

MBD BRIEF

AUSTRALIAN CO₂ CAPTURE & ALGAE SYNTHESISER TECHNOLOGY ELIGIBILITY UNDER CARBON POLLUTION REDUCTION SCHEME

Introduction to MBD

MBD (est. 2006) is a new generation algae based Australian energy company. The company is developing industrial scale and algae based technology that offers sustainable solutions to 3 critical issues:

1. bio-oil: availability, security and affordability;
2. animal feed: drought-proof production of nutritious feed for livestock; and
3. CO₂: cost effective and productive large scale bio-sequestration.

Rather than see flue gas emissions as an expensive cost, MBD's process has the potential to significantly value add to these emissions offering carbon abatement to both large and small emitters, a significant offset to Australia's importation of oil and meal and long term sustainable jobs:

- a win for the environment;
- a win for the balance of trade through domestic production of oil and meal; and
- a win for Australia through the creation of long term sustainable jobs and related industries.

In simple terms, algae can consume large amounts of carbon dioxide (CO₂) to grow, and emitters such as power stations for example, need to reduce their CO₂ emissions given the government's proposed implementation of a Carbon Pollution Reduction scheme (CPRS).

MBD plans to use the key ingredients of waste CO₂ (sourced in the first instance from a coal fired power station), sunlight, nutrient enriched surplus waste water, and land sited within a power station's buffer zone to deploy its CO₂ Capture and Algae Synthesiser Technology. MBD will in-effect will be using waste products on non-arid land to generate numerous high value products/commodities including: algae oil, algae meal and associated derivative products:

Algae Oil options include:

- base oil for plastic production;
- base oil for biodiesel production;
- base oil for jet fuel and other fuels production depending on refining process adopted.

Algae Meal options include:

- feed for livestock industry (algae meal is in essence a replacement for soy meal);
- feed for the production of fertilizer;
- biomass for plastic production; and
- biomass for electricity production.

MBD's algae synthesis process will bio-sequester 1/3rd of the carbon emissions it receives from an emitter into Algae Oil and the remaining 2/3rd in Algae Meal.

Importantly, MBD plans to utilize / engineer the use of the natural raw flue gas coming from, for example a power station's smoke stack, rather than the significantly more expensive and still to be developed pure CO₂ capture solution ie, the Post Combustion, Capture and Storage solution (PCC&S). This will greatly reduce the complexity, risk, cost and timeframe for emitters to benefit from our unique CO₂ to fuel and feed solution.

MBD considers its proprietary technology and large scale Algal Synthesiser approach to be amongst the premier CO₂ emissions reduction and algae production systems in the world today. We envisage deploying the system across a wide range of large scale industry including power generation, refineries, cement, gas producers/processing, mining and others. The technology is flexible and modular and as such can also be potentially deployed across small scale industry as well.

Technology Deployment Plans

MBD is currently in advanced commercial and technical discussions with 3 of Australia's major power stations - 1 in each state of Victoria, NSW and Qld. We have agreed terms and are scheduled to formalise our relationship (under a detailed Memorandum of Understanding (MOU) Agreement) with the first of these power stations prior to the end of March 2009 and anticipate doing the same with 2 more powers station during the 2nd quarter 2009. These agreements will enable the parties to jointly explore the detailed feasibility of implementing MBD's process along side 1 or more of the power stations via MBD's 3 Stage Development Strategy.

The table below provides a summary of the key parameters at a single site:

	Stage 2		Stage 3
	Display Plant	Pilot Plant	Demonstration Plant
	Phase 1 Full scale single 1 Ha Module	Phase 2 Full scale Commercial Module	Commercial Role Out
Cost (A\$M)	\$2.1M	\$23.1M	\$300M
Operational	2010	2011	2013
CO ₂ e Abatement p.a	3500 T	100,000 T	>2M T
Algae Production (p.a.)	1500 T	35,000 T	700,000 T
Algae Oil Production	500 T (580,000 litres)	10,000 T (11 M litres)	250,000 T (300 M litres)
Algae Meal Production	1000 T	25,000 T	450,000 T
Employment			
- Construction	30	50	100
- Operation	20	30	100
- Secondary	20	100	2000

A detailed discussion of the Company's Project may be found in Appendix 1 to this Brief.

Eligibility of Carbon Abatement

A key consideration for each power station/emitter with which MBD is currently in discussions is the "eligibility" of MBD's process under the government's proposed CPRS.

Emitters are seeking formal confirmation from MBD / the Federal Government that the physical carbon abatement achieved by undertaking a project with MBD (ie, the reduction of flue gas emissions from their chimney stack/s) will be deemed "eligible" as far as the government's implementation of its proposed CPRS is concerned.

Emitters are keen to ensure that once a quantum of their emissions has been physically bio-sequestered into MBD's algae synthesis process, the emitter is then able to benefit from the resulting emissions abatement by passing on the associated carbon liability to MBD. MBD would in-turn utilise the emissions for the production of value added and sustainable products each of which may be treated differently under the proposed CPRS - the responsibility for which is proposed to lie fully with MBD.

However, in recent discussions with the Department of Climate Change, MBD was advised that the MBD process/technology, which offers emitters carbon abatement via bio-sequestration of the carbon

into algae, may not meet the requirements for “eligibility” under the government’s CPRS which has been designed predominantly with a focus on geo-sequestration (ie, the capture and storage of emissions in underground geological structures).

The Draft Legislation, released 10 March 2009, does provide a mechanism for emitters to transfer their liability to other parties by way of the “Obligation Transfer Number”. [See attached summary document] However, and once again, this mechanism appears to be directed toward entities that employ geo-sequestration of the emissions rather than bio-sequestration.

MBD’s understanding of the draft legislation is that it does not specify entities such as MBD as eligible for an OTN.

Amendments to Draft Legislation

Bipartisan support is sought to ensure that bio-sequestration companies are covered by the final CPRS legislation.

MBD is keen to ensure the CPRS legislation allows emitters to transfer carbon liability to MBD via the Obligation Transfer Number mechanism. To enable this, MBD and its bio-sequestration process/technology must be specifically deemed “eligible” for an OTN under the government’s proposed CPRS.

MBD is seeking to confirm the government’s CPRS will not deliver a perverse outcome that sees both an emitter unable to benefit from the physical emissions abatement created by their participation with MBD’s project, and MBD also incur a carbon charge for the possible and subsequent release of carbon by the downstream usage / combustion of its algae based products - the so called “double dip” on carbon liability.

A quote from our recent meeting with the Department of Climate Change:

“...this is exactly the type of project that the CPRS should encourage...”

From MBD’s perspective we wholeheartedly agree. To ensure this becomes reality the legislation must be amended to clearly identify both bio-sequestration and geo-sequestration as eligible processes for transfer of greenhouse gases.

Please feel free to contact me directly on +61-3-9415-8711 or +61-412-299-678.

Yours faithfully



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Attachments

- Carbon Pollution Reduction Scheme – Exposure Draft Legislation
OBLIGATION TRANSFER NUMBER
- Comparison: **PCC&S (Geo-sequestration) and
MBD's Algae based solution (Bio- sequestration)**
- Typical Project Profile



Australian Government
Department of Climate Change

CARBON POLLUTION REDUCTION SCHEME – EXPOSURE DRAFT LEGISLATION

OBLIGATION TRANSFER NUMBER

The Obligation Transfer Number (OTN) is a mechanism designed to manage Scheme obligations between upstream fuel suppliers and direct emitters and avoid double-counting of emissions and gaps in coverage. It allows Scheme obligations to be transferred from upstream suppliers of fuels and synthetic greenhouse gases to intermediate suppliers and end users.

- In general, applying Scheme liabilities to entities at appropriate points ‘upstream’ from final use is an efficient way of capturing emissions by a large number of downstream fuel users, resulting in a smaller number of obligated parties under the Scheme.
- However, in some situations the Carbon Pollution Reduction Scheme (CPRS) provides for liability to be transferred downstream, either to increase incentives for abatement or to pass liability to an entity that is better able to manage Scheme obligations.
- Imposing Scheme obligations directly on large fuel users creates the clearest possible incentive for these large emitters to undertake abatement.
- Some downstream entities use fuels in ways that result in lower (or no) emissions than if fully combusted, for example, they may use fuels to make plastic. The downstream entities would be better able to calculate Scheme obligations than the upstream suppliers.
- Natural gas retailers and liquid petroleum gas marketers have access to accurate customer usage information which upstream suppliers do not have.
- Some entities transform one type of fuel into another type of fuel, for example from coal to coke.

How will the OTN work?

- An entity will apply to the Australian Climate Change Regulatory Authority for an OTN, or, in some situations the Authority will issue an OTN on its own initiative.
- An OTN Register on the Authority’s website will list current OTNs and their holders. OTNs are not transferable.
- The entity will quote its OTN to the upstream supplier when obtaining a supply of fuel.

- An upstream supplier is required to accept the quotation of an OTN where this quotation is mandatory, as specified in the draft Bill, but is not required to accept a voluntary quotation.
- The upstream supplier will be liable only for the potential emissions from combustion of fuels supplied to entities that did not quote an OTN (plus any direct emissions it may have produced), but will need to report volumes of fuel supplied to all entities.
- Holders of an OTN will report volumes of fuel supplied to them under the OTN and directly manage Scheme obligations for this fuel.

Who can quote an OTN?

- The following entities will be required to quote an OTN:
 - Large users of a single fuel other than liquid petroleum fuels, for that particular fuel
 - Natural gas retailers and liquid petroleum gas marketers
 - Feedstock users of liquid petroleum gas
- In addition, some entities will be permitted to quote an OTN. They are:
 - Large users of fuels that trigger the threshold for a particular fuel will also be permitted to quote their OTN for other fuels
 - Packagers of fuels for use as solvents or other products not intended for combustion
 - Entities using fuels as feedstocks to manufacture other products, or in ways that do not result in greenhouse gas emissions
 - Entities that transform certain fuels from one type into another (for example making coke)
 - Exporters and intermediate suppliers of certain fuels and of synthetic greenhouse gases.

More details about OTNs are included in Part 3 of the draft Carbon Pollution Reduction Scheme Bill.

Website reference: www.climatechange.gov.au

Comparison: PCC&S vs MBD's Algae Based Solution

With its imminent implementation, the government's proposed CPRS is driving considerable research and development activity into carbon reduction and capture solutions by major emitters. The focus of this activity has thus far been on Post Combustion Capture and Storage (PCC&S) solutions: the geo-sequestration solution. However research is confirming the considerable CAPEX and OPEX associated with PCC&S and the considerable risks associated with its implementation.

We understand, 20 to 30% of a power station's base load power will be required to drive a PCC&S solution. MBD's bio-sequestration solution requires less than 1% of the base load power, and can be delivered at a fraction of the CAPEX, using the carbon emissions to produce valuable commodities such bio-oil and animal feed. MBD's experience reveals that large emitters are actively looking for commercial alternatives to PCC&S and are attracted to MBD's proposition.

By way of high-level comparison, the following chart has been prepared to compare PCC&S with MBD's algae based solution. The chart is provided to highlight the key elements of capital cost, energy consumed, carbon abatement and potential value added products. The chart has not been prepared as an exhaustive comparison but to give a scale to the quanta of investment and return from each project.

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

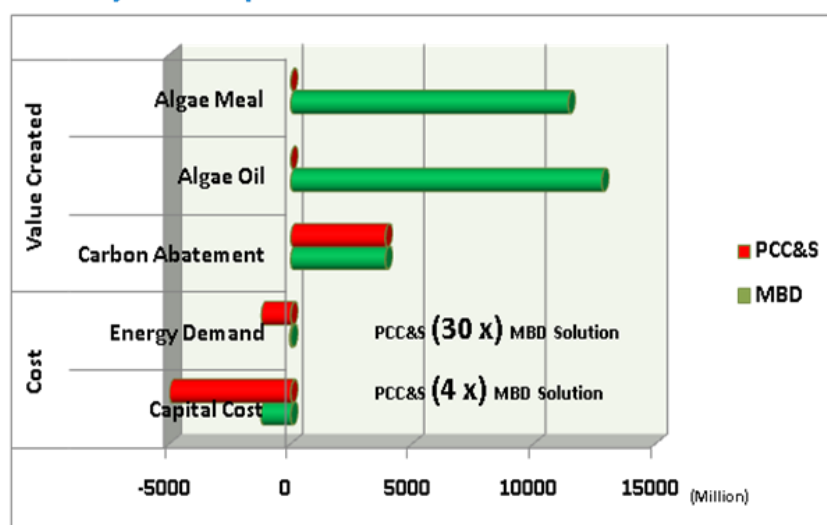
20 year comparison of value created

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 \$5000M

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 \$1225M



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 years scale up, MBD 5 years scale up
 All figures per tonne and based on 1 years operation.
 * Estimated plant capital costs for 20 year project.

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

Appendix 3 – Typical Project Profile

Project Title	Emitter CO ₂ Capture & Algae Synthesiser Project	
Project Participants	MBD Biodiesel Limited (est 2006) (MBD) Emitter Corporation	
Formal Arrangements	(1) Memorandum of Understanding (MOU): executed 1 st /2 nd Qtr 2009 (2) Binding Agreement(s): "Display Plant" executed by end of 2 nd Qtr 2009	
Location	Emitter Power Station	
Key Benefits	<ul style="list-style-type: none"> - Significant Environmental Benefits - Significant Industry / Job Creation benefits for Local Community / State - Significant Homeland Security Benefits - Bio-sequestration option that offers compelling alternative to geo-sequestration - Broad Industry Application - once Stage 2 proven to meet requirements - Process consumes large quantities of industry CO₂ - Process can be sited on marginal land and uses order of magnitude smaller footprint than conventional feedstocks - Process provides sustainable source of large-scale biofuel feedstock - Process produces large-scale production of drought-proof stockfeed 	
Development Plan	<p>Stage 1:</p> <div style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 10px;"> <p>Stage 1: Operational: Expansion to 2400m² (July 2009)</p> </div> <p>Stage 2:</p> <div style="border: 1px solid black; background-color: #ffffe0; padding: 5px; margin-bottom: 10px;"> <p>Stage 2: Two Stage Strategy: Phase 1: 1 Ha Display Plant Full Single Sub-Module Cost \$2.1M Program July 2009 – March 2010</p> <p>Phase 2: Full Stage 2 Commercial Module. (Replication * Part 1 Display Module) Cost \$23.1M Program April 2010 – January 2011</p> </div> <p>Stage 3:</p> <div style="border: 1px solid black; background-color: #ffffe0; padding: 5px;"> <p>Stage 3: The Future: Replication of Stage 2 to match CO₂ e waste emissions at Emitter (January 2012 onward)</p> </div>	<p>Stage 1: NOW OPERATIONAL... Test Plant at James Cook University (JCU) used to confirm optimal algae strain(s) & engineering input for Stage 2 Capex: A\$600K. Commissioned: July 2008 Expansion Capex: A\$500k+ Algae Production Capacity: Existing: 3kg per day or 1 tonne per annum (tpa) of dry algae production Expansion: 20 to 50kg per day, dry weight, by July 2009.</p> <p>Stage 2: SINGLE MODULE "PILOT PLANT" - ready to move forward... Pilot Plant to provide commercial "Proof of Concept" for large scale Stage 3 Capex: A\$25M 2 Phase Development Strategy: (1) Display Plant; (2) Full Scale Pilot Plant;</p> <p>Key Inputs:</p> <ul style="list-style-type: none"> - CO₂ Supply / Abatement: 105,000 tpa from JV Partner's flue gas emissions, - Land Requirement: 35 to 100 Ha - Water: 110,000 m³/yr of wastewater - Nutrients: 3,500 tpa (N, P, K, S...) - Electricity: 4,400,000 kWh per year - Sunlight <p>Key Outputs:</p> <ul style="list-style-type: none"> - Algae Production Capacity: 100 tonnes per day or 35,000 tpa of dry algae production - Algae Oil: 10,000 tpa - Algae Meal: 25,000 tpa <p>Stage 3: - FULL SCALE DEMONSTRATION PLANT - the future - Demonstration Plant to provide full commercial operation - Capex: A\$300M for Algae Synthesiser only - Construction Start: 2012, Progressively Commission</p> <p>Key Inputs:</p> <ul style="list-style-type: none"> - CO₂ Supply / Abatement: Envisage > 2,000,000 tpa from JV Partner's flue gas emissions, - Land Requirement: 300 to 1000 Ha - Water: 2,200,000 m³/yr of waste water - Nutrients: 70,000 tpa (N, P, K, S...) - Electricity: 63,000,000 kWh per year - Sunlight <p>Key Outputs:</p> <ul style="list-style-type: none"> - Algae Production Capacity: 2,000 tonnes per day or 700,000 tpa of dry algae production - Algae Oil: 250,000 tpa - Algae Meal: 450,000 tpa
Key Tier 1 Partners:	<p>Algae Technology:</p> <p>Plant Construction:</p> <p>Plant Operation:</p> <p>Storage of Feedstock & Products:</p> <p>Sale of Oil:</p> <p>Sale of Feedstock:</p>	<ul style="list-style-type: none"> - MBD Proprietary Algae Mass Systems - James Cook University (Algae Strain Development); AlgaeLink NV (Photobioreactors) - KNM Group - Thiess Services - Marstel - Masefield AG and others - In house expert team
Project Term	Long-Term Contracts Ranging 10 to 25 years	