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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

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Copenhagen, 8–12 December 2009

Agenda item 8 (b)

Methodological issues under the Kyoto Protocol

**Carbon dioxide capture and storage in geological formations as
clean development mechanism project activities**

**Further views on issues relevant to the consideration of carbon dioxide
capture and storage in geological formations as project activities
under the clean development mechanism**

Submissions from Parties

1. The Subsidiary Body for Scientific and Technological Advice, at its thirtieth session, invited Parties to submit to the secretariat, by 28 September 2009, further views on issues relevant to the consideration of carbon dioxide capture and storage in geological formations as clean development mechanism project activities (FCCC/SBSTA/2009/3, para. 114).
2. The secretariat has received one such submission. In accordance with the procedure for miscellaneous documents, this submission is attached and reproduced* in the language in which it was received and without formal editing.

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SUBMISSION FROM AUSTRALIA

AUSTRALIA

Issues relevant to the consideration of Carbon Dioxide Capture and Storage in Geological Formations as Clean Development Mechanism Project Activities

Submission to SBSTA 31

November 2009

Australia is pleased to submit its views relating to the inclusion of carbon dioxide capture and storage (CCS) in geological formations as clean development mechanism (CDM) project activities, for consideration by SBSTA at its thirty-first session.¹ This submission builds on Australia's previous submission to SBSTA at its twenty-ninth session.²

There have been a number of important developments on this issue since COP-14 in Poznan. These include the recent release of the report to the CDM Executive Board on "Implications of the Inclusion of Geological Carbon Dioxide Capture and Storage as CDM Project Activities"³ along with significant new national and international initiatives aimed at supporting the development and deployment of CCS.

Australia welcomes the report to the Executive Board. The report sets out the key parameters of a robust technical and policy framework for the safe and efficient inclusion of CCS projects in the CDM. It shows that inclusion of CCS will not have a significant impact on the CER market in the short-term with uptake in developing countries being gradual over time. In particular we note that the report estimates that the CCS share of CER supply would be very low before 2012 and likely to represent 10 percent or less of total supply by 2020 and is therefore unlikely to significantly impact on the broad pattern of CDM investments in the period to 2020.

Inclusion now will, however, send an important positive signal to those developing countries and businesses interested in deployment of CCS technology in order to stimulate and provide certainty for long term

¹ FCCC/SBSTA/2009/MISC.11

² <http://www.climatechange.gov.au/government/initiatives/unfccc/~media/submissions/international/ccs-as-cdm-project-activities.ashx>

³ <http://cdm.unfccc.int/EB/049/eb49annagan4.pdf>

investment decisions. Australia believes this is critically important as CCS will be an important technology for many developing countries and the CDM provides incentives for technology cooperation and diffusion between developed and developing countries.

Another key development in 2009 was the successful establishment and launch in July 2009 of the Global Carbon Capture and Storage Institute (Global CCS Institute). The Global CCS Institute has 146 Foundation members, comprising 23 national governments (including 10 developing countries) and more than 100 major companies and organisations. Australia has committed \$100 million per annum over four years to fund the Global CCS Institute, and a further \$2 billion to build two to four industrial-scale CCS projects in Australia under the Government's new Carbon Capture and Storage Flagships program.

In light of these positive developments and in the hope of constructively progressing discussions, Australia has prepared the following items for consideration by Parties:

- A short discussion paper outlining the key issues relating to inclusion of CCS in the CDM (**Attachment A**)
- The core elements of a draft decision text proposal for consideration at the next session of SBSTA that builds on the work of other Parties and seeks to identify common elements and progress consensus (**Attachment B**)
- A summary of current and proposed CCS related outreach activities to enhance the capacity of developing countries that may wish to deploy CCS in the future (**Attachment C**).

We look forward to working constructively with Parties to progress this issue at the next session of the SBSTA.

Attachment A

Providing sustainable long term incentives for global CCS deployment

The need to deploy CCS

Analysis by expert organisations such as the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) unambiguously demonstrates that achieving an ambitious long term global goal such as stabilizing atmospheric greenhouse gases at 450 ppm or lower will require deployment of the full range of low emission technologies across developed and developing countries. Given that fossil fuel consumption is projected to continue to underpin economic development well into the future, CCS represents a transitional technology with the potential to make a substantial contribution by removing up to 90% of carbon emissions in a range of fossil fuel based energy and industrial activities.

Developing commercial scale CCS applications is currently underway with a number of medium scale sites in operation today. The deployment of CCS is dependent on an explicit or shadow carbon price. In developed countries this will happen through national policies, including the introduction of market based or regulatory measures. In the case of developing countries the wide range of different national circumstances suggests that a multifaceted approach will be needed to support deployment, and the CDM will be one important tool.

Inclusion of CCS in the CDM will provide direct financial incentives for those developing countries that may wish to deploy this technology. As CCS investments are long lived and generally large scale, there is a need to send markets clear signals at an early stage to provide certainty and aid business planning.

The benefits of including CCS in the CDM

Inclusion of CCS in the CDM (and other incentive mechanisms) would offer the following benefits:

- It provides an economic incentive for developing countries that can offset the incremental cost of the technology;
- It provides developing countries access to the same economic incentives that are available for other emission abatement technologies;
- As a voluntary mechanism it supports the right of developing countries to choose their preferred development path, including a choice not to use CCS; and
- Application of rigorous project approval criteria will promote best practice deployment of CCS.

Addressing concerns

This issue has been the subject of vigorous debate over recent years and a number of potential concerns have been expressed by some Parties in relation to the approval of CCS projects under the CDM. Some of these relate to the use of CCS as a low emissions technology and some relate to the operation of the mechanism. Broadly considered these include:

- a) Inclusion of CCS in the first commitment period would jeopardise current CDM investments by collapsing CER prices or diverting resource flows;
- b) The technology is unproven or unsafe;
- c) Developing countries lack the technical and policy capacity to utilise CCS; and
- d) Inclusion would require a substantive rewrite of CDM rules due to potential non-permanence of stored carbon emissions.

It is important that these concerns are addressed.

Analysis in the recently released report to the CDM Executive Board on “Implications of the Inclusion of Geological Carbon Dioxide Capture and Storage as CDM Project Activities”⁴ shows that that inclusion of CCS is not expected to significantly impact on CER markets in the short to medium term with uptake in developing countries being gradual over time. The report estimates that the CCS share of CER supply would be very low before 2012 and likely to represent 10 percent or less of total supply by 2020. Australia believes it is unlikely that inclusion of CCS in the CDM will affect investment patterns in forestry, renewable, bio-fuel and energy efficiency projects.

Australia considers that inclusion of CCS in the CDM now will, however, send an early positive signal to those developing countries and businesses interested in deployment of CCS technology in order to stimulate and provide certainty for long term investment decisions.

As demonstrated in the conclusions of the report to the CDM Executive Board, CCS can readily be accommodated within the general structure and modalities and procedures of the CDM. However, CCS specific modalities and procedures will be needed to address core environmental, safety, social and legal concerns. This is similar in principle to the modalities and procedures developed for afforestation and reforestation projects under decision 5/CMP.1 (although treatment of issues such as non-permanence may differ).

Consistent with normal CDM practices, relevant project methodologies would be agreed by the CDM Executive Board through the PDD/project registration and approval process. There would need to be specific CCS expertise made available for the Board and Designated Operational Entities would need CCS accreditation. We note that the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines), as well as the IPCC Special Report on CCS set out an accounting framework for calculating CCS related emission flows and could have ready application in the context of CDM methodologies. We note also that the SBSTA will commence a work program in 2010 that, inter alia, will address methodological issues associated with reporting when using the 2006 IPCC guidelines. CCS emission estimation methodologies for the CDM should be consistent with those developed through the 2010 work program. In all cases project criteria and methodologies would respect and support all relevant national and international approval processes and laws consistent with the operation and mandate of the CDM.

The need to develop technical, legal and policy/regulatory capacities in developing countries interested in deploying CCS is well recognized and there is a significant body of work underway through bodies such as the Carbon Sequestration Leadership Forum (CSLF), the Global Carbon

⁴ <http://cdm.unfccc.int/EB/049/eb49annagan4.pdf>.

Capture and Storage Institute (GCCSI), the IEA and others (see **Attachment C** for a summary of planned and current capacity building activities).

A way forward

Australia welcomes the proposal put forward by AOSIS on CCS in the CDM, Norway's proposal for a carbon dioxide storage mechanism and the progress made in other negotiating groups. Both proposals consider methodologies to support the uptake of CCS and define similar parameters for establishing new modalities and procedures for CCS projects.

In the hope of moving towards consensus, Australia has developed the core elements of a possible CMP decision text (set out at **Attachment B**). This text builds on the proposals by AOSIS and Norway and takes into account the recommendations in the report to the CDM Executive Board. It adopts a similar approach to the framework for modalities and procedures for afforestation and reforestation project activities included in the Annex to decision 5/CMP.1. It does not presuppose any change in the respective roles and powers of the Executive Board or other entities such as the DOE. In summary it is proposed that:

CCS projects would be eligible to generate CER units where such projects fully meet CDM project approval criteria, including the following requirements:

1. Project boundaries are defined;
2. Robust and comprehensive baseline and monitoring methodologies based on 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines)⁵ relevant parts of the IPCC Special Report on CCS, and available industry best practice are specified;
3. A thorough risk assessment has been conducted of the storage site and operation that included an assessment of all potential seepage paths and environmental impacts, using detailed site characterization and simulation based on the methodological guidance identified in point 2 above;
4. Procedures for the proper and safe sealing and abandonment of the reservoir, responsibilities for monitoring for any seepage from the reservoir in the long term, long term liabilities and accounting for any seepage and the remediation required are identified;
5. The Project Design Document (PDD) states that the proposed project is compliant with the relevant host party regulatory provisions for deployment of CCS projects. Host Parties shall declare in their letter of approval that there are regulatory arrangements in place for the deployment of the CCS projects including measures that provide for project and post-project liability regimes, and that the proposed project is compliant with those arrangements;

⁵ As further addressed through the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" as revised by the SBSTA through its work programme launched in 2010, for adoption by the Conference of the Parties to the Convention.

6. The PDD states that the proposed project supports the expectation that CO₂ within the reservoir will reach a stable distribution in the long term, entailing zero seepage to the atmosphere;
7. Public and stakeholder consultation, including with any affected local and indigenous communities, are described;
8. Designated Operational Entities are accredited to ensure they possess appropriate expertise to assess the technical aspects relevant to CCS to enable them to discharge their validation and verification functions;
9. Any trans-boundary issues are identified and dealt with appropriately, in accordance with international law and following the guidance on cross-border CCS operations in the 2006 IPCC Guidelines.⁶

⁶ As further addressed through the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” as revised by the SBSTA through its work programme launched in 2010, for adoption by the Conference of the Parties to the Convention.

Attachment B

Core elements of draft text for CCS in the CDM

The CMP:

1. *Notes* the final report to the Clean Development Mechanism Executive Board on “Implications of the Inclusion of Geological Carbon Dioxide Capture and Storage as CDM project activities”.⁷
2. *Decides* that activities relating to carbon dioxide capture and storage in geological formations, including saline aquifers and excluding ocean sequestration, should be eligible as project activities under the Clean Development Mechanism.
3. *Requests* the Subsidiary Body for Scientific and Technological Advice to recommend modalities and procedures for Clean Development Mechanism project activities relating to carbon dioxide capture and storage in geological formations, with a view to forwarding a draft decision on this matter to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol for adoption at its sixth session, including modalities and procedures in relation to:
 - a) Definitions;
 - b) Role of Conference of the Parties serving as the meeting of the Parties;
 - c) Role of the Executive Board;
 - d) Accreditation and designation of operational entities;
 - e) Role of designated operational entities;
 - f) Participation requirements;
 - g) Validation and project registration;
 - h) Monitoring during project operation and following project closure;
 - i) Verification and certification;
 - j) Addressing non-permanence of carbon dioxide capture and storage project activities.
4. *Requests also* the Subsidiary Body for Scientific and Technological Advice, in preparing its recommendations pursuant to paragraph 3, to incorporate in the Clean Development Mechanism approval procedures and the project design document, as appropriate, requirements that the project participants, inter alia:
 - a) Define physical project boundaries;
 - b) Undertake and report on the comprehensive risk assessment conducted of the storage site and operation, including an assessment of all potential seepage paths, and environmental, health and safety impacts;
 - c) Identify procedures for addressing the risks identified in subparagraph 4 (b) including for safe sealing and abandonment of the reservoir and for monitoring

⁷ <http://cdm.unfccc.int/EB/049/eb49annagan4.pdf>

and accounting seepage of CO₂ emissions;

- d) Declare that the proposed project will achieve compliance with all relevant national laws and regulations for deployment of carbon dioxide capture and storage; and
- e) Undertake and report on public and stakeholder consultation, including with any affected local and indigenous communities.

5. *Further requests* the Subsidiary Body for Scientific and Technological Advice, in preparing its recommendations pursuant to paragraph 3, to incorporate requirements that the host countries, inter alia:

- a) Establish measures to identify and address any trans-boundary seepage paths in accordance with international law;
- b) Establish national regulatory frameworks for the deployment of carbon dioxide capture and storage;
- c) Affirm the declaration of the project participants pursuant to subparagraph 4 (d) of this decision; and
- d) Establish measures that provide for appropriate project and post-project liability regimes.

6. *Requests also* the Subsidiary Body for Scientific and Technological Advice, in preparing its recommendations pursuant to paragraph 3, to incorporate in the Clean Development Mechanism procedures for the accreditation of designated operational entities (DOE) the requirement that such entities possess the technical expertise necessary to discharge their validation and verification functions with respect to project activities relating to carbon dioxide capture and storage in geological formations.

7. *Encourages* developed country Parties to provide appropriate support to assist developing countries interested in deploying carbon capture and storage technologies.

Attachment C

Snapshot of CCS Capacity Building Activities

The table below outlines a range of current and proposed CCS capacity building measures that would assist interested developing countries in hosting CCS projects. This is not an exclusive list and further measures may emerge following a decision to provide incentives for deployment in developing countries

Global Carbon Capture & Storage Institute	
<i>Existing Capacity Building Partnerships</i>	
Activities	Country Focus
<p>Carbon Sequestration Leadership Forum (CSLF) June 2009 - 30 June 2011 \$1.2 million provided to the CSLF for capacity building activities:</p> <ul style="list-style-type: none"> • <i>CCS activity analysis</i>: identification of capacity building activities both planned and underway in key developing countries. • <i>Non-technical Capacity building workshops</i>: develop and deliver workshops targeted to the needs of government, industry, NGOs and the public in specific countries. • <i>Technical Capacity building workshops</i>: develop and deliver technical workshops focused on issues of deployment to targeted audience. • <i>Country Recommendations</i>: following the workshop series, it is hoped a final report will be developed for each host country. 	<p>Developing countries for example:</p> <ul style="list-style-type: none"> • China • India • Brazil
<p>Asia Development Bank (ADB) 19 June 2009 – until funds are spent The Global CCS Institute has provided AUD\$21.5 million to the ADB under a ‘Clean Energy Trust Fund’ (part of the ADB’s ‘Clean Energy Financing Partnership Facility’) to further a number of aims, including:</p> <ul style="list-style-type: none"> • “engaging in capacity development” <ul style="list-style-type: none"> - Actual capacity building activities are yet to be defined. 	<p>Developing countries particularly:</p> <ul style="list-style-type: none"> • China • India • Vietnam • Indonesia
<p>International Energy Agency May 2009 RET provided €10.4 million to the IEA to implement a CCS work program, by a CCS Unit that the IEA intends to establish. There are four streams to the work program, including:</p> <ol style="list-style-type: none"> 1) Technical analysis, 2) legal and regulatory analysis, 3) capacity building/outreach and 4) international coordination. <p>Key activities proposed under the capacity building stream include:</p> <ul style="list-style-type: none"> • <i>Country specific roadmaps</i>: the IEA proposes to develop a set of country- 	<p>Not yet specified</p>

<p>specific recommendations for CCS.</p> <ul style="list-style-type: none"> • <i>CCS Centre of Excellence in China</i>: to support best practice CCS research, development, demonstration and deployment. • <i>Staff Development to Build Local CCS Capacity</i>: secondment of staff to the IEA's CCS Unit. • <i>CCS Communication Projects</i>: IEA proposes to review communication studies and develop various aids to communication informed by the conclusions of the studies. 	
<p>IEA Environmental Projects Ltd 9 June 2009 – end 2010</p> <p>The Global CCS institute has provided \$2.5 million for a number of activities, including co-funding for three years the:</p> <ul style="list-style-type: none"> • <i>International Energy Agency Greenhouse Gas Programme (IEA GHG) Summer School</i>: which brings 60 students from developed and developing countries, to a venue for a one week intensive training course on CCS. <ul style="list-style-type: none"> • This will include providing mentored Summer Schools at future Greenhouse Gas Control Technologies conference for students from developing countries. • For the 2009 Summer School, to be held in Vic, Australia, the GCCSI provided \$100,000 as a major contributor. 	<p>Developed and developing countries</p>
<p>International Energy Forum 10 June – 31 October 2010</p> <p>The Global CCS Institute has provided \$250,000 for administrative costs of holding:</p> <ul style="list-style-type: none"> • <i>Two Symposia</i>: one in Asia-Pacific (probably China in Sep 09) and one in the Middle East (probably Algeria in June 2010) for industry and governments. <ul style="list-style-type: none"> • The agenda for the first symposium will cover policy issues in the lead up to the CSLF, IEA and IEF meetings. The second symposium will focus on technical issues and other developments since the first symposium. <p><i>While not labeled capacity building per se, it has this effect.</i></p>	<ul style="list-style-type: none"> • Beijing, China • Middle East (probably Algeria)

<p>ICF Incorporated 22 June - 30 Dec 2009</p> <p>\$1.5 million was provided for a number of activities, including \$229,799 for a:</p> <ul style="list-style-type: none">• CCS Ready workshop. Workshop participants from government and industry will review and comment on:<ul style="list-style-type: none">• a) Technical, legal and regulatory issues required for an appropriate definition of CCS Ready, b) the economies of CCS Ready regulation; c) financing issues that may impede CCS development and d) uptake; a review of CCS Ready technologies; e) opportunities to promote the uptake of CCS in developing countries. <p><i>While not labeled capacity building per se, it has this effect.</i></p>	
<p>South Africa national Energy Research Institute (SANERI)</p> <p>The Global CCS institute is providing \$130,000 sponsorship for a:</p> <ul style="list-style-type: none">• <i>CCS Conference</i> to be hosted by SANERI in South Africa. The two day conference will help South African and global proponents build knowledge and capacity in developing a CCS demonstration project.• <i>Two Workshops</i> will be associated with the conference, one on geological modeling and second on injection techniques.	South Africa

Asia Development Bank (ADB)	
Activities	Country Focus
<p>Clean Energy Financing Partnership Facility Established April 2007</p> <p>The ADB supports activities many of which potentially have capacity building components under their ‘Clean Energy Financing Partnership Facility’ and a ‘Clean Energy Fund’. This is a multi-donor fund to support technical assistant, grant components of investment projects, and any other activities that may be agreed. They also establish ‘clean energy trust funds’ bilaterally (e.g. the arrangement they have with the Global CCS Institute).</p> <p>The following two projects are funded from this Facility/Fund.</p>	Developing member countries of ADB
<p><i>People’s Republic of China: Carbon Dioxide Capture and Storage Demonstration – Strategic Analysis and Capacity Strengthening</i> May 2009 – 30 April 2010</p> <p>The ADB is will contribute US\$1.25 million of a US\$1.55 million project to develop:</p> <ul style="list-style-type: none"> (i) a comprehensive road map for CCS demonstration project(s); (ii) essential enabling policies, legal and regulatory framework for CCS demonstration; (iii) identification of priority demonstration projects and associated financing needs; and (iv) <i>capacity assessment and comprehensive capacity development in critical areas of CCS demonstration.</i> [emphasis added] 	China
<p>Carbon Dioxide Capture and Storage Demonstration in Developing Countries – Analysis of Key Policy Issues and Barriers May 2009 -</p> <p>The ADB will fund technical assistance of US\$350,000 to achieve the following aims:</p> <ul style="list-style-type: none"> (i) analysis of intellectual property issues from the perspectives of developing countries (PRC and India), (ii) identification of innovative and low-cost financing approaches, (iii) examination of appropriate classification of CCS to reduce trade barriers; (iv) formulation of recommendations on enabling policies for seeking private investment in CCS demonstration and deployment. 	China India
World Bank	

Activities	Country Focus
<p>Carbon Partnership Facility/Carbon Asset Development Fund</p> <p><i>Planned</i></p> <p>The World Bank is investigating the establishment of a Carbon Partnership Facility and associated Carbon Asset Development Fund (similar to the ADB Facility & Fund, however, managed differently). This Facility and Fund could play a pioneering role in exploring opportunities for creating a new type of high-quality carbon assets from CCS technology deployment in developing countries. This would include a focus on:</p> <ul style="list-style-type: none"> • Capacity building in developing countries, particularly for the establishment of an appropriate policy, legal and regulatory framework related to carbon assets from CCS. 	

Asia Pacific Partnership (APP)	
Activities	Country Focus
<p>Cleaner Fossil Energy Task Force</p> <p>This Task Force is undertaking 17 projects, many of which have elements of capacity building. Three of the projects have a more specific capacity building focus:</p> <ul style="list-style-type: none"> • <i>CO2 Capture and Storage Program (Aus, China)</i>: This project will identify a range of initiatives that Partner countries may wish to consider in advancing knowledge and understanding of carbon capture and storage technologies. • <i>Cooperative R&D on Cleaner Fossil Energy (Korea, USA)</i>: cooperate in the field of fossil fuel-related R&D. This includes exchanging information, knowledge, experience, and best practices; joint R&D projects; joint publications; meetings, workshops, and symposia; personnel exchanges; and human and institution capacity building. • <i>Guidelines for Safe and Effective CCS (China, USA)</i>: This project aims to speed the demonstration of CCS technologies by building capacity. It will do so by developing and defining recommended guidelines and best practices for safe and effective CCS. 	<p>APP countries</p> <ul style="list-style-type: none"> • Australia • China • Japan • Korea • USA • India • Canada

Asia Pacific Economic Cooperation (APEC)	
Activities	Country Focus
<p>CCS Capacity Building Workshop (conducted by the Australian CO2CRC)</p> <p>Second half of 2009</p> <ul style="list-style-type: none"> • <i>2 Capacity Building Workshops</i>: to help increase the capacity of developing APEC economies to assess the potential of CCS technologies within their 	<p>Developing APEC countries such as:</p>

<p>own economies and evaluation options for the implementation and potential uptake of such technologies.</p> <ul style="list-style-type: none"> • Target audience, 50-80 industry and government decision makers from member countries. 	<ul style="list-style-type: none"> • China • Indonesia • Vietnam • Thailand
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Organisations or Groups that are, or may potentially, operate in the CCS capacity building space	
Global CCC Institute	South Africa national Energy Research Institute (SANERI)
Asia Development Bank (ABD)	International Energy Forum (IEF)
Carbon Sequestration Leadership Forum (CSLF)	Asia Pacific Partnership (APP)
World Bank	Asia Pacific Economic Cooperation (APEC)
International Energy Agency (IEA)	East Asia Summit
Climate Group	EU-China Cooperation on Climate Change
Clinton Foundation	The Support to Regulatory Activities for Carbon Capture and Storage (STRACO2)
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	The European Technology Platform on Zero Emission Fossil Fuel Power Plants (ZEP)
Bellona	UK-China Near Zero Emissions Coal (NZEC)
World Institute Resources institute	EU-India Working Group on Clean Coal Technologies
