

MBD's 'CO₂ to energy' process overview



Sunlight



Waste Nutrient

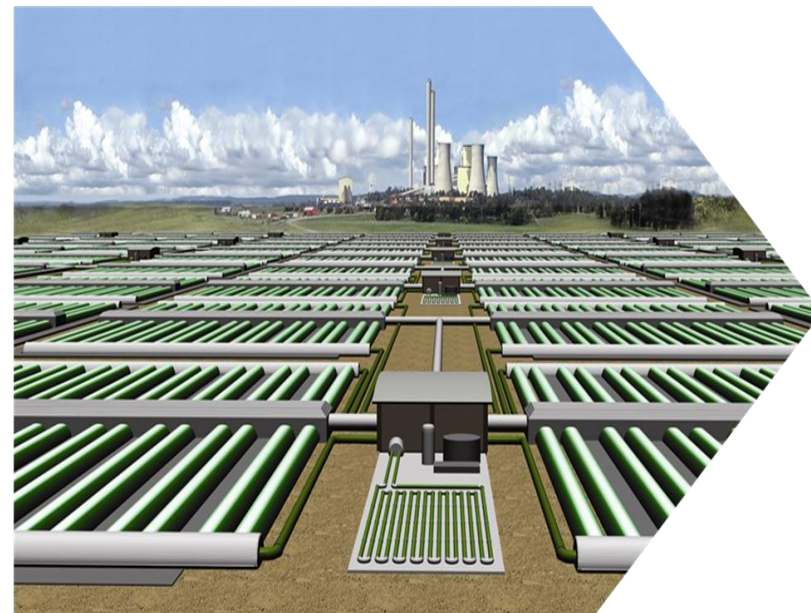


N, P, K, S,
Sewerage
Waste from feedlot
Waste water
Fertilizer Supplemented



CO₂ Emitter

Greenhouse gases from emitter collected at the bases of the flue gas chimney and piped to algae farm.
(CO₂ NO_x SO_x)
e.g.
Power Plant;
Refinery;
Cement Kiln;
LNG & Coal Seam Gas



Algae Synthesizer

Land (low value buffer): 300 to 1000 Ha
Each Million tonnes of CO₂ e sequestered produces the following outputs:
550,000 tonnes of algae
- 180,000 tpa algae oil
- 370,000 tpa nutritious livestock meal



Algae Oil 35% Oil Options Include:

- Biodiesel Production
- Plastic Production
- Jet Fuel, other fuels



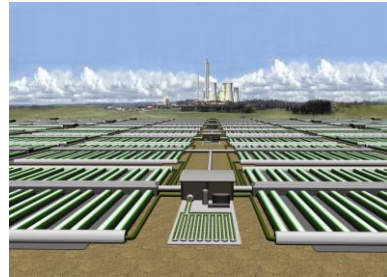
Algae Meal, 65% Meal Options Include:

- Feed for livestock industry
- Biomass for fertilizer
- Biomass for bio-plastic production
- Biomass for electricity production

100% of Algae used as value added product

Captured CO₂ from the emitter's waste exhaust flue gases is directly injected into the circulating waste water to synthesise oil-rich algae. The water thickens as CO₂ and sunlight combine with nutrients to produce heavy oil-laden algae slurry. The continuous cycle harvests the algae which are then crushed to extract pure oil and algae meal. The fully enclosed Algae Synthesiser unit provides absolute control to deliver quality assured output to the highest market standards.

MBD's 'CO₂ to energy' system



Building commercially and environmentally sustainable solutions to carbon capture and recycling

MBD technology recycles captured industrial flue-gas emissions into oils suitable for manufacture of high grade plastics, transport fuel and nutritious feed for livestock and monogastric consumption.

MBD bypass the inherent problems associated with 'geosequestration' by keeping captured CO₂ above ground for immediate large-scale production of valuable input commodities fundamental to the global economic supply-chain.

Happily, MBD's environmentally friendly carbon-recycling process also produces large quantities of 'A1 quality' fresh water and masses of pure oxygen.

MBD Energy has reached agreements with 3 of Australia's largest greenhouse gas emitters: Tarong Energy in Queensland, Loy Yang Power in Victoria, and Eraring Energy in NSW. The agreements are for the planning and provision of a pilot MBD Energy Carbon Capture and Recycling (CCR) plant at each location.

MBD Energy's algal carbon capture, storage and recycling solution was selected by these greenhouse gas emitters for three compelling reasons:

- Captured CO₂ is immediately recycled into oil-rich micro algae suitable for oil and meal;
- 100% of the algae is recycled; 35% as oil for plastics or fuel, 65% for low-methane stock-feed;
- MBD's CCR is today's premier green house gas reduction solution for use by power stations.

In addition to its project at Loy Yang Power, MBD Energy is working in concert with the operators of a number of major coal-fired power stations, and other CO₂ emitters, to implement solutions that will soon enable broad industrial-scale deployment of its CCR technology.

Supported by an extensive, expert team, MBD Energy is co-operatively enabling delivery of a number of large-scale Demonstration Projects to be operating before 2020, as identified by the 'G8 mandate on climate change.' MBD expects to play a significant role in the newly created Global Carbon Capture and Storage Institute.



Not much land required for MBD algal fuel production

Marginal or waste land that is flat, or terraced, is ideal. Unlike virtually all other biofuel solutions, MBD's system presents no land use conflicts and does not compete with food crops. The table below graphically demonstrates the high oil yield (plus feed, glycerine and clean water) compared with conventional biofuel feed stocks.

CROP	OIL YIELD (litres /ha)	LAND NEEDED (M Ha)	RATIO OF EXISTING AUSTRALIAN CROPPING AREA (%)
Corn	172	90.1	375.5
Soybean	446	34.8	144.8
Canola	1190	13.0	54.3
Jatropha	1892	8.2	34.1
Coconut	2689	5.8	24.0
Oil Palm	5950	2.6	10.9
Algae (30% oil by wt)	58,700	0.3	1.1
Algae (70% oil by wt)	136,900	0.1	0.5

Tomorrow's energy today



Capture and conversion of CO₂ emissions for the sustainable production of high value commodities

Few new production technologies offer the opportunity secured by such breadth of commercial application and scale of demand as that now offered to by MBD's CO₂ to energy process. MBD has developed a fully operational test facility and is currently moving from test facility to full scale Display Plants, on site, at a 3 of Australia's major coal-burning power stations. Each plant will deliver a compelling array of valuable benefits to the power station owners, government and to MBD investors.



Industry CO₂ emissions reduction

The Australian government's declared commitment to meeting ambitious green house gas emissions reduction targets has placed considerable commercial pressure on major CO₂ producers (such as coal and gas power stations) to find sustainable ways of significantly cutting their emissions. Technologies that offer credible solutions are highly sought after and actively encouraged by both emissions producers and government. MBD's Algal Synthesiser is such a solution.



Sustainable source of biofuel

Continuing high prices and diminishing world supplies of crude oil has forced growing dependency on biofuel. However, traditional biofuel, sourced from broad-acre crop farming has resulted in direct competition for land and water with human food and animal feed crops and has been blamed for contributing to rising food costs. Hence, there is strong demand for sustainable new sources of biofuel, suitable for planes, trucks and cars that do not interfere with essential food and feed production. MBD's Algal Synthesiser produces oil ideally suited to such biofuel production.



Sustainable base feedstock for plastic

As with fuel, plastic production requires vast quantities of oil. MBD is in discussion with a major manufacturer of plastics. MBD is in the process of matching our algae strain and related oil output to the company's specification for plastic production. Both companies see substantial benefits in moving to algae oil based plastics.



Drought-proof stockfeed

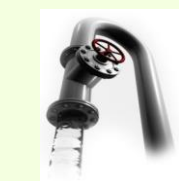
Growing population, shifting rainfall patterns and stress on grazing pastures and cropping lands have combined to create a viable market for nutritious 'drought-proof' stockfeed to underpin sustainable and environmentally friendly meat production. Large volumes of highly nutritious stockfeed suitable for cattle and aquaculture are manufactured as a valuable direct by-product of the algal cake produced by the MBD Algal Synthesiser. The feed is similar in nature to soybean meal.



Glycerine manufacture

The Australian pharmaceutical, cosmetics and food production industries have significant on-going demand for supply of high quality glycerine which is a high value commodity used in production of a wide range of manufactured goods and foodstuffs.

Significant quantities of glycerine are produced as a secondary by-product of the algal oil refinement process to produce biofuel.



Clean water supply

Water suitable for Australia's rivers, lakes and dams is an increasingly contested and commercially valued commodity. MBD's Algal Synthesiser uses only waste water, such as sewerage, and converts this waste into clean water suitable for any number of uses. Another by-product of the process is production of oxygen which is returned to the atmosphere.