



# revolve

OFFICIAL MAGAZINE OF THE WASTE MANAGEMENT INSTITUTE NZ

MARCH 2019 \ ISSUE 170 \ \$9.00

**RURAL WASTE**

A ONE-STOP  
SHOP SOLUTION

**TAKING THE  
LEAD ON  
LEAD**

**ENERGY  
FROM  
WASTE**

A RESOURCE  
NOT RUBBISH

CADMIUM IN SOIL CONCERNS | RECYCLING CONSTRUCTION WASTE | IDEAL COFFEE

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WasteMINZ is the leading professional body for waste management, resource recovery and contaminated land management in New Zealand. We deliver value to our members through the shaping and sharing of policy and the development of industry good practice.

WasteMINZ publishes *revolve* magazine four times a year, it plays a vital role in ensuring our members are up-to-date with the latest in industry news, policy and legislative changes as well as innovations and advances.

***revolve* magazine is a forum for positive sector debate and discussion. The articles contained in *revolve* do not necessarily represent the views of WasteMINZ or the WasteMINZ Board.**

ISSN 2324-5417 (Print)  
ISSN 2324-5425 (Online)

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# FROM PAUL'S DESK

**Talk to me**  
**+64 9 476 7172**



**Paul Evans**  
CEO, WasteMINZ  
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This is my last column in *revolve* after seven years as part of the WasteMINZ team.

It seems somewhat surreal to be leaving, as this job has been such a massive part of my life; it's taught me plenty and, importantly, it has given me the opportunity to meet some amazing and passionate people. It has been an absolute privilege to be part of the WasteMINZ journey. I'll miss the organisation, its members and, of course, the outstanding team.

I would like to sincerely thank our Chair, Darren Patterson, and Paul Bishop before him, for their support of me and commitment to the sector as a whole. My thanks extends to all the Board members who have made my time here so incredibly positive, and my team – who I wish I could take with me (but I promise I won't!).

In seven years, the landscape has changed a huge amount. Our sector's issues are at the forefront of the public's mind, politicians are engaging in a meaningful way and we are beginning to see movement towards the systemic change that is

needed. WasteMINZ has been central to this; I think we can all be proud.

If there's something that I'm disappointed about, it's the rate of change. It's still a slowly-slowly risk-averse approach. While I understand this to a degree, I think that as a nation we need to be brave.

We have some incredible challenges ahead, and we need to step up and meet these. We need to quit tinkering around the edges, quit talking about the same old things and take some action.

No action will be perfect, and we may get some things wrong along the way, but I think it's far better than not acting and living with regret. We should all be putting vested interests to one side and thinking about what is truly the best approach for Aotearoa.

WasteMINZ's new chief executive Janine Brindson will be starting at the end of March. She has many challenges ahead, but with the support of a passionate Board, an amazing team and a mandate from our members, I'm confident that WasteMINZ will continue to flourish under her leadership.

WASTEMINZ HAS AN IMPORTANT ROLE TO PLAY IN THE FUTURE OF AOTEAROA. WE HAVE A REAL OPPORTUNITY TO MAKE A DIFFERENCE – LET'S NOT SQUANDER IT.



# YOUR BOARD



**Parul Sood**  
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The start of a new year is always a good time to look ahead, identify challenges and opportunities, set new goals, try new things and start to do things differently.

Auckland has set a goal to be a Zero Waste City by 2040. That's only 21 years away. That means each year we need to plan, take positive action and move purposefully towards that target. Around the country, other local councils are working equally hard to make headway on waste reduction.

Under the Waste Minimisation Act, local authorities are mandated with the serious responsibility of supporting our communities to reduce the amount of waste generated and disposed of.

Central government has begun to drive change through legislation such as the ban on microbeads and single-use soft plastic bags. But there are still many fronts that we need to tackle in order to make further headway on waste minimisation.

As a sector, we have some smart thinking to do to develop nationwide waste minimisation infrastructure that helps New Zealand to deal with its own waste onshore. Having a robust resource recovery industry would reduce our current reliance on the vagaries of international markets and create the resilient local, closed-loop system we need for the future.

Being part of WasteMINZ creates a forum for us to come together – for councils, the community sector and the private sector to collaborate in partnership to develop new solutions to fill the current recovery infrastructure gaps.

We have a lot going for us – our diversity is our strength. Our differing opinions and perspectives, technical expertise and knowledge drawn from unique experiences and a variety of local contexts give us the opportunity to share ideas, aggregate wisdom, make collective decisions and co-create and design new services.

With WasteMINZ as a launchpad, working together, the private sector, community sector and councils can successfully transition New Zealand to a circular economy.

As a sector, we can deliver the benefits: long-term cost savings, increased local job opportunities, technical innovation and a reduction in the amount of harmful waste produced, thereby turning down the dial on climate change.

So, I'd encourage you to let 2019 be the year to really step up and get involved. If you're interested in doing more, get involved with one of our WasteMINZ sector groups that are continuing to drive change in organic materials, product stewardship, contaminated land management, disposal to land and societal behaviour change.

## HOW TO CONTACT YOUR BOARD MEMBERS



*left-to-right top, middle, bottom*

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# SULO



GLOBAL NAME, KIWI MADE

# NEWS BITES

## Plastic ranks as Kiwis' top concern

The build-up of plastic in the environment is the top concern of New Zealanders when it comes to environmental and social issues, new research shows. The latest Colmar Brunton Better Futures report surveyed 1,000 New Zealanders in December 2018 on a wide range of environmental and social issues.

Read the full research:  
[bit.ly/betterfuturesreport](http://bit.ly/betterfuturesreport)

## Love Food Hate Waste saves 14,000 tonnes of food waste

Our latest Love Food Hate Waste research has shown that households who have heard of the Love Food Hate Waste campaign have decreased their food waste to landfill by 27.1 per cent. This means that at least 14,000 tonnes of food waste has been diverted directly as a result of the campaign.

Find out more about our research:  
[bit.ly/lfhwresearch](http://bit.ly/lfhwresearch)

## Study hopes to end speculation around cadmium levels in soil

A new study into the environmental impact of cadmium (Cd) could help farmers reduce their fertiliser usage and prevent build-up in soils and waterways. Waikato University geochemistry senior lecturer Adam

Hartland received a \$999,808 grant from the Ministry of Business, Innovation and Employment to undertake the two-year project.

Project details:  
[bit.ly/cadmiuminsoil](http://bit.ly/cadmiuminsoil)

## Australia's new waste policy misses the mark

Australia's new National Waste Policy acknowledges the importance of a circular economy, but is largely a missed opportunity, writes University of Technology Sydney senior research consultant Jenni Downes.

Treading the circular path:  
[bit.ly/notsocircular](http://bit.ly/notsocircular)

## Storm in a coffee cup?



Buoy Cafe at Westhaven Marina in Auckland is reducing waste by not allowing takeaway cups to be used by people not taking coffee away. However, there was a heated confrontation when a woman objected to being told she couldn't have a takeaway coffee cup if she stayed on-site. Her rationale was that the porcelain cup might smudge her lipstick.

Find out more:  
[bit.ly/lipstickissues](http://bit.ly/lipstickissues)

## Are asbestos 'compost heaps' the way of the future?

A team of researchers at Unitec believes it has come up with a biological way of breaking down asbestos and making soil safe again.

Unitec lecturer Terri-Ann Berry says, "We realised we're looking at vast volumes of contaminated soil and products that need to go somewhere, and was there a better way of managing this?"

Find out more:  
[bit.ly/asbestosheaps](http://bit.ly/asbestosheaps)

## Queensland waste levy will be \$75 per tonne

The state's waste levy was approved by the Queensland Parliament. Most waste to landfill will attract a levy of \$75 per tonne from 1 July 2019. Read the Environment Minister's statement: [bit.ly/levystatement](http://bit.ly/levystatement) Sir Michael has spoken!

Sir Michael Cullen's tax working group has recommended a swathe of changes to New Zealand's tax system. While everyone's focus was on the capital gains tax, there was also a very significant recommendation for the waste and recycling sector, that is, to "Expand coverage and rate of Waste Disposal Levy". This has the potential to fundamentally change our sector.

See the recommendations:  
[bit.ly/levyoutandup](http://bit.ly/levyoutandup)

## National Party moots container deposits

The National Party has released an environment discussion document which states that "National proposes introducing measures to see either by a container deposit scheme in association with existing kerbside and recycling programmes is introduced, or by the beverage



sector itself be responsible for ensuring through initiatives they set up, that 90 per cent of beverage containers are saved from being sent to landfill". Given that the establishment of a container deposit scheme is Green Party policy, does this mean there could be bipartisan support?

Read the full discussion document: [bit.ly/nationaldiscussiondoc](http://bit.ly/nationaldiscussiondoc)

## What to do with unclaimed medication?

\$40 million worth of unclaimed prescription medicine is dumped in landfills each year. In most countries, unclaimed drugs are incinerated, but in New Zealand, there's no country-wide policy for disposing of medicines.

[bit.ly/bitterpillnz](http://bit.ly/bitterpillnz)

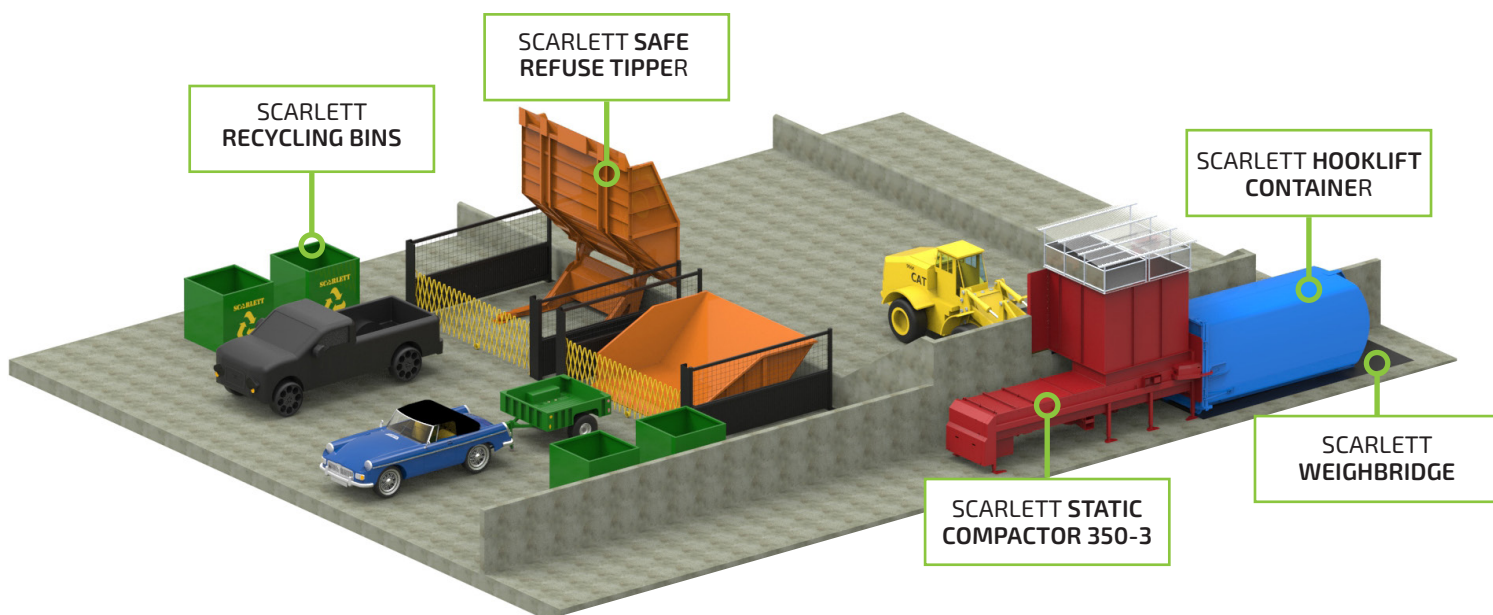
## 98 per cent of household e-waste heads to landfill

As much as 98 per cent of New Zealand's household electrical and electronic waste may end up in landfills, according to recent research. "Unless we consider prioritising e-waste for product stewardship, the risks of detrimental effects caused by e-waste will continue to rise, and New Zealand could become a literal dumping ground for inferior and end-of-life electronic goods," says report author Vicktoria Blake.

Read her research: [bit.ly/ewasteresearch](http://bit.ly/ewasteresearch)



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# MOVERS & SHAKERS



## EMILY JASMINE

Emily joined Ruapehu District Council in June 2018 as waste minimisation educator. This new role supports Ruapehu District Council's vision of being zero waste by 2040. Emily has enjoyed working in a variety of fields, including landscape management, agriculture, arboriculture, horticulture and community health. This role combines her passion of working with communities with caring for Papatūānuku. Beeswax wrap workshops were well received in 2018 and this year she is hoping Boomerang Bag workshops will be popular. If you have established a Boomerang Bag group, please contact her at [emily.jasmine@ruapehudc.govt.nz](mailto:emily.jasmine@ruapehudc.govt.nz).



## MILLIE PORTER

Millie joined Upper Hutt City Council in the newly created role of waste minimisation officer in December last year. She has a Bachelor of Science in Environmental Studies and Development Studies, and a Bachelor of Arts in International Relations and French. She has worked for a few start-ups – most recently CoGo (previously Conscious Consumers). Millie is motivated to better educate communities about the waste industry and the impacts of their consumption. She loves sharing ideas and can be contacted on [millie.porter@uhcc.govt.nz](mailto:millie.porter@uhcc.govt.nz).



## DARNELLE TIMBS

Darnelle started as the waste minimisation facilitator for Gisborne District Council in April last year. She comes from an eclectic background, with a Masters in Social Science, and in recent years focused on sustainability projects and event management. Driven by concern for the impact of waste on our environment, notably plastics in the oceans, she is grateful to return to her hometown of Gisborne to work on waste minimisation in Tairāwhiti. She mostly enjoys being able to engage with the community to work on the many and diverse challenges and opportunities for the region. Darnelle can be contacted at [Darnelle.Timbs@gdc.govt.nz](mailto:Darnelle.Timbs@gdc.govt.nz).



## VICTORIA MOYLE

Victoria Joined the South Taranaki District Council this year as waste minimisation officer for increased focus on sustainability in the district and the implementation of the Waste Management and Minimisation Plan. She has a Bachelor of Science focused in geography and is just starting her career within local government, which is fueled by her passion for the environment and sustainability. She has a special interest in integrated geography and consumer habits. Victoria can be contacted at [victoria.moyle@stdc.govt.nz](mailto:victoria.moyle@stdc.govt.nz).

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### INDIVIDUAL

Shaun Bowler

Lynette Ellison

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### STUDENT

Emma Foukles

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# THE TRUTH ABOUT LEAD (AGAIN)

Graham Aveyard from Environment Canterbury wants key organisations to break the cycle of concern and reaction to the health effects of lead in paint by taking action now.

**T**HE GREEKS identified it as early as the second century BC; the Romans knew it as morbi metallici. In 1656, its health impacts were “rediscovered” by Samuel Stockhausen, a German physician.

The use of internal household paints containing lead during the 19th century increased domestic childhood exposure. Before this time, lead had been predominantly an occupational hazard.

Toxicity to children from lead paint was identified in Australia in 1897, an important step in the understanding of childhood lead poisoning. Subsequently, in 1909, white lead interior paints were banned in France, Belgium and Austria.

Despite accepted widespread understanding from the 1950s that lead paint was the cause of serious childhood illness, it took until the 1960s and 1970s for lead to eventually be reduced in paint from as much as 50 per cent to 1 per cent and, more recently, to less than 0.1 per cent. Higher concentrations of lead in domestic paint is still used in countries such as India or the Philippines.

## Long-lasting health impact

New Zealand is estimated to have 250,000 weatherboard properties of an age where lead paint would have been used. Maintenance, removal, repair or general deterioration is likely to have contaminated the surrounding area to the extent that analysis routinely confirms lead concentrations in the soils sufficient to impact human health.





THERE IS NO  
KNOWN SAFE  
BLOOD LEAD  
LEVEL.

Ingested lead can be stored in bone within the body and gradually released over many years; the half-life of lead within bone is 10 to 25 years. Once lead has entered the body in great quantities, a person can be affected for much of their early life. Lead can be released again from the bone during pregnancy and can affect the foetus.

Lead is not required in the human body. There is no known safe blood lead level. We know young children absorb four to five times as much ingested lead as adults from a given source, most probably due to their rapid growth and development. This coincides with the maximum period of development of the brain, the primary organ to suffer long-term damage from absorption of the metal.

It is difficult to quantify the impact on public health, due, in part, to limited data on those affected, and the lack of obvious symptoms even in those with blood lead levels above the action level set by public health services in New Zealand, Australia and the United Kingdom.

Annual notifications of cases in New Zealand are typically between 100 and 200. The process is limited to people who have sought medical care and who, on investigation, have been identified to exhibit raised blood lead (>10µg/dL).

Those identified are predominantly working-age males, of white New Zealand/European backgrounds (more than likely to be due to occupational exposure). The greatest number of those affected are painters/decorators, showing that, once removed, lead paint presents a significant hazard to those in close contact with it.

While there are examples of significant childhood exposure, these seem to be limited in number, and we don't have the evidence base to link these with exposure to soil rather than to internal or external lead paint removal. As a result, there is a lack of clear national understanding on the burdens of lead within the population which urgently requires investigation.

The cycle of 'concern' and 'reaction' to this issue never seems to get broken. As a result, we return time and again to act to protect our children from entirely preventable impacts on their health from paint.

## Limitations to current regulations

Some contaminated land professionals consider revision of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and Hazardous Activities and Industries List (HAIL) to be the solution.

The NESCS relies on a site having a contaminative historic land use to drive remediation triggered by consented development. There are lesser used regulatory powers such as building codes or the Health Act; however, declaring the property contaminated and adding it to a list of contaminated sites provides no immediate solution.

However softly the message is delivered, the attitude of contaminated land and consenting professions is to shy away from declaring and registering 250,000

homes as potentially contaminated. The issue continues to remain in the too hard basket, where it has resided ever since HAIL was defined.

The real concern is much more straightforward and rather more pragmatic. In New Zealand there are 1.84 million residential properties being subject to around 20,000 territorial district consents, meaning that if every consent had an NES (Contaminated Soil) component, it would take 100 years to address each of the 250,000 properties potentially affected by lead paint contamination. Clearly, we need to find an approach that delivers far shorter term and real outcomes.

Lead is a good deal more than a contaminated land issue; most of the time as professionals we are dealing with nuances of risk or the "significant possibility of significant harm". Lead is more in your face as a risk than this; we can point to

actual harm from ingestion of the contaminant – from a variety of sources and often in unremarkable circumstances – which actually affects exposed individuals.

## Breaking the cycle

The solution requires a combined and coordinated effort between the Ministry of Health, Ministry for the Environment, regional and district councils and the public health services of district health boards. No one can address this issue alone. So what could be done?

Even though the RMA and NESCS won't necessarily deliver change within an acceptable timeframe, HAIL does provide a backstop catch-all Category I: "Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment."



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This should be sufficient to address cases of higher probability of existence of hazard, whereas regulation such as the Health Act could deal with situations where paint is literally falling off old timber properties. In addition, any site investigation prompted by other HAIL uses should also address the potential for risk from historic lead paint removal or deterioration.

Increased focus should be directed through medical services to those people occupying property that is likely to pose a threat and on increased numbers of blood lead tests from non-occupational patients (particularly children) exhibiting possible symptoms. This would provide a greater number of cases with which to understand the exposure thresholds more fully.

Councils supporting DHB public health teams should also follow up on notified cases of raised blood lead levels to provide

advice and options for managing or removing the source. Education campaigns targeted to locations of greatest risk could also start to address the less visible cases of soil contamination.

Much of the above is only a first response using existing rules, powers or opportunities. In time, a more robust regulatory approach is required. However, we can't wait for a solution to appear miraculously from the depths of that too hard basket while we wait for something more specific to be developed.

### Time to 'take the lead'

I completed a dissertation on the impacts of lead paint as a degree project and have spent 32 years of my career in its shadow. I have decided that I am not willing to leave this for the next generation to resolve and let the cycle begin again. This is why, I believe, along with many fellow professionals, that we should be 'taking the lead'. 🍷



Graham Aveyard is science team leader – contaminated land for Environment Canterbury. Prior to that, he worked as an environmental health officer – contaminated land health risk for Auckland Council and is a former UK environmental protection manager and environmental health officer.

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# THE ONE-STOP SHOP

A FARMER-CENTRIC APPROACH  
TO ADDRESSING RURAL WASTE

**Fraser Scott, Simon  
Andrew and Isla Hepburn**  
report on the success  
of a project tackling  
the serious inorganic  
rural waste problem in  
New Zealand.



**I**N 2018, CHINA effectively shut its doors to post-consumer plastics. The go-to solution for recycling plastics disappeared almost overnight, causing what is the greatest shake-up in the international waste industry in recent memory.

Plastic waste has become a cause célèbre in New Zealand, and much attention has been focused on the likes of supermarket bags as a source of waste that we are now struggling to deal with. However, you have to get out of the cafes and supermarkets and visit the farms, orchards and vineyards to see one of the most concerning sources of waste in New Zealand.

Inorganic rural waste in New Zealand is a serious problem. Research undertaken in Canterbury, Waikato and the Bay of Plenty suggested that up to 10 tonnes of plastics, chemicals, treated timber and other non-natural wastes are produced annually by New Zealand farms. Where does it go? Unfortunately, most of it is burned, buried in farm pits or stored in often precarious conditions on farms.

## Identifying current practice and barriers to change

The New Zealand Rural Waste Minimisation Project was initiated by Environment Canterbury to understand the reasons for this and facilitate an industry-led response to it. The project was undertaken by True North Consulting with communications support from Cherry Red Consulting.

The project initially focused on creating a risk framework for prioritising farm wastes. Perhaps unsurprisingly, plastics, agrichemicals and used oil were identified as the top priorities for further work.

It was then necessary to build an understanding of rural waste management in New Zealand. Farmers were asked about the methods currently employed to dispose of farm waste. Eighty per cent said that burning, burying or bulk storage of waste was a key method used to deal with waste.

Yet, protecting the environment and the legacy of the land were also high on farmers' agendas. Attention was therefore focused on determining what was preventing farmers from pursuing more sustainable forms of farm waste management.

Farmers listed numerous reasons for not using existing services, including a lack of incentives to do so, a lack of awareness that such services existed and a concern over the economic viability and continuity of such services. However, the main reasons for not using alternative services were simply that they were perceived as too expensive and too inconvenient.

Further research with farmers suggested that how farmers wished to deal with waste split them into two distinct groups with differing service needs and expectations. Farmers producing high volumes of waste tended to be more comfortable paying for an on-farm collection service. Convenience was considered more important than cost avoidance.

Farmers with lower volumes of waste tended to be more willing to drop waste off at a secondary location to avoid paying significant transportation costs. Cost avoidance was considered more important than convenience.

This realisation suggested that service delivery to farmers needed to be two-tier in order to encourage more off-farm waste management, with a drop-off option and an on-farm collection option.

Farmers also tended to be strong in their desire to deal with everything all at once. Dealing with separate companies or organisations for each discrete waste stream was typically viewed as an annoyance, whereas being able to only deal with wastes from certain manufacturers or brands with a service provider was considered even more frustrating.



## One-Stop Shop concept

The concept of a One-Stop Shop for farm waste emerged relatively early in the project as farmers articulated different aspects of an ideal service that offered flexibility, a commitment to understanding the farmers' needs and the ability to deal with all major waste streams simultaneously.

The One-Stop Shop model became anchored around regional Pop-Up Recovery Events. These events were conceived as an opportunity for farmers willing to transport waste to bring a wide range of waste streams to a convenient location and drop them off at low or no cost.

Concurrently, the service provider would coordinate on-farm collections for farmers with higher volumes of waste, particularly soft plastics and agrichemical containers, or agrichemicals that were unsafe to transport.

## MOST INORGANIC RURAL WASTE IS BURNED, BURIED IN FARM PITS OR STORED IN OFTEN PRECARIOUS CONDITIONS ON FARMS.

By providing a regional focus within a specified and predictable time window, a region would be 'blitzed' and farmers could plan and prepare appropriately. By making the events and accompanying service delivery regular (perhaps twice a year) and rationalising service delivery in this way, significant costs savings for both the service provider and farmers could be enjoyed.

It was determined that the organisation best placed to deliver the One-Stop Shop model was Agrecovery. As a non-profit

organisation with a board that represents a cross-section of farming organisations and with a mandate to address persistent farm waste issues, Agrecovery was well placed to expand from its core agrichemicals and agrichemical containers programmes to offer a more comprehensive service to farmers.

## Pilot events a success

Agrecovery was active in assisting in the development of the model design and, working in partnership with Territorial Authorities in Matamata and Geraldine, Agrecovery hosted two pilot events to test the model in May 2018.

The events were evaluated by the project consultants and by Agrecovery as being very successful and farmer feedback was particularly strong. The combined total waste collected from the events was:

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- 2,782 kg of unwanted agrichemicals
- 5,342 kg of unwanted oil
- 2,030 kg of fertiliser bags
- 4,000 kg of silage wrap.

In total, 87 registered participants contributed approximately 19,100 kg of waste products for diversion from potentially harmful disposal practices.

Every interviewed attendee liked the idea of a One-Stop Shop approach to rural recycling. Most attendees were strong in their support for the idea and stressed the importance of making the events regular.

Agrecovery now intends to further pilot and deploy the new model throughout 2019 and 2020. This will include identifying and developing markets for post-consumer agricultural plastics. By

implementing the One-Stop Shop model, Agrecovery aims to deliver strong and sustainable benefits for farmers and growers, and for New Zealand. Key to successful deployment around New Zealand will be strong local partnerships with territorial authorities that have a desire to address rural waste issues in their districts. 



Fraser Scott is the managing director of Christchurch-based business consultancy, True North Consulting. He led and undertook the New Zealand Rural Waste Minimisation Project.



Isla Hepburn is a senior scientist at Environment Canterbury, specialising in contaminated land and waste issues, and has 14 years' experience working in consultancy, not for profit and local government. She is the current convenor of the regional council special interest group for contaminated land and waste.



Simon Andrew is the general manager for Agrecovery and holds an MBA and BA (Hons) from Victoria University of Wellington. Simon is passionate about farming and New Zealand produce having grown up on a farm and been involved in the primary industries on a professional basis for 15 years.

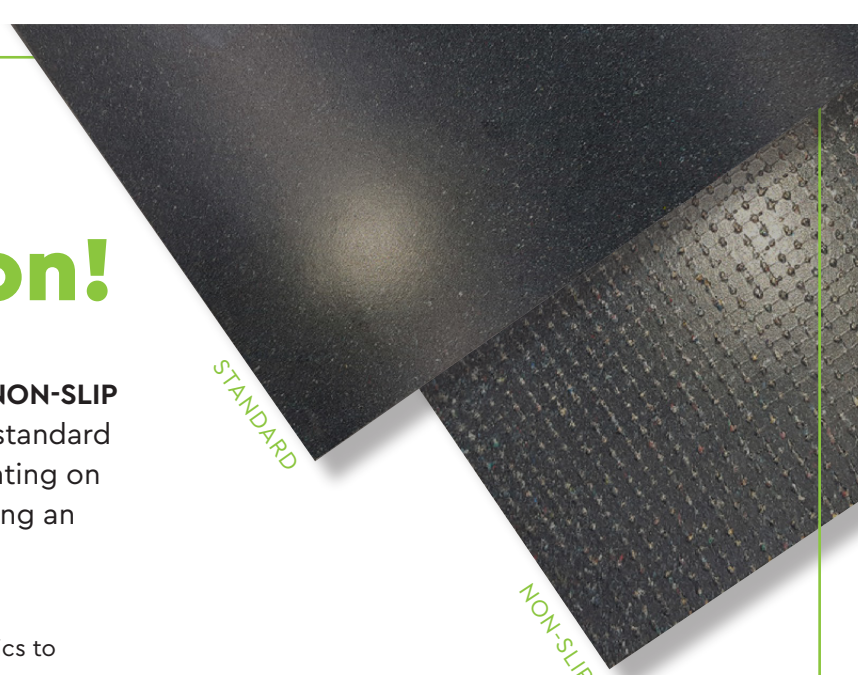
# The solution to the pollution!

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**TUFFBOARD19 NON-SLIP** is available in a standard sheet with a coating on one side providing an anti-slip surface.

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## AN IDEAL WAY TO HAVE YOUR COFFEE

IdealCup co-owner **Stephanie Fry** is excited about helping cafes and corporates around the country divert thousands of disposable coffee cups from landfill.

**L**AST YEAR WAS A PRETTY compelling one in the world of waste. We observed so much change – some not for the better.

New Zealand's recycling systems began to crumble, with piles of destination-less plastic being hoarded with few or no new options for processing, either here or offshore.

Our government declared a future ban on single-use plastic bags, only to have some retailers replace single-use bags with other plastic bags.

Internationally, headway was made at the United Nations COP24 conference. Remember COP24 president Michał Kurtyka taking his "giant leap of celebration" after the Paris Agreement work programme was approved? A joyous moment perhaps, but not all are on board. A heck of a lot of commitment is still needed from global powerhouses.

As we reflect on 2018, at IdealCup we are excited that we are working in this space and that we are leading and creating change in our industry by sharing our continued passion, energy, products and programmes.



We've been working in this space for almost 15 years and it's incredible that after fighting the sustainability fight and working tirelessly to support positive change for so long, seemingly overnight the world appears to have woken up to the desperate need for us to make change now, to ensure we have a planet with a positive future for generations to come.

The image of a turtle with a plastic straw stuck in its nose sure sparked awareness and provoked a public outcry to ban the use of plastic straws. More and more individuals are up in arms about waste, and there is a greater and growing awareness that we all need to make change ... and fast!

### Cup reuse system

One of the key areas of success in 2018 for our IdealCup business was the engagement with and uptake of our cup reuse system, CupCycling™.

Customers pay a small one-off bond to borrow a reusable CupCycling™ cup from a participating cafe and can then return the used cup to any participating CupCycling™ outlet and get a clean cup with their next drink ... and around and around they go.

We launched CupCycling™ in Motueka, where we live, 18 months ago. We wanted to do more than just sell a reusable product, and we realised we had the perfect solution to make change and a positive impact in our community.

Our vision was to roll out Cupcycling™ in Motueka as a fully funded social enterprise project, and we hoped other regions around New Zealand would see the amazing results and benefits of the system and want to join. Motueka embraced the rollout, and in a year we had diverted 16,000 cups from landfill in our little town.

Late in 2017, the amazing team at Keep it Green Cromwell reached out to say they had seen what was happening with CupCycling™ in Motueka and that they wanted in. We rolled out Cromwell CupCycling™ with great success.

Then we were contacted by the wonderful team at Love Titirangi. They too were excited by what they had seen in the media, and they also wanted in. During 2018, we rolled out CupCycling™ in Titirangi, Upper Hutt City, Golden Bay, Richmond, parts of Waikato and Wellington, as well as in British Columbia, Canada.

IN ONE YEAR, MOTUEKA DIVERTED 16,000 SINGLE-USE COFFEE CUPS FROM LANDFILL, WHILE KANTEEN, THE CAFE AT THE BASE OF THE NZ POST HEAD OFFICE IN WELLINGTON, DIVERTED MORE THAN 10,000 IN FIVE MONTHS.

TOP : IdealCup co-owner Steph Fry in Dunedin talking CupCycling™ with Dunedin City councillor and Breeze radio host Damian Newell.

BELOW: NZ Post cafe Kanteen CupCycling™ tally board.



CUPS REFILLED  
 NOT LANDFILLED!

MONDAY:	98
TUESDAY:	101
WEDNESDAY:	82
THURSDAY:	86
FRIDAY:	18
RUNNING TOTAL:	10,139!
START DATE:	18/6/18



Park Road Kitchen is one of six cafes in Tairāngi participating in CupCycling™ as part of the Love Tairāngi initiative.

A number of other large corporate businesses are now considering implementing Corporate CupCycling™ in their organisations. It's a cost-effective, tangible, easy-to-implement, successful and measurable system for any business that is serious about diverting single-use products from its waste stream.

We're beyond excited about the opportunities we are working on in 2019 and about the partnerships we are forging with amazing New Zealand organisations that want to make positive, sustainable change and support a unique, New Zealand-made product and business, run by honest people who want to do the right thing. It's in our DNA and if it's in yours too, why not get in touch? 🌱

We're excited to be kicking off 2019 with a CupCycling™ roll-out in Dunedin in February, with Thames, Southland, Whakatane, Tauranga, Queenstown, Wanaka, Waipa, Carterton and more set to join the movement this year.

We have been proactive in garnering regional stakeholder buy-in wherever possible. It's a great way for local councils and community boards to assist cafe owners to get CupCycling™ underway in their town or city. We've been fortunate to receive funding from a number of councils and community boards that see the merit in supporting the movement in their respective regions. It's a win-win-win – for the retailers, the stakeholders and the environment.

We've developed a data collection system so cafes can report their weekly tally of cups diverted from landfill and we, in turn, can report that data to our stakeholders. It's crucial that we are able to demonstrate the measurable impact CupCycling™ is having in a community or region and provide stakeholders with accurate data and reporting.

CupCycling™ isn't just for cafes in a town or city, however. We have now developed the programme for the corporate environment. It's particularly effective for businesses where staff frequent on-site cafes. We call this Corporate CupCycling™.

In June 2018, we rolled out Corporate CupCycling™ at Kanteen, the cafe at the base of the New Zealand Post head office building in Wellington. In less than five months, more than 10,000 single-use cups had been diverted from landfill. Having read about the success at NZ Post, Fonterra contacted us, and we've now successfully rolled out Corporate CupCycling™ at Fonterra's head office in Auckland.



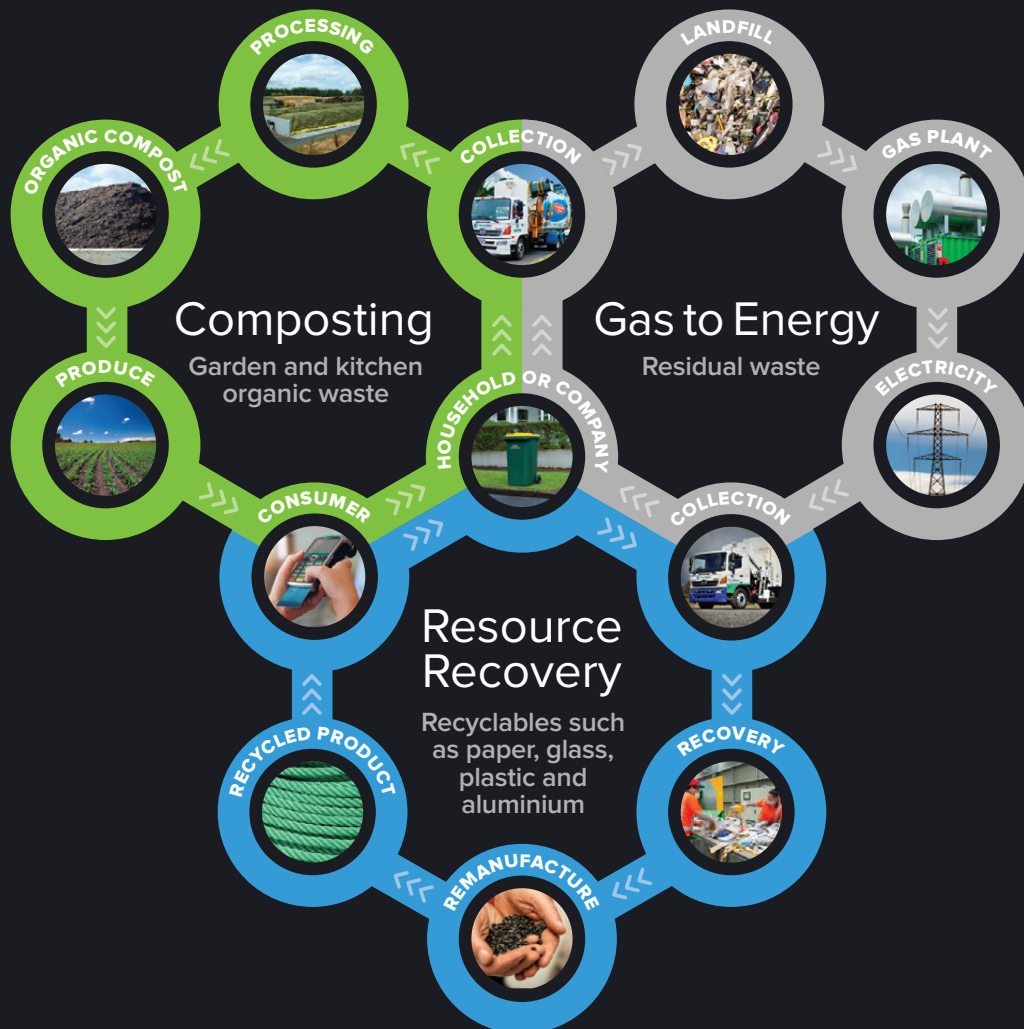
Stephanie Fry co-owns and manages IdealCup and Celcius Coffee with her husband Nick. Award-winning company IdealCup was the first to design and manufacture a New Zealand-made reusable cup, and provides leadership with its vision for a cleaner, greener Aotearoa by giving Kiwis the option to reuse, and reduce waste in our landfills, via the CupCycling™ initiative.

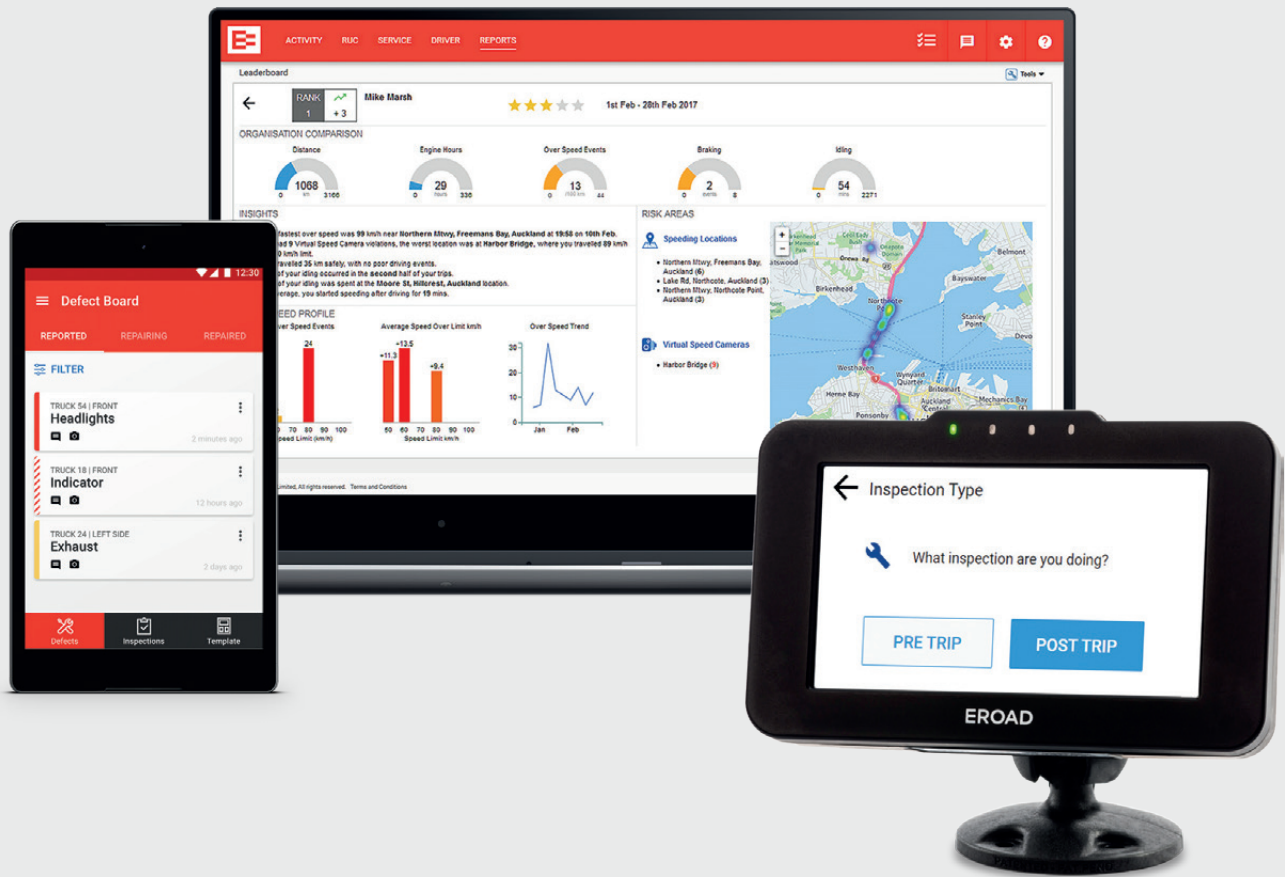
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# WASTE A RESOURCE TO BE USED, NOT WASTED

Harrison Grierson engineering solutions manager **Holger Zipfel** and **Hana Kirk**, a graduate mechanical engineer with the company, explain the benefits of proven Energy from Waste (EfW) technology.

**INCREASINGLY WE ARE** facing the effects of climate change and the rapid growth of urban living. Our everyday living is laden with consumption. This is very difficult to avoid and carries a huge environmental cost. Among other things, sea levels are rising and plastics are polluting our oceans.

Proven Energy from Waste (EfW) technology generates clean resources from residual waste. It is the vital piece of the waste treatment puzzle for New Zealand to achieve a long-term sustainable green solution to waste management.

## Clean and green?

New Zealand is lagging behind other developed countries when it comes to waste management practices. Our clean, green reputation is at stake.

Compared to other OECD countries, we are 1.7 times the average for total annual greenhouse gas emissions, 1.4 times for municipal waste generation and 1.3 times for municipal waste to landfills. In 2015, we collected 1.5 million tonnes of domestic kerbside waste. Of this, 1.1 million tonnes of untreated waste was landfilled and only 25 per cent of domestic kerbside waste was recovered.

## The status quo is unsustainable

Landfilling our waste is a short-term solution. It is recognised as the least preferred disposal method for waste in terms of risk to human health and the environment. It contaminates rangi (air), whenua (land) and wai (water) due to methane emissions and leachate discharge. Although methane can be captured, landfills are not a closed system, and pollution cannot be controlled for the entire lifetime of a landfill.

None of the materials sent to landfills are converted into reusable material, and comparatively little energy is produced.

In 2000, combustible waste landfilling was banned in Switzerland. After 18 years, decommissioning of contaminated landfill sites is still in progress and has been estimated to cost more than NZ\$7.5 billion. The first fully decommissioned site in Kolliken alone cost NZ\$1.4 billion.



## Creating energy from waste

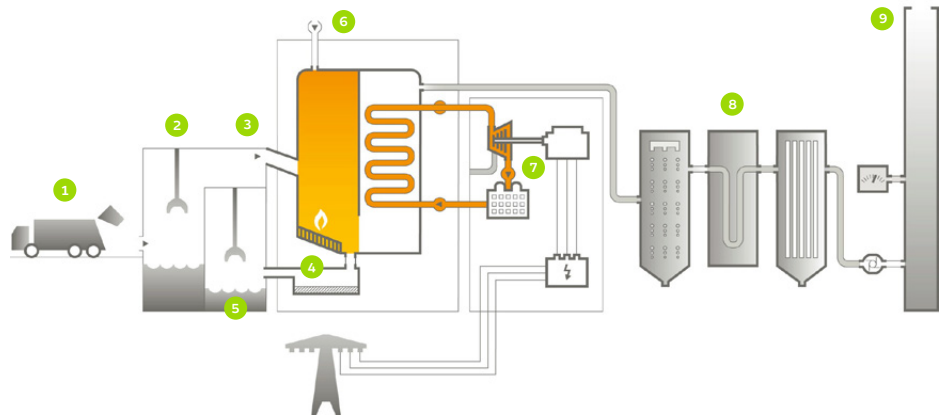
Proven Energy from Waste (EfW) technology generates clean resources from residual waste. To achieve New Zealand's zero waste aspirations, the lifespan of resources must be maximised, then recycled and repurposed at the end of each service life. While there will always be a percentage of waste that is not recyclable, this can be used to generate energy in the form of electricity and heat.

There is a linear trend in New Zealand of GDP increase and municipal waste produced per capita. EfW provides the technological support required for immediate advancement and is a stepping stone toward a circular economy. It provides a solution to the limitations set on recycling complex materials. As our inferior quality plastics are exported to emerging countries, we lose control and pass on responsibility, potentially allowing waste to end up polluting the environment or being incinerated inadequately.

EfW technology can eliminate the need for landfill and the export of inferior plastics. Adopting this approach would enable New Zealand to take responsibility for all waste produced by managing waste domestically, simultaneously converting it to clean energy.

### EfW – the Swiss example

Switzerland has a well-established resource management system with 100 per cent recovery of all waste material. Of the total waste produced, 52 per cent is sustainably repurposed, and the residual 48 per cent is recovered through EfW. This demonstrates EfW technology can work well in collaboration with recycling efforts.



1 **Tipping hall**

2 **Waste bunker**

3 **Feed hopper:** waste fed into combustion chamber by waste crane.

4 **Grate combustion:** optimised waste feeding combustion control system which integrates flue gas recirculation and bottom ash handling.

5 **Bottom ash treatment:** this inert bottom ash consists of non-combustible material, where metals and minerals can be recovered, which is environmentally beneficial and can be made profitable.

6 **Ammonia injection:** nitrogen oxide generated during combustion is converted into harmless nitrogen and water.

7 **Energy utilisation:** the plant can be configured to three main concepts: Electric Power, Combined Heat and Power, and Combined Cold and Power.

8 **Flue gas treatment:** flue gas pollutants produced from waste combustion are cleaned before discharge into the environment. **Fly ash washing (optional)** removes or immobilises fly ash contaminants. **Effluent treatment:** flue gas and fly ash treatment residue removes contaminants, such as heavy metals and ammonia. Contaminants such as mercury or zinc can be recovered for recycling.

9 **Stack**

## EfW facts

EfW plants are controlled, closed systems enabling complete monitoring and treatment of by-products. They are engineered to suit feedstock, preferred energy utilisation and environmental regulations. Energy, heat, precious metals, CO<sub>2</sub>, inert ash and aggregate can be captured from this process. EfW is a well-developed and established technology integrated in many developed countries. Air pollutant emissions are less than that of road traffic.

The feedstock for EfW is residual waste, which no other technology can sustainability treat. This is material that is either contaminated or has reached the end of its service life (plastic significantly degrades each time it is recycled and has a finite lifetime). With the aid of EfW technology, what is perceived as waste can be utilised and converted into beneficial resources.


## Sustainable natural resources for future generations

Apart from the evident environmental and economic benefits, there are social, cultural and technological benefits to EfW.

These key benefits underpin the recent Renew Energy Ltd proposal for a state of the art EfW facility to be built in the Buller District, where it predicts an increase in full-time employment opportunities. The EfW facility will be a catalyst for collaboration and co-location of businesses that can utilise EfW facility by-products for industries such as hydroponic farming, food processing and construction products' manufacturing.

It creates opportunities to work with tangata whenua and will support stronger communities and partnerships. EfW will drive a shift toward sustainable lifestyles leaving our rangi, whenua and wai in the best possible condition for future generations.

## Conclusion

Tangata whenua believe that everything and everyone is interconnected, and therefore should be valued and cared for. The well-being of the people is directly related to the well-being of all natural resources. Using residual waste and converting it into beneficial resources sustainably aligns with the roots of New Zealand culture and our clean, green reputation. Adopting the EfW approach will enable New Zealanders to take responsibility of all our waste produced by managing this sustainably. 

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Hana Kirk is a recent University of Auckland mechanical engineering graduate. She has provided in-depth insight for Energy for Waste opportunities for Auckland, and researched the economic effects of integrating EfW technology and increasing the landfill levy. Hana is part of Harrison Grierson's Engineering Solutions team, where she has developed a passion for creating sustainable living environments, and utilising what is perceived waste as a resource.



Holger Zipfel is the engineering solutions manager at Harrison Grierson, leading the Building Services and Mechanical & Electrical Teams. He has returned to New Zealand after working in Switzerland implementing EfW technologies in England and Ireland. Having lived in Germany and Switzerland, Holger has experienced an integrated waste management system in action, where waste reduction, reuse, recycling and energy recovery are common practice.



## DIY GARAGE SALE DIVERTS 15 TONNES FROM LANDFILL

A bright idea to turn products destined for landfill into bargains for DIY enthusiasts raised \$11,000 for a local primary school.

**A** GIANT DIY GARAGE Sale in Cambridge has saved nearly 15 tonnes – around 13 skip bins – of construction waste from landfill.

In the process, it's raised \$11,000 for a local primary school and has kicked off an idea that looks set to roll out across the country.

The idea of turning products destined for landfill into bargains for DIY enthusiasts came from Cambridge-based Rob May Builders and was supported by Waipā District Council. Others involved in the construction

industry, also struggling with construction "leftovers", were quick to jump on board.

Around 15 local firms got involved, donating products ranging from kitchen sinks to paint, GIB board and boxes of small goods like doorknobs. Some were brand new, and others were end-of-line products or simply no longer needed.

Instead, all were put up for sale during a giant DIY Garage Sale hosted by Shaw's Wire Ropes at their massive undercover premises. The sale was promoted by Waipā District

Council and managed by volunteers from Cambridge East School.

When the doors closed, the volunteers banked \$11,000 into the school's fundraising account, and Rob May Builders director Jono McCullough was left smiling.

"We try not to be wasteful, but there are always some leftover products at the end of each build. These materials are either thrown out or stored to be used at a later date," McCullough said.

"We've been looking at better ways to manage this, but there are always some products that slip





Bargain-hunters Steph and Glen Curin joined the crowds at the DIY Garage Sale in Cambridge.

Everything including the kitchen sink was up for grabs!

“IT’S AMAZING TO SEE HOW OUR LOCAL COMMUNITY TOOK HOLD OF THIS ONE IDEA. RETHINKING HOW WE RECYCLE OUR PRODUCT HAS BENEFITED NOT JUST A LOCAL SCHOOL BUT THE PEOPLE AND FACILITIES OF THIS BEAUTIFUL TOWN. WE’RE LOOKING FORWARD TO A BIGGER AND BETTER EVENT NEXT YEAR.”

through the cracks. This event was great because we’re finding new uses for our waste, keeping material out of landfill and supporting a local school in the process. It was a win-win all round.”

### **Bargain hunters**

The community agreed. On the day more than 500 bargain hunters poured through the sale, many leaving with bargains and all doing their bit for waste minimisation. Any products left over were donated to Habitat for Humanity.

Waipā District Council’s waste minimisation officer Sally Fraser was thrilled by the success of the event, which saw everything “including a couple of kitchen sinks” taken away and reused.

“There’s truth to the saying that one person’s trash is another person’s treasure and we really saw that at this event. It was just so good to see the collaboration

between the local building industry, council and Cambridge East School, not only to pull off a great event but to help educate the community that there are other options for waste.”

Nor did the event blow Fraser’s modest budget, which comes from the government’s waste minimisation fund. The Council spent \$6,200 on the event, only just surpassing the estimated \$5,000 it would have cost for local companies to dump the goods at a landfill.

“Facebook was key in terms of marketing. We reached almost 40,000 people, and a quick 30-second video we made was viewed more than 5,000 times,” she said.

“Local media were also interested and ran quite a few stories, which was great. I think if you lived in Cambridge or the Waipā district, the DIY Garage Sale was hard to miss.”

Angela Stockley and Gord Thomas were two of those grabbing bargains.



McCullough said the event identified a community need and opportunity that could easily be replicated in towns across the country.

"It's amazing to see how our local community took hold of this one idea. Rethinking how we recycle our product has benefited not just a local school but the people and facilities of this beautiful town. We're looking forward to a bigger and better event next year."

### Factors for success

Fraser, meanwhile, has been helping spread the word so that councils nationwide can help stimulate local interest in doing something similar.

"Construction and demolition waste makes up an estimated 11.5 per cent of all waste in the greater Waikato region – around 26,000 tonnes of product each year. Across the country, the numbers are huge."

Along with Rob May Builders, she's identified the 'factors for success' to make similar events hum.

"You need a well-known and well-respected local from within the building or construction industry to lead it, and that company should choose where the money goes because it gives them a personal stake in the event going well," she said.

"You need an organisation that is genuinely interested in minimising waste; this isn't about just getting rid of stuff. You need volunteers who are happy to manage the event on the day. And it's a good idea to get the local council involved because they use their channels to help promote the event and spread the word."


You also need to be realistic, she said.

"We priced everything the night before, and we weren't greedy. On the day, we reassessed how things were going and at one point, dropped everything to half price.

Then, as the morning moved on, we changed again to 'make-an-offer'. This was about moving stuff on so it could be useful elsewhere."

Waipā has already offered to share its knowledge and templates developed for the event with anyone interested. With a Cambridge event locked in again for next year, Fraser is hoping an industry leader on the western side of the Waipā district will step up to the plate.

In the meantime, the DIY Garage Sale has already won accolades from Wellington. Associate Minister for the Environment Eugenie Sage said wasting good, usable products was "not the Kiwi way".

"The DIY scheme is a fantastic example of making recycling a snap rather than a headache. The leadership Waipā is showing is a great contribution to this shift to more sustainable thinking." 





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# CADMIUM

## HOW MUCH IS IN OUR SOIL AND WHAT LEVEL POSES A RISK TO OUR AGRICULTURE?

Despite soil cadmium concentrations being the indicator through which fertiliser-derived cadmium is currently managed in this country, there was no New Zealand-specific data on the soil cadmium concentrations that may pose a risk to our agricultural systems and how these risks might be managed. **Jo-Anne Cavanagh** from Manaaki Whenua – Landcare Research describes recent research to address this lack.

### CADMIUM and New Zealand Agriculture and Horticulture: A strategy for long term risk

management outlines a risk-based approach to managing cadmium in New Zealand agricultural soils as follows: “To ensure that cadmium in rural production poses minimal risks to health, trade, land use flexibility and the environment over the next 100 years.”

Soil cadmium (Cd) concentration is the primary indicator through which fertiliser-derived Cd is currently managed under this strategy. Specifically, the Tiered Fertiliser Management System (TFMS) aims to minimise Cd accumulation in soil by imposing increasingly stringent fertiliser management practices as Cd concentrations increase. The concentrations used as trigger values in the TFMS were agreed by the Cadmium Working Group, following international review, and are from a variety of sources.

However, there is no New Zealand-specific data on the soil Cd concentrations that may pose a risk to New Zealand agricultural systems and how these risks

might be managed. This paper describes research undertaken over the past three years on Cd uptake in food crops and risks to pastoral systems to inform further strategy development, including New Zealand-specific soil-guideline values, and outlines recommendations for further research to manage risk.

### Methodology

Full details are available in Cavanagh et al. 2017. Briefly, the components of the research undertaken were as follows.

Food crops – undertaken in two stages: (1) assessing the variation in Cd uptake in a range of commonly

grown cultivars of wheat, potatoes, onions and lettuces at a limited number of sites; and (2) assessing the influence of soil properties on Cd uptake in one or two higher-accumulating cultivars of wheat, potatoes, onions, lettuces and spinach in the main growing areas of each crop across New Zealand (Table 1, Figure 1).

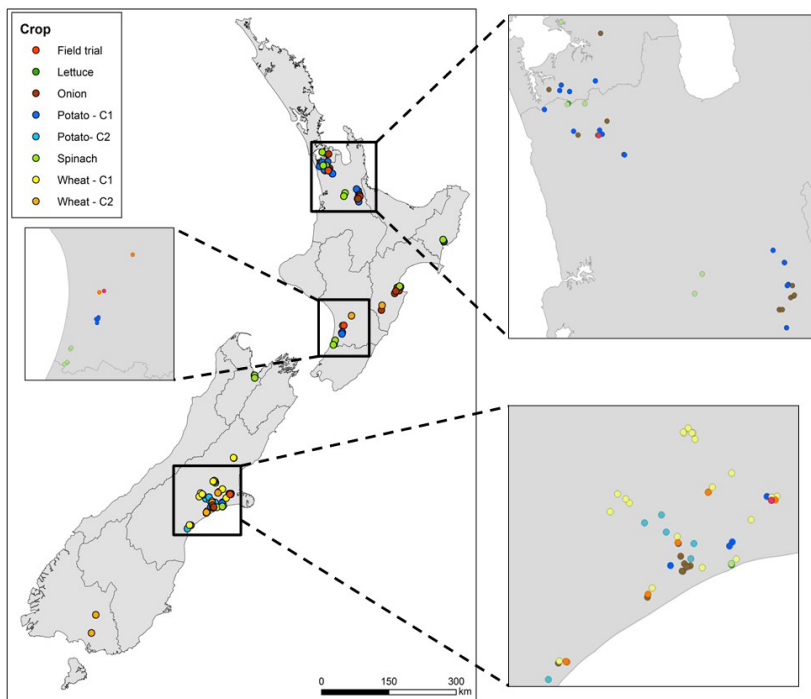
**Field trials** to assess the efficacy of lime and compost additions to reduce Cd uptake were undertaken at two research farms and at a commercial field (Table 2). Results are not presented here.

**Pasture and forage species** – soil and plant samples were collected as described for food crops, except

**Table 1. Cultivars and number of sites used in the two studies**

CROP	CULTIVAR STUDY	SOIL STUDY – CULTIVAR
Wheat ( <i>Triticum aestivum</i> )	Bread wheat: 8 cultivars, 1 location Feed and biscuit wheat: 6 cultivars, 2 locations	C1: bread wheat, 26 sites C2: biscuit wheat, 9 sites
Onions ( <i>Allium cepa</i> )	4 cultivars, 3 locations	C1, 28 sites
Potatoes ( <i>Solanum tuberosum</i> )	10 cultivars, 3 sites	C1, 28 sites C2, 7 sites
Spinach ( <i>Spinacia oleracea</i> )	Not sampled	Baby leaf, 10 sites Bunching, 11 sites
Lettuce ( <i>Lactuca sativa</i> )	3 cultivars of crisphead lettuce, 2 locations	8 types across 3 sites

Note. Three to four replicate plots were sampled for crop and soil at each site.



**Figure 1.** Sampling locations for different crops. C1 and C2 are separate cultivars (Cavanagh et al. 2017).

**Table 2. Proposed treatments for the field trials**

ANTICIPATED PH	TARGET/ SULPHUR/LIME	COMPOST
5.6	Acid (sulphur)	0
6	0	0
	0	Med (25 t/ha)
	0	High (50 t/ha)
6.3	Low	0
	Low	Med
6.7	Med	0
	Med	Med
7	High	0
	High	Med

Note. Final treatments depended on the soil properties at the specific location.

soils were sampled to 7.5 cm for pasture species. Species tested were chicory, plantain, ryegrass, white clover, lucerne, maize, fodder beet, kale, sunflower. Sampling was undertaken at one or two sites per species.

#### Rhizobia-legume symbiosis

– the effect of Cd on growth of *Rhizobium leguminosarum* was isolated from two soils with high and low soil Cd, and the dominant commercial strain TA1 was assessed, as were the effects of increasing Cd concentration on the growth of white clover seedlings in the presence and absence of rhizobia, and the effect on plant N.

**Cadmium uptake in lambs** – at four commercial farms, recently weaned (14–16 weeks), pasture-fed, Romney composite lambs were randomly divided into groups of 15 and grazed on pasture or forage crop (Table 3). Liver biopsies were taken on three or four occasions, along with soil and plant samples.

### Provisional soil guideline values

Provisional soil guideline values were established using a Freundlich-type equation (1) and regression analyses, and rearrangement of the plant uptake factor (PUF) (2 & 3) using food standards as the target plant concentration. As these relationships are developed using plant concentrations expressed as dry weight, the relevant food standards were converted to dry weight assuming constant dry matter content for the different crops and used in equation (1) or (3) to back-calculate soil Cd.

These values are not intended as threshold limits, but rather provide insight into the soil properties influencing plant uptake and the Cd concentrations at which management to mitigate the risk of exceeding food standards should be considered.

**Table 3. Field locations and forage treatments, and number of liver samplings at each location**

LOCATION	FORAGE CROP	NO. OF ANIMALS	NO. OF TIMES SAMPLED
Tangimoana	Ryegrass, lucerne	30	3
Waipukurau	Ryegrass, lucerne	30	4
Taihape – township	Ryegrass, plantain	30	3
Taihape – rural	Ryegrass, plantain, chicory	45	3



## Results

### Cadmium in food crops

A 2.4-fold difference in wheat grain Cd concentrations between different cultivars was observed. Assessment of two cultivars across 35 sites found few significant relationships between soil properties or site management factors and Cd concentrations.

Differences in Cd concentrations in onion cultivars were inconsistent across sites. Assessment of a single onion cultivar across 28 sites revealed that pH and total Cd were significant predictors of onion Cd (explaining 38 per cent of the variation); including region explained 50 per cent of the variation.

Differences in Cd concentrations between cultivars of crisp-head (iceberg) lettuce were inconsistent across sites and lettuce types (e.g., cos, iceberg). Concentrations were very low (<0.04 mg/kg FW). Observed regional differences in lettuce Cd were not related to soil Cd concentrations. Cd concentrations in both baby leaf and bunching spinach were close to, or above, the FSANZ food standard of 0.1 mg/kg FW, with Cd concentrations higher in bunching spinach. Soil carbon and soil Cd were key factors influencing Cd uptake in bunching spinach, explaining 48 per cent of the variation.

There was a 2.3-fold difference in potato Cd concentrations between different cultivars. No relationships between soil properties and tuber Cd concentrations were identified. With the exception of one site, potato Cd concentrations were remarkably uniformly low, much lower than the FSANZ food standard of 0.1 mg/kg FW. Soil properties at the exceptional site were similar to those at other sites, other than potatoes being the first crop grown after conversion from long-term pasture.

Soil Cd concentrations in the majority of sites fell into Tier O of the TFMS, for which only five-yearly monitoring of soil Cd is required. Provisional soil guideline values were developed using identified relationships based on regression analyses for onion and bunching spinach (Table 4). The onion relationship under-predicted observed high onion Cd concentrations, suggesting caution needs to be applied in using these values to support compliance.

**Table 4. Provisional Cd soil guideline values (pFS-SGV) to meet EU maximum limits for onions (0.05 mg/kg FW) and the FSANZ standard for leafy greens (0.1 mg/kg FW) as a function of soil properties**

ONIONS		SPINACH	
soil pH	pFS-SGV (mg/kg)	soil C	pFS-SGV (mg/kg)
5.5	1.7	2	0.24
6	2	3.5	0.36
6.5	2.2	5	0.48

Note. 38 per cent and 42 per cent of variation in plant Cd was explained by soil Cd and pH or soil C, respectively.

Provisional soil guideline values developed using the PUF approach – which assumes that site conditions, including soil properties and management (and therefore PUF), do not change – ranged from 0.3–4.7 mg/kg (mean, range 0.14–16 mg/kg) for individual crops, with clear regional differences.

### Cadmium in pastoral systems

Pasture Cd concentrations were highest in chicory and plantain and lowest in ryegrass and clover. Leaf Cd concentrations were higher than other plant components for all forage crops. Increased liver Cd concentrations were observed in lambs grazed on crops with higher Cd (plantain and chicory), with the highest liver concentration occurring in lambs grazed on chicory.

$$1 \quad \log_{10}(\text{Plant Cd}) = a + b.\log_{10}(\text{soil Cd}) + c.(pH) + d.\log_{10}(C) + \dots$$

$$2 \quad PUF = \frac{Cd_{\text{plant}} \text{ (mg/kg (DW))}}{Cd_{\text{soil}} \text{ (mg/kg)}}$$

$$3 \quad nCd_{\text{food standard}} \text{ (mg/kg)} = \frac{Cd_{\text{plant limit}} \text{ (mg/kg (DW))}}{PUF}$$

Cadmium negatively affected growth of rhizobia isolated from New Zealand pastures, with the current commercial strain, TA1, being most sensitive. Conversely, TA1 appears to mediate the toxicity of Cd to clover: a minimum-tolerable-concentration of Cd for white-clover in the absence of rhizobia was 0.040 mg/kg Ca(NO<sub>3</sub>)<sub>2</sub>-extractable Cd, and 3.34 mg/kg in the presence of rhizobia. These concentrations are markedly higher than current environmental concentrations of up to 0.00068 mg/kg (Reiser et al. 2014). No effect on nitrogen content in clover was observed in clover/rhizobia exposed to extractable Cd concentrations up to 5 mg/kg.

## Conclusions

Findings from this research will help to manage the risk of exceeding food standards in food crops and livestock products in New Zealand and aid further strategy development. The key findings were as follows:

- The soil trigger values in the TFMS alone are insufficient to manage the risk of exceeding food standards in some food crops.
- Differences in Cd uptake by different cultivars of wheat, potatoes, lettuces and onions were often inconsistent across sites.
- Management of Cd in potatoes and wheat appears likely to be best achieved by cultivar management, as no relationships with soil properties was identified.

- Management of soil pH may be sufficient to ensure compliance with food standards for onions, while the addition of compost may reduce Cd uptake in bunching spinach.
- Further monitoring and field studies of plant crops, including a range of cultivars, is required to verify the wider applicability of these findings.
- Further data is required to develop robust soil guideline values, but provisional values provide insight into the Cd concentrations at which management to mitigate the risk of exceeding food standards should be considered.
- There is minimal risk of negative impact from soil Cd on clover-rhizobia symbiosis, or plant nitrogen content, until Cd concentrations are markedly higher than current concentrations in pastoral soils.
- Cadmium was elevated in the liver of lambs grazed on feed crops with elevated Cd (chicory) and warrants further investigation.

Note. A full description of the Tiered Fertiliser Management System is available at [bit.ly/fertilisermanagement](http://bit.ly/fertilisermanagement).



Jo-Anne Cavanagh is the research priority area leader for soil and ecosystem health at Manaaki Whenua – Landcare Research. She has a background in environmental chemistry and toxicology, with a passion for the effective use of science in environmental decision-making.

## Acknowledgements

Enormous thanks to all the growers who provided access for sampling their crops and who supported the field trials. Without your support this project would not have been possible.

Sincere thanks to fellow researchers Kiran Munir, Colin Gray, Steve Wakelin, Zicheng Yi, Nik Lehto, Parasmorthy Jeyakumar, Chris Anderson, Brett Robinson, and the many people who provided logistic and technical support.

Project I was funded by the Fertiliser Association of New Zealand, with support from Foundation for Arable Research, Millers Association, Bakers Industry Research Trust, Manaaki Whenua - Landcare Research and OnionsNZ.

Project II was funded by the Ministry for Primary Industries and the Fertiliser Association of New Zealand, with support from Taranaki Regional Council, Manaaki Whenua - Landcare Research, Foundation for Arable Research, Waikato Regional Council, DairyNZ, Flour Millers Association, Bakers Industry Research Trust, Greater Wellington Regional Council, Ministry for the Environment, Beef + Lamb NZ, Bay of Plenty Regional Council, Vegetables New Zealand, OnionsNZ, Gisborne District Council, Environment Canterbury and Marlborough District Council

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# FROM THE **REGIONS**



## SAY "NO" TO A BAG

Macpac stores began their 'Do some good, say no to a bag' initiative in January. This involves the company donating 20 cents to the Macpac Fund for Good every time a customer refuses a shopping bag at the counter.

Environmental and social impact manager Pen Turnbull says, "There has been so much public conversation in the last couple of years about shopping bags and the negative impact of single use plastics. We've used paper shopping bags for a while now, but we wanted to take it one step further.

"We have started to roll out bags made from 90 per cent post-consumer waste, but we also wanted a system in place that reduced the number of retail bags in the waste cycle altogether. So, we reward the positive behaviour of refusing a bag by making a donation to the Macpac Fund for Good. The fund supports individuals and organisations who are committed to effecting positive change for people and the planet.

"Over 9,000 Macpac customers refused a bag in the first month of the initiative. It's small change for an individual but creates a meaningful impact at scale," says Turnbull.

"In the last 12 months the fund has supported the Brook Waimarama Sanctuary in Nelson, which focuses on restoring local populations of native flora and fauna which have been ravaged by introduced predators. We have also provided funding for the Mastering Mountains Charitable Trust, which empowers people with multiple sclerosis to maintain active, healthy lifestyles in an effort to minimise the effects of the disease."

## COLOUR-CODED RECYCLING BINS COME TO WHAKATĀNE

A recycling trial in Whakatāne aims to reduce the amount of waste going to landfill from public places.

The Whakatāne District Council says the bins will incorporate features to make it easier for people to separate recyclable items from general waste, including nationally consistent bin colours, clear signage in English and te reo Māori, and WiFi technology to reduce overflow and make collection systems more efficient.

The council is one of a small number around the country to have been successful in applying to be part of this trial. The campaign has



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been developed by The Packaging Forum, which promotes recycling under the Government's Love NZ brand, and the Auckland Litter Prevention Steering Group, which manages the Be a Tidy Kiwi brand.

District Council manager solid waste Nigel Clarke says the trial offers many benefits, but its success relies on people doing the right thing and "putting litter in its place".

"Residents have been asking for public bins to match our kerbside collection system, so we're pleased to be offering this system and hope to see some positive results through reduced landfill waste volumes."

*Collaboration Bay of Plenty  
bit.ly/colourcodedbins*

## JOINT WASTE-EDUCATION INITIATIVE

Four councils in the Waikato region are collaborating on shared messaging to promote waste reduction and reuse. Hamilton City Council, Waikato District Council, Waikato Regional Council and Waipa District Council have formed a Sub-Regional Waste Awareness Group with the aim of collaborating on waste education and communication.

Working with Waikato-based magazine *Nourish*, they have

developed a series of graphics promoting different elements of waste minimisation. Topics covered so far include food waste, single use plastic, fashion, eco entertaining and the sharing economy.

Waipa District Council waste minimisation officer Sally Fraser says, "We wanted to move away from a traditional ad format to create content which felt like you were reading just another article in a magazine. The best thing is, we are able to align with the wider theme of the magazine so benefit from supporting articles and features".

With eye-catching visuals, examples of locals making a difference and top hints and tips, the content has resonated well with the community.

## RESIDENTS URGED TO USE ALTERNATIVE RECYCLING CONTAINERS

Opotiki District Council is urging residents to find alternative containers for recycling, now that single-use plastic bags are being phased out. They say any medium-sized container – approximately the size of the 20L crate – will do. This could be a plastic container or an opaque kitchen-tidy bag.

The suggestion does come with a warning: if you use a cardboard box or

a plastic bag as a recycling container, you run the risk of having it collected along with your recycling.

*Opotiki District Council News  
bit.ly/alternativecontainers*

## HOLIDAY PERIOD PUTS PRESSURE ON RECYCLING SERVICES

Recycling contractors put in extra hours and called in additional resources as the amount of recycling skyrocketed around the country over the Christmas and New Year holiday period. Palmerston North City Council says 266 tonnes of glass was recycled in December, while January is the city's busiest month with 50 per cent more glass recycled than in other months.

In Hawke's Bay, unprecedented levels of recycling over the holiday period led to delays in the kerbside collection. Increased consumption throughout the region – both in terms of purchasing items and consumables – resulted in a 15 per cent increase in the volume of recycling compared to the same time last year.

*Palmerston North City Council  
bit.ly/pressureonservices*

*Hastings District Council  
bit.ly/collectioncatchup*



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# SECTOR GROUPS

## BEHAVIOUR CHANGE

The three-year Love Food Hate Waste campaign finished on 31 January. All key performance indicators were met, and the impact of the campaign has been rigorously evaluated.

The bin audits found that households that had heard of Love Food Hate Waste threw out 27 per cent less food waste than those that hadn't. This means that, on average, households are throwing away only 0.8 kilograms of food per set out. If the set-out rate for rubbish is assumed to be weekly, then households that had heard of the campaign reduced their food waste by 41.6 kilograms per annum.

The bin audit survey found 22 per cent of the population were aware of Love Food Hate Waste, while the online survey recorded 19 per cent awareness. Based on this, the reduction in food waste to landfill from households that had heard about the campaign is at least 14,000 tonnes!

Further, 66 per cent of households had taken action to reduce their food waste over the past two years, with most undertaking six different actions, such as eating leftovers and planning their meals.

The financial return on investment for this campaign was

excellent. For every \$1 invested by the New Zealand Government and councils, households saved \$95.

While government funding has now ceased, the website will remain live and content will continue to be posted on our social media channels. Opportunities to continue sharing the food-waste reduction message are also being explored.

## CONTAMINATED LAND MANAGEMENT

A working group has been formed to look at the issues surrounding residential lead. The group comprises representatives from consultancies, district, city and regional councils, and a district health board. Members met on 25 January and 28 February and discussed proposed objectives, issues and potential actions. The group is currently developing a work plan.

The Steering Committee met on 28 November, with the main topics of conversation the CLM stream at the recent conference and key stakeholders in the sector. The committee met again on 13 February, when members discussed health and safety standards for the CLM sector, this year's work plan, key stakeholders in the sector, WasteMINZ's upcoming events, the Residential Lead Working



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Group's progress and a presentation for the upcoming Regional Waste and Contaminated Land Forum. The Ministry for the Environment also attended the 13 February meeting to provide an update.

Two webinars will be held on 19 March (Evolution of New Zealand Contaminated Land Regulatory Regimes and Management Strategies) and 9 April (The Challenge of Engagement), and on 28 March the next CLM networking event will be held in Christchurch. To register for any of these events go to [bit.ly/WasteMINZeventcalendar](http://bit.ly/WasteMINZeventcalendar).

## DISPOSAL TO LAND

The Ministry for the Environment has appointed a consultant to make further revisions to the *Technical guidelines for disposal to land*. The Ministry is in the process of forming a working group, which will include several Disposal to Land Sector Group Steering Committee members. The revisions will focus on the creation of an extra landfill class and the waste acceptance criteria methodology and monitoring regimes for this class.

The Steering Committee has had two meetings in the past three months, on 4 December and 21 February, at which members discussed the *Technical guidelines for disposal to land*, final revisions to the



thought piece around expanding and increasing the Waste Disposal Levy, and updating the work plan.

## HEALTH AND SAFETY

In mid-January, after a lot of hard work by a working group and an extensive consultation process, the *Waste industry guidelines to manage the collection, receipt, transport and disposal of asbestos waste* were published. A section addressing disposal of low-concentration asbestos-contaminated soil at a landfill will be developed in 2019 and this section will be added to the guidelines.

The Steering Committee is busy identifying the sector's critical risks and what the sector could do to manage these, which was one of the main agenda items at the committee's meetings on 27 November and 19 February. Other items discussed included left-hand driven, low-entry vehicles and kerbside collections, setting up a working group to review the content of NZTA's Kerbside Collection Traffic Leader workshop, the health and safety benchmarking data trial, the *Waste industry guidelines to manage the collection, receipt, transport and disposal of asbestos waste*, and developing this year's work plan.

On 6 and 14 March, key industry stakeholders and community representatives will meet to discuss issues surrounding left-hand driven, low-entry vehicles.

The health and safety data benchmarking trial will come to an end in April. A thorough debrief will then be done with the trial's participants to identify whether the data collected and subsequent reports produced were useful, and to determine a way forward.

## ORGANIC MATERIALS

The WasteMINZ website now hosts a list of composting facilities in New Zealand that accept compostable packaging. Information is provided on what types of packaging are accepted and how they can be transported to the facility. This information will be regularly updated as more facilities become able to accept compostable packaging. Currently, six companies and three community schemes now accept compostable packaging.

WasteMINZ is continuing to work with Scion to assist facilities to run trials to test whether compostable packaging can be effectively composted in their facility. WasteMINZ is also continuing to work with The Packaging Forum to determine whether an international standard for compostability needs to be adopted in New Zealand or whether an industry agreement would be sufficient.

The Advertising of Compostable Products Working Group has developed a set of consumer guides to clarify terminology used to advertise compostable and biodegradable packaging and products and their end-of-life disposal options.

In collaboration with Plastics NZ, the working group has also drafted a *Best practice guideline for the advertising of compostable products and packaging*. WasteMINZ Organic Materials Sector Group members were consulted on this guideline in February and it was reviewed by the Commerce Commission.

## TERRITORIAL AUTHORITY FORUM

The TAO Forum has made an application to the Waste Minimisation Fund to undertake

research to gather baseline information on tonnages of household recyclables diverted from landfill by waste stream and product type, and to understand the opportunities for missed capture (i.e., items put in the general rubbish that are accepted for recycling locally) and contamination (i.e., items put in the recycling when they are not accepted).

A working group of recyclers has been set up to determine whether there are opportunities to standardise recycling rules across regions or even nationally to enable more shared messaging by councils.

## PRODUCT STEWARDSHIP

Elections for the newly formed Product Stewardship Sector Group Steering Committee were held in October and the following members were elected: Alec McNeil (Marlborough District Council), Alexandra Kirkham (Auckland Council), Francesca Lipscombe (The New Zealand Ecolabelling Trust), Juhi Shareef (Vector), Laurence Zwimpfer (eDay Trust), Marty Hoffart (Waste Watchers), Rebecca Maiden (Tauranga City Council) and Sarah Clare (3R Group Ltd). Sarah Clare was appointed Chair of the Steering Committee.

The Steering Committee met on 20 November and 20 February and has now drafted its strategic plan and work plan. The committee has a focus on mandatory product stewardship schemes under the Waste Minimisation Act and aims to develop an understanding of the scope of proposed schemes for each waste stream, identify key implementation challenges and foster a collaborative approach to advancing mandatory product-stewardship schemes.

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