change and it is ASPIRE members that drive us to ensure our initiatives are heard and achieved;

A word from an ASPIRE business:
"At Casafico we manufacture construction materials made from waste, ASPIRE is an integral part of our business which shows transparency to all our stakeholders to see how much waste we divert from landfill and how much CO2 we save., We will use ASPIRE to research new waste streams for product development and most importantly know that our waste is not being stock piled or buried. With ASPIRE we have confidence that our waste is being responsibly rescued, reused or, as we do, transformed into a new product."

EDA ACKNOWLEDGES THE SUPPORT OF ITS CORPORATE MEMBERS

EDA
ECONOMIC DEVELOPMENT AUSTRALIA

CORPORATE MEMBERS OF EDA
AT SEPTEMBER 30 2020