



# Sustainable Materials Guide

# PROMEG® Polypropylene

## Environmental impact report

### Reduce – Reuse – Recycle. Where does PROMEG® fit?

Over the past decade there has been an increasing emphasis on recycling plastics - and rightly so. The growth in consumption of plastic, like all materials, creates waste. Recycling results in less waste going to landfill and should also result in less resource and energy use. PROMEG® polypropylene (PP) belongs to a group of plastics known as thermoplastics. Thermoplastics are easily recyclable and recycling saves most of the energy in manufacture. Unlike other recycled materials such as paper, PROMEG® can be recycled without “downcycling.” This means that the strength and other benefits of the original material remain despite maybe being recycled many times!

Megara has a purpose-built recycling facility and recycles all its own waste. We also manufacture the ecologia® range, which is 100% recycled PP sheet. Replacing 1kg of virgin PP with 1kg of ecologia® reduces CO<sub>2</sub> emissions by 97%<sup>1</sup>. Another benefit of PROMEG® is that it is often substituted for other materials such as paperboard. Because they are so durable, PROMEG® items rarely need to be replaced. This results in lower whole-of-life costs both financially and environmentally. The strength and low weight of PROMEG® also means that there is a reduction in the amount of material used & transported, such as where it can replace steel sheet for example. Using a durable material also encourages re-use. This is perhaps the best way to decrease our environmental footprint. To focus on recycling is to concern ourselves only with what happens after consumption. If we can reduce consumption and our reliance on a “throwaway society” we instead focus on the other end of the Waste Reduction Pyramid, which is where we can have the greatest positive environmental impact: Reduce and Reuse.

### Is PROMEG® a renewable resource?

All conventional plastics come from oil, gas or coal, which are fossil fuels and therefore finite resources. Whether or not we ascribe to the Peak Oil theory there have been concerns over the rapid rise in demand for plastics, and the effect that this is having on reserves. Though it is not a renewable resource, all the plastics in the world consume just 4% of oil as feedstock<sup>2</sup>. The origin of PROMEG® PP is propylene gas, which is a waste by-product of petroleum refining. If not converted into other compounds this gas would otherwise be flared off or burned, thus releasing CO<sub>2</sub> into the atmosphere<sup>3</sup>. Whilst there is a demand for petrol it may be argued that manufacturing PP itself is not depleting oil reserves. However, as an organisation we are cognisant of our responsibility to use finite resources

wisely, as well as our responsibility to decrease our impact on the environment wherever possible.

### Does its production use or pollute water?

The extrusion system for manufacturing PROMEG® relies on water for cooling through a closed-loop cooling tower system. The amount of water needed in the manufacturing process is relatively small. In fact, water usage is about 9000% less than that attributed to paper making, for example<sup>4</sup> and over 3000% less water is used over PROMEG®'s entire life cycle<sup>5</sup>. The majority of water use in manufacturing PROMEG®, as with many industrial processes, comes from the use of cooling towers. Megara was the first company to work with PACIA on third party auditing to optimise performance of our cooling tower. One way that we could decrease water evaporation would be to install a chiller system. Unfortunately, this system requires much more energy to run (thus contributing to greenhouse gas emissions) and we have determined that the environmental impact of this change would be negative.

### What is the carbon footprint?

There is a public perception that plastics in general have a poor environmental profile. However, it is worth remembering that so-called “natural” products with an eco-friendly image, such as cotton or wool, actually have significant environmental impacts. According to PACIA<sup>6</sup>, plastics manufacturing uses 2.7% of the total energy consumed in Australia, but contributes only 1.4% of carbon emissions<sup>7</sup>. PROMEG® sheet is energy efficient to manufacture, requiring much less energy than other materials such as paper or glass<sup>8</sup>. It is also important to reiterate that replacing 1kg of virgin PP with 1kg of ecologia® reduces CO<sub>2</sub> emissions by 97%<sup>1</sup>. We have implemented sustainability projects over the past few years including plant improvements to reduce our energy use in manufacture, installing energy efficient lighting and minimising landfill through maximising recycling of waste. Notably, raw materials used are sourced locally wherever possible. This minimises potentially significant emissions from transport. Provenance of materials is very important to the environmental cost equation when considering where the sheet is manufactured and where the inputs come from. Almost all the inputs to PROMEG® start from the cradle in Australia.

### Does it contain dangerous chemicals?

The propylene gas used to make PROMEG® is a hydrocarbon (carbon + hydrogen), and the carbon from the raw material is largely retained in PROMEG® sheet. Thus it

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may be argued that using PROMEG® products effectively sequesters, or stores, carbon from the environment. There are no toxic additives used at any stage to make the sheet. Other forms of plastic, and even some other manufacturers of PP, can use heavy metals such as lead or cadmium in colouring agents, for example.

All raw materials used in PROMEG® are the highest standard available. To ensure safety, the components used are actually food grade and comply with Australian Standard 2070-1999, "Plastic Materials for Food Contact Use."<sup>9</sup> Unlike PVC, PROMEG® contains no halogenated compounds, chlorine (vinyl chlorine is a known carcinogen<sup>10</sup>) or phthalates (endocrine disruptors, used primarily as softening agents).

### Is it biodegradable?

PROMEG® is not biodegradable. Although theoretically all plastics will eventually degrade through photo-oxidation, in practice this would take hundreds of years. If PROMEG® ends up in landfill it won't degrade, but neither will it have any negative effects on the environment. This is because there are no toxins in PROMEG® and also because it is inert. The different components of PROMEG® could not leach out into soil or aquifers; but this is not the case for some other plastics and many other items of household waste.

Megara encourages recycling our products so that they don't take up valuable space in landfills. One important thing to consider about standard landfills is that they are anaerobic. This means that they are designed not to let in light and oxygen, which are needed for the decomposition process. So despite the fact that it is regarded as "biodegradable," in practice, paper doesn't easily biodegrade in landfill. Who hasn't unearthed a 50 or even 100 year old newspaper in the wall or under the floor that can still be read quite easily?

Another issue with decomposition in landfills is that as the organic matter breaks down it releases methane gas (CH<sub>4</sub>) into the atmosphere. Methane is a greenhouse gas which has 21 times the global warming potential (GWP) of carbon dioxide. It has been estimated that nearly half of GHG emissions from paper are comprised of methane emissions from paper in landfills<sup>11</sup>. So "biodegradability" is not necessarily an environmental positive. PROMEG® does not break down, but this also means that it is not contributing any additional greenhouse gases at the end of life phase.

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1. Based on calculated embedded emissions from cradle to gate
2. "Plastics- Materials For Our Future," Plastics & Chemical Industries Assoc. 2005
3. [http://www.sustain-ed.org/PAGES/Waste/basell\\_detail.html](http://www.sustain-ed.org/PAGES/Waste/basell_detail.html)
4. "Papermaking generally requires 99 parts water for each part raw material," "Paper recycling: China's Rubbish Economy," Ethical Corporation, 2009
5. Water usage for PP resin production is no more than 2 parts water (LyondellBasell) + PROMEG® extrusion no more than 1 part
6. *Plastic and Chemical Industries Association*
7. As cited in <http://www.kesab.asn.au/uploads/File/Fact%20Sheets%20-%20Plastics.htm>
8. "...it takes about three times more energy to make a paper bag compared to a plastic one and about six times more energy to make a glass milk bottle than a plastic one of the same volume" <http://www.kesab.asn.au/uploads/File/Fact%20Sheets%20-%20Plastics.htm>
9. "In the manufacture of plastics items for food contact use it is essential to use only raw materials that are formulated to specifications suitable for food use or that are known to be safe for contact with food." AS 2070-1999, Standards Australia, 1999
10. <http://archive.greenpeace.org/toxics/pvcdatabase/bad.html>
11. "Waste management options to reduce greenhouse gas emissions from Paper in Australia," Picken, Yuen & Hennings 2001, in "Atmospheric Environment," Volume 36 Issue 4, Feb 2002

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# ecologia<sup>®</sup> Recycled Sheet

## Reduce your carbon footprint!

Introducing the **ecologia<sup>®</sup>** range of 100% recycled polypropylene sheet.

The **ecologia<sup>®</sup>** sheet range comprises three members:

- **marmo<sup>®</sup>** – marble-like sheet
- **transeco<sup>®</sup>** – translucent sheet
- **fluido<sup>®</sup>** – glossy metallic-like sheet

**ecologia<sup>®</sup>** is a recycled and recyclable polypropylene product that has the same excellent printability and durability as virgin **PROMEG<sup>®</sup>** PP. Available in a large range of finishes and gauges, **ecologia<sup>®</sup>** is well suited for stationery, packaging, POP & POS displays, signage, presentation kits, industrial applications... anywhere you require a strong, lightweight and waterproof material.

**ecologia<sup>®</sup>** is produced on site by Megara through our purpose-built recycling plant. Incorporating state-of-the-art technology, the plant transforms post-industrial scrap and products into a pelletised form whose properties closely match those of virgin material. It even allows us to re-use product with a high density of print on the surface. All of this makes it possible to formulate high quality products from 100% recycled material in an energy-efficient way which would have otherwise been disposed of in landfill.

Megara aims to maximise the amount of material that is recycled, which benefits the environment by:

- extending the life of a raw material resource
- no landfill
- recycling in an energy efficient way
- reduction of greenhouse gases produced\*
- no pollutants in the water or environment

Once finished with your products, we encourage them to be returned to Megara for recycling.

\* For every kilowatt-hour of electricity produced, a proportion of CO<sub>2</sub> is emitted to the atmosphere. For example, one kilowatt-hour of electricity produced by burning brown coal will emit approximately one kilogram of CO<sub>2</sub> into the atmosphere. (US Dept of Energy and EPA, July 2000.)



**FACT: Did you know that recycling 1kg of paper is more energy intensive than recycling 1kg of plastic?**

The **ecologia<sup>®</sup>** sheet range is non-toxic and highly energy efficient. For example, production of this recycled material uses 40 times less energy than virgin material along its path of transformation back into sheet stock. This means 40 times less carbon dioxide is released into the atmosphere, resulting in far fewer greenhouse gas emissions\*\*.

**When you replace 1kg of virgin polypropylene with 1kg of ecologia<sup>®</sup> polypropylene sheet you reduce CO<sub>2</sub> emissions by 97%**

\*\* Based on calculated embedded emissions from cradle to factory gate

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