



**Department  
of Industry**

**Report to NSW Parliament**

# **Coal Innovation NSW Fund**

**Income, Expenditure  
&  
Evaluation of Projects**

**2014-2015**

## **Coal Innovation NSW Fund**

### **Income and Expenditure, and Evaluation of Projects Report 2014/2015**

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#### Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (November 2015). However, because of advances in knowledge, users are reminded of the need to ensure that information on which they rely is up to date and to check the currency of the information with the appropriate officer of NSW Trade & Investment, or the user's independent advisor.

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# Annual Report 2014-15

## Coal Innovation NSW Fund

### Outcomes Achieved to 30 June 2015

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#### A. BACKGROUND

The Coal Innovation NSW Fund (the Fund) has been established and is governed under the *Coal Innovation Administration Act 2008* (the Act).

Part 2, section 5 of the Act establishes the Purpose of the Fund, as follows:

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

Part 2, section 7 of the Act, details Payments out of the Fund, to include:

- (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 CINSW, 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 low emissions coal technologies to the NSW public.

Part 3, section 10 of the Act, prescribes the Membership of CINSW, as follows:

- (1) CINSW is to consist of the following members appointed by the Minister:
  - (a) an independent person appointed by the Minister to be the Chairperson of CINSW,
  - (b) 2 persons, each of whom is employed in or by a government agency,
  - (c) 2 persons who are nominated jointly by the Australian Coal Association and the Minerals Council to represent the New South Wales black coal industry,
  - (d) such other persons (up to a maximum of 4) as the Minister may appoint from time to time, being persons whom the Minister considers have qualifications or experience relevant to the functions of CINSW.

Part 3, section 11 of the *Act* establishes Coal Innovation NSW (CINSW) and prescribes its functions.

- (1) *The functions of CINSW 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 low emissions 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 low emissions coal technologies,*
  - (d) *to advise the Minister on such other matters concerning low emissions coal technologies as the Minister may refer to the CINSW,*
  - (e) *such other functions with respect to low emissions coal technologies as the Minister may from time to time direct.*
- (2) *CINSW may give its advice and make its recommendations either at the request of the Minister or without any such request.*
- (3) *CINSW has such other functions as are conferred or imposed on it by or under this or any other Act.*

The Coal Innovation NSW (CINSW) (Ministerial Advisory Council) two year membership expires 31 December 2015.

The purpose of this report is to fulfil the requirements of the Act's Part 2, sections 7(3) to 7(6) inclusive. That is to produce an Annual Report detailing Coal Innovation NSW's Fund allocations and to provide an evaluation of the effectiveness of each of the projects.

The Fund was established as a fund in the Special Deposits Account under section 4 of the Act. The Fund receives funds and expends monies in accordance with the Act. The Fund has prepared a special purpose financial report comprising a statement of financial position, a statement of comprehensive income, a statement of cash receipts and payments and associated note disclosures, for the year ended 30 June 2015.

The Treasury has requested that the Auditor-General audit the special purpose financial report under section 27B(3)(c) of the *Public Finance and Audit Act 1983* and are attached

## B. PAYMENTS RECEIVED

During the 2014/15 financial year the Fund received income from:

- Interest: with the separation of accounts from (the then) Department of Trade & Investment, the Fund earned \$1,780,842 in interest payments. The interest is calculated under the Treasury Cash Forecasting System on the daily balance in the bank account and paid twice yearly. As from 1 April 2015, funds earning interest within Treasury Banking System (TBS) will be paid the Reserve Bank of Australia cash rate.
- The CO<sub>2</sub> Storage Assessment Program Funding Agreement with the Commonwealth and Australian Coal Association Low Emission Technologies Ltd (ACALET). The funding agreement for this program had the Commonwealth's contributing upfront and ACALET's paying quarterly in arrears on invoice.

The tables below summarise the income calculated as follows:

description	value \$
Interest	1,780,842
Total	1,780,842

<i>Other income</i>	
Australian Coal Association Low Emission Technologies Ltd (accruals)	55,939

total income 2014/15	<b>1,836,780</b>
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## C. EXPENDITURE

Coal Innovation NSW has dispersed funds received across the key areas as set out as follows:

### C1: Coal Innovation NSW (Ministerial Advisory Council) & Technical Working Group costs

For the financial year ending 30 June 2015 the following funds have been expended in relation to the costs of Coal Innovation NSW meetings and sitting fees. (It is noted that the Technical Working Group did not meet during this period):

description	value \$
Total costs of Coal Innovation NSW (Council).	20,353

### C2: Coal Innovation NSW Secretariat

Coal Innovation NSW Secretariat employs six staff:

- Program Director;
- 2 Senior Project Officers (Economist and Scientist);
- Project Officer (Finance);
- Geoscientist;
- Graduate Officer.

For the financial year ending 30 June 2015 the following funds have been expended against salaries and on costs:

description	value \$
Secretariat costs including salaries and on costs, professional fees not listed elsewhere, travel, and office supplies, (Audit costs disclosed separately)	758,509

### C3: Research & Development (R&D) projects funded under Expressions of Interest process.

For the financial year ending 30 June 2015 the following funds have been expended in relation to the R&D projects:

Applicant	project description	value \$
UCC Energy P/L	Project cancelled at end of Stage 1	<i>terminated</i>
Centennial Coal (Mandalong) P/L	Fugitive Emissions (ventilation)	<i>Milestones deferred</i>
CSIRO (Feron)	Capture Testing Solvents	82,764
CSIRO (Connell)	Fugitive Emissions (open cut)	<i>terminated</i>
Uni of Newcastle (Moghtadery)	Chemical Looping – oxyfuel	9,070
Uni of Newcastle (Webb)	Social Research/Public Awareness	<i>Milestones deferred</i>
CSIRO (Shu Su)	Novel Capture & Energy Efficiency	17,207
Uni of Newcastle (Scott Donne)	Direct Carbon Fuel Cell	157,681
Uni of Newcastle (GreenMag)	Mineral Carbonation	1,037,666
<b>Total</b>		<b>1,304,388</b>

#### C4: NSW CO<sub>2</sub> Storage Assessment Program

For the financial year ending 30 June 2015 the following funds have been expended in relation to the NSW Data Acquisition & Drilling Program:

<b>description</b>	<b>value \$</b>
Total State Wide Storage Assessment project	<b>644,099</b>

Note: The CO<sub>2</sub> Storage Assessment Program is a \$54.3 million jointly funded agreement. Currently the Darling Basin drilling program has a \$20.2 million budget and has / will receive income from the funding partners along with CINSW Funds.

#### C5: Membership of CO2CRC

For the financial year ending 30 June 2015 the following funds have been expended and accrued in relation to membership of CO2CRC.

<b>description</b>	<b>value \$</b>
Membership of CO2CRC	250,000
Total	<b>250,000</b>

#### C6: Audit Fees

<b>description</b>	<b>value \$</b>
Audit Fees for FY 2014-2015 & FY 2013-14	45,119
Program Management Audit Fees for R&D round 2009	18,320
Audit NSW CO <sub>2</sub> Storage Assessment Program	10,500
<b>Total</b>	<b>73,939</b>



## D. EVALUATION

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

#### D1 Coal Innovation NSW (CINSW)

The *Coal Innovation Administration Act 2008 (Act)*, (amendments assented 22 August 2011), requires the formation of Coal Innovation NSW (CINSW), a Ministerial Advisory Council. As prescribed in Part 3, section 10 of the Act, CINSW is to comprise an independent Chair, and up to eight members appointed by the Minister, consisting of two appointed members from government and two from industry to represent the NSW black coal industry, and up to four additional members appointed by the Minister.

As at 1 July 2014 the membership of CINSW was:

- Dr Neil Shepherd, Chair
- Prof Mary O’Kane, NSW Chief Scientist
- Mr Brad Mullard, ED, Mineral Resources, Department Trade and Investment
- Mr Michael Buffier, Chairman NSW Minerals Council
- Mr David Moul, Chairman NSW Minerals Council and CEO Centennial Coal
- Prof Michael Dureau, Deputy Chairman, Warren Centre for Advanced Engineering
- Prof Jim Galvin, Mining Engineer Consultant and Academic
- Prof Dianne Wiley, Program Manager (CO<sub>2</sub>Capture) CO2CRC and Professor UNSW

During September 2014 Mr Brad Mullard announced his retirement (and resignation) from the Department, effectively also resigning his membership to CINSW. Subsequent to his resignation, the Acting Executive Director, Geological Survey NSW, Department of Trade and Investment, attended meetings as the second government member.

CINSW held three meetings in the 2014/15 financial year:

- 30 July 2014
- 4 December 2014
- 24 March 2015.

Several sub committees were held to discuss progress of R&D projects and the development of a future ‘*low emissions coal strategy*’.

Of the \$ 20,352 expenditure, \$20,000 was paid to the Chair as his remuneration. The remaining costs were sitting fees for other Council members.

#### **Evaluation:**

The Minister for Resources and Energy opened the 9<sup>th</sup> meeting of CINSW, held 30 July 2014, and requested CINSW to provide preliminary advice on future strategy options to develop and demonstrate low emissions coal technologies. A detailed presentation was given by Professor Moghtaderi on his final report on the ‘Chemical Looping Air Separation’ CINSW R&D project. Members also received a presentation on the preliminary results of the Darling Basin drilling program. The final report of this

program is now available on the Department's website (see section D4.5 for details). Discussions on funding were held in response to the Commonwealth's budget decision to reduce funding to low emission coal technology and impacts upon NSW programs.

Resulting from discussions at the 9<sup>th</sup> CINSW meeting concerning the Commonwealth's budgetary decisions, an out of sessions paper was circulated to CINSW members (18 September to 2 October 2014). From this CINSW made an initial recommendation to the Minister concerning reprioritising Coal Innovation NSW Fund and programs.

The 10<sup>th</sup> meeting held 4<sup>th</sup> December 2014 continued working on the restructure of the Fund and programs.

The 11<sup>th</sup> meeting of CINSW, held 24 March 2015, focused on two items. First was a detailed presentation of the Final Report of CO<sub>2</sub> Storage Assessment Program, Stage 1B - Darling Basin Drilling Program, highlighting key aspects of the CO2CRC Report. (see section D5 for full evaluation of this project). The remainder of the meeting concentrated on the finalisation of the recommendations to the Minister on the restructure of CINSW Fund budget and forward programs. This recommendation was forwarded to the Minister in accordance with the Act.

All three meetings continued the development of future programs as the restructure of the Fund was debated. These future programs will commence delivery from the financial year 2015/16 and will be reported in next year's Report to Parliament.

## **D2 Coal Innovation NSW Secretariat – Salary costs.**

Coal Innovation NSW Secretariat employs five staff:

- Program Director,
- 2 Senior Project Officers (Scientist and Economist),
- Project (finance) Officer
- Geoscientist
- Graduate Officer

### **Evaluation:**

Employment at the Secretariat has continued be stable, with the addition of a Graduate through the Department's Graduate program. This has allowed the Unit to maximise its efforts in utilising the staff's skills. Significant tasks for the financial year have centred on:

- managing existing projects, including working with researchers in development of final R&D reports;
- finalising of reports for the Darling Basin drilling and data acquisition program;
- the project management of Darling Basin drilling program consumed significant time and resources of the Secretariat;
- development of the next research grants program for release in early 2015/16;
- working closely with CINSW and Chair in developing options for the reprioritising of CINSW Fund budget and future programs;
- consultation with industry and Commonwealth on future research options;

- involvement within policy debate at a National level; and
- continued upgrade of the CINSW website.

### **D3 Delta Carbon Capture and Storage Demonstration Project.**

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

The total for Stage 1 of the project is \$28.3 million. Two thirds of the funding was to be provided from the Commonwealth and Australian Coal Association Low Emissions Technologies Limited (ACALET) in equal shares, pending conditions of the Funding Agreement being met.

Stage 1 of the Delta CCS project was essentially an approvals and planning stage, the development of a storage site for CO<sub>2</sub> and the Front End Engineering and Design (FEED) stage. Stage 1 was aiming to 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

Stage 2 was to demonstrate the integrated process:

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

NSW had committed \$40 million to Stage 2 of the project, 'Construction and Operation', along with similar commitments from the Commonwealth and ACALET. NSW's commitment has been allocated within the existing Coal Innovation NSW Fund budget.

#### **Evaluation:**

As advised in last year's report, on the 22 May 2014, the Commonwealth Department of Industry wrote to NSW Department advising them that the Commonwealth "*has decided to reduce funding for the National Low Emissions Coal Initiative in the 2014/15 Budget.*" This resulted in Commonwealth funds for the Delta Project no longer being available. On 11 July 2014, a meeting of the Funding Partners Steering Committee terminated the Project in accordance with the Funding Agreement's terms. At that meeting the Commonwealth stated "*the decision to withdraw Commonwealth funding was not a reflection on the management of the project but was made in the context of budget pressures which resulted in the government reducing funding across a number of government programs.*"

This led directly to the work over the following period by CINSW in reprioritising CINSW Fund and program.

#### **D4 Research Projects**

A "Call for Expressions of Interest under the NSW Clean Coal Fund" closed on 4 December 2009, and 29 applications were received and assessed. In May 2010, the then Minister approved 10 successful projects as follows. After negotiations of funding agreements, some of the awarded amounts varied slightly:

Applicant	project description	Awarded funding up to (\$)	Duration	restructured funding agreements	Amount spent at closure (\$)
Uni Newcastle / GreenMag	Alternative CO <sub>2</sub> storage	3,040,000	4 yrs	3,040,000	
UCC Energy	Combustion	2,581,000	4 yrs	closed early	50,000
Centennial Coal	Fugitive emissions	2,200,000	2 yrs	2,200,000	
CSIRO	Capture technology	1,300,000	3 yrs	1,582,319	1,582,319
CSIRO	Fugitive emissions	1,000,000	2 yrs	closed early	115,000
Uni of Newcastle	Combustion alternative	886,618	3 yrs	851,618	851,296
Uni of Newcastle	Social research	618,930	2 yrs	661,946	661,946
CSIRO	Capture technology	613,711	1.5 yrs	613,711	613,711
Uni of Newcastle	Carbon fuel cell	608,719	5.5 yrs	564,748	
OurSun P/L	Combustion technology		did not commence		
		12,848,978			

**A detailed evaluation of each project follows.**

#### **D4.1 Project: UCC Fired Diesel Engines in the generation of electricity Grantee: UCC Energy Pty. Ltd**

Project closed.

See report 2012/13 for details

#### **D4.2 Project: Fugitive emissions abatement from ventilation air Grantee: Centennial (Coal) Mandalong Pty Ltd**

*Centennial Mandalong P/L* has received initial grant funding to trial an exciting new technology termed a VAM-RAB (Ventilation Air Methane Regenerative After Burner) that has potential to mitigate fugitive methane emissions escaping from underground coal mines. These emissions are notoriously difficult to abate because this naturally-occurring gas becomes diluted by the large volumes of ventilation air that is 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 concentration is too low to burn-off (often referred to as flaring) or process for electricity generation.

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. By 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'.

## **Evaluation:**

Commencing in 2011, the VAM-RAB Demonstration Project progressed well, quickly securing the required approvals to build and operate the plant at an active underground coal mine. Detailed engineering designs were also approved with onsite construction completed by end 2012. Commissioning commenced, albeit slowly at times due to the necessity of working within the operations of an active mine. For example, the supply of gas to the VAM-RAB has not been readily available whilst the mine carries out underground longwall moves. During these operations, the gas plant is turned off to redirect all gas to underground inertisation, resulting in delays in scheduling activities associated with commissioning of the VAM-RAB. Nevertheless, the project team has worked diligently throughout the year and made significant progress towards readying the plant for experimental research.

During commissioning, the system was operated successfully under a variety of test conditions. Testing also revealed several necessary modifications and redesigns before the project could begin the experimental phase. In mid-2014, meetings were held between the project team and CINSW and a plan to implement actions to modify the plant was agreed to. Although having to accommodate another 'longwall change out' most issues had been rectified by November 2014, and the plant was ready for further commissioning test work to determine if the plant would operate as designed. This work revealed a need to replace some of the packing material in the lower section of the VAM-RAB to improve the functionality of the system. Following this activity, this project is expected to start phase 1 of the experimental plan in Q3 2015, followed by phase 2 which is expected to complete the project by end 2016.

### **D4.3 Project: Further development of post combustion capture Grantee: CSIRO Energy Technology**

*CSIRO Energy Technology* received initial 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 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). This innovative project continues to be the only current research and development pilot program on liquid-based absorbent Post Combustion Capture technologies suitable for NSW power stations. The results also have applicability across the Australian black coal electricity generation sector.

The pilot-scale CO<sub>2</sub> capture plant used in the research was located at Delta Electricity's Munmorah Power Station on the Central Coast, north of Sydney. The Coal Innovation NSW Fund assisted the upgrade and move of the pilot plant from Munmorah to Delta Electricity's Vales Point Power Station so that this critical research program could continue.

## **Evaluation:**

This project was completed during 2014 and the final report submitted and accepted by CINSW. The project has enabled the consolidation and extension of technical infrastructure for the evaluation of post-combustion capture technologies for application in coal fired power plants in NSW. The project has also been valuable to the CSIRO in that a number of maintenance issues were identified during commissioning and a number of modifications made that have resulted in an improved test rig in line with the project objectives. The pilot plant at Vales Point is unique in that it is the only facility in NSW that can actually evaluate technologies utilising real flue gases from coal combustion.

Following project completion, the infrastructure became available to be utilised to address issues that are pertinent to the development and deployment of environmentally benign and cost-effective carbon capture technologies. At present, the plant is being used in a project funded by the Australian Renewable Energy Association (ARENA), aimed at the demonstration of solar thermal energy for regeneration of the liquid absorbents used to capture the CO<sub>2</sub> from the flue gas. This is a global first practical demonstration of this hybrid technology concept.

<b>D4.4 Project: Reducing Fugitive Emissions -Enhanced Drainage techniques Grantee: The CSIRO Centre for Environment, Social and Economic Research</b>
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Project closed December 2012 and unspent moneys returned.

See 2012/13 report for full details

<b>D4.5 Project: A Novel Chemical Looping Based Air Separation Technology Grantee: The University of Newcastle Priority Research Centre for Energy</b>
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*The University of Newcastle Priority Research Centre for Energy* received 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, termed Chemical Looping Air Separation (CLAS), promises to reduce the greenhouse gas emissions from air separation processes, and to be a cost effective method of mitigating one of the major barriers to the adoption of carbon capture technologies such as oxy-fuel combustion (i.e. electricity generation via steam produced by the combustion of coal in pure oxygen rather than air) as conventional air separation is notoriously expensive. With support from the Coal Innovation NSW Fund, a three-year program was pursued to get this innovative air separation technology commercially ready.

## **Evaluation:**

In this period this project was successfully completed and a final report submitted and accepted. The emphasis of the project was mainly on fundamental studies at bench-scale and pilot-scale under controlled laboratory settings. The project reached all its milestones and successfully met its key targets. More importantly, the project produced the scientific evidence that confirms the superiority of the CLAS process over conventional cryogenic systems to produce oxygen from both technical and economic points of view.

A detailed techno-economic feasibility assessment was done on converting NSW coal fired power plants to oxygen fuel (oxy-fuel) combustion with the CLAS process. The specific power requirements of the CLAS system were estimated to be about 11% (including heat losses to the surrounding ambient air temperature) of that of the most advanced cryogenic air separation unit. Theoretically, it was found that the integration of CLAS units therefore made the rollout of oxy-fuel conversion more viable. However more work has to be completed on scale-up demonstration models and feasibility studies. Final report can be found at <http://www.resourcesandenergy.nsw.gov.au/energy-consumers/energy-sources/coal-innovation-nsw/research-projects/coal-combustion-and-electricity-generation-efficiency>

### **D4.6 Project: Managing Project Risk: The Role of Public Awareness Grantee: University of Newcastle**

*The University of Newcastle's Research Institute for Social Inclusion and Well-being* has received 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 aims to 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 undertook research in regional and metropolitan areas, and studied varying technological applications to develop a set of recommendations and strategies for government, society and industry to increase public awareness and acceptance for low emissions coal technologies.

## **Evaluation:**

This project has successfully completed and met its research objective of understanding the risks to public perception in technical developments. It has identified potential pitfalls in developing low emissions coal technologies that may come from public dissatisfaction. The project conducted leading research in online networks, revealing how scientific information is distributed online and then shared, brokered and contested by different social groups. Valuable insights were gained into how and why users chose to join and use new social media to share information.

Importantly it found that scientific facts alone were not strong enough to quell mounting public opposition, a valuable insight for future public engagement in carbon capture and storage. The final report and its findings can be found at <http://www.resourcesandenergy.nsw.gov.au/energy-consumers/energy-sources/coal-innovation-nsw/research-projects/public-consultation-and-community-awareness>

**D4.7 Project: Site Trials of Novel CO<sub>2</sub> Capture Technology**  
**Grantee: CSIRO Coal Technology**

*CSIRO Coal Technology* received initial 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 a novel type of carbon-fibre based adsorbent material termed Honeycomb Monolithic Carbon Fibre Composite adsorbents. The promoted benefit of this technology is that it enables dry CO<sub>2</sub> capture at room temperature and atmospheric pressure, and in dusty environments with low pressure drop, thereby reducing the operational and maintenance cost of the post-combustion capture process. In addition, it was proposed that the heat in the flue gas could 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 Coal Innovation NSW Fund, an adsorption test unit was installed at Delta Electricity's Vales Point Power Station on the Central Coast, north of Sydney. The effect of real flue gas on the operation and performance of the test unit has been tested and CO<sub>2</sub> capture process demonstrated. Information on the commercial application of the technology was also generated from the field trial.

**Evaluation:**

This Project was successfully completed within budget in 2014-15 and the final report reviewed and accepted by CINSW. The project met its intended aim and objectives, a rigorous, systematic project methodology was clearly followed, and the technical work performed was excellent, thereby characterising the professionalism of the project team.

During the two year project, over 200 tests were conducted over a twelve month period, on real flue gas from the power station. The results from these site trials highlighted the stability of the solid adsorbent material under power station conditions and its high capacity to remove high purity CO<sub>2</sub>, as well as other constituents of the flue gas, including nitrous oxides (NO<sub>x</sub>), and sulphurous oxides (SO<sub>x</sub>). It is this potential of providing a single technological solution to adequately deal with all of these gases at once that may make this a highly prospective technology. Conventional carbon capture using a liquid chemical process requires an additional flue gas pre-treatment step, but this technology could remove the need for flue gas pre-treatment prior to CO<sub>2</sub> capture.



A high quality life cycle assessment study was carried out on a base case study of a 350 MW power plant. It found that a combination of auxiliary heat from the power station and waste heat from the flue gas could be used during the regeneration stage for processing all of the flue gas generated from the power plant.

The site trials were a world first in demonstrating such solid sorbents on real flue gas. The important experimental data and site operational experience obtained at the power station form a good basis for further development of this carbon composite adsorbent CO<sub>2</sub> capture technology for fossil fuel fired power stations. The final report can be found at <http://www.resourcesandenergy.nsw.gov.au/energy-consumers/energy-sources/coal-innovation-nsw/research-projects/post-combustion-capture-of-carbon-dioxide>.

#### **D4.8 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* has received 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%). The higher efficiencies equate to substantial reductions in greenhouse gas emissions as less fuel is used per unit of electricity generated. In addition, the fuel cell emissions are almost entirely pure CO<sub>2</sub> which is therefore ready for sequestration without the need to firstly separate out other gases such as nitrogen, which are present in the flue gases emitted from 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 DCFC relies on the external supply of a fuel (in this case coal) which must be continually replenished.

The overall objective of this project is to obtain proof of concept for the technology and progress towards commercialisation of the DCFC through further development and optimisation of bench-scale and then pilot-scale systems.

#### **Evaluation:**

This project made steady progress on all milestone tasks during this period and is currently on track in relation to milestone delivery and budget. All of the fundamental laboratory studies and bench-scale testing using a 'half-cell' design have been completed and the information acquired has been utilised in the design of a larger fully functioning system. A full pilot scale cell with auxiliary components has been constructed and commissioned with testing and optimisation studies well underway. This project is expected to finish in Q1 2016.

**D4.9 Project: Permanent Large Scale CO<sub>2</sub> Storage by Mineral Carbonation**  
**Grantee: Mineral Carbonation International**

*The GreenMag Group and University of Newcastle Priority Research Centre for Energy* was awarded grant funding, contingent on the receipt of matching Commonwealth and industry funding, to develop and optimise a promising method of storing carbon dioxide gas emitted from NSW coal-fired power stations. GreenMag and the University of Newcastle formed Mineral Carbonation International Pty Ltd (MCI) with a commitment from Orica to match funding as the industry partner. This joint venture will undertake further research into mineral carbonation technology and establish a CO<sub>2</sub> mineral carbonation pilot plant at the University of Newcastle. The project aims to transform captured CO<sub>2</sub> emissions into forms of carbonate rock that will be trialled as new green building materials for the construction industry.

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.

The Project is intended to take existing known processes for mineral carbonation from bench scale to demonstration plant scale and to conduct complementary R&D activities, which each could reduce the overall cost of mineral carbonation that could eventually operate at industrial scale. The major goal for the Project is to reduce the cost of existing mineral carbonation processes from the current \$70 per tonne of CO<sub>2</sub> sequestered to \$40 per tonne (with potential for further reduction) and to demonstrate that the process involved can be scaled up from the laboratory to this pilot scale and beyond.

The MCI project extends over a four-year period and encompasses three main strands including: 1) pilot plant construction and operation, 2) intensive research and development, and 3) program governance, communication and commercialisation. The project was officially launched 23 August 2013 by Minister for Mineral Resources at the Newcastle Institute of Energy and Resources, University of Newcastle (NIER).

**Evaluation:**

This project completed its second year of work and is on track in relation to milestones and budget. One of the main project tasks is the construction of the pilot reactors which are near completion. These plants will demonstrate the feasibility of applying direct aqueous carbonation technology at industrial scale to store CO<sub>2</sub> permanently by reacting it with a suitable, heat activated mineral feedstock. Suitable rock material has been sourced for the trial experiments to commence. Collaborative research agreements have also been signed with Columbia University and Sydney University extending the research capacity of the project. The next year will see further analysis, and development of models for thermal activation and operation of the experimental facility. This four year project is expected to finish in mid-2017.

**D4.10 Project: A Simple Heat Engine for Sustainable Coal Generation  
Grantee: ourSUN Pty Ltd – application WITHDRAWN December 2010.**

Application withdrawn December 2010.

**D5 NSW CO2 Storage Assessment Program**

The drilling program is being developed in 3 stages as follows:

- Stage 1A – Sydney Basin (4 wells)
- Stage 1B – Darling Basin (2 wells)
- Stage 2 – to be determined based on results from Stage 1 and further desktop analysis.

Funding Agreements between NSW Trade & Investment, the (then) Commonwealth Department of Resources, Energy and Tourism and industry, Australian Coal Association Low Emissions Technologies Limited (ACALET) were signed for Stage 1 and announced on 4 June 2012. This announcement also advised of commencement of Stage 1B of the program.

**Evaluation:**

Having commenced in 2008, the Program is expected to run until the end of 2017. Program status is as follows:

- Stage 1A – Sydney Basin data acquisition and assessment (completed)
- Stage 1B – Darling Basin data acquisition and assessment (in progress)
- Stage 2 – further data acquisition (defined based on Stage 1 outcomes, this program has to be developed and funding arrangements confirmed).

The table below displays updated financial contributions, expenditure under the Funding Agreement:

	Stage 1A Contributions	expended during Stage 1A	Stage 1B contributions	expended during Stage 1B	Total expenditure todate
Commonwealth	\$ 2,500,000		\$ 7,200,000	\$ 9,700,000	\$ 9,700,000
ACALET	\$ 300,000		\$ 8,000,000	\$ 8,300,000	\$ 8,300,000
CINSW Fund	\$ 7,550,000	\$ 7,550,000	\$ 2,200,000	\$ 2,200,000	\$ 9,750,000
			<i>note 1</i>	<i>note 2</i>	

*note 1:* ACALET reduced its contribution to Stage 1B by \$1,400,000 (effectively contribution to the 20% contingency fund)

*note 2:* There is a surplus of approximately \$566,000 from Stage 1B which will be rolled over to Stage 2 to commence the planning operations, but for this exercise it has been assumed to have been expended.

CINSW has been in discussions with the Commonwealth and ACALET for continued funding of the drilling program based on the successful results obtained from the Mena Murtee site in the Darling Basin (see below). These discussions are on-going.

The work in 2014/15 focussed on the analysis and interpretation of the scientific data acquired in the Darling Basin (Stage 1B of the CO<sub>2</sub> Storage Assessment Program). The data acquisition program in the Darling Basin consisted of the drilling of two

stratigraphic wells to a planned depth of 2,400m, to acquire core and to complete significant downhole testing. There was no injection or storage of CO<sub>2</sub> gases.

There were three broad aims for the Stage 1B (Darling Basin) drilling campaign:

- gather information on the geothermal potential of the area in collaboration with the CSIRO.
- to assess the carbon dioxide (CO<sub>2</sub>) storage potential for the sites.
- general geological data for the region.

### Work Program

On 19 March 2013, NSW Department of Trade & Investment was granted two exploration licences, EL8065 and EL8066, under the *Mining Act 1992*. The Department, assisted by NSW Public Works (for procurement of service providers), awarded the Principal Contract to Aztech Well Construction (Aztech).

Drilling was conducted in early 2014 using a petroleum rig under contract to Enerdrill Pty Ltd, capable of drilling to the depths required and expected hardness of rock. Site location was determined from the previous geological work, proximity to the gas pipeline corridor, modelling of seismic lines undertaken by Departmental geologists and positive landholder sentiment. The locations of the two sites with the exploration licences are illustrated in Figure 1.

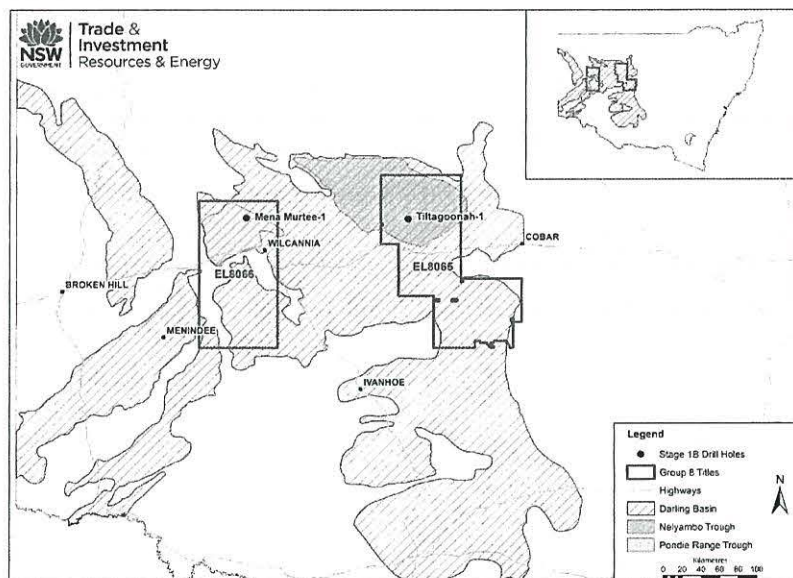


Figure 1: Location of the Stage 1B wells, Darling Basin.

Tiltagoonah-1 was the first borehole to be drilled and was located in the Nelyambo Trough (Figure 1). The well was designed to intersect Devonian age (i.e. ~ 400 million years old) sedimentary packages at a depth suitable for CO<sub>2</sub> storage. Data coverage in this area was limited to a few high to moderate quality 2D seismic surveys. As there were no stratigraphic or deep boreholes drilled within this sub-basin, geological assumptions were based largely on modelling of seismic data.

The well was spudded on the 21<sup>st</sup> February 2014 with drilling, wireline logging, plug and abandonment, and rig release completed by the 24<sup>th</sup> March 2014. Rocks encountered within the well were excessively hard, dense, and heavily silicified, which resulted in a slow drilling rate and a reduction in coring, and ultimately a relatively shallow total depth of 1434 m (MD – Measured Depth from the drill rig

rotary table). The decision to call TD at 1,434 m, rather than the proposed TD of 2,400 m, was taken to maintain the project within budget and time constraints.

Mena Murtee-1 was the second hole drilled and was located in the Pondie Range Trough (Figure 1). It was the first well to be drilled in the depocentre (i.e. the location with the thickest sediments) of the Pondie Range Trough, and like, Tiltagoonah-1, was designed to intersect Devonian age sedimentary packages at a depth suitable for CO<sub>2</sub> storage. Seismic data coverage in this area was limited to a few high to moderate quality 2D surveys. The Pondie Range-1 well, located 28 km to the southwest, was drilled in 1966, and is the only other deep borehole penetration within this sub-basin.

The well was spudded on the 4<sup>th</sup> April 2014, with drilling, wireline logging, plug and abandonment, and rig release completed by the 14<sup>th</sup> May 2014. Overall, the rocks encountered at Mena Murtee-1 were not as silicified as those encountered at Tiltagoonah-1, with a total depth reached of 2270 m (MD).

### Data Acquisition

The aim of the data acquisition program was to provide data to support an initial pre-competitive assessment of the potential of each targeted geological formation to safely and securely store supercritical CO<sub>2</sub> rather than to comprehensively characterise each rock formation. Both holes were stratigraphically and geophysically logged with several sections in each selectively cored using side wall coring and either wireline or conventional coring techniques to acquire samples of the rocks drilled through. In total, 117 m of core was cut from the two wells with 114 m recovered; an excellent recovery rate of 97% being achieved. These rock samples were supplemented by the acquisition of 34 side wall cores. All retrieved core is now stored in the W.B. Clark Centre, Londonderry.

Summary data for cores acquired through the Darling Basin Drilling Program. SWC = side wall cores

Well	Core No	Depth Interval m MD	Cut m	Recovery m (%)
Tiltagoonah-1	1	675.5 – 683.7	8.2	7.8 (95.5%)
	2	683.7 – 691.8	8.1	7.5 (92.6%)
	3	691.8 – 695.3	3.5	3.5 (100%)
	4	1279.9 – 1288.9	9.0	8.6 (95.9%)
	1 – 15 (SWC)	150 – 552		
Mena Murtee-1	1	1598.0 – 1625.6	27.6	27.3 (98.7%)
	2	1625.6 – 1632.7	7.1	6.8 (95.9%)
	3	1850.0 – 1877.0	27.0	26.5 (98.1%)
	4	2012.5 – 2039.0	26.5	26.0 (98.1%)
	1 – 19 (SWC)	1417 – 2098		

Samples from the cores were selected for laboratory analysis to quantify the rock composition and to measure the porosity (i.e. tiny pore spaces within rocks required to hold/store injected CO<sub>2</sub>) and permeability (i.e. connection between the pore spaces to allow injected CO<sub>2</sub> to flow away from an injection well out into the storage site). A total of 290 tests were conducted on the core samples. The geophysical logs run in the hole also provided comprehensive data on porosity, permeability, density, rock type and seal propensity. The substantial data and sample sets acquired from this exploration program was sufficient to meet the needs of an initial geological interpretation of the near well lithology, which included the identification of reservoir/seal pairs as prospective intervals for CO<sub>2</sub> geological storage.

### Key Results and Outcomes

Results from Tiltagoonah-1 indicated that the sandstones intersected were heavily silicified and lacked porosity and permeability, thereby rendering them unsuitable as a storage site for CO<sub>2</sub>. Unfortunately this has effectively ruled out this area of the Nelyambo Trough as a region for further exploration, but was not unexpected following the conditions encountered down hole.

In contrast to the results from Tiltagoonah-1, three sandstone units overlain by extensive claystone units were identified in Mena Murtee-1 as prospective storage reservoirs for CO<sub>2</sub>. The existing well and seismic data from previous exploration in the Pondie Range Trough along with the newly acquired data sets from Stage 1B exploration were used by collaborative researchers from the CO<sub>2</sub>CRC to undertake studies on the geological storage system characterisation, injection and plume migration modelling, geomechanical evaluation, and geochemical analysis and modelling. These studies provided positive indications for large scale storage of CO<sub>2</sub> within the Darling Basin. The prospective intervals encountered in Mena Murtee-1 were identified through low resolution injectivity and capacity modelling to have suitable porosity and permeability for CO<sub>2</sub> storage. The computer modelling revealed that the porous sandstones may be capable of storing approximately 555 million tonnes of CO<sub>2</sub>. Thus, these sites could theoretically permanently store 50 years' worth of the emissions captured from one of NSW's biggest emitters, (for example, Bayswater Power Station, had emissions estimated to be 14.6 million tonnes, 2013-14). To put it another way, the sites could potentially store one-fifth of the CO<sub>2</sub> emitted over a 50 year period from the State's coal power sector.

The CO<sub>2</sub>CRC concluded that the results acquired from the Pondie Range Trough provided reasonable justification for the expansion of an exploration program within this sub-basin and also in other underexplored areas of the Darling Basin. Further collaborative research is also underway with the CSIRO investigating aspects of the geothermal regime in both troughs, and with ANLEC R&D studying aspects of the Mena Murtee-1 cap rocks. These two projects are due for completion by end 2015.

### Conclusion

Stage 1B in the Darling Basin achieved its aims and objectives with Mena Murtee-1 showing potential as a CO<sub>2</sub> storage site. The discovery of prospective storage and seal units in the Pondie Range Trough highlight the geosequestration potential of the Darling Basin. Whilst the Tiltagoonah-1 site proved unsuitable for storage, a great number of learnings were acquired that will assist in enhancing the outcomes of further exploration undertaken as part of the NSW CO<sub>2</sub> Storage Assessment Program. The greater Darling Basin area remains the focus for Stage 2 exploration. Concomitantly, an enhanced understanding of the geology of the basin has been gained, and a large volume of subsurface data and drill core were acquired. These data and cores are now available for continued assessment and study by government agencies, academia and industry involved in Carbon Capture and Storage and mineral/petroleum exploration activities.

The funding, income and expenditure for Stage 1B of the program was separately audited for reporting to the Funders' Steering Committee meeting in November 2014. Preliminary balance sheets show that the \$20.2 million budget expenditure has come in marginally (approximately 3%) under budget.

Final reports on the results and outcomes from Stage 1B exploration in the Darling Basin have been finalised and were released to the public in April 2015. Further details can be obtained on the Department's website at <http://www.resourcesandenergy.nsw.gov.au/energy-consumers/energy-sources/coal-innovation-nsw/research-projects/darling-basin-drilling-program>

## D6 Membership of CO2CRC

"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>

### **Evaluation:**

NSW has had a long-standing commitment of membership to the CO2CRC with a fee structure of \$250,000 per year. Membership is current until 30 June 2015. Future membership beyond June 2015 remains under review.

Membership of this world leading research organisation has been of considerable benefit to NSW as it develops its carbon capture and storage research and demonstration programs. The Coal Innovation NSW Secretariat Scientific Officer and Geoscientist attended the annual CO2CRC Research Symposium and exchanged valuable information on NSW programs.

As a result of negotiations at the time of joining CO2CRC, a significant return on membership fees was gained during 2014-15 in relation to the NSW CO<sub>2</sub> Storage Assessment Program, with services and advice being provided by CO2CRC experts towards the Stage 1B drilling in the Darling Basin.

During the year, a collaborative work program between the Secretariat and the CO2CRC that focused on a comprehensive analysis and geological modelling of data acquired from the Darling Basin drilling program was executed and successfully completed. The analyses and modelling were undertaken by the CO2CRC and its affiliated research institutes (CSIRO, Geoscience Australia, University of Adelaide, and University of Melbourne). During the six-month analysis, the CO2CRC-led team used the data collected from the Darling Basin Drilling Program to geologically characterise the region and determine the likely movement of CO<sub>2</sub> in the rock, as well as chemical changes and overall CO<sub>2</sub> storage capacity of the site.

The value of this work is in excess of \$479,000 from the CO2CRC or over \$959,000 including CO2CRC's research partner's in-kind contributions under the CO2CRC collaborative research agreement.

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

The evaluation of the return on membership based on services provided for that membership fee has been enormous. It has allowed the drilling budget (D.5) to concentrate expenditure on the gathering of data and minimise expenditure on modelling, which was undertaken by the CO2CRC. Without this value, and if we had gone to the market for commercial modelling, it was estimated to have expended 150 to 200% of the total in-kind payment, and as stated above this has come in-kind due to our membership.

## **D7 2009/10 Grants Program Audit**

The Coal Innovation NSW Secretariat requested O'Connor Marsden & Associates (OCM) to undertake a review of their 2009/10 Research and Development Projects Grants Management Program. OCM's review undertook an 'end-to end' process from advertising of grants to the letting process and acquittal process followed thereafter.

The objective of the grants audit was to provide limited assurance that there are effective controls in place around the management of grants. OCM's procedures were to focus on controls in relation to the management of grants for following areas:

- Policy and procedures covering grants;
- Alignment of grants with strategy;
- Budgetary approval and monitoring;
- Marketing/advertising of schemes;
- Application and approval process;
- Probity aspects of the evaluation process;
- Conditions, milestones, approval of payments;
- Oversight by the relevant management/Committee;
- Evaluation of outcomes; and
- Adoption of best practice guidelines in grant processing.

As part of OCM's engagement, they provided commentary, where applicable, on the efficiency of process and/or control design.

Additionally, OCM's review was guided by criteria as set out in the *NSW Government Good Practice Guide to Grants Administration* issued by Premier's Circular C 2010-16 on 26 May 2010.

### **Findings:**

The following is an extract from the OCM Report:

*"Based on the tests conducted, as outlined in the Scope, which is set out in the Terms of Reference in Section 2 of this report, our opinion is that the practice and procedures surrounding the grants management program are overall satisfactory.*

*In particular, given the size of the Secretariat, the practices and procedures surrounding the following activities within the grants management system appeared to be robust:*

- *Assessment of applications*
- *Selection of projects for funding*
- *Reporting to Technical Working Group and Advisory Council*



- *Quarterly assessment of project progress (which may also include site visits) prior to acquittal of next scheduled payment.*

*We also commend the Secretariat for the positive approach it has taken subsequent to the first round of funding, by completing a “lesson learnt” review of its own practices and procedures carried out during that first funding phase. The document produced from the review was comprehensive and we note the Secretariats’ commitment to adopt the additional improvements highlighted in the document.”*

The audit provided an overall (high level) rating system and has given the Program a ‘B’ score (within a range of A to D), which equates to ‘a small number of minor control weaknesses / opportunities for improvement identified.’ Within the report’s Summary of Findings, OCM have identified seven (7) actions to be remedied in any future program, assigning them with the rankings of: three (3) important and four (4) minor, noting that no significant matters were raised.

The 3 important matters concerned the following broad items:

- Risk register
- Code of conduct
- Meetings with applicants

The CINSW Secretariat has responded to these matters formally within the audit report. All matters raised have been addressed in the future R&D Grants program and a risk register has been developed and approved by CINSW for the program.

<p><b>D8 GHGT 12 World Conference (6-9 October 2014)</b></p>
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The Secretariat’s Scientist represented the Department at the 12th International Conference on Greenhouse Gas Control Technologies (GHGT-12), held in Austin, Texas. The GHGT biennial event is conducted by the International Energy Agency, and has established itself as the principal international conference on low emissions coal technologies and carbon capture and storage. The conference was well attended by over 1,150 delegates from 35 countries. In line with the recent opening of the world’s first fully integrated commercial-scale CCS plant on a coal fired power station, the key message from the conference was that CCS is now technologically ready, yet not quite commercially ready, and still requires government support. Attendance at the conference was very fruitful, with numerous insights gained into the current status and operation of projects around the world; techniques for exploring and characterising the subsurface, and monitoring injected CO<sub>2</sub> plumes; and lessons learnt from managing both small-scale injection projects and commercial scale storage sites. Constructive discussions were also held with many international experts in this field. It became event that many projects employed a very similar array of tests and analytical techniques to those used recently in the Darling Basin Drilling Program, thereby validating the Darling Basin Data Acquisition Program. Many learnings were also gained that may assist in future proposed projects by CINSW, including continued storage exploration and a trial CO<sub>2</sub> injection in the Darling Basin.

## E. CONCLUSION

The financial year 2014/15 was a successful year for CINSW, with progress on many fronts. The highlights of the financial year have seen several research projects concluding with significant achievements attained. Final Reports for these projects have been assessed, peer reviewed and placed on the Department's website. The results from the Darling Basin drilling program have provided evidence for the first time of the potential for commercial-scale storage of CO<sub>2</sub> in NSW. These results demonstrate that NSW could theoretically permanently store 50 years' worth of CO<sub>2</sub> emissions captured from one of NSW's biggest emitters.

### Overall Financial Balance

	\$
Opening balance as at 1 Jul 2014 (credit)	86,373,858
Interest revenue	1,780,842
Income from ACALET (invoices)	55,939
total	<b>88,210,639</b>
Less expenditure	3,051,288
<b>TOTAL as at 30 June 2015 (credit)</b>	<b>85,159,351</b>

### Expenditure for financial year 2014/15:

Coal Innovation NSW (Advisory Council) costs	20,353
Secretariat costs including salaries	758,509
R&D projects grants	1,304,388
CO <sub>2</sub> Storage Assessment Program	644,099
CO2CRC membership	250,000
Audit Fees	73,939
GRAND TOTAL	<b>3,051,288</b>

# COAL INNOVATION NSW FUND

## Financial Report

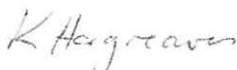
30 June 2015

**Coal Innovation NSW Fund**  
**Financial Report**  
**for the year ended 30 June 2015**  
**STATEMENT BY DEPUTY SECRETARY**

I declare that in my opinion:

- a) The accompanying financial report provides details of the transactions of the Coal Innovation NSW Fund for the year ended 30 June 2015;
- b) The financial report has been prepared as a special purpose financial report in accordance with the basis of preparation described in Note 2; and
- c) The accompanying financial report exhibits a true and fair view of the financial position of the Coal Innovation NSW Fund as at 30 June 2015 and of its income and expenditure for the year ended on that date.

Further, I am not aware of any circumstances which would render any particulars included in the financial report to be misleading or inaccurate.



Kylie Hargreaves  
Deputy Secretary Resources & Energy

Date: 4/10/15

**Beginning of the Financial Report**

**COAL INNOVATION NSW FUND**

**STATEMENT OF COMPREHENSIVE INCOME FOR THE YEAR ENDED 30 JUNE 2015**

	2015	2014
	\$000	\$000
<b>Revenue</b>		
Grants - industry/private bodies	-	7,690
Grants - Commonwealth Government	-	7,200
Interest revenue	1,781	2,073
Other revenue	56	538
<b>Total Revenue</b>	<b>1,837</b>	<b>17,501</b>
<b>Expenses</b>		
Advertising and promotion	-	1
Auditor's remuneration – audit of financial reports	45	56
Auditing – other services	29	-
Consultancy	10	23
Insurance	14	55
Legal	-	26
Membership	250	250
Motor vehicle expenses	8	428
Operating lease rental expense – minimum lease payments	41	1
Other Contractors (Refer note 2 (a))	614	18,198
Personnel services		
Salaries and wages (including recreation leave)	586	512
Superannuation	54	45
Long service leave	2	-
Payroll tax and fringe benefits tax	36	30
Research and development grants	1,304	716
Telecommunication	2	1
Training and staff development	1	2
Travel	24	47
Other operating expense	31	47
<b>Total expenses</b>	<b>3,051</b>	<b>20,438</b>
<b>Net Result</b>	<b>(1,214)</b>	<b>(2,937)</b>

The accompanying notes form part of the financial report.

**COAL INNOVATION NSW FUND  
STATEMENT OF FINANCIAL POSITION AS AT 30 JUNE 2015**

	2015	2014
	\$000	\$000
<b>ASSETS</b>		
<b>Current Assets</b>		
Cash and cash equivalents	84,830	74,381
Receivables		
Interest receivable	836	7,238
Net GST receivable	11	-
Other debtors	-	5,660
Accrued Income	56	-
<b>Total Current Assets</b>	<b>85,733</b>	<b>87,279</b>
<b>Total Assets</b>	<b>85,733</b>	<b>87,279</b>
<b>LIABILITIES</b>		
<b>Current Liabilities</b>		
Payables		
Creditors	26	55
NSW Department of Trade & Investment, Regional Infrastructure & Services (DTIRIS)	548	344
Net GST payable	-	507
<b>Total Current Liabilities</b>	<b>574</b>	<b>906</b>
<b>Total Liabilities</b>	<b>574</b>	<b>906</b>
<b>Net Assets</b>	<b>85,159</b>	<b>86,373</b>
<b>EQUITY</b>		
Accumulated funds	85,159	86,373
<b>Total Equity</b>	<b>85,159</b>	<b>86,373</b>

The accompanying notes form part of the financial report.

**COAL INNOVATION NSW FUND  
STATEMENT OF CASH RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 30 JUNE 2015**

	Notes	2015 \$'000	2014 \$'000
<b>Receipts</b>			
Bank interest	3(1c)	8,138	-
Contribution received	3(2)	5,143	-
Receipt from DTIRIS		-	74,381
<b>Total receipts</b>		<b>13,281</b>	<b>74,381</b>
<b>Payments</b>			
Project costs	4(1a)	1,228	-
Grants and subsidies	4(1a)	800	-
Administrative expenses	4(1b)	804	-
<b>Total payments</b>		<b>2,832</b>	-
<b>Net receipts</b>		<b>10,449</b>	<b>74,381</b>
<b>Opening balance of Special Deposit Account</b>		74,381	-
<b>Closing balance of Special Deposit Account</b>		<b>84,830</b>	<b>74,381</b>

The accompanying notes form part of the financial report.

**Coal Innovation NSW Fund**  
**Notes to the Financial Report**  
**for the year ended 30 June 2015**

**1. COAL INNOVATION NSW FUND**

**Entity**

The Coal Innovation NSW Fund (the Fund) is a not-for-profit entity (as profit is not its principal objective) and the Fund does not have a cash generating unit.

The Fund has been established and is governed under the *Coal Innovation Administration Act 2008* (the Act). Part 2 Section 4 of the Act establishes the Fund as a Special Deposits Account.

The financial report has been prepared on the basis that the Fund is a non-reporting entity under the Australian Accounting standards. The financial report for the Fund is therefore a Special Purpose Financial Report with the financial year being from 1 July 2014 to 30 June 2015.

This financial report for the year ended 30 June 2015 has been authorised for issue by the Deputy Secretary on the date the accompanying statement by the Deputy Secretary was signed.

**Key activities**

Part 2 Section 5 of the Act establishes the purpose of the Fund as follows:

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

**Funding sources for the Fund**

Part 2 Section 6 of the Act states that:

- (1) There is payable into the Fund:
  - (a) all money advanced by the Treasurer to the Fund, and
  - (b) all money appropriated by the Parliament for the purposes of the Fund, and
  - (c) the proceeds of the investment of money in the Fund, and
  - (d) all money directed or authorised to be paid into the Fund by or under this or any other Act or law, and
  - (e) all money received for voluntary contributions to the Fund made by any person or body.
- (2) A voluntary contribution to the Fund may be made on the condition that the contribution is to be used only for a specified purpose.

**Payments out of the Fund**

Part 2 Section 7 of the Act states that:

- (1) There is payable from the Fund
  - (a) payments approved by the Minister for the purpose of the Fund, and
  - (b) administrative expenses incurred in relation to the Fund or Coal Innovation NSW (CINSW), 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 it 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.



**Coal Innovation NSW Fund**  
**Notes to the Financial Report**  
**for the year ended 30 June 2015**

**2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

**Basis of preparation**

This financial report is a special purpose financial report that has been prepared in order to account for the transactions of the Fund under the Act.

The financial report has been prepared in accordance with the significant accounting policies disclosed below. Such accounting policies are consistent with the previous period unless stated otherwise.

The Statement of Financial Position and the Statement of Comprehensive Income have been prepared on an accruals basis and based on historic costs and do not take into account changing money values or, except where specifically stated, current valuations of non-current assets.

The Statement of Cash Receipts and Payments reflects the movement in the Fund's bank account (cash basis). Transactions and events are recognised only when cash is received or paid via the Fund. Receipts are realised when cash is received and expenditures are recorded when cash is actually paid.

All amounts are rounded to the nearest thousand (\$'000) dollars and are expressed in Australian dollars.

**(a) Research and development expenses**

The Fund engages contractors to conduct work for site preparation, drilling, engineering, project management and research activities. This activity is classified as in research phase for the project and no expenses have been capitalised. An asset will not be recognised until clear and quantifiable future benefit is established. However there is acknowledgement that any grant is from the Fund and any future economic benefits (assets) arising out of it may belong to NSW government and/or the research partner.

**(b) Accounting for Goods and Services Tax (GST)**

Income, expenses and assets are recognised net of the amount of GST, except that:

- (a) the amount of GST incurred by the Fund as a purchaser that is not recoverable from the Australian Taxation Office is recognised as part of the cost of acquisition of an asset or as part of an item of expense and
- (b) receivables and payables are stated with the amount of GST included

Cash flows are included in the Statement of Cash Receipts and Payment on a gross basis.

**(c) Income recognition**

Income is measured at the fair value of the consideration or contribution received or receivable. Additional comments regarding the accounting policies for the recognition of income are discussed below.

- (a) Grants and contributions  
Grants and contributions include industry contributions and grants from Commonwealth and New South Wales government. They are generally recognised as income when the Fund obtains control over the assets comprising the grants and contributions. Control over grants and contributions are normally obtained upon the receipt of cash.

However, some revenue is recognised when the Fund issues invoices in relation to partnership agreements where work is completed and grants are based on actual expenses incurred in the previous quarter. The invoices are issued after the Steering Committee accepts the financial report and the actual expenses for the quarter.

- (b) Interest Revenue  
Interest revenue is recognised using the effective interest method as set out in AASB 139 Financial Instruments: Recognition and Measurement

**(d) Receivables**

Receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. These financial assets are recognised initially at fair value, usually based on the transaction cost or face value less an allowance for any impairment. Any changes are recognised in the net result for the year when impaired or derecognised.

**Coal Innovation NSW Fund**  
**Notes to the Financial Report**  
**for the year ended 30 June 2015**

**2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

**(e) Payables**

These amounts represent liabilities for goods and services provided to the Fund and other amounts. Payables are recognised initially at fair value, usually based on the transaction cost or face value.

**(f) Personnel services**

The Fund does not have any employees and receives administrative, secretarial support and operational assistance from DTIRIS. The Fund has an arrangement with DTIRIS to reimburse them for personnel services

**3. RECEIPTS**

**2015**  
**\$'000**      **2014**  
**\$'000**

Amounts received into the bank account are as follows:

The Fund is authorised to receive amounts in accordance with Section 6 of the Act.

(1)(a) all money advanced by the Treasurer to the Fund	-	-
(b) all money appropriated by the Parliament for the purposes of the Fund	-	-
(c) the proceeds of the investment of money in the Fund	8,138	-
(d) all money directed or authorised to be paid into the Fund by or under this or any other Act or law	-	-
(e) all money received for voluntary contributions to the Fund made by any person or body.	-	-
(2) a voluntary contribution to the Fund may be made on the condition that the contribution is to be used only for a specified purpose.	5,143	-
Transfer from DTIRIS	-	74,381
<b>Total receipts</b>	<b>13,281</b>	<b>74,381</b>

**4. PAYMENTS**

Amounts paid out of the bank account are as follows:

Payments from the Fund are in accordance with Section 7 of the Act.

(1)(a) payments approved by the Minister for the purpose of the Fund	2,028	-
(b) administrative expenses incurred in relation to the Fund or CINSW	804	-
(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 it 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.	-	-
<b>Total payments</b>	<b>2,832</b>	<b>-</b>

**5. EVENTS AFTER THE REPORTING DATE**

Other than that disclosed below, there are no events subsequent to the balance date that affect the financial information disclosed in this financial report.

On 1 July 2015 the Department of Industry, Skills & Regional Development established as a continuation of the abolished DTIRIS. All the payables to DTIRIS are payable to the new department.

**End of financial report**