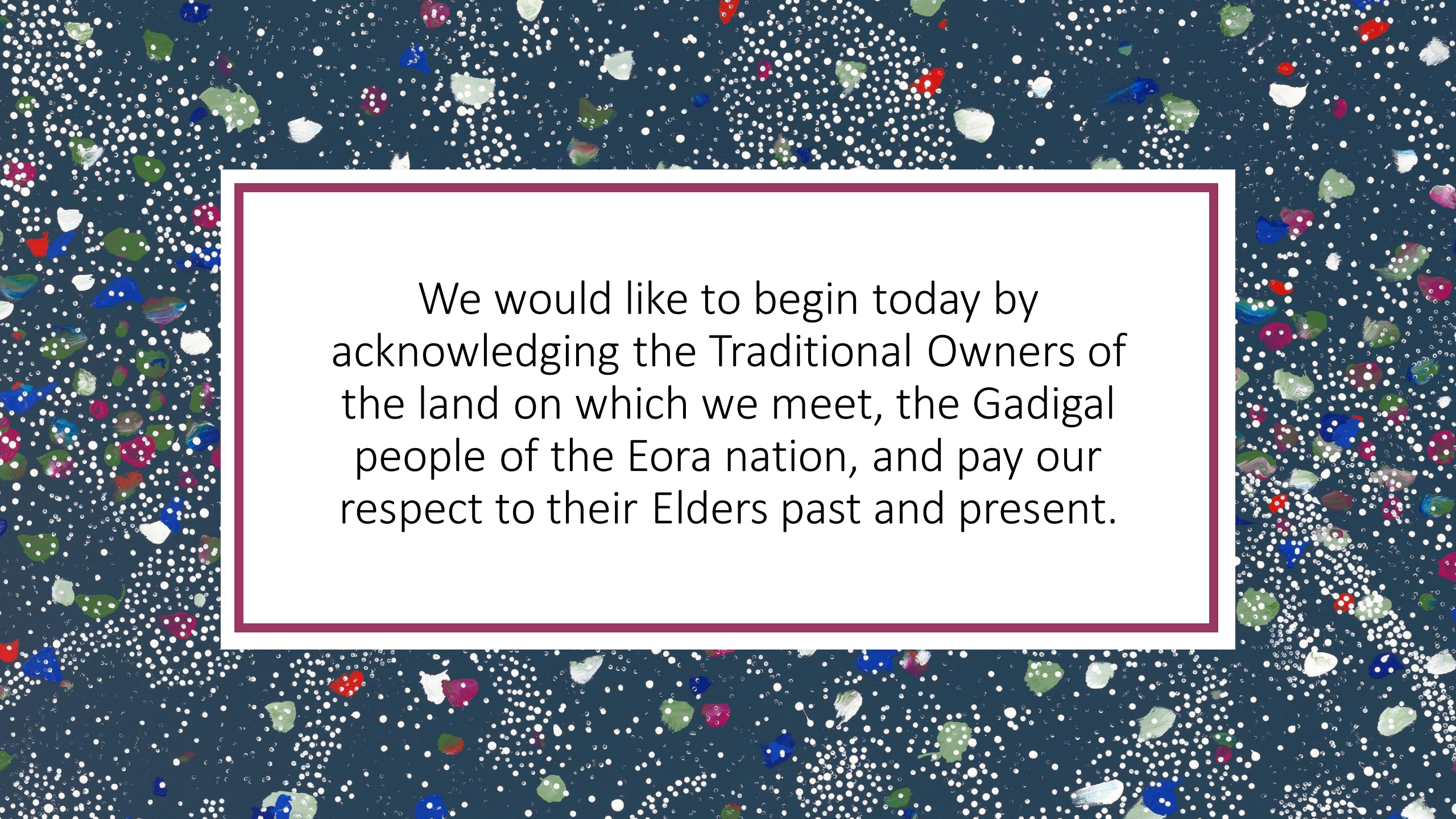


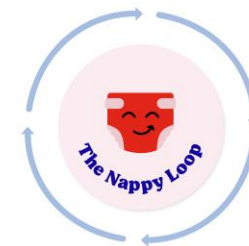
A Circular System for Disposable Nappies





We would like to begin today by acknowledging the Traditional Owners of the land on which we meet, the Gadigal people of the Eora nation, and pay our respect to their Elders past and present.

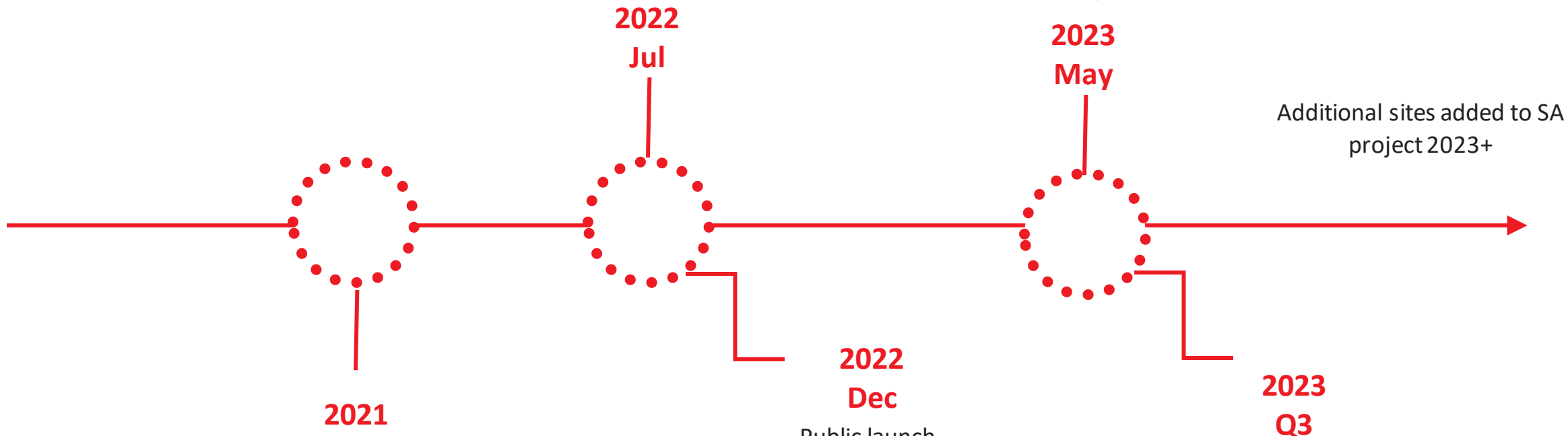
The story so far



Trial kicks off in SA with key partners



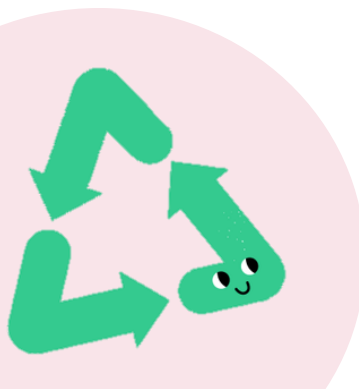
Final scientific report delivered by CSIRO



Feasibility study conducted with CSIRO and Swinburne University. Anaerobic Digestion and institutional collection model identified as best options for trial.

Public launch

Scalability study outlining next steps in SA





The Nappy Loop system



We collect used nappies



And take them to a composting facility



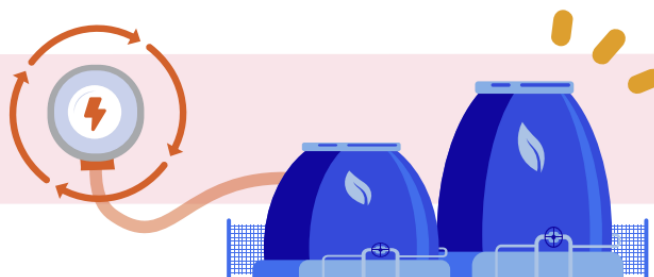
Where the plastic components are separated and could be made into future plastic products



And the organics are extracted for anaerobic digestion



Then tiny microbes turn the material into nutrient-rich compost

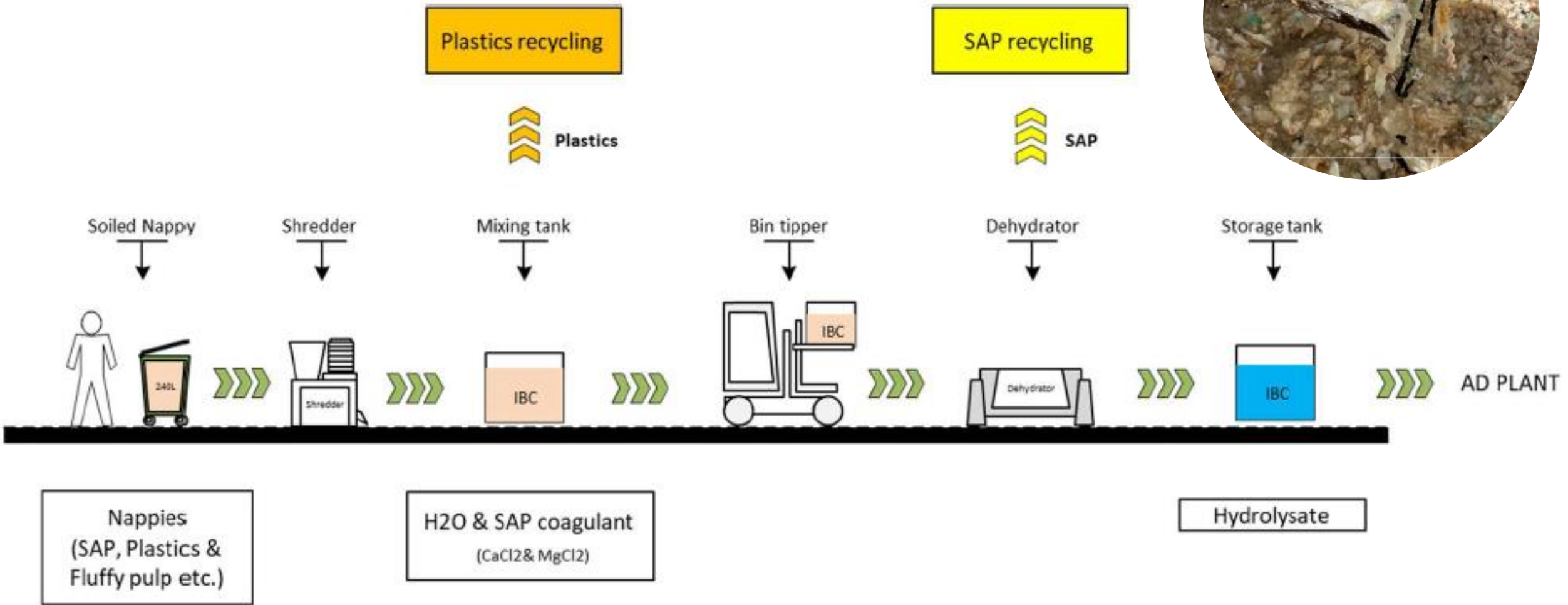


The anaerobic digestion process also creates bioenergy which can be used to power the system



A great result for the planet's bottom line

The process



Challenge: Separation of SAP

Laboratory trials :

- Addition of calcium and magnesium salts
- Addition of expired food waste (EFW) feedstock



Field-Trial

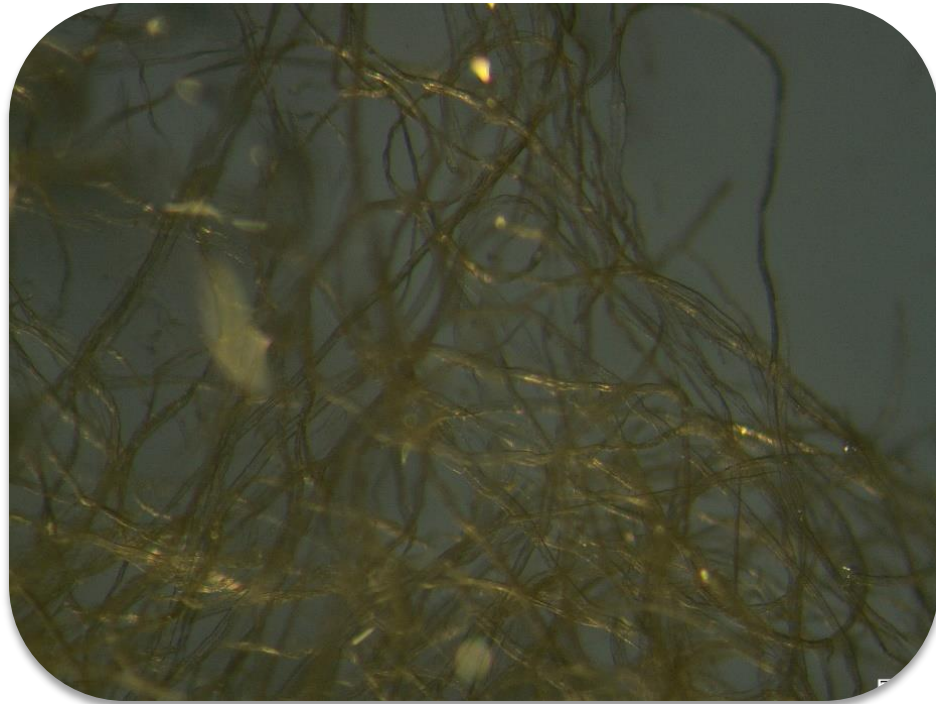


Testing protocol

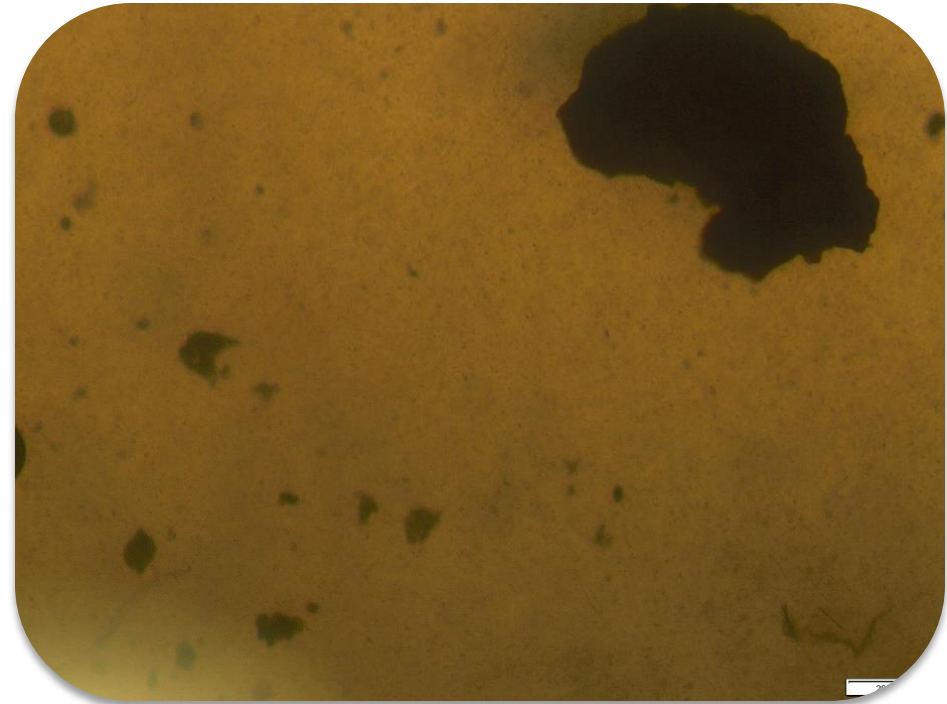
Baseline (pre-trial) EFW Digestate	Baseline ('Nappy mix')	AD Input ('Nappy Juice')	Digestate (during trial)
<ul style="list-style-type: none"> - pH - Salinity - COD - Total Organic Carbon (TOC) - Nitrogen (total and ammonia) - Major nutrients - Micronutrients - Trace elements - Heavy metals - Total solids - Microplastics - Microscopy-plastics/fibres 	<ul style="list-style-type: none"> - pH - Salinity - COD - Total Organic Carbon (TOC) - Nitrogen (total and ammonia) - Major nutrients - Micronutrients - Trace elements - Heavy metals - Total solids - Microplastics - Microscopy-plastics/fibres 	<ul style="list-style-type: none"> - pH - Salinity - COD - Total Organic Carbon (TOC) - Nitrogen (total and ammonia) - Major nutrients - Micronutrients, Trace elements - Heavy metals - Total solids 	<ul style="list-style-type: none"> - pH - Salinity - COD - Total Organic Carbon (TOC) - Nitrogen (total and ammonia) - Major nutrients - Micronutrients, Trace elements - Heavy metals - Total solids <p><u>Sample at 28 days:</u></p> <ul style="list-style-type: none"> - Microplastics - Microscopy-plastics/fibres



Anaerobic digestion: A viable option



Nappy mix sample prior to AD



Digestate sample on Day 28 after AD trial using nappy juice

Trial: Key findings

- Close to 2 tonnes of soiled disposable nappies were collected during the trial
- The anaerobic digestion process was beneficial in biodegrading the organic matter in the nappy water stream
- A successful conversion of organic carbon (within soiled nappies) to biogas was achieved
- Microplastic fragments were not observed in the 28 day digestate



Consumer engagement

100.1 5GTRFM Courier The Border Watch

Trial to make gas, compost from disposable nappies

LOUIS MAYFIELD

A Hills childcare centre is the first to get involved in a new trial which involves turning used nappies into nutrient-rich compost and renewable energy.

Welly Road Early Learning Centre at Mt Barker has had close to two tonnes of nappies picked up by Soils Resource Recovery and delivered to a Peats Soils and Garden Supplies composting facility since it began the trial six months ago.

There are 1.5 billion disposable nappies that end up in landfill each year, according to Kimberly-Clark, the makers of Huggies nappies and the promoter of the trial.

The plastic part of the nappies is separated, and the tons behind the trial is working with APR Plastics to test recycling the recovered plastic using pyrolysis, a process where organic material heated to around 500C.

The non-plastic part of the nappies, including the waste, are broken down through a process called anaerobic digestion, which includes using expired food waste and beverages with high sugar content to break down the organic matter in nappies.

Biogas
Soiled nappies are transformed into compost and biogas – a mixture of methane, carbon dioxide and hydrogen sulphide which can be used as a renewable energy source.



Parent Samantha Howard with her child Addison Bassman and Welly Road Early Learning Centre manager Kirsty Wheeler.

Welly Road Early Learning Centre manager Kirsty Wheeler said it was "super exciting" to be the first centre involved in the trial, known as the Nappy Loop, and it was a "simple" process to donate the nappies.

"Everything's pretty much the same for us, we use a certain bin for the nappies ... So, it's super important for us to be making a difference."

Parent Samantha Howard said it was great to see the centre embracing sustainability practices. "It teaches the children from such an early age about sustainability," she said. "To really prove that Welly Road has stepped up to do this and hopefully it leads the way for other centres to get involved."



ADELAIDE TRIAL
Recycling potentially millions of used disposable nappies
Second NSW person dies from meningococcal disease after attending music festival 18:45 SA

Nappy recycling program to reduce plastic waste in landfill harvests tonnes within months

By Shari Hama
Posted Wed 7 Dec 2022 at 8:40am, updated Wed 7 Dec 2022 at 8:44am



FINANCIAL REVIEW



Peats Soil and Garden Supplies technical assistant engineer, Kun Chang, on the site near Langhorne Creek in South Australia.

Nappies going from soiled to soil in trial to cut down waste of 1.5 billion

Simon Evans

Huggies, the dominant disposable nappies brand in Australia, is one of the big sales drivers for parent company Kimberly-Clark, which generates annual revenues of \$1 billion-plus from its broader local operations.

With a market share of 60 per cent, it is also at the centre of a complex environmental problem: 1.5 billion used nappies go to landfill sites annually in Australia from all players.

Kimberly-Clark Australia managing director Belinda Driscoll said the early stages of a trial to turn soiled nappies into compost using an anaerobic decomposition process which the group has worked on with the CSIRO is showing promise.

The company has been collecting soiled nappies from a childcare centre at Mount Barker in the Adelaide Hills since July, and testing the process at a site near Langhorne Creek, south of Adelaide.

ASX-listed childcare giant GS Education, which has 440 centres in Australia, operates the Mount Barker site. Ms Driscoll said Kimberly-Clark had a supply contract with GS, and its national network was appealing as the project expands.

She said it would be a long haul but that the early stages had shown that the process works.

The soiled nappies are separated into pulp and plastic. The pulp, which makes up about 40 per cent, is destined for compost. The plastic is being kept aside pending investigations for potential recycling with a group called APR Plastics.

Peats Soil and Garden Supplies is overseeing the decomposition on a site near Langhorne Creek, a region better known for its winemaking. The fibre and pulp from the nappies is mixed with food waste and beverages with high sugar content, to help break it down.

Ms Driscoll said Huggies has been built up into a big brand, and parents and childcare centre operators were behind the strong demand. She said 95 per cent of babies wore disposable nappies. Convenience was a huge factor.

Families and daycare centres really do rely on them," she said. Two generations ago, most babies used cloth nappies, which were washed after each use. Cloth nappies were making a minor comeback, and Sustainability Victoria, a government agency, said they were better than disposable, particularly if dried on an outside clothesline. There are some small players, such as Ecooriginals from Byron Bay, who trumpet a disposable nappy which is "no less than" 90 per cent biodegradable.

Thus far about 1.6 tonnes of soiled nappies have been collected from the Mount Barker childcare centre in the Kimberly-Clark program. Urine and faeces are treated the same way in the process.

Ms Driscoll said a program in Toronto in Canada had been running for years where fibre from nappies was turned into compost.

"That shows these programs can be rolled out on a large scale," she said.

The timetable for the next steps is still being worked on.

The goal was to try to implement a program around Australia. Kimberly-Clark manufactures the Huggies nappies in Asia after the global conglomerate, which has a share-market capitalisation of \$US46 billion (\$68.3 billion) in the US, shut a plant in Ingelburn in Sydney in 2009 and transferred production to China.

Ms Driscoll said the group's mill at Millicent in south-eastern South Australia, was making headway in its manufacture of Kleenex toilet paper and Viva paper towels. The Australian business has been hit hard by sharp rises in input costs. "Our business is not immune," she said.

Kimberly-Clark was among companies that accelerated production of toilet paper in Australia early in the COVID-19 pandemic when panic buying stripped supermarket shelves.

Radio Adelaide Sydney, 100.1 5GTRFM, Courier, sunrise, FINANCIAL REVIEW, ABC, inside FMCG, SM sustainability matters, Viable.Earth, NONWOVENS INDUSTRY 1976, RetailWorld, @AuManufacturing Powered by the Australian Manufacturing Forum, supermarketnews, insidewaste, waste MANAGEMENT REVIEW, FOOTPRINT, KINDICARE, The Border Watch

Kimberly-Clark Australia & New Zealand, CSIRO

What's next?

Overall, the project has verified that anaerobic digestion is a feasible solution for transforming the fluff pulp and other organic elements of soiled nappies (after separating plastics) into biogas and nutrient-rich compost. From here, the team will be:

- Actively working to scale the project
- Finding end markets for separated SAP
- Recycling soft plastics via pyrolysis
- Working with SA Government and EPA to bring them on the journey





Thank you

Dr Anu Kumar

Program - Industry Environments
CSIRO Environment
Email: anupama.kumar@csiro.au

Lucy Jackson

Manager Communications & Government Affairs
Kimberly-Clark ANZ
Email: lucy.Jackson@kcc.com