

CO₂ to energy

Capture and conversion of CO₂ emissions for the sustainable production of valuable commodities

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Commercial-in-Confidence




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Company Overview / Our Approach


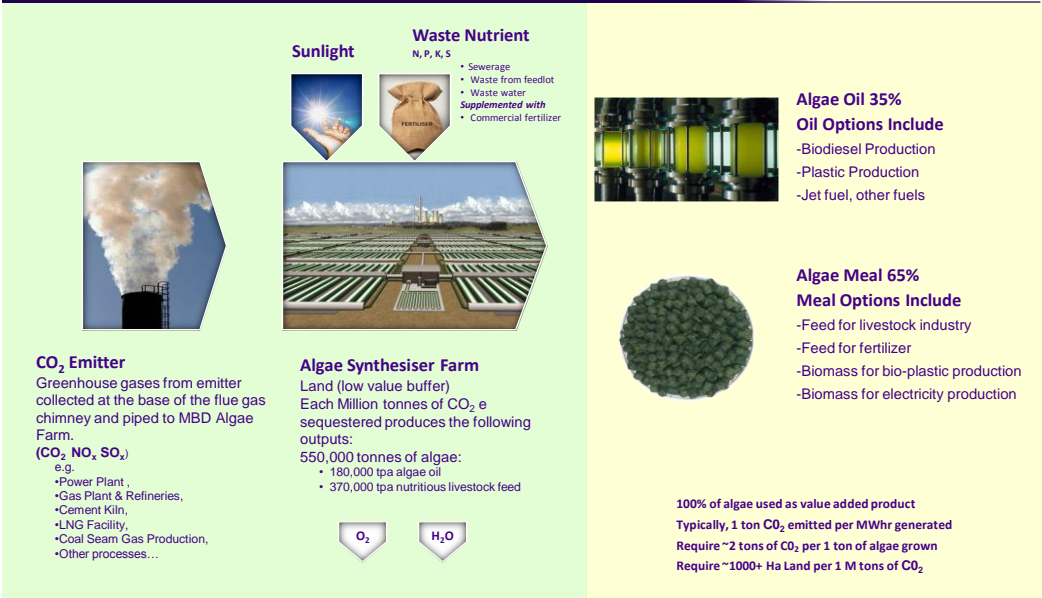


The Australian Leader in large scale, algae based bio-fuel and food production, and CO₂ bio-sequestration...MBD est. 2006

- Strong and experienced Board and Executive Management Team
- A compelling sustainable solution to 3 significant issues: oil, food and CO₂
- MBD's total-engineered approach is delivering a system that enables large scale industrial growth of algae in MBD's CO₂ to energy hybrid system
- IP owned by MBD: existing and growing patent portfolio
- Exclusive relationship, and access to proprietary algae libraries, with world leading algae research expertise at the James Cook University (JCU), QLD
- Existing large scale Research and Development Facility (5000m²) at JCU
- Signed Formal Agreements with 3 major Australian CO₂ emitters (Binding Contracts/MOUs)
- Advanced design work on fully automated 1 hectare (ha) module - insitu, Display Plant
- Partnerships with Key Tier-1 suppliers

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MBD's CO₂ to energy Process Overview

MBD's R&D Facility (JCU Townsville)



The expanded R&D facility is developing the following key development information:

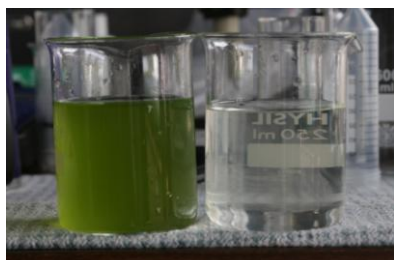
- Optimisation of the algae growth systems, strains, nutrient levels
- Harvest and extraction process
- Base for support and assessment of MBD projects and algae operations
- Monitoring and automation of the growth and harvest processes
- Education and training associated with the project and processes
- International best practice in the Algae research and development.
- Central Control Centre for MBD's projects both in Australia and internationally.



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R&D Facility: Photo-Bioreactor System Centrifuge, Harvesting and Oil Separation


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Scale Up 3 Stage Process Display / Pilot / Demonstration



	Stage 2		Stage 3
	Display Plant (Proof of Concept)	Pilot Plant (Commercial Operation)	Demonstration Plant
	Phase 1 (1 Ha Module)	Phase 2 (80 Ha Expansion)	Large Scale Roll Out
Indicative Capital Cost (A\$M)	\$3.5M+	\$30M	\$300M+
Commence Operation	1Q 2011	Progressive Build: 2012 Full Operation: 2013	: 2014 : 2015
CO ₂ e Abatement p.a	800 T	70,000 T	>1.4M T
Algae Production (tpa) (productivity 120g/m ² /d)	400	35,000	700,000
Algae Oil Production	120 T (140,000 litres)	10,000 T (11 M litres)	250,000 T (300 M litres)
Algae Meal Production	280 T	25,000 T	450,000 T



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Tarong Display Project



Tarong Display Plant Program

August - October 2010

Bund and construct all civil engineer works to supply utilities to the Display site and prepare the banded display site for the project equipment and structures

December 2010 / January 2011

12 x 3.0m high growth-columns to grow a local algae strain at Tarong
-Tarong Flue-gases

Key Deliverables:

Process will provide inoculation columns for larger Display project
Grow local Tarong region algae, with flue gas from power plant
Scale levels of biomass for bag inoculation



March 2011

- 4 x 10m BAGS (Inoculation & Scale-up)
- 8 x 50m BAGS (Full-module) and complete external servicing for Biomass for meal / oil-trials

Key Deliverables:

Meal and oil for local feed trials and fuel production
High level water treatment to grow a full scale module (8*50m bags) – meal suitable for 3 month accreditation trials
Heat and climate conditions monitored
Gas scrubbing increased to capacity for system



Tarong Display Project



Tarong Display Plant Program

March – September 2011

Completion of Water Treatment Trials & Installation of remaining 24 x 50m BAGS, with consideration for the following water treatment scenarios

- Ash-dam / blow-down cooling-tower – no treatment required,
- Recycle high-% of water,
- Full water treatment (as per the 8xBAGS system delivered in March), and
- Macro algae Water treatment (for use as an auxiliary fuel).

Notes:

A critical assessment will be made of the most economical / least sterile treatment of the Ash Dam and Blow Down Water. This will be used for the large scale expansion.

The macro algae trial has the potential to provide additional sequestration and produce biomass for production of briquettes. The briquettes can then be used as coal replacement creating an offset product for energy production.

Tarong Display Project



Tarong Display Plant Program

September 2011

Commissioning of 32 x 50m BAGS.

Following assessment of water treatment solutions the Display plant will be fully commissioned and operated through summer and winter to assess the operation and provide "proof of concept".

Key Deliverables:

Full scale operation of Tarong Display plant.

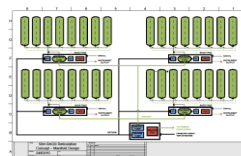
"Proof of Concept" sequestration as the basis for a commercial solution to large scale use of flue gases and production of oil and meal products.

Assessment trial for Tarong and MBD to enable modification and fine tuning over the trial period and provide Tarong Energy with confidence to commit to scaling the project up to commercial scale with MBD.

Notes:

Following the running of the system at full scale for a further 6 months both Tarong and MBD will be in a position to confirm operation parameters and look to the best approach for the expansion of the project.

Tarong Display Plant
 - "Proof of Concept"
 - 1 Ha
 - 32 BAG System



Tarong Display Project

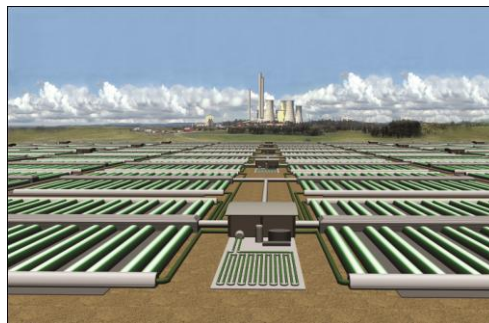


Tarong Display Plant Program

2012/13

Following the running of the system at full scale for a further 6 - 12 months both Tarong and MBD will be in a position to confirm operation parameters and look to the best approach for the expansion of the project.

Tarong Pilot Plant
- "Commercial Project"
-80 Ha
-4000 BAG System



Drawing of Power Station with Commercial Scale expansion

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Macro Algae



Macro Algae – a potential source of recycled biomass

Capture and use of waste flue gases with macro algae:

- Grow macro algae on flue gas emissions
- Dries the algae to make algae briquettes
- Burn algae briquettes as replacement for coal
- Collect waste flue gases and repeat process.

The Macro Algae project would be constructed at a commercial scale from stage 1. Preliminary planning is to target full operation by the end of 2011.

Costs for harvest and transport would be significantly reduced and the power station would have a product that produces a fraction of the emissions and a model for wider expansion with its current infrastructure as the base.

As with micro algae macro algae also has strong value as a food supplement for livestock.



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Carbon Capture Comparison

Sequestration of all CO₂ emissions from 1000 MW Brown Coal Power Station



Post Carbon Capture and Storage

Collection, concentration, liquefaction of CO₂ and storage in ground

Emitter to fund large capital and operating costs
No income from CO₂ based products.
Feasibility at \$25/T appears questionable.

MBD's CO₂ to fuel Solution

Collection, consumption and use of CO₂ for Algae based value added products.

Emitter not required to fund costs.
Significant value creation from algae products
Project feasible independent of carbon price

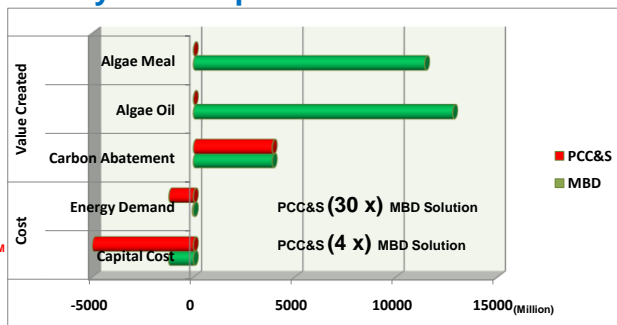
20 year comparison of value created

PCC&S
Value Creation
-\$2.2B

Annual Value Created
- Carbon Abatement \$225M
- Algae Oil Income \$0M
- Algae Meal Income \$0M

Annual Energy Demand 30%,
300MW
\$79M p.a. (@ \$30 /MWh)

Capital cost over 20 years \$5000 M



MBD's CO₂ to fuel
Value Creation
\$26.8B

Annual Value Created
- Carbon Abatement \$225M
- Algae Oil Income \$740M
- Algae Meal Income \$660M

Annual Energy Demand 1%, 10MW
\$2.7M p.a. (@ \$30 /MWh)

Capital cost over 20 years \$1225 M

MBD developed comparison – figures are provided for quantum comparison only.
Detailed comparisons to be developed for each specific site and operation.
All figures in Million Dollars

Assumptions:
Carbon Credit Value \$25/T, CO₂ sequestered 9MT, Oil \$800/T, Meal \$400/T,
Value MW = \$30, 100% Plant operation (8760 hours per year), PCC&S 5 year scale up, MBD 5 year scale up
All figures per tonne and based on 1 years operation.
* Estimated plant capital costs for 20 year project.

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Questions



Questions

