

APR Company Background

APR Kerbside

Specialising in Circularity of Recyclable Materials

APR Kerbside is an Australian family owned business that specialises in glass out innovation, ensuring quality products in and out and circularity of recyclable materials.

The APR Kerbside Material Recovery Facility (MRF) in Truganina is the only one in Victoria that doesn't accept glass. Improving the separation of household recyclables and having no glass in the kerbside commingled recyclable stream has led to a significant improvement in the quality of all recyclables.

Municipal councils who have partnered with APR over the last four years have seen first hand, the substantial benefits of having no glass in the commingled stream. Results from the APR glass-out program show that recyclables are now being received with less than 1% glass. These remarkable results have directly contributed to reducing contamination levels and further diverting waste from landfill.

Key learnings and invaluable experience gained throughout the program well positions APR Kerbside to best support the needs of Municipal Councils who are preparing to implement 'glass out' of the commingled stream, transition smoothly and re-educate residents.

Australian Paper Recovery

Setting the Standard for Waste Paper Recovery

Australian Paper Recovery (APR) has been in the business of collecting waste paper, plastic and cardboard waste since 2002 and has earned an industry leading reputation.

Australian Paper Recovery has five facilities in Victoria, including a Material Recovery Facility at Truganina, a Commercial and Industrial Processing site at Dandenong and a Secure Destruction and Shredding facility at Fairfield.

With baling and sorting facilities and a willingness to contract process, APR has handled in excess of 1,000,000 tonnes of recyclable products especially paper, plastic and cardboard to both domestic and international markets.

In today's ever increasingly competitive business environment, APR is an important resource for many commercial and industrial companies in the recovery and recycling of all grades of waste paper, plastic and cardboard.

APR Plastics

The Home of Advanced Recycling

APR Plastics is a sister company to Australian Paper Recovery and APR Kerbside. APR Plastics was formed in an endeavour to address and deliver a long-awaited viable solution for existing soft plastic processing difficulties faced by the recycling industry.

APR Plastics works closely with APR Kerbside who specialises in glass out innovation and the processing of household resources through the Victorian kerbside stream.

APR Plastics has invested significant resources and time to secure progressive technology that will enable the roll-out of the Plastics to Oil project. This will be a game changer for plastics recycling. This technology will provide sustainable alternatives to the Australian Recycling industry diverting soft plastics currently destined for landfill.



The Home of Advanced Recycling



Soft Plastics to Oil Solution

After successfully removing glass-out, we are now seeing that the biggest waste component coming out of APR Kerbside Material Recovery Facility (MRF) is soft plastic. The Soft Plastics to Oil project initiative aims to provide a solution to help tackle Australia's plastic pollution problem.

The APR Plastics and APR Kerbside teams remain strongly focused to continuously improve technology and solutions. With a view of turning talk into action, APR have committed and are ready to take the next step towards real action for change and building a circular economy.

The roll-out of the project will involve the introduction of the Biofabrik WASTX technology. The advanced recycling unit will convert soft plastics such as chocolate wrappers and bread packaging, into feedstock oil for plastic remanufacture. The first of the one tonne Biofabrik WASTX unit is currently undergoing commissioning on site at the APR Plastics Sorting Facility in Dandenong South, Victoria.

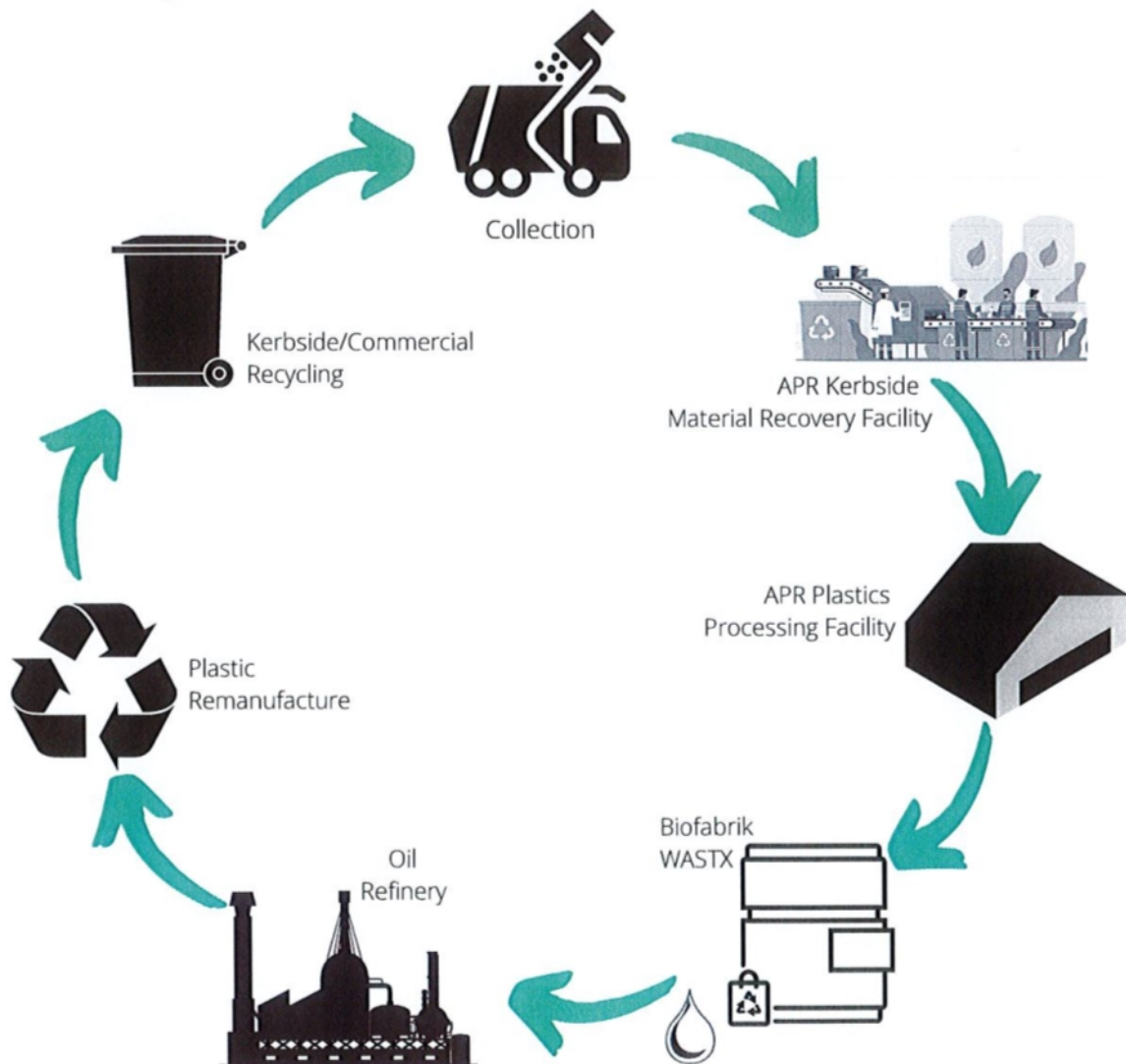
In partnership with Plastoil Australia, and working closely with the Biofabrik Group, APR Plastics are thrilled to be able to deliver a long-awaited solution to market in April 2022. This initiative will escalate local development of advanced recycling and almost double Australia's capacity to recycle soft plastics by 2024.

The project is anticipated to deliver promising results by diverting soft plastics that are currently not collected and processed through the kerbside stream and going to landfill. The pyrolysis method provides a circular solution for plastic waste. Due to the design of the unit being a completely sealed system, it has little to no emissions compared to traditional disposal methods such as incineration.

Key Benefits

- Divert soft plastics from landfill.
- Seamless integration with APR's existing processes and operations.
- New solution that aligns and works towards achieving zero waste strategy goals.
- Collaborative opportunities with local manufacturing businesses in accordance with the Modern Manufacturing Strategy.
- Job Creation.
- Assisting to meet national packaging targets of 50% by 2025.
- Scalable to deliver high volumes and positively impact the circular economy.

Circularity Process





Biofabrik WASTX

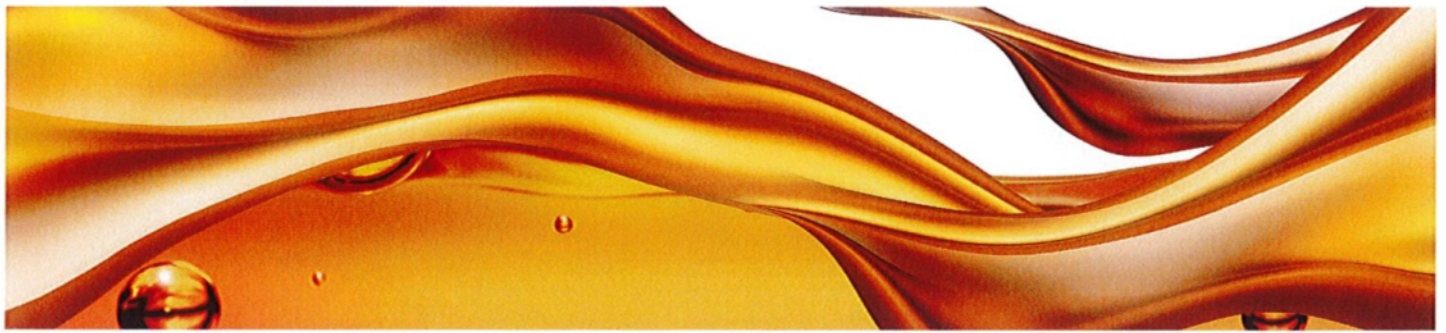
The Biofabrik WASTX operation system transforms waste plastics such as multi-layer films into high quality, energetically usable products. The WASTX P1000 uses pyrolysis, the process of applying high temperatures under zero oxygen conditions, to break down products.

This modular-based plastic recycling plant allows for ease of scalability and the opportunity to recycle plastic waste through the innovative pyrolysis process whilst solving critical environmental issues sustainably.

Manufactured by the Biofabrik Group in Germany, it is the first of its kind in Australia. One unit has the capacity to process up to 1000 kilograms of plastic per day. One kilogram of plastic waste becomes 850 grams of recycled oil.

How it Works

1. The plastic waste must first be shredded so it can be consistently fed into the process.
2. Once fed into the day silo, in which the material is temporarily stored, the system automatically draws the material for processing.
3. A uniquely designed corkscrew conveyor transports the plastic waste into the reactor and breaks it down.
4. In the reactor itself, the material is split at high temperatures.
5. The pyrolysis process shortens the long hydrocarbon chains of the plastic and creates an oil vapour.
6. This oil vapour flows into the subsequent condensation stages, where it becomes liquid again.
7. The achieved products are simply stored in sealed containment and used locally and internationally.



Frequently Asked Questions

Which soft plastic materials can be utilised for conversion to oil?

At this stage, plastic types 2, 4 and 5 can be processed.

#2 - High-Density Polyethylene (HDPE)

#4 - Low-Density Polyethylene (LDPE)

#5 - Polypropylene (PP)

How does the process work?

The plastic waste is fed into a shredder which is then blown and dried into a storage unit. From the storage unit, the shredded plastic is fed into the reactor which will, through high temperature, break down the plastic into a Gas, Liquid and Solid.

What is pyrolysis?

Pyrolysis is the treatment of material at high temperatures in the absence of oxygen. The material goes through a chemical and physical separation into different molecules (Gas, Liquid, Solid).

What is the oil used for?

The oil created will be sent to a refinery to be further processed so it can be reused in food-grade plastic products.

How much energy does the machine use?

This machine is self sufficient and runs off a developed hybrid generator that utilises the gases from the plastic processed to power the machine.

Is there any waste from the plastic and where does it go?

The waste (contaminants) from the plastic becomes carbon ash or carbon black. Both of these can be used in the manufacture of either paints, tyres, asphalt and bitumen.

How loud is this machine?

On average, this machine runs at 75dB which is equivalent to your vacuum cleaner.

Is the machine dangerous?

This process is completely sealed and has been pressure tested to meet the highest EU Safety Standards (DIN EN ISO 12100), being the foundation for which the AS standard 4024 was developed. The EU standard currently held, exceeds the equivalent requirements of the AS4024 standard.

1 Cutting mill (optional)
If the input material is too coarse, it can be crushed to a suitable grain size in a cutting mill.

2 Buffer (optional)
In a silo the small-sized substrate is buffered e.g. for a daily requirement. From there a blower conveys the material to the intermediate storage above the feed hopper.

3 Substrate entry
By means of a stuffing screw, the material is introduced into the pyrolysis reactor in an airtight, demand-driven manner and melted.

4 Pyrolysis reactor
In the reactor, the material is heated with constant movements. At temperatures of up to 500 °C, depolymerisation occurs, i.e. cracking of the long hydrocarbon chains of the solid plastics into shorter chains of the liquid and gaseous products. Excess carbon atoms are split off and, together with mineral impurities, form the solid residue.

5 Separator and residue discharge
In the separator, the residues fall downwards, while the oil and gas vapours rise upwards and are conducted to condensation. The residues are conveyed via a cooling section into the gas-tight sealable residue container.

6 Stepped condensation
In several temperature stages, the condensable components of the pyrolysis vapours are obtained as oil or waxy products.

7 Cooling system
By means of an active cooling system (compression chiller), low cooling water flow temperatures can be reliably provided even at higher ambient temperatures in order to also separate low-boiling components.

12% PYROLYSIS GAS

Energy 3300kWh/day

85% PYROLYSIS OIL / WAX

Base oil 1000l/day

10 Output and possible uses

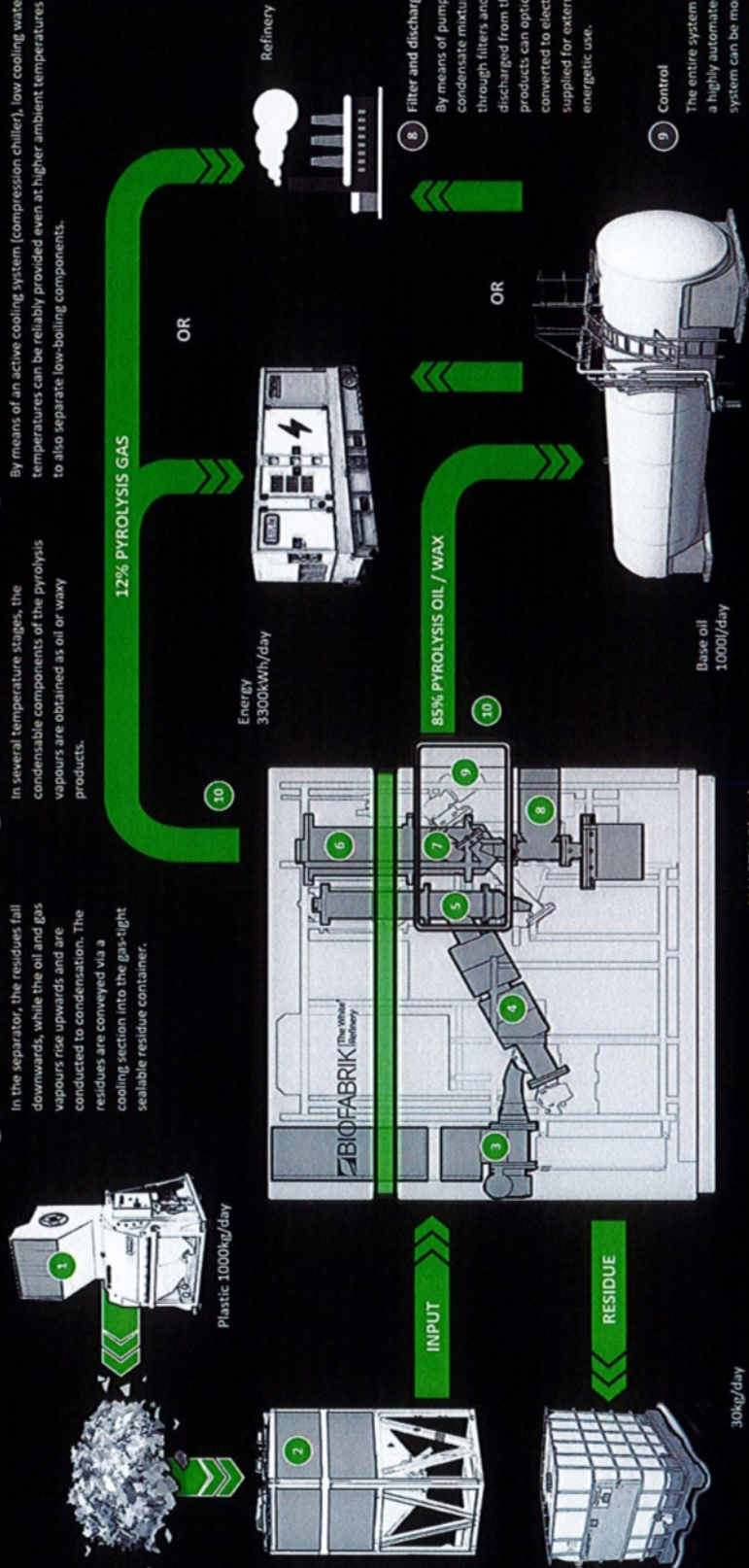
The output of the machine contains 85% base oil, 12% pyrolysis gas and small amount of residuals. The oil can be sold to the petrochemical industry as the main component of the output or it can be converted into energy by a special generator. The gas may be used to supply energy to the plant or be sold bottled.

8 Filter and discharge

By means of pumps, the condensate mixture is passed through filters and then discharged from the system. The products can optionally be converted to electricity on site or supplied for external material or energetic use.

9 Control

The entire system is controlled in a highly automated manner. The system can be monitored by the operator on site or remotely via appropriate interfaces and, if necessary, controlled.



WASTX Plastic



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APR Plastics Pty Ltd
1-7 Villas Road
Dandenong South VIC 3175

1800 277 800
www.aprplastics.com.au
enquiry@aprplastics.com.au



Household Recoverables & Processing Solutions



Tetra Pak Carton Recycling

The successful development of the Soft Plastics to Oil project at APR Plastics has paved the way for innovation and the creation of additional solutions in the fight to recover resources and maximise waste to landfill diversion.

In partnership with saveBOARD and Tetra Pak, APR Kerbside has begun separating Tetra Pak cartons during the sorting process using AI robotic technology. This AI sorting robot will have a sorting rate of 25 picks per minute which will exponentially increase recovery rates. These baled cartons will be sent to the saveBOARD facility in Warrangamba NSW prior to the VIC facility becoming operational in late 2024.

This project will have a large impact in removing Tetra Pak cartons from the waste stream and allow the resource to be recovered and transformed into a new product. Tetra Pak is a brand of liquid paperboard food packaging which contains multiple layers of lining to ensure liquid contents remain sealed and safe to consume; resulting in a complex packaging product to recover and recycle.

SaveBOARD's flagship product is a board like plywood, made entirely from recovered materials such as Tetra Pak cartons, waste paper and soft plastic. The products are made by shredding and hot pressing beverage cartons, generating no waste or VOC emissions, and without formaldehyde. At end of life, saveBOARD products can be completely recycled into new products resulting in a closed loop circular system with end-to-end product stewardship.

APR Kerbside is excited to work with participating councils to soon announce this development in the recycling space.



How it Works

1 - Collection & Transport

Residents place Tetra Pak cartons in their yellow lidded kerbside recycling bin, bins are collected by trucks and transported to the APR Kerbside Truganina site for processing

2 - Sorting

Truck contents are separated through the MRF, during which Tetra Pak cartons are identified and picked out by an AI robot and manual sorting

3 - Packing & Transport

The sorted resources are then compressed into bales and transported to the saveBOARD facility in NSW (until the VIC site is operational). The bales are processed at the saveBOARD facility.

4 - Shredding

Material is shredded to create fibres ready for processing

5 - Production

SaveBOARD products are created by applying heat and pressure to the shredded cartons. The process requires no additional glues, chemicals or water.

6 - Installation

The saveBOARD products are primarily used in construction, with any offcuts able to be returned to the facility to be reprocessed into new saveBOARD products

7 - Recovery

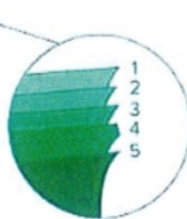
SaveBOARD products can have end-to-end product stewardship, with end-of-life products being returned to the facility to be reprocessed, creating a completely circular and waste free system.

What Does Tetra Pak/Liquid Paperboard Packaging Look Like?



Packaging Material

Long-life carton (Aseptic brick)



Layers

- 1 - Polyethylene
- 2 - Alufoil
- 3 - Polyethylene
- 4 - Cardboard
- 5 - Polyethylene

Fresh carton (Gable top)



Layers

- 1 - Polyethylene
- 2 - Cardboard
- 3 - Polyethylene

Frequently Asked Questions

What is a Tetra Pak carton?

Tetra Pak are a global food and beverage processing and packaging company that produces aseptic liquid paper board cartons. Tetra Pak is the brand, however it is often a household name that is used to describe any packaging in this style. Tetra Pak cartons have at least two layers of polyethylene and a layer of aluminium designed to increase the shelf life of products to provide safe nutrition to people around the world; the double layered packaging is what makes it a difficult product to recycle. Common Tetra Pak cartons are long life milk, juice containers and packaged soup.

Does saveBOARD only use tetra Pak cartons for their products?.

SaveBOARD has created a process which recycles Tetra Pak cartons in their entirety, without needing to reduce the packaging to single layers. saveBOARD can also use materials such as paper cups, soft plastics, and other materials. These same materials that keep food and beverages safe and hygienic are the same materials the boards are made from. Each saveBOARD product has differing quantity requirements of each type of household waste item.

How much energy does it take to turn Tetra Pak cartons into saveBOARD products?

SaveBOARD uses high pressure and high heat to create new products, there is [an embodied energy report](#) on each of their products which speaks to the energy cost of production.

What waste is produced from the process

Zero waste is produced, the feedstock is shredded down and pressed into shape using high heat and pressure to create the saveBOARD range.

How widely are saveBOARD products used in Australia?

The QLD facility is opening toward the end of 2023 and the VIC facility in late 2024. KFC used saveBOARD in the recent fit out of their store in Sydney, and the National Gallery of Victoria used saveBOARD products in their Alexander McQueen display, so we will see this product become increasingly more prevalent in the construction industry.

How are saveBOARD products disposed of at end of life?

SaveBOARD building products are 100% recyclable (by saveBOARD). Any recovered products (off cuts or end of life) will be shredded and remanufactured into new saveBOARD products providing a fully circular solution for the products.