

**Report to NSW Parliament**

# **NSW Clean Coal Fund**

**Income and Expenditure  
&  
Evaluation of Projects**

**2009/2010**



**Industry &  
Investment**

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## NSW Clean Coal Fund

### Income and Expenditure and Evaluation of Projects Report 2009/2010

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# NSW Clean Coal Fund

## Outcomes Achieved to 30 June 2010

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### A. BACKGROUND

Part 3 of the *Clean Coal Administration Act 2008* (the Act) established the Clean Coal Council (Council) specifically, Section 11 of the Act,

- (1) *The functions of the Council are as follows:*
- (a) *to give advice and make recommendations to the Minister concerning the funding from the Fund of projects and other activities for the purposes of the Fund, including advice about priorities for funding and recommendations concerning applications for funding,*
  - (b) *to advise the Minister on policies to encourage the development and implementation of clean coal technologies,*
  - (c) *to make recommendations to the Minister concerning opportunities for involvement by private and public sector entities in interstate, national and international research projects involving clean coal technologies,*
  - (d) *to advise the Minister on such other matters concerning clean coal technologies as the Minister may refer to the Council,*
  - (e) *such other functions with respect to clean coal technologies as the Minister may from time to time direct.*
- (2) *The Council may give its advice and make its recommendations either at the request of the Minister or without any such request.*
- (3) *The Council has such other functions as are conferred or imposed on it by or under this or any other Act.*

Members of the Council are appointed according to the Act; as <sup>(1)</sup> 5 persons employed by Government Agencies, <sup>(2)</sup> 5 persons jointly nominated by Australian Coal Association and NSW Minerals Council and <sup>(3)</sup> Ministers nominations. Members are appointed for a term of two years.

A Technical Working Group (TWG) supports the workings of the Clean Coal Council, providing guidance and advice on technical matters. The TWG is comprised of six members; five from industry and one member from Government. Members were nominated by Council in accordance with S.13 of the Act, Committees of Council.

Further Part 3 of the Act established the Clean Coal Fund as such:

The Purposes of the Clean Coal Fund, Section 5 of the Act, are as follows:

- (a) *to provide funding for research into, and development of, clean coal technologies,*
- (b) *to provide funding to demonstrate clean coal technologies,*
- (c) *to provide funding to increase public awareness and acceptance of the importance of reducing greenhouse gas emissions through the use of clean coal technologies, and*
- (d) *to provide funding for the commercialisation of clean coal technologies.*

Section 7 of the Act, Payments out of the Fund, includes:

- (1) *There is payable from the Fund:*
  - (a) *payments approved by the Minister for the purposes of the Fund,*
  - (b) *administrative expenses incurred in relation to the Fund or the Council,*  
*and*
  - (c) *payments directed or authorised to be paid from the Fund by or under*  
*this or any other Act or law.*
- (2) *Any money paid into the Fund on the condition that is to be used only for a*  
*specified purpose, including any proceeds of the investment of that money in*  
*the Fund, is only payable from the Fund for the specified purpose and a*  
*proportionate share of the administrative expenses payable from the Fund.*
- (3) *The Minister is to produce an Annual Report detailing fund allocations and*  
*the projects and other activities that received funding under this Act during*  
*the year.*
- (4) *The Annual Report is to include an evaluation of the effectiveness of each of*  
*the projects and other activities that received funding under this Act.*
- (5) *The Annual Report is to be tabled in each House of Parliament within 6*  
*months after the end of the financial year to which it relates.*
- (6) *The Minister is to publish each Annual Report, so as to promote clean coal*  
*technologies to the NSW public.*

The purpose of this report is to fulfil the requirements of the Acts Sections 7(3) to 7(6) inclusive. That is to produce an Annual report detailing Clean Coal Fund Allocations and to provide an evaluation of the effectiveness of each of the projects.

## **B. PAYMENTS RECEIVED**

Two payments were received from the NSW Climate Change Fund (via The Department of Environment Climate Change and Water NSW) to the NSW Clean Coal Fund in the financial year ended 30 June 2010;

- |                 |               |
|-----------------|---------------|
| • December 2009 | \$12.5m       |
| • June 2010     | \$12.5m       |
| • Total         | \$25 million. |

## C. EXPENDITURE

The NSW Clean Coal Fund has dispersed funds received across the key area as set out in the details that follow.

### **1. NSW Clean Coal Council & Technical Working Group costs.**

*As at 30 June 2010 the following funds have been expended in relation to the costs of the Clean Coal Council, and its Technical Working Group:*

| Description  | \$               |
|--|------------------|
| Total costs of the Clean Coal Council & its Technical Working Group. | <b>18,456.67</b> |

The Clean Coal Council met on the following dates (from inception to 30 June 2010) and discussed the following matters.

| Date of meeting  | Main purpose of meeting  |
|------------------|--|
| 11 December 2008 | Inaugural meeting – operational & forward planning   |
| 10 February 2009 | Establishment of the Secretariat and Technical Working Group   |
| 10 June 2009     | Joint meeting with the Technical Working Group<br>Expression of Interest draft selection criteria  |
| 2 September 2009 | Clean Coal Fund Guidelines & call for Expression of Interest.  |
| 25 November 2009 | Update Expression of Interest.<br>Development of the business case for the NSW drilling program.   |
| 19 April 2010    | Recommendations to the Minister on projects for funding under the Expression of Interest process.<br>Planning for the NSW Low Emissions Coal Technologies Summit |

The Technical Working Group (TWG) met on the following dates (from inception to 30 June 2010) and discussed the following matters.

| Date of Meeting                   | Purpose of Meeting   |
|-----------------------------------|--|
| 26 May 2009                       | Inaugural meeting –the working of the TWG;   |
| 30 June 2009                      | Assessment of Delta Post Combustion CCS demonstration project.   |
| 4 November 2009                   | Delta Demonstration funding agreement; NSW drilling program development of a business case; and Clean Coal Fund Expression of Interest - application processes & guidelines. |
| 1 March 2010                      | Assessment of the 29 applications received under the call for Expression of Interest process.  |
| 22 March 2010<br>(Teleconference) | Further assessment of the applications received under the call for Expression of Interest process.   |
| 6 April 2010                      | Final assessment of the applications received under the call for Expression of Interest process & recommendations to Council.  |

## **2. NSW Clean Coal Council Secretariat – Salary costs.**

*As at 30 June 2010 the following funds have been expended against salaries and on costs:*

| <b>Description</b>        | <b>\$</b>         |
|---------------------------|-------------------|
| Total salaries & on costs | <b>437,073.85</b> |

The Clean Coal Council Secretariat employs four staff:

- Director,
- 2 Senior Project Officers (Scientist and Economist), and
- Project Officer.

## **3. Delta Carbon Capture and Storage Project (Delta Electricity).**

*As at 30 June 2010 the following funds have been expended in relation to the Delta CCS project:*

| <b>Description</b>                    | <b>\$</b>         |
|---------------------------------------|-------------------|
| Delta CCS project milestone 1         | 47,030.66         |
| Legal Costs                           | 69,255.00         |
| Total CCS Delta Demonstration Project | <b>116,285.66</b> |

In August 2009, the Minister, approved \$9.43m from the NSW Clean Coal Fund for Stage 1 of the Delta Carbon Capture and Storage (CCS) project, being the 'Development and Approvals' phase. Details of the project are as follows:

- NSW Government, Commonwealth Government (under National Low Emission Coal Initiative (NLECI) funding) and Australian Coal Association Low Emission Technology (ACALET) have signed a funding agreement (\$28.3m) with Delta Electricity for a 'Development and Approvals' Stage (Stage 1) for the Delta Demonstration Project. Project officially announced 25 March 2010.
- The (complete) Project is to demonstrate post combustion capture, transport and permanent geological storage of carbon dioxide (up to 100,000 tonnes of CO<sub>2</sub> per annum in a deep saline aquifer) from a black coal power station.
- Stage 1 is essentially an approvals stage, the development of a storage site and Front End Engineering and Design (FEED) stage.
- Stage 1 will pioneer in NSW:
  - community engagement on a CCS project
  - gaining exploration permits for CO<sub>2</sub> storage
  - establishment of storage leases
  - planning and environmental approvals for CCS
- Preliminary work has commenced on the approvals process.
- The combined in-principle funding commitment (from the 3 funding partners) for both stages of the Project is \$150 million (a more definitive cost will be known once Stage 1 is complete).

Stage 2 (which has yet to commence) will demonstrate the integrated process, and:

- validate Post Combustion Capture Technology on NSW coals, and
- verify geological storage techniques.

NSW has committed a further \$40million (from the Clean Coal Fund) to stage 2 of the project, Construction and Operation, along with the Commonwealth and ACALET.

#### **4. Expression of Interest under the NSW Clean Coal Fund.**

*As at 30 June 2010 the following funds have been expended in support of the Expression of Interest process under the NSW Clean Coal Fund and the conducting of the NSW Low Emissions Technology Summit:*

| <b>Description</b>  | <b>\$</b>         |
|---|-------------------|
| Total Clean Coal Fund EOI and Low Emissions Technology Summit # | <b>102,750.30</b> |

# Note: As at 3 August 2010, the Meetings Managers have advised of a \$21,942.05 credit coming back to Industry & Investment NSW for the cost of the Low Emissions Technology Summit.

Under the provisions of the Act, a call for Expressions of Interest under the NSW Clean Coal Fund was made on 16 September 2009 and closed on 4 December 2009, 29 applications were received for research funding grants.

Successful applications needed to meet the “Essential Technical Criteria” as set out in the NSW Clean Coal Fund Project Selection Criteria, as follows:

- *Project must be designed for coal from mines within NSW or be directly related to aspects relevant to NSW coal production, or coal projects or reduction of emissions from coal fired power stations;*
- *Must have the potential to lead to significant, measurable, monitored and verifiable reduction in greenhouse gases, using appropriate life cycle assessment methods;*
- *Be soundly conceived in a technical / engineering / scientific / economic sense;*
- *Must satisfy the rigorous commercial and technical evaluation by the NSW Clean Coal Council Technical Working Group; and*
- *Result in increased technical capability for NSW.*

The following assessment process took place for applications received under the NSW Clean Coal Fund call for Expression of Interest:

- The Council’s Secretariat and Technical Working Group (TWG) carried out three assessment phases which included the use of an Independent Reference Group, technical and economic assessments, follow-up interviews, weighted assessment scoring and requests for information and/or revised budgets.
- The Secretariat, Technical Working Group and Clean Coal Council carried out a clear and comprehensive assessment of the applications submitted under the Clean Coal Fund. An independent probity auditor was appointed to oversee that a fair and due process had taken place by those involved in the assessment process. His initial report stated: *“Consequently, again in my opinion, the Selection Panel has a firm probity grounding to support its recommendation to the Clean Coal Council.”*
- An aim of the selection process was to produce a diverse portfolio of innovative technologies. This was attained with technologies falling within fugitive emissions, capture, combustion efficiency, and storage technologies along with alternative usage of coal and raising community awareness (social research).
- Minister McLeay announced 10 projects receiving \$13 million in funding at the Low Emissions Coal Technologies Summit 8 and 9 June 2010.
- Funding of \$13million is spread over 2 to 3 years. Industry & Investment NSW are currently finalising funding agreements, for “up to” the approved value. Funding Agreements will have appropriate milestones to be met quarterly. These will assist in evaluating effectiveness of research for following reports.

Details of the successful applicants are as follows:

| Applicant                         | Brief project description         | Funding, up to (\$) | Duration |
|-----------------------------------|-----------------------------------|---------------------|----------|
| Uni of Newcastle & GreenMag Group | Mineral Carbonation.              | 3,040,000           | 3.5 yrs  |
| UCC Energy P/L                    | UCC Burning Efficiency            | 2,581,000           | 4 yrs    |
| Centennial Coal (Mandalong) P/L   | Fugitive Emissions (ventilation)  | 2,200,000           | 2 yrs    |
| CSIRO                             | Capture Testing Solvents          | 1,300,000           | 3 yrs    |
| CSIRO                             | Fugitive Emissions (open cut)     | 1,000,000           | 2 yrs    |
| Uni of Newcastle                  | Chemical Looping – oxyfuel        | 886,618             | 3 yrs    |
| Uni of Newcastle                  | Social Research/Public Awareness  | 618,930             | 2 yrs    |
| CSIRO                             | Novel Capture & Energy Efficiency | 613,711             | 1.5 yrs  |
| Uni of Newcastle                  | Direct Carbon Fuel Cell           | 608,719             | 5.5 yrs  |
| ourSun P/L                        | Combined Brayton Rankine Cycle.   | 159,200             | 7 mths.  |
| <b>Total</b>                      |                                   | <b>13,008,178</b>   |          |

A summary of the project are listed below in order as listed in the table:

**Project: Permanent Large Scale CO<sub>2</sub> Storage by Mineral Carbonation in NSW**  
**Grantee: GreenMag Group and the University of Newcastle**

*The GreenMag Group and University of Newcastle Priority Research Centre for Energy will receive grant funding to develop and optimise a promising method of disposing of carbon dioxide gas emitted from NSW coal-fired power stations. The Mineral Carbonation process takes advantage of a natural process whereby CO<sub>2</sub> is captured in mineral deposits resulting in it being stored in rocks. A key advantage of this process is that the CO<sub>2</sub> is permanently stored in the rocks. It would only re-enter the atmosphere if the rocks were subjected to extremely high temperatures. Building products and the extraction of noble metals left over from the mineral carbonation process may also assist in offsetting the economic costs of sequestering CO<sub>2</sub>.*

This cutting edge project will be a ‘world first’ in the building and operation of a mineral carbonation pilot plant. The pilot work will be supported by laboratory research to optimise and demonstrate the technical and economic feasibility of two mineral carbonation processes to speed up the chemical reaction between concentrated CO<sub>2</sub>, (that has been captured from power station flue gas, stripped and then pressurised) and finely ground rock (serpentinite mined in NSW). The underlying aim is to optimise the processes with a lower energy penalty.

**Project: UCC Fired Diesel Engines in the generation of electricity**  
**Grantee: UCC Energy Pty. Ltd**

*UCC Energy Pty Ltd will receive grant funding to further develop their process of producing Ultra Clean Coal and assessing its use as a coal-water fuel for firing in diesel engines to generate electricity. As diesel engines have higher thermal efficiencies than most power plant combustion engines, funding will assess whether the energy and emissions used to develop Ultra Clean Coal can efficiently and effectively operate in diesel engines large enough to generate electricity in a redistributed energy network.*

The UCC process already removes most of the coal’s impurities and ash through a chemical cleaning process. The end product is micronised refined coal that can be mixed with water and additives to form a slurry fuel for use in diesel engines. Further testing however needs to establish if the long term use of this fuel is viable and can operate in diesel engines.

This project has the potential to fuel small power stations (50-250 MW) based on diesel engines which could be strategically located within the grid. The advantages of this distributed power generation include reduced transmission line losses, fast start capability, and it could effectively provide a solid base to support renewable power sources like wind and solar which are prone to sudden stoppages. The findings of this project could provide an alternative pathway to low emissions power based on coal



**Project: Fugitive emissions abatement from ventilation air**  
**Grantee: Centennial (Coal) Mandalong Pty Ltd**

*Centennial Mandalong P/L* will receive grant funding to trial an exciting new technology termed a VAM-RAB (Ventilation Air Methane Regenerative After Burner) that promises to mitigate fugitive methane emissions escaping from underground coal mines. These emissions are notoriously difficult to abate because the naturally-occurring gas becomes diluted in the large volumes of ventilation air that are flushed through the mine during standard mining operations. As methane typically constitutes less than 1% of the ventilation air expelled from the mine, the gas is in too low a concentration to burn-off (often referred to as flaring) or process to generate electricity.

The VAM-RAB system overcomes this problem by directing the ventilation air through what is essentially a large industrial oven where it is heated up to approximately 1000° C. Using this oxidation technique almost all of the methane (> 99%) is converted to carbon dioxide and water. A key feature of the technology is the ability to be self-sustaining without the need for additional energy to maintain the temperature in the combustion chamber. This is accomplished by preventing the heat from migrating out of the chamber via a periodic change in direction of the flow of the ventilation air through the system; hence the title 'Regenerative After Burner'.

**Project: Further development of post combustion capture**  
**Grantee: CSIRO Energy Technology**

*CSIRO Energy Technology* will receive grant funding to support a research and development program dedicated to the chemical capture of CO<sub>2</sub> emitted in the flue gas from NSW coal-fired power stations. The program is specifically tailored to focus on NSW black coals and the power stations in which they fuel and aims to optimise and improve the aqueous ammonia absorbent process under real working conditions (i.e. operating on an existing power station). The pilot-scale CO<sub>2</sub> capture plant used in the research is currently located at Delta Electricity's Munmorah Power Station on the Central Coast, north of Sydney.

This innovative project continues to be the only current research and development pilot program on liquid-based absorbent PCC technologies suitable for NSW power stations. The results also have applicability across the Australian black coal electricity generation sector. The NSW Clean Coal funds will assist in upgrading the pilot plant and moving it from Munmorah to Delta Electricity's Vales Point Power Station so that this critical research program can continue.

**Project: Reducing Fugitive Emissions using Enhanced Drainage techniques**  
**Grantee: The CSIRO Centre for Environment, Social and Economic Research**

*The CSIRO Centre for Environment, Social and Economic Research* will receive grant funding to undertake a 'world-first' trial to confirm whether the volume of methane gas drained from a NSW coal mine can be dramatically increased before open-cut mining commences. The 'enhanced drainage' technique embraces recent advances made overseas in effectively extracting methane from deep un-mineable coal seams by pumping inert gases such as nitrogen, carbon dioxide (CO<sub>2</sub>) or flue gas into the seam. The inert gases act to flush out the methane from the coal seam where it is then drained using bore wells.

The novel NSW Clean Coal funded project is, in essence, a step towards creating a 'greenhouse gas-less mine'. The experiment involves injecting inert gases into a shallow, coal seam in an attempt to flush out a much larger volume of methane than would otherwise be extracted by current 'primary drainage' techniques. The drained gas can be used for power generation rather than being uncontrollably released during the mining process into the atmosphere where it can become a problematic greenhouse gas.

**Project: A Novel Chemical Looping Based Air Separation Technology****Grantee: The University of Newcastle Priority Research Centre for Energy**

*The University of Newcastle Priority Research Centre for Energy* will receive grant funding to undertake research into a novel way of producing pure oxygen for use in the efficient burning of coal to generate electricity. The technology relies on the principles of 'chemical looping' and uses the cyclic interaction of a metallic compound (called a metallic oxide carrier) with air as a means of separating out the oxygen. The proposed technology promises to be a cost effective means of mitigating one of the major barriers to the adoption of carbon capture technologies such as oxy-firing as conventional air separation is notoriously expensive. The specific power requirements of the Chemical Looping Air Separation system is about 26% (including heat losses to the ambient) of that of the most advanced cryogenic air separation unit. This equates to a corresponding oxygen production cost of 0.64 vs 2.4 €/m<sup>3</sup> and greenhouse gas emissions of 72 vs 270 g/CO<sub>2</sub> per m<sub>3</sub> of product oxygen.

In addition to greatly reducing the greenhouse gas emissions from air separation processes, the Chemical Looping Air Separation technology could accelerate the commercial-scale deployment to low emissions electricity generation utilising cost effective highly-advanced coal technologies currently being developed such as Oxy-Fuel Combustion. With support from the NSW Clean Coal Fund, a 5-year program will be pursued to get this innovative air separation technology commercially ready.

**Project: Managing Technology Project Risk: The Role of Public Awareness****Grantee: University of Newcastle**

*The University of Newcastle's Research Institute for Social Inclusion and Well-being* will receive grant funding to use an innovative approach to understand the network of relations between industry, society and government that impact on public acceptance of low emission coal technologies.

Using a contemporary methodology of the Actor-Network Theory (ANT) which can explain how technology and people interact over time, the research will identify and implement those contemporary public awareness methods, beyond traditional consultation and public relations, to increase the public awareness and positive social attitudes to support the adoption and applications of low emission coal technologies.

This project will undertake research in regional and metropolitan areas, and look at varying technological applications to implement solution focused mechanisms and strategies for government, society and industry to increase public awareness and acceptance.

**Project: Site Trials of Novel CO<sub>2</sub> Capture Technology****Grantee: CSIRO Coal Technology**

*CSIRO Coal Technology* will receive grant funding to investigate the ability of a novel, patented technology to physically separate out CO<sub>2</sub> emitted from NSW coal-fired power stations. The technology uses HMCFC adsorbents which are a type of nano-structured Monolithic (i.e. one moulded component) Carbon Fibre Composite adsorbent material fabricated in a Honeycomb structure. The technology enables dry CO<sub>2</sub> capture at room temperature and atmospheric pressure and in dusty environments with low pressure drop, reducing the operational and maintenance cost of the post-combustion capture process. In addition, the heat in the flue gas can be utilised in the process thereby further reducing the electricity requirements of capturing CO<sub>2</sub>. Thus this technology promises to play a key role in the cost effective and environmentally responsible generation of electricity in the future.

Through the support provided by the NSW Clean Coal Fund, an adsorption test unit will be installed at one of Delta Electricity's power stations on the Central Coast, north of Sydney.

The effect of real flue gas on the operation and performance of the test unit will be tested and CO<sub>2</sub> capture process demonstrated. Information on the commercial application of the technology will also be generated from the field trial.

**Project: Development and Optimisation of the Direct Carbon Fuel Cell**

**Grantee: University of Newcastle's Discipline of Chemistry**

*The University of Newcastle's Discipline of Chemistry* will receive grant funding to research and develop a Direct Carbon Fuel Cell (DCFC). This technology is yet to be commercialised but is widely promoted as being the 'holy grail' of coal-fuelled electricity generation as it has the capacity to generate electricity with much higher thermal efficiencies (~70-80%) than engines and turbines (~35-55%). In addition, the fuel cell emissions are almost entirely pure CO<sub>2</sub> which is therefore ready for capture and storage without the need to firstly separate out other gases such as nitrogen which are present in the flue gases of exiting power plants.

In a DCFC, electricity is generated directly from coal through the chemical oxidation of coal which has been ground and purified of ash and other contaminants. This differs substantially to the way electricity is traditionally generated – coal is burnt to boil water to make steam to turn a turbine, to turn a generator, to produce electricity. In essence, a fuel cell can be compared to an electrochemical battery. They differ in that a battery stores electrical energy chemically whilst a fuel cell relies on the external supply of a fuel (in this case coal) which must be continually replenished. A DCFC works by chemically separating the component electrons and protons of the coal, and forcing the electrons to travel through a circuit thereby converting them to electrical power.

**Project: A Simple Heat Engine for Sustainable Coal Generation**

**Grantee: ourSUN Pty Ltd**

*ourSUN P/L* will receive grant funding to undertake an independent technical and economic assessment, and cost benefit analysis to confirm the potential of their provisionally patented engine designed to generate electricity with better efficiencies. The invention, which is called the Combined Brayton Rankine Cycle Mark II (CBRC-II) engine, works on the principle of recycling waste heat and can potentially operate on any fuel.

The CBRC-II will be assessed to confirm that it can achieve higher thermal efficiencies (~65-69%) and is able to be retrofitted to existing utilities at lower capital investment costs than current combustion engines like Integrated Gasification Combined Cycle (IGCC) and other gas turbines (~40-55%) for power generation.

If viable, the higher thermal efficiencies would result in less CO<sub>2</sub> emissions as less fuel is required per the unit of electricity generated. Thus, this invention has the potential to significantly reduce the greenhouse gas emissions associated with coal-fired electricity generation in NSW, and also has application throughout Australia and beyond.

**Low Emissions Coal Technologies Summit**

The NSW Low Emissions Coal Technology Summit took place on the 8<sup>th</sup> and 9<sup>th</sup> June 2010. The Summit showcased the State's commitment to promoting Low Emissions Coal Technologies by featuring the announcement by Minister Paul McLeay, of the 10 successful applicants under the NSW Clean Coal Fund Expression of Interest process.

Successful applicants presented their innovative projects which aim to significantly reduce greenhouse gas emissions from the use of coal. Key presentations were

received from highly regarded international research organisations from major trading partners JCOAL (Japan) and Korean Institute Energy Research (South Korea).

A total of 129 people attended the Summit over the two days, feedback from an exit poll of attendees revealed a very high rating of 4.46 out of a possible 5.0 score for the Summit, indicating a very positive outcome for Industry and Investment NSW.

A further positive outcome was attendance of delegates from overseas Consulates, especially NSW's trading partners, and those countries that are high consumers of coal. Countries represented by their Consulates included: China, Brazil, Canada, Italy, Germany, Korea, France and South Africa. Some Consulates expressed enthusiasm for possible collaborative work with NSW in the area of Low Emissions Coal Technologies.

## **5. State Wide Assessment of CO2 Storage Capacity.**

*As at 30 June 2010 the following funds have been expended and accrued in relation to the NSW State Wide Assessment of CO2 Storage Capacity:*

| <b>Description</b>                                 | <b>\$</b>           |
|--|---------------------|
| Accrual - Drilling Program                         | 397,870.00          |
| Combined costs of Drilling Program                 | 3,298,414.28        |
| <b>Total State wide storage assessment program</b> | <b>3,696,284.28</b> |

Industry & Investment NSW has developed a Business Plan for the State Wide Assessment of CO2 Storage Capacity, which is a three stage process. A budget for Stage 1 and 2 (including contingency) is estimated at \$54.3 mill. Industry & Investment NSW is currently negotiating funding arrangements with the Commonwealth Department of Resources, Energy and Tourism and industry for contributing funding.

The NSW State Wide Assessment of CO2 Storage Capacity Project with two aims:

1. In the immediate term, it is to identify storage for a CCS demonstration project by 2012; and
2. Inform the medium to longer-term outlook by undertaking a state wide assessment of potential storage opportunities in NSW to prepare pre-competitive data for acreage release.

The Plan is based on a nationally agreed prioritised basin plan, under the National Carbon Storage Taskforce Report. The project has 3 prioritised stages:

- Stage 1 consists of 4 wells in the Sydney-Gunnedah Basin and seismic testing, 4 wells in the Darling basin and 1 well in the Clarence-Moreton Basin;
- Stage 2 consists of 2 wells in the Clarence-Moreton Basin including seismic testing, and 2 wells in the Gunnedah Basin, (depending on findings in stage 1), and
- Stage 3 consists of 4 wells in Sydney Basin, 4 wells in Darling Basin including seismic testing and 1 well in the Oakland Basin, (again this work will require further funding and results from stage 1).

Current drilling activity, is as follows:

- Munmorah and Vales Point site - Drilling finalised, reaching 2,300m and 2000m. Initial analysis stated likelihood of storage was poor and that further modelling was not recommended.
- Merriwa - Drilling has reached 1450m and ceased as at Friday 18 June 2010. Logging of the core has commenced, and we are awaiting core analysis.
- The drilling rig is to be moved to a 4<sup>th</sup> site in the coming weeks.

I&I NSW are currently awaiting core analysis results. A full and comprehensive analysis of the effectiveness of this project will be detailed in the report for 2010/2011.

## **6. Membership of CO2CRC**

| <b>Description</b>              | <b>\$</b>         |
|---------------------------------|-------------------|
| Annual membership fee of CO2CRC | <b>250,000.00</b> |

NSW has had a long standing commitment of membership to the CO2CRC with a fee structure of \$250,000 per year. 2009/10 was the final year commitment; membership commitment was transferred to the Clean Coal Fund.

*“The Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) is one of the world's leading collaborative research organisations focused on carbon dioxide capture and geological sequestration (geosequestration, carbon dioxide capture and storage, carbon capture and storage, or CCS). CO2CRC is a joint venture comprising participants from Australian and global industry, universities and other research bodies from Australia and New Zealand, and Australian Commonwealth, State and international government agencies. Its resources come from the Federal Government Cooperative Research Centres Program, other Federal and State Government programs, CO2CRC participants, and wider industry”.*<sup>1</sup>

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<sup>1</sup> <http://www.co2crc.com.au/about/>

## D. EVALUATION

### **7. Evaluation of the effectiveness of each of the projects & other activities that received funding under the Act.**

The NSW Clean Coal Fund was established under the NSW Clean Coal Act 2008. All the above projects are still in their infancy; a more detailed evaluation of projects effectiveness will follow in next financial year's report (2010/11). However, this report has attempted to outline how projects were selected and given priority that will be used as a benchmark in evaluation in next year's report.

### **8. Life Cycle Assessment (LCA)**

The Clean Coal Council Secretariat engaged the services of Worley Parsons to produce a LCA Methodology to be used as an evaluation tool in the assessment of the reduction of green house gas emissions, for projects approved under the NSW Clean Coal Fund.

The LCA Methodology has been distributed to all successful applicants and will provide a base line for the evaluation of the effectiveness of each applicant's project in reducing green house emissions as detailed in their approved project. It is an essential technical criterion that all successful projects "*must have the potential to lead to a significant, measurable, monitored and verifiable reduction in greenhouse gases, using appropriate life cycle assessment methods*".

The evaluation of green house gas reduction of each applicant's approved project under the Clean Coal Fund will be detailed in subsequent reports. This will be an essential tool in the evaluation process.

## **E. CONCLUSION**

### **Expenditure for financial year 2009/10**

|  |                     |
|--|---------------------|
| Total costs of the Clean Coal Council & its Technical Working Group. | <b>18,456.67</b>    |
| Total salaries & on costs  | <b>437,073.85</b>   |
| Total CCS Delta Demonstration Project                                | <b>116,285.66</b>   |
| Total Clean Coal Fund EOI and Low Emissions Technology Summit        | <b>102,750.30</b>   |
| Total State wide storage assessment program                          | <b>3,696,284.28</b> |
| Membership of CO2CRC   | <b>250,000.00</b>   |
| Secretariat/ office costs  | <b>12,617.79</b>    |
| <b>GRAND TOTAL</b>   | <b>4,633,468.55</b> |

### **Balances for financial year 2009/10**

|   |                      |
|---|----------------------|
| Income from DECCW   | <b>25,000,000.00</b> |
| Expenditure by the NSW Clean Coal Fund (as detailed above). | <b>4,633,468.55</b>  |
| <b>Balance</b>  | <b>20,366,531.45</b> |

In summary, the NSW Clean Coal Fund was in credit by \$20,366,531.45 in the 2009/10 financial year. These funds were able to be rolled over into the next financial year (2010/11), as agreed by NSW Treasury. Essentially the Fund has to budget for a substantial capital expenditure in year 4 of the fund of approximately \$40m for stage 2 of the Delta Demonstration CCS Project.

The overall forecasted budget for the 2010/11 financial year for the NSW Clean Coal Fund is approximately \$19 mill.

Additionally the NSW State Wide Assessment of CO2 Storage project will increase in activity to include a forecasted budget of \$10 mill in the 2010/11 financial year.

The signing of Funding Agreements by the 10 successful applicants under the call for Expression of Interest process is due to take place by December 2010, this will allow for the flow of up to \$13 mill of funds from the Clean Coal Fund over a period of 2 to 3 years.