

Advanced Methanol Production and Greenhouse Facility Fact Sheet

Artists representation showing how the former cement works will be developed. Silo in foreground is the current large silo on-site to maintain the site's connection with its historical beginnings.

About the Development

Cenagen Pty Ltd propose to construct and operate an Advanced Methanol Production and Greenhouse Facility (the Proposal), located at 1 Jamison Street, Kandos (Lot 143 DP755789 and Lot 3 DP1187085) (the Site).

The 50.29 hectare Site is located at the former Cement Australia cement works, one hour drive north-east of Bathurst, on land zoned E4 General Industrial under the Mid-Western Local Environmental Plan 2012 (LEP).

The Site is bound to the north and north west by the village of Kandos, zoned RU5 Village, and bushland to the east and south and farm land to the west (zoned RU1 Primary Production). The Site has a rail siding, and is provided with high voltage power, water and sewer services, including a network of internal roads, buildings and silos used by the former cement works.

In one of the largest industrial-renewal projects in NSW's history, the former cement works which manufactured cement for the country for more than a century will host an advanced and high technology plant for the manufacturing of green methanol, including facilities for intensive food production and flower crops.

Green methanol is a form of sustainable transport fuel that can be used as an alternate to fossil-based fuels to reduce the greenhouse gas emissions (GHG) of transportation fuels.

Green methanol is in high demand by the world's shipping industry, which is heavily reliant on diesel.

The Proposal will involve the development of a commercial scale, 1,500 tonne per day gasification facility that will process engineered feedstock manufactured from residual Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste that is normally sent to landfill. The annual throughput of the operation will be approximately 450,000 tonnes per year.

What is Gasification?

Gasification is a form of advanced waste processing that converts waste materials at high temperatures (~500°C to 1,000°C) in a low oxygen environment within a completely sealed reaction system to produce syngas containing carbon monoxide, carbon dioxide and hydrogen – all of which are useful chemical precursors, or building blocks for the production of other chemicals.

These chemicals will be used to manufacture a high value fuel known as methanol. It is expected that the Proposal will manufacture as its primary output around 91,000 tonnes (or 91 megalitres) of methanol on an annual basis.

Overview of the Proposal

-  Fully enclosed waste receipt, storage and processing building(s) with advanced odour controls, negative pressure and fast acting roller doors to prevent fugitive odour emissions from incoming MSW and C&I unprocessed waste from regional Councils.
-  This material will be delivered by trucks. The building(s) will be provided with advanced sorting technology to recover recyclables, removal of non-compliant waste items (e.g. batteries, gas bottles, cans of paint, ceramics, inerts etc), shredding, drying, and manufacturing of the Processed Engineered Fuel (PEF) ready for use in the process.
-  Facilities for the receipt and unloading of specially designed shipping containers (air and liquid tight) of baled and wrapped PEF by rail at the site for use in the gasification process. This PEF does not need to be processed through the on-site sorting plant as it is pre-prepared and ready for the gasification process.
-  Building(s) with odour and fire safety controls for the storage of PEF ready for use in the gasification process.

How is Methanol Produced and Operation of the Greenhouse

The Proposal will involve fifteen process stages to convert the engineered feedstock into methanol, with the surplus carbon dioxide from the process being used to enhance the growth of food produce and flower crops in a purpose built greenhouse facility on the site.

The whole process is summarised as follows:

1 Unloading of shipping containers from rail

The PEF in shipping containers railed to the Site are unloaded by a mobile container handler and containers are stacked in a rail siding container yard. These operations are conducted on the far southern side of the Proposal area, at maximum distance from the township. Empty shipping containers are loaded onto the train for return. Shipping containers of PEF are then moved by the container handler inside a PEF storage building for unloading.

2 Indoor storage and management of PEF stockpile

Both sources of PEF (manufactured on site and railed in from other areas) are stored in building(s) with advanced odour controls, in stockpiles to provide a sufficient inventory for continuous 24/7 operation of the gasification units. Building(s) are to be provided with advanced fire detection and fire safety systems.

3 Loading of PEF into fully sealed gasification units

4 Gasification process

The PEF is converted into syngas in a low oxygen environment within the fully sealed gasification units. Syngas is a mixture of primarily hydrogen, carbon monoxide, carbon dioxide and water.

5 Syngas purification

Syngas is then purified through a series of processes to remove contaminants. Some of the syngas is used to support the solid residue melter.

6 Solid residue (slag) recovery

Solid residue from the gasification units settle into the solid residue melter, where the residue is further processed in the presence of steam, oxygen and syngas. The residue becomes molten (slag) and this is removed from the melter, and will be reused as an aggregate product in construction applications.

7 Oxygen generation

The gasification system is supported by an on-site oxygen generation process, where oxygen is purified from normal air using well established Vacuum Pressure Swing Adsorption technology.

8 Water gas shift reactor

The remaining syngas, referred to as 'sour syngas' is then processed through a Water Gas Shift reactor. The purpose of this unit is to convert the water and carbon monoxide in the sour syngas into hydrogen and carbon dioxide, at the ratio for production of methanol fuel.

9 Acid gas separation

The sour syngas is further purified to remove chemicals that can form acid gases (e.g. hydrogen sulfide) and other contaminants to ensure that the syngas is pure for methanol production. The purified syngas is referred to as 'sweet syngas'.

10 Methanol production

The sweet syngas is then compressed and sent to the methanol reactor. Methanol is then purified through three distillation stages to create pure methanol.

11 Methanol storage and transportation to market

Tank systems will be installed on the site for methanol produced, with all spill and safety systems provided. Methanol will be transported to market using bulk liquid rail transportation vessels or by liquid tanker semi-trailers (as a backup).

12 Sulfur redox and carbon dioxide purification

Before the surplus carbon dioxide from the plant can be directed to the greenhouse complex, all hydrogen sulfide needs to be removed from the surplus carbon dioxide stream. About 2.5 tonnes of sulfur will be produced per day, which will be sold for fertiliser manufacturing or other chemical manufacturing uses.

13 Greenhouse production

Purified food grade carbon dioxide from the process will then be directed to the ten (10) hectare greenhouse facility located on the northern side of the Proposal area (closest to township of Kandos) to produce intensively grown food and cut flower crops. Enriched carbon dioxide growing atmospheres in greenhouses helps enhance and accelerate crop growth, and overcomes deficiencies in carbon dioxide which can occur in greenhouse environments. Crops like tomatoes, capsicum, lettuce, cucumbers, eggplant, herbs and cut flower crops such as carnations, chrysanthemums, gerberas, lilies, asters, statice, freesias, baby's breath, lisianthus and alstromeria (and others) will be grown, depending on seasonal demand.

14 Produce processing and distribution

A purpose built warehouse will house all operations needed to support the greenhouse facility, including media preparation, planting, harvesting, grading, packaging, cool storage and distribution of food and flower products for bulk transport to markets via trucks.

15 Auxiliary plant and equipment services

Additional services will be needed to support the Proposal, and will include: wastewater treatment plant including buffer tanks, primary dissolved air flotation (DAF), anaerobic digester and secondary DAF; two steam boilers; and turbine, cooling, refrigeration and compressed air plant.

Supporting Infrastructure

Additional infrastructure is needed to support the Proposal:

- Storage and distribution infrastructure for methanol, liquified CO₂ and sulfur cakes.
- Greenhouse finished goods storage and distribution area.
- Maintenance workshop.
- Grid electricity connection (approximately 30MW).
- Rail head and shipping container unloading facilities.
- Shipping container storage and unloading / loading areas.
- Internal access roads as required.
- Office and amenities for administration, operational staff and visitors.
- Upgrades to the existing mains water supply.
- Firefighting systems.
- Weighbridges.
- Stormwater capture, treatment and reuse systems to avoid impacts on water quality and reduce reliance on potable supplies.
- Mobile material handling machines and equipment.
- Landscaping works.
- Staff and truck parking areas.
- Solar systems to supply off-grid energy.

Sustainability Measures

Several proposed sustainability measures and targets have been included in the plant design, such as:

-  Minimal emissions to air, helping to protect local air quality at all times.
-  Objective of net-zero greenhouse gas emissions.
-  Minimal solid waste generated, with majority of residues manufactured into saleable products, therefore avoiding landfill disposal.
-  Advanced heat recovery and reuse, to minimise the energy requirements for the plant.
-  Full rainwater and stormwater harvesting and reuse, to reduce net water requirements.
-  Wastewater recovery and recycling, to avoid any off-site discharges.
-  Solar electricity generation to reduce the power requirements of the site.
-  Battery storage of surplus electricity to reduce the need for imported grid electricity.

Will the Local Environment be Affected?

Minimal impacts on the local environment are expected.

The Proposal is being designed to have minimal emissions, will be clean with advanced engineering design and safety systems to ensure that methanol and the greenhouse crops are produced continually with minimal impact on the environment.

The high-tech plant will replace the former cement works, and will have far lower impact than the previous use of the site, helping to protect and enhance public health and the local environment.

Why is the Project Being Proposed?

The Proposal seeks to repurpose a former cement works site located that is provided with all required supporting infrastructure (rail, transport, electricity, sewer and water infrastructure) that has been abandoned for more than ten years.

The Proposal is compatible with the E4 General Industrial zone at the Site, and is a permitted form of development with consent under the LEP.

The Proposal aims to produce much needed methanol, a form of green fuel that is in extremely high demand by the shipping industry. Methanol is a form of sustainable alternative fuel that can help reduce the world's use of fossil fuels and decarbonise shipping.

The Proposal aims to provide productive uses for waste materials, which are otherwise sent to landfill, which impacts our environment and communities. By reducing volumes of waste going to landfill, and so reducing the amount of raw material required, the circular economy is supported. This aids the NSW government's sustainability goals.

The Proposal will assist to deliver key outcomes for NSW Government, industry and the community under the NSW Climate Change Adaptation Action Plan 2025-2029 and the NSW Sustainable Materials Strategy 2041.

Why Kandos?

Cenagen Pty Ltd chose Kandos as the site for the Proposal because of the industrial and proud history of the town.

Kandos has been at the forefront of innovation, strength and courage at the turn of the 20th century.

Pioneering the supply of a new product (cement), in a new town and that vision helped build some of the most recognisable landmarks in the country.

Kandos embraced change, the people had a 'KanDo' attitude and pulled together and had a very successful and prosperous century due to embracing new industry at the time, involving cement production.

Cenagen are hopeful that this proud town can again once embrace a new product, in a new time and join us in a new journey whilst we tackle local, state and federal issues with innovation, alternate fuel production, sustainable methods of growing food and flower crops.

What Will the Operation Look Like?

The proposed plant will be constructed mostly within the previous footprint of the cement plant, with some buildings being repurposed. The main cement silo will be retained to provide a community connection to the long and proud cement history of the site, which has supported the Kandos community over many generations.

Current Status of the Project

Cenagen Pty Ltd are seeking feedback from the community on the Proposal prior to the lodgement of the Development Application.

The feedback received from the community will be included in the Scoping Report, which is the first stage of the development application process.

Following the completion of the Scoping Report, this will be lodged with the Department of Planning, Housing and Industry to obtain the Secretary's Environmental Assessment Requirements (SEARs) under Section 5.16 of the Environmental Planning and Assessment Act 1979. The Scoping Report will identify key priorities for assessment and form an important part of community engagement.

Community consultation will be undertaken throughout the planning process to provide transparency and certainty to the community.

A comprehensive Environmental Impact Statement will then be developed assessing issues such as human health, noise, air quality, traffic and access, hazards, fire safety, hydrology, soil, water, waste management, biodiversity, Aboriginal cultural heritage, European heritage, visual impacts, landscaping, social and economic matters to assist in designing a clean, sustainable and safe facility for staff, the township of Kandos, regional communities and the environment.

The existing site entry with mature landscaping will be retained. Old parts of the cement plant will be demolished, with all materials recycled where possible.

The completed plant will look like a high-tech manufacturing plant, comprising contemporary looking buildings, offices, tanks, pipelines, warehouses and greenhouses. The development will be enhanced by surrounding landscaping and retention of native vegetation to provide a buffer around the plant and surrounding land uses.

How Will the Project Benefit the Local Community?

The Proposal will inject up to one billion dollars in investment into the NSW economy (in construction costs alone) and create 300 to 350 permanent full-time jobs.

Who is Cenagen?

Cenagen Pty Ltd is an Australian-owned company that is focused on developing sustainable, net zero emission solutions using world's best practice technology for the manufacturing of alternative fuels to support the decarbonisation of our economy.

Cenagen is working with a range of waste suppliers, including MET Waste Management Pty Ltd, a waste and recycling business in Silverwater. Their Silverwater facility is currently going through the planning process to build a purpose-built state-of-the-art warehouse and plant to support the production of PEF and providing an important alternative to landfill for MSW and C&I wastes.

Cenagen has partnered with global engineering firm, Wood Beca, who has a very strong track record in the engineering design of bioenergy, oil, gas, wood and fibre developments. Specialist industrial planning firm JEP Environment & Planning, will be leading the environmental assessment, community consultation and planning application for the Proposal. They have led some of the largest and most complex industrial development approvals in NSW history.

Who is Assessing the Application?

The Proposal is considered a State Significant Development and will therefore be assessed by the NSW Minister of Planning.

Want More Information?

More information can be found at the Cenagen web site, <https://cenagen.com>.

How to Provide Feedback

You can provide your feedback about the Proposal via the Cenagen web site as above or contact JEP Environment & Planning via:

E: admin@jacksonenvironment.com.au

T: 02 8056 1849

We greatly appreciate your feedback on this project which will benefit both the environment and the local economy.

