In a wastewater treatment plant the wastewater is separated into solids and liquids. Gases are also produced from these treatment processes. These solids, liquids and gases are useful products that are re-used wherever possible. Some treatment plants also send treated water to recycled water plants where it is further treated for a wider variety of uses.

**Re-using treated wastewater**

Water re-use means using water from sources other than drinking water, such as treated wastewater. Treated wastewater can be re-used in various ways depending on how it’s treated.

Wastewater treated to a tertiary level from a wastewater treatment plant can be re-used for:

- washing screens and filters as part of the water treatment process (North Head Wastewater Treatment Plant can recycle up to 1.5 million litres a day for its own treatment processes)
- irrigating nearby sports fields (Penrith Wastewater Treatment Plant supplies 18 million litres of tertiary treated water a year to irrigate nearby parks and reserves)
- flushing toilets at the plant or at nearby businesses.

**Recycled water**

Recycled water is wastewater (or stormwater) treated to a standard fit for a particular use, whether it’s homes, agriculture, industry or the environment.

For some uses, recycled water may need to be treated beyond tertiary level. This is done at a recycled water plant using a variety of microfiltration, ultrafiltration and reverse osmosis technology.

Greater Sydney currently recycles about 27 billion litres of wastewater a year. By 2015, 70 billion litres of wastewater a year, or up to 12% of Sydney’s water needs, will come from recycled water.

Recycled water is used for:

- **homes** – Australia’s largest residential recycling scheme at Rouse Hill provides recycled water to more than 18,000 homes. This will increase to around 36,000 homes
- **industry** – Sydney Water’s largest industrial recycling project at Port Kembla provides about 20 million litres of recycled water a day to BlueScope Steel and the Port Kembla Coal Terminal, saving about 17% of the Illawarra’s daily water needs
- **the environment** – a new recycled water plant at St Marys will produce up to 18 billion litres a year of highly treated recycled water to help maintain the flow of the Hawkesbury-Nepean River
- **irrigation and agriculture** – Sydney Water supplies about 3.8 billion litres of recycled water a year for irrigating farms, golf courses, sportsgrounds, parks and a racecourse.
Re-using solids

Solid material left over from the wastewater treatment process is called biosolids. These biosolids contain high levels of nutrients, making them excellent fertilisers and soil conditioners.

Sydney Water uses 100% of captured biosolids. These are processed and tested at laboratories to make sure they comply with regulations to protect the environment and human health.

Once processed, biosolids are sold under the registered business name of Biosoil® as fertilisers to improve soil quality in agriculture and horticulture. Sydney Water produces about 190,000 tonnes of Biosoil® a year, as part of its biosolids land application program

Re-using gases

Methane gas is generated by decomposing bacteria in organic material. At some wastewater treatment plants, Sydney Water captures the methane and uses it to generate electricity and heat anaerobic treatment tanks. This process is called cogeneration.

Sydney Water has eight cogeneration plants operating at wastewater treatment plants. Together, these plants generate around 20% of Sydney Water’s energy and form part of Sydney Water’s plan to be carbon neutral by 2020.

Using renewable energy in this way reduces greenhouse gas emissions by about 80,000 tonnes a year. This represents over 15% of Sydney Water’s total emissions. Cogeneration plants are in place at the following wastewater treatment plants:

- Bondi
- Cronulla
- Glenfield
- Liverpool
- Malabar
- North Head
- Warriewood
- Wollongong.

Re-use and recycling at Penrith Wastewater Treatment Plant

Re-using treated wastewater

Penrith Wastewater Treatment Plant treats wastewater to a tertiary level. This treated wastewater is re-used in a number of ways including:

- **wastewater treatment processes** – in 2007–08, Penrith plant re-used 627 kL/d for its treatment processes
- **industrial and commercial uses** – re-use opportunities are being investigated and include water for cooling towers and toilet flushing at Penrith Panthers and for toilet flushing at the Australian Taxation Office
- **irrigation** – up to 18 million litres of recycled water a year is used by Penrith Council to irrigate nearby sports fields, including Mt Pleasant, Jamison Park and Hickeys Reserve. Opportunities are also being investigated at Penrith Paceway for turf irrigation.

Recycled water

Tertiary treated water from Penrith Wastewater Treatment Plant (and from Quakers Hill and St Marys wastewater treatment plants) is piped to the St Marys Water Recycling Plant to be treated before use as recycled water. This forms part of the Replacement Flows Project. Up to 18 billion litres of recycled water a year is piped back to Penrith and eventually flows into the Hawkesbury-Nepean River from nearby Boundary Creek. This recycled water helps maintain healthy flows in the Hawkesbury-Nepean River, along with water released from the Upper Nepean dams for ‘environmental flows’.

Re-using solids

Penrith Wastewater Treatment Plant produces about 2,000 tonnes of biosolids a year. Sydney Water pays a transport company to remove the biosolids, which are sold by the company to farmers and horticulturalists as Biosoil®.