



# What are Biosolids?

## Fact Sheet

This Fact Sheet has been prepared by the Australian and New Zealand Biosolids Partnership.

The intent of these Fact Sheets is to provide interested groups and individuals with information about aspects of the treatment and management of biosolids.

This Fact Sheet explains:

- What biosolids are
- How they are made
- What materials might commonly be found in biosolids
- How biosolids might be used
- How they might be disposed

### What are biosolids?

Biosolids are treated sewage sludges. Sewage sludge is the solids that are collected from the wastewater treatment process but which have not undergone further treatment. Sludge normally contains up to around 3% solids. Biosolids are a product of the sewage sludge once it has undergone further treatment to reduce disease causing pathogens and volatile organic matter significantly, producing a stabilised product suitable for beneficial use. Biosolids, normally contain between 15% to 90% solids. Biosolids are carefully treated and monitored and they must be used in accordance with regulatory requirements.

### How are biosolids made?

Biosolids are produced primarily from the treatment of sewage. Sewage consists of used water from household activities such as washing dishes and clothes, taking a shower, flushing the toilet and even cleaning your teeth.

Industry also discharges into the sewerage system. This discharge is usually regulated and limits are set so that any potentially dangerous compounds are not allowed in the sewer at levels that might cause harm to the environment or people.

During sewage treatment, microorganisms digest (eat) the sewage, completely breaking down the original organic solids that have been discharged into the sewerage system. The water content of the solids is then reduced, usually by passing through mechanical processes. The resultant product is biosolids.

Biosolids comprise dead microorganisms, a small portion of active microorganisms, and inert solids such as sand that may enter the sewerage system. The final quality of the biosolids produced depends on the quality of the sewage entering the treatment plant and the treatment process. Strict state and national guidelines in Australia and New Zealand specify the allowed uses of specific biosolids. Australian and New Zealand water industries use some of the most advanced wastewater treatment and biosolids production technology and quality assurance programs in the world to ensure the safe and sustainable management of biosolids.

See Figure 1 on sewage treatment, and Figure 2 showing different methods for production of biosolids.

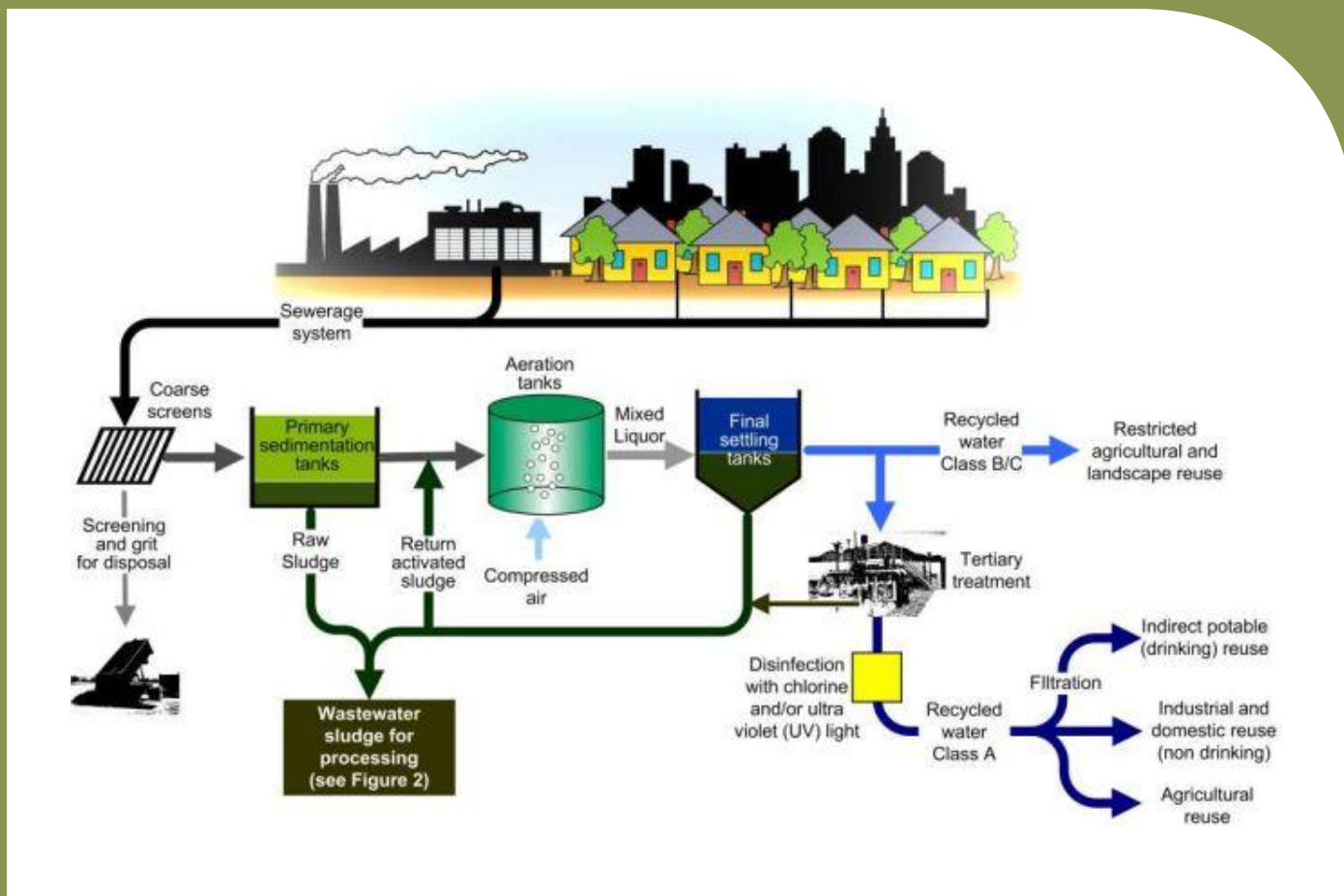


Figure 1: Processes in a typical wastewater (sewage) treatment plant which produce wastewater sludge for processing into biosolids.

## What is in biosolids?

Biosolids are mainly a mix of water and organic materials that are a by-product of the sewage treatment processes. Most wastewater comes from household, kitchens, laundries and bathrooms. Biosolids may contain:

- Macronutrients, such as nitrogen, phosphorus, potassium and sulphur; and
- Micronutrients, such as copper, zinc, calcium, magnesium, iron, boron, molybdenum and manganese.

Biosolids may also contain traces of synthetic organic compounds and metals, including arsenic, cadmium, chromium, lead, mercury, nickel and selenium. These contaminants limit the uses to which biosolids can be put, with all applications regulated by appropriate government authorities in each State and federally. Australia has one of the strictest regulatory regimes for biosolids application and use in the world.

## What are biosolids used for?

Biosolids can be applied as fertiliser to improve and maintain soils and stimulate plant growth and also to fertilise gardens and parks and reclaim mining sites.

In Australia and New Zealand, biosolids have been used for:

- Co-generation/power production/energy recover
- Land application in agriculture (vine, cereal, pasture, olive)
- Road base
- Land application in forestry operations
- Land rehabilitation (including landfill capping)
- Landscaping and topsoil
- Composting
- Incineration
- Landfill
- Oil from sludge (experimental).

Other uses overseas include:

- Bricks and construction material
- Vitrification (glass manufacture)
- Bio-fuel
- Fuel substitute (cement works)
- Additive to road base
- Jewellery

Biosolids are graded according to chemical composition and the level of pathogens remaining after production. Not all biosolids can be used for all applications. Lower qualities are typically used for road based and mine site rehabilitation. Only the highest grade of biosolids can be used to grow crops for human consumption. Regulators, such as State departments of Health and Environment strictly control the application, production and quality of biosolids.

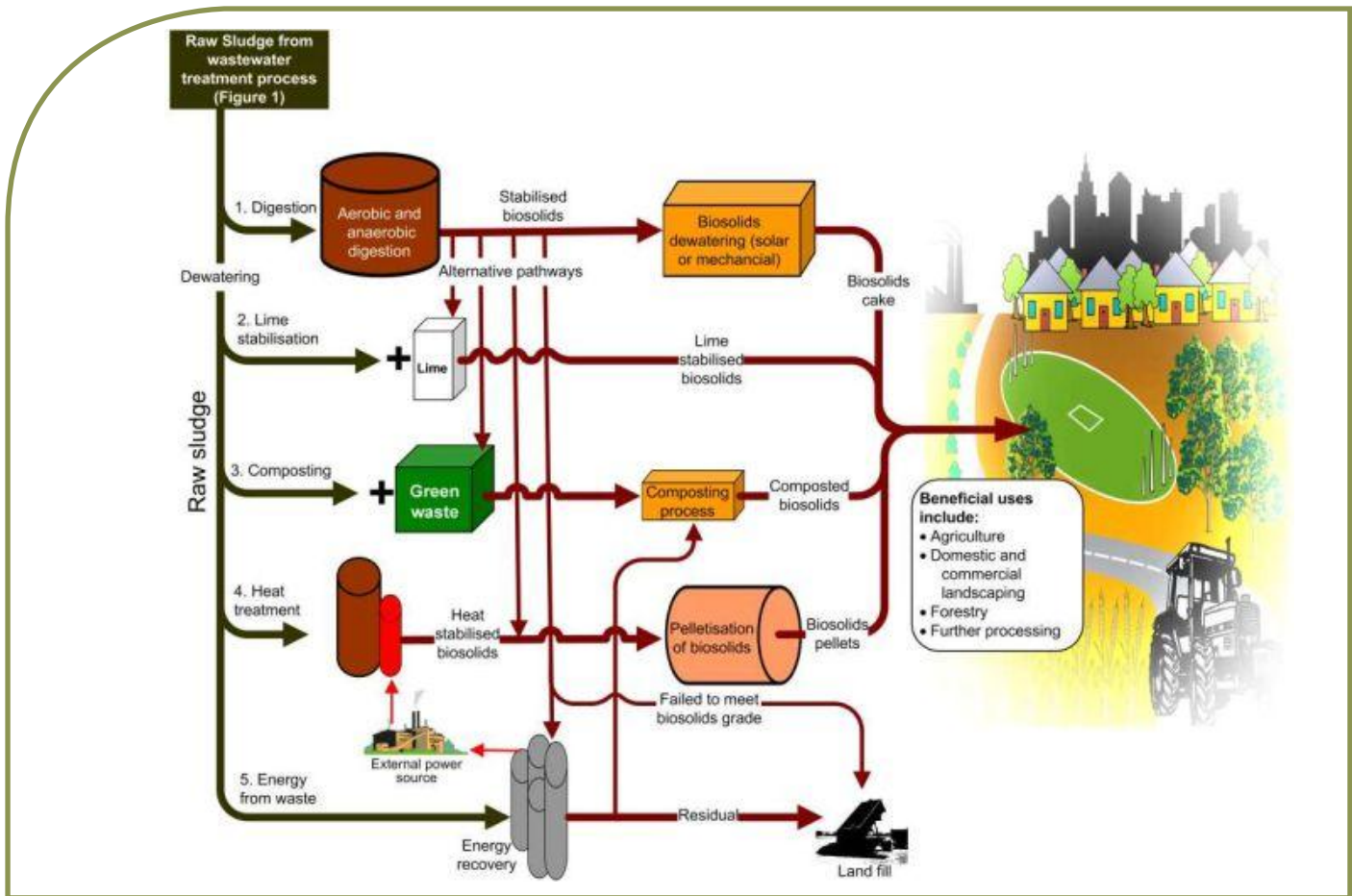


Figure 2: Five typical production systems for biosolids with possible alternative productions pathways.

## How can biosolids be used or disposed of?

Basically, there are only two options for long term biosolids management:

1. Application to land in one form or another, with a range of stabilisation and dewatering/drying options; and
2. Incineration (including energy from waste), with disposal of the residue to landfill or land.

Landfill of biosolids is not generally accepted, or will not be accepted in the future, by regulators in Australia and New Zealand. The accepted waste management hierarchy is: avoidance, reuse, recycling, recovery of energy, incineration, containment and disposal (as a last resort).

## About the Australian and New Zealand Biosolids Partnership

The Australian and New Zealand Biosolids Partnership (ANZBP) is a collective of utilities, consultants, academics and government agencies committed to the sustainable management of biosolids. Since its formation in 2007, the ANZBP subscriber base has continued to grow and has developed a diverse range of research products and tools to support the objectives of the Partnership. More information on the ANZBP and its activities can be found on the website [www.biosolids.com.au](http://www.biosolids.com.au).

