

Carbon Sequestration leadership forum

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POLICY GROUP

Emerging Economy Project Activity

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EMERGING ECONOMY PROJECT ACTIVITY

Note by the Secretariat

Background

The CSLF Secretariat, in early October 2007, contacted the Asian Development Bank (ADB) and arranged for an ADB delegation to attend a meeting of the CSLF Financial Issues Task Force later that month in New Delhi, India. At that meeting, the ADB expressed its interest in CSLF activities concerning financing of carbon capture and storage (CCS) in emerging economy countries.

At the CSLF Financial Issues Task Force meeting in New Delhi, India, in December 2008, the ADB proposed funding a Technical Assistance Report that would address several areas:

- Analysis of intellectual property rights (IPR) issues from emerging economy countries' perspectives.
- Identification of innovative and low cost financing approaches to CCS.
- Examination of appropriate classification of CCS to reduce trade barriers.
- Formulation of recommendations on enabling policies for seeking private investment in CCS demonstration and deployment.

The Technical Assistance Report will be the first step in developing a financing roadmap for CCS demonstrations in emerging economy countries.

This document presents the proposal for the ADB's anticipated Technical Assistance Report.

Action Requested

The Policy Group is requested to review and consider the ADB's Technical Assistance Report proposal.



Technical Assistance Report

Project Number: 43116
Regional Policy and Advisory Technical Assistance (R-PATA)
March 2009

REG: Carbon Dioxide Capture and Storage Demonstration in Developing Countries – Analysis of Key Policy Issues and Barriers

(Financed by the Climate Change Fund)

CURRENCY EQUIVALENTS

(as of 20 March 2009)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1464
\$1.00	=	CNY6.83

ABBREVIATIONS

ADB	–	Asian Development Bank
CCS	–	carbon dioxide capture and storage
CDM	–	Clean Development Mechanism
CIF	–	Climate Investment Fund
CO ₂	–	carbon dioxide
CSLF	–	Carbon Sequestration Leadership Forum
DMC	–	developing member country
EA	–	Executing Agency
EAEN	–	Energy Division, East Asia Department
GHG	–	greenhouse gas
GW	–	gigawatt
IEA	–	International Energy Agency
IPCC	–	intergovernmental panel for climate change
IPR	–	Intellectual property right
MDB	–	multilateral development bank
PRC	–	People's Republic of China
RSID	–	Sustainable Infrastructure Division, Regional and Sustainable Development Department
SAEN	–	Energy Division, South Asia Department
TA	–	technical assistance
WTO	–	World Trade Organization

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Regional Policy and Advisory Technical Assistance (R-PATA)
Targeting classification	–	General intervention
Sector (subsector)	–	Energy (Energy sector development)
Themes (subthemes)	–	Environmental sustainability (global and regional transboundary environmental concerns)
		Capacity Development (client relations, network and partnership development)
		Regional cooperation and integration (other regional public goods)
Climate change	–	Climate change mitigation (CCS is a key mitigation technology)
Location impact	–	Regional/Global
Partnership	–	Carbon Sequestration Leadership Forum as implementation partner

NOTE

In this report, "\$" refers to US dollars.

Vice-President	C. Lawrence Greenwood, Jr., Operations Group 2
Director General	K. Gerhaeusser, East Asia Department (EARD)
Team leader	A. Bhargava, Senior Energy Specialist, EARD
Team member	M. Pajarillo, Finance Specialist (Energy), EARD

I. INTRODUCTION

1. The Carbon Sequestration Leadership Forum (CSLF) through its secretariat approached Asian Development Bank (ADB) in January 2009 to provide assistance on a study on key policy issues and barriers that may prevent or delay demonstration of carbon dioxide capture and storage (CCS) technologies in developing countries.¹ The proposed regional policy and advisory technical assistance (TA) study came out of a series of CSLF deliberations in its financial issues task force (the Task Force) meetings for more than a year, which were also attended by ADB as a stakeholder.² During the last Task Force meeting in India in December 2008, the request for the proposed TA was endorsed. Subsequent discussions were held with the CSLF secretariat and some key members notably, European Commission to firm up the impact, outcomes, outputs, implementation arrangements, cost, and financing arrangements of the TA as reflected in this paper.³ The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. Climate change is emerging as a key development challenge in the region. A growing body of scientific evidence indicates that increases in greenhouse gases (GHGs) caused by human activities are predominantly responsible for the rapid climate change. The intergovernmental panel on climate change (IPCC) in its fourth assessment report in 2007 highlights the need to halve energy related carbon dioxide (CO₂) emissions by 2050, if the global temperature increases are to be kept below 2–3 degrees Celsius, which corresponds to 450 and 550 stabilization scenarios, respectively.⁴ As per the International Energy Agency's (IEA's) assessment on a global scale, CCS technologies have the potential to reduce overall climate change mitigation costs and increase flexibility in reducing GHG emissions. The CCS is an integral part of all GHG emission reduction strategies proposed by IPCC and IEA.

3. Globally, electricity generation accounts for 29% of CO₂ emissions. After energy efficiency, CCS provides the largest potential for CO₂ emission reductions. However, CCS is in its early stage of development and urgent actions are required to undertake demonstration projects. IEA, in its report to the G8 summit in Hokkaido, Japan in July 2008, recommended that at least 20 fully integrated industrial-scale demonstration power plant with CCS be committed and new generation stock be prepared for future CCS retrofit.⁵ The G8 summit strongly supported the launching of 20 large-scale CCS demonstration projects globally by 2010, taking into account various national circumstances, with a view to beginning broad deployment of CCS by 2020. At the moment, there is no industrial-scale coal-based power plant with CCS. Based on IEA's World Energy Outlook 2008, about 1,000 gigawatts (GW) of new coal-based capacity will

¹ The CSLF is a framework for international cooperation in research and development for the separation, capture, transportation and storage of carbon dioxide (generally referred to as CCS).

² The financial issues task force is one of the four task forces supporting CSLF objectives, India is the chair. ADB became a stakeholder of CSLF in November 2007.

³ The TA first appeared in the ADB business opportunities on 26 March 2009.

⁴ 450 and 550 stabilization scenarios refers to the targeted CO₂ concentration in the atmosphere by 2030, which are being discussed globally for a possible post 2012 global climate change policy regime.

⁵ In 2005, G8 leaders invited the IEA to contribute to the Gleneagles G8 Plan of Action for Climate Change, Clean Energy and Sustainable Development. IEA was asked to advise on alternative scenarios and strategies for clean, clever, and competitive energy future.

be added in India and the People's Republic of China (PRC) cumulatively in the next 20–25 years.⁶ In general, Asia is expected to continue to be the largest user of coal.

4. The CSLF seeks to make CCS commercially competitive and environmentally safe. It is an international effort largely supported by ADB member countries and is expected to result in technology transfer and rapid diffusion of CCS in developing member countries (DMCs). CSLF members are national governmental entities that are significant producers or users of fossil fuels and have a commitment to invest resources in research, development and demonstration activities in CCS technologies. From among ADB DMCs, India and the PRC are CSLF member countries. The activities of the CSLF are conducted by a Policy Group, which governs the overall framework and policies, and a Technical Group, which reviews the progress of collaborative projects and makes recommendations to the Policy Group on any needed actions. The United States Department of Energy is the secretariat for the CSLF. India is the vice chair of the CSLF Technical Group.

5. CCS is particularly relevant to coal-based large economies such as India and the PRC to decouple their growing energy needs from rising CO₂ emissions in the future. Both India and the PRC have taken keen interest in CCS development. The CSLF is one of the few forums which is playing a crucial role in bringing together large fossil fuel-based developing and developed economies to discuss and collaboratively work in the early development of this key technology. Both India and the PRC participation in CSLF also strengthen regional cooperation in this area. Due to higher costs and risks associated with CCS, financing CCS is proving to be a challenge in both developed and developing countries. In the developing countries the challenge is more pronounced due to the absence of regulatory requirements and economic incentives.⁷ Under the CSLF Policy Group, the Task Force (para. 1), was set-up to formulate policy recommendations to overcome costs and associated barriers in early stage demonstration projects in developing countries.⁸ The Task Force recognizes the crucial role of multilateral development banks (MDBs) in identifying appropriate policy recommendations and formulating low cost funding mechanism due to the perceived balance and neutral approach of MDBs on the critical issue of transfer of technology and their long term engagement with the developing countries. The Task Force aims to analyze key policy issues and barriers and help accelerate formulation of creative policy recommendations which can then be submitted to the Policy Group for further consideration and possible inclusion in the CSLF Ministerial meeting in October 2009.

6. Recognizing the direct relevance of CCS in coal-based power plants in India and the PRC and, in general, to its operating region, the ADB is already ahead of other MDBs in formulating suitable interventions in the region, particularly in the PRC.⁹ India has shown strong interest in CCS related activities as illustrated by its active and prominent role in CSLF. The proposed TA has a good fit with ADB energy sector policies and climate change agenda.

⁶ Each GW of coal-based power plant emits about 6 million tons of CO₂ per year.

⁷ Under the existing Kyoto Protocol, the developing countries do not have any mandatory emission reduction target. Moreover, at the moment, CCS is not an eligible technology under the Clean Development Mechanism.

⁸ India is the chair of the Financial Issues Task Force of CSLF.

⁹ In the PRC, the 250 megawatt Tianjin integrated gasification combined cycle is included in the country operations business plan (under preparation) for ADB loan of \$150 million. A complementary TA of \$1.25 million is being finalized for Strategic Analysis and Capacity Strengthening for CCS in the PRC.

7. Since the CCS deployment is time-critical, its demonstration in major coal consuming developing countries such as India and the PRC will need to be brought forward so that the time lag between proving CCS in developed countries and its uptake in developing countries can be minimized. Appropriate low cost financing and rapid transfer of technology to developing countries are recognized by the global CCS community as the critical issues in moving forward with CCS. In particular, there is an urgent need to strengthen the analysis of CCS related global issues such as (i) intellectual property rights (IPRs) related policies and incentive mechanisms to bring CCS technologies to marketplace in developing countries; (ii) rationale for additional investments in capture ready new power plants to avoid carbon lock out, and assessment of elements of additional capture ready costs and their estimation in developing countries; (iii) estimation of the need for level and elements of financing concessionality, if any, for with CCS and capture ready projects, and assessment of existing and emerging clean energy funds of MDBs and their direct relevance to provide low cost funding and risks sharing for CCS demonstration; (iv) assessment of ways to reduce trade barriers surrounding CCS technology in the international trade negotiations, and assess possibilities and ways to classify CCS in the World Trade Organization in order to benefit from the proposed reduction in tariffs for environmental products; (v) an assessment of MDB's interest in investments in CCS demonstration; and (vi) evaluation of policies needed to seek private investments in CCS projects.

8. While suitable in-country interventions are being designed to address capacity issues and country specific barriers (para. 6; footnote 9), there is an urgent need to address the global issues in parallel to keep the CCS agenda on target. The proposed regional policy and advisory TA will analyze these issues in greater depth from developing countries' perspectives and make recommendations to an international body such as CSLF. It is expected that lowering of these critical barriers may provide opportunities to accelerate CCS deployment in India and the PRC.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

9. The impact of the TA will be an established financing road map for CCS demonstration in developing countries. The TA outcome will be formulated recommendations to overcome key global barriers in CCS demonstration in developing countries.

B. Methodology and Key Activities

10. The key outputs of the TA will be (i) analysis of IPR issues from developing countries' perspectives, (ii) identification of innovative and low cost financing approaches, (iii) examination of appropriate classification of CCS to reduce trade barriers, and (iv) formulation of recommendations on enabling policies for seeking private investment in CCS demonstration and deployment.

11. At the initial stages of the TA implementation, a stakeholder network will be established. Throughout the TA implementation, close coordination will be maintained with the CSLF secretariat and the stakeholder network to ensure that the TA takes into account the relevant

studies and international experiences in formulating recommendations. When a preliminary structure and outline of the recommendations are available, consultants will use the information flow from the TA tasks to further refine the recommendations. A knowledge dissemination program with due consideration to similar international initiatives will be designed and implemented before the TA is completed, the details of which will be finalized in consultation with the CSLF secretariat during the TA implementation.

12. The key assumptions and risks are included in the design and monitoring framework in Appendix 1. Since the CCS is in early stages of development with uncertain economic rationale and incentives in developing countries (footnote 7), the major risk is that due to diverse and irreconcilable views among Task Force members, it may take considerable time and effort, likely to extend beyond the TA implementation phase, to arrive at a consensus on the recommendations. Similarly, it is not practically possible to hold individual discussions with each Task Force members to seek their views on TA activities. This has been factored in the TA implementation approach whereby ADB will coordinate directly with the CSLF secretariat who in turn will coordinate with Task Force members as appropriate.

C. Cost and Financing

13. The TA is estimated to cost \$350,000. It will be financed on a grant basis by ADB's Climate Change Fund.¹⁰ It will cover remuneration, travel, and per idem for international experts, training, seminars, and conferences, and TA administration and support costs. The detailed cost estimates and financing plan is in Appendix 2.

D. Implementation Arrangements

14. ADB will be the EA. Within ADB, the TA will be implemented by EAEN in close coordination with SAEN and RSID. The management of the TA will have a three-tiered structure. A study team comprising a team of international consultants will form the core team to carry out TA activities. The study team will be led by a team leader, appointed from among the ADB staff and will be guided by the CSLF secretariat, who will act on behalf of the CSLF Task Force in providing the required guidance and supervision oversight. To optimize resource utilization and strengthen implementation, the ADB team leader will be the same staff that is leading the complementary TA implementation in the PRC (footnote 9).

15. The TA will require 10 person-months of international consulting inputs in the following four critical areas with 2.5 person-months each: (i) IPR issues, (ii) trade barriers, (iii) financial modeling and analysis, and (iv) CCS technical analysis. The individual consultants will be engaged by ADB in accordance with the *Guidelines on the Use of Consultants* (2007, as amended from time to time). Considering the timeline for delivery of TA outputs, advance contracting will be used recruit individual international consultants. Outline terms of reference for the consultants is in Appendix 3.

16. The consultants will produce a draft report by June 2009 that will be circulated to CSLF secretariat at least two weeks before a scheduled meeting of the Task Force. The consultants will

¹⁰ Established by ADB.

attend the Task Force meeting and present their outputs and respond to comments received from participants. A final report addressing consolidated comments will be submitted to CSLF secretariat within 4 weeks of receiving consolidated comments.

IV. THE PRESIDENT'S DECISION

17. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$350,000 on a grant basis for Carbon Dioxide Capture and Storage Demonstration in Developing Countries – Analysis of Key Policy Issues and Barriers, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risk
<p>Impact Established financing road map for CCS demonstration in developing countries</p>	<p>A framework for financing CCS demonstration endorsed by the CSLF Policy Group by 2009</p> <p>Follow on activities on IPR, WTO classification and low cost financing are carried out from 2010</p>	<p>CSLF meetings' notes</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • The CSLF and developing countries maintain strong interest in CCS development. • large coal-dependent developing economies readily accept all the recommendations • Enabling international financing and technology transfer mechanisms agreed. <p>Risk</p> <ul style="list-style-type: none"> • Diverse and irreconcilable views among Task Force members delay acceptance of TA recommendations.
<p>Outcome Formulated recommendations to overcome key global barriers in CCS demonstration in developing countries</p>	<p>Set of creative policies and incentive mechanisms endorsed by the CSLF Task Force in 2009</p>	<p>Consultants' reports</p>	<p>Assumption</p> <ul style="list-style-type: none"> • The recommendations are acceptable to the CSLF Task Force members.

<p>Outputs</p> <ol style="list-style-type: none"> 1. IPR issues analyzed from developing countries' perspectives 2. Innovative and low cost financing approaches recommended and agreed 3. Appropriate classification of CCS in WTO analyzed and recommended to reduce trade barriers 4. Enabling policies formulated for private investment in CCS demonstration and deployment 	<p>The recommendations and measures supported and adopted by the Task Force in 2009</p> <p>General agreement in the Task Force by 2009 on the need and level of financing concessionality for with CCS and capture ready plants</p> <p>The Task Force accepted the recommendation by 2009 on reducing trade barriers</p> <p>A suite of policies and initiatives agreed within the Task Force on promoting private investment in CCS projects in developing countries</p>	<p>Consultants' report</p> <p>Back-to-office reports of TA review missions</p> <p>CSLF Task Force meetings' notes</p> <p>Technical assistance performance reports</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Timely engagement of suitable consultants. • Active participation of CSLF Task Force members in review of TA reports' and in Task Force meetings. • Prompt and effective coordination by the CSLF secretariat. <p>Risk</p> <ul style="list-style-type: none"> • Weak ownership of the TA design and implementation by the CSLF Task Force members.
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Activities with Milestones	Inputs
<p>1.0 Analyze IPR related issues and formulate recommendations to overcome related barriers</p> <p>1.1 Review the range of CCS technologies under patent cover in the United States, European Union, Japan, and Australia and identify companies that have patents on them (weeks 1–6).</p> <p>1.2 Work out modalities of collaborative research based on public–private partnerships to bring out new CCS technologies that are adapted to local conditions (weeks 4–12).</p> <p>1.3 Ascertain possibilities of setting up dedicated financing mechanisms to license in, or purchase these technologies and make them available to developing countries on fair and concessional terms (weeks 6–12).</p> <p>1.4 Work out other business models of collaboration and technology transfer, involving proprietors of the technology and developing country undertakings to ensure that CCS technologies are transferred and indigenized in developing countries (weeks 8–18).</p> <p>2.0 Identify innovative financing approaches and low-cost financing</p> <p>2.1 Define an appropriate industrial-scale fully integrated CCS project based on current trend in developing countries; assess critical technical readiness for coal-based power plants in major coal-based developing countries of CSLF (weeks 1–10).</p> <p>2.2 Develop benchmark standards and criteria for defining capture ready power plant concepts and critically examine the rationale for being capture ready with future CCS retrofit (weeks 1–10).</p> <p>2.3 Establish additional cost elements of capture ready and estimate these costs for a typical coal-based power plant in India and the PRC (weeks 1–10).</p> <p>2.4 Identify total indicative investment needs for the CCS demonstration and undertake detailed analysis of with and without CCS costs to assess the concessionality of incremental funding (weeks 6–12).</p> <p>2.5 Assess international funding mechanisms available—MDBs, CDM, CIF, etc.—and their relevance and suitability for developing countries (weeks 8–18).</p> <p>2.6 Identify the need and potential funding support for preparing a bankable demonstration project (weeks 8–18).</p> <p>3.0 Classification of CCS to reduce trade barriers</p> <p>3.1 Overall assessment of trade barriers, if any, surrounding CCS technology in international trade negotiations (weeks 1–8).</p> <p>3.2 Capture the current status of these potential barriers and critically examine ways to reduce these trade barriers (weeks 6–12).</p> <p>3.3 Evaluate eligibility of CCS and its possible classification in the WTO to benefit from the proposed reduced tariff for environmental products (weeks 8–16).</p> <p>3.4 Capture positive and negative effects of such classification of CCS and formulate suitable recommendations (weeks 10–18).</p> <p>4.0 Enabling policies for private investment in CCS demonstration and deployment in developing countries</p> <p>4.1 Examine international experiences in seeking private investments in CCS demonstration and deployment and their relevance to developing countries (weeks 1–8).</p> <p>4.2 Identify near-term opportunities and key barriers in seeking private investments in CCS (weeks 4–12).</p> <p>4.3 Formulate enabling policies and risk sharing mechanisms that may remove barriers and encourage private investments (weeks 8–16).</p> <p>4.4 Identify measures to enhance awareness of CCS among stakeholders and organize appropriate international workshops and seminars (weeks 10–18).</p>	<p>ADB: \$350,000</p> <ul style="list-style-type: none"> • Consultants: \$265,000 • Seminars and conferences: \$40,000 • TA administration and support cost: \$20,000 • Contingencies: \$25,000

KEY:

ADB = Asian Development Bank

CCS = carbon dioxide capture and storage

CDM = Clean Development Mechanism

CIF = Climate Investment Funds

CSLF = Carbon Sequestration Leadership Forum

IPR = intellectual property right

MDB = multilateral development bank

PRC = People's Republic of China

TA = technical assistance

WTO = World Trade Organization

COST ESTIMATES AND FINANCING PLAN
(\$' 000)

Item	Total Cost
Asian Development Bank Financing^a	
1. International Consultants	
a. Remuneration and Per Diem	210.0
b. International and Local Travel	45.0
c. Reports and Communications	10.0
2. Seminars, and Conferences ^b	40.0
3. Miscellaneous Administration and Support Costs ^c	20.0
4. Contingencies	25.0
Total	350.0

^a Financed by the Climate Change Fund.

^b Details of seminars and conferences will be finalized during the technical assistance (TA) implementation. It will include participation in relevant international high-level CCS conferences and Carbon Sequestration Leadership Forum meetings by Asian Development Bank staff and key consultants.

^c Considering a group of international consultants, these resources will be utilized to administer the TA and collate reports and recommendations as appropriate.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The regional policy and advisory technical assistance (TA) will be administered by EAEN, in close coordination with SAEN and RSID internally and with the Carbon Sequestration Leadership Forum (CSLF) secretariat, who in turn will coordinate with the CSLF Financial Issues Task Force (the Task Force) members. A team of four individual international consultants (total of 10 person-months) will form the core study group of the TA to carry out its activities. The international consultants will have expertise in (i) intellectual property rights (IPRs) issues, (ii) trade barriers, (iii) financial modeling and analysis, and (iv) carbon dioxide capture and storage (CCS) technical issues. Asian Development Bank will appoint a team leader from among its staff to lead the study group. In addition, the TA will engage administrative support on as needed basis in Manila, Philippines to ensure proper coordination among group of individual consultants and other stakeholders.

A. International Consultants

2. **IPR Analyst** (2.5 person-months). The IPR analyst will be responsible for the following specific tasks:

- (i) map out a similar study or initiative in the past that has been successful in resolving the IPR issues related to a technological innovation; summarize its key success factors and lessons learned;
- (ii) review the range of CCS technologies under patent in the United States, European Union, Japan, and Australia and identify companies that have patents on them;
- (iii) identify appropriate approaches and modalities for collaborative research preferably based on public-private partnerships to bring out new CCS technologies that are adapted to local conditions in developing countries;
- (iv) ascertain possibilities of setting up dedicated financing mechanisms to license in, or purchase these technologies and make them available to developing countries on fair and concessional terms. Critically examine the positive and negative aspects of such an approach;
- (v) work out other business models of collaboration and technology transfer, involving proprietors and developing country undertakings to enable rapid transfer of CCS technology to developing countries;
- (vi) compare cost-benefit analysis of different approaches and make recommendations. Support all recommendations with analytical data;
- (vii) at the commencement of work, prepare a work plan with due consideration of the urgency of tasks, in particular, a draft final report should be submitted to the team leader within 8 weeks of mobilization and present the draft report in an international CSLF Task Force Meeting (within 10 weeks);
- (viii) a final report shall be submitted within 20 weeks from commencement of work.

3. **CCS Technical Expert** (2.5 person-months). The expert will support the financial analyst in relevant tasks and will undertake the following specific tasks:

- (i) review existing and planned carbon dioxide capture approaches in coal-based power plants internationally – pre-combustion (integrated gasification combined-cycle plants), post-combustion (ultra-supercritical plants), and oxy fuel – and undertake a comprehensive cost-benefit comparative analysis of these capture approaches;

- (ii) analyze the technical readiness of the new coal-based power plants in India and the People's Republic of China (PRC) for CCS demonstration. Analyze the concept of capture-ready coal-based power plants for future CCS retrofit, its strategic merits and relevance. Estimate additional investments needed for capture ready power plants;
- (iii) undertake a desk analysis of with and without CCS power plants cost based on the recently completed coal-based power plants in the PRC. State assumptions and basis for the CCS elements of the cost estimate;
- (iv) develop technical benchmark standards and criteria for identifying and ranking demonstration sites;
- (v) at the commencement of work, prepare a work plan with due consideration of the urgency of tasks, in particular, a draft final report should be submitted to the team leader within 8 weeks of mobilization and present the draft report in an international CSLF Task Force Meeting (within 10 weeks);
- (vi) a final report shall be submitted within 20 weeks from commencement of work.

4. **Financial Analyst** (2.5 person-months). The expert will assist the team in analyzing the cost barriers in CCS demonstration and in identifying innovative financing that may make CCS work in developing countries; the expert will undertake the following tasks:

- (i) prepare an indicative cost structure for with and without CCS coal-fired demonstration power plants including base cost and physical and price contingencies; clearly spelling out all assumptions in arriving at the indicative costs;
- (ii) analyze existing relevant financing mechanisms such as Clean Development Mechanism, Climate Investment Facility and others that can provide concessional financing or additional revenues to CCS demonstration project;
- (iii) prepare an indicative financing plan for the demonstration project(s), including proposed concessional financing, justifying the need for the concessionality and its potential source, and appropriate counterpart funds;
- (iv) carry out in-depth financial analysis of power plants for with and without CCS, including calculation of the financial internal rate of return and weighted average cost of capital, taking into account all the financial costs and benefits;
- (v) check and compare the financial viability of with and without CCS projects and the expected impact on electricity tariffs with CCS components. Analyze the impact of concessional funding on the electricity tariff and the financial viability;
- (vi) conduct a comprehensive analysis of all risks to project revenues and costs and conduct relevant sensitivity analyses on the financial results;
- (vii) in conjunction with the CCS technical experts in the team, identify incremental benchmark costs for making coal-fired power plants capture ready plants;
- (viii) at the commencement of work, prepare a work plan with due consideration of the urgency of tasks, in particular, a draft final report should be submitted to the team leader within 8 weeks of mobilization and present the draft report in an international CSLF Task Force Meeting (within 10 weeks);
- (ix) a final report shall be submitted within 20 weeks from commencement of work.

5. **International Trade Specialist** (2.5 person-months). The expert will undertake the following tasks:

- (i) overall assessment of trade barriers, if any, surrounding CCS technology in international trade negotiations;
- (ii) capture the current status of these potential barriers and critically examine ways to reduce these trade barriers;
- (iii) evaluate eligibility of CCS and its possible classification in the World Trade Organization to benefit from reduced tariff under environmental products;
- (iv) analyze and compare positive and negative impacts of such classification and make recommendations;
- (v) at the commencement of work, prepare a work plan with due consideration of the urgency of tasks, in particular, a draft final report should be submitted to the team leader within 8 weeks of mobilization and present the draft report in an international CSLF Task Force Meeting (within 10 weeks);
- (vi) a final report shall be submitted within 20 weeks from commencement of work.