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## **United Nations Development Programme**

### **National Development and Reform Commission Government of China**

## **UNDP/GEF Project: Enabling China to Prepare Its Second National Communication to the UNFCCC (PIMS 2962)**

## **Final Evaluation Report**

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**September 2013**

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## SYNOPSIS

**Title of UNDP supported GEF financed project:** Enabling China to Prepare Its Second National Communications to the UNFCCC (SNC)

**UNDP Project ID:** 2962

**GEF Project ID:** 598

**Evaluation time frame:** September 2008 to March 2013

**Date of evaluation report:** April 6, 2013

**Region and Countries included in the project:** China

**GEF Focal Area Objective:** CCM-6: Climate Change Enabling Activities

**Implementing partner and other strategic partners:** National Development and Reform Commission

**Evaluation team members:** Mr. Roland Wong, International Consultant, Mr. Zhang Xiaohua, National Consultant

### **Acknowledgements:**

The Evaluators wish to acknowledge with gratitude the time and effort expended by all project participants and stakeholders during the course of terminal evaluation. In particular, the Evaluation Team wishes to thank the UNDP China and SNC team for arranging mission meetings and for their warm hospitality. The Evaluators would also like to thank all stakeholders including the Regional UNDP-GEF office in Bangkok and the entire SNC Project for their lively informative and passionate discussions on their experiences in implementing the SNC project; your passion, insights, and candid perspectives has added value to the evaluation process. We hope that this report will contribute towards further support for China's sustained communications with its development partners and the UNFCCC.

## EXECUTIVE SUMMARY

### Background

To enable China to fulfill the commitments under the United Nations Framework Convention on Climate Change (UNFCCC) in accordance with the Guidelines for the Preparation of National Communications from non-Annex I Parties (17/CP.8) adopted by the Conference of Parties (COP) to the UNFCCC, the project of “*Enabling China to Prepare Its Second National Communication (SNC) to the UNFCCC*” was supported by the Global Environment Facility (GEF) and UNDP, and implemented by the National Development and Reform Commission (NDRC). The project will strengthen the National Communication process and its linkage with national development priorities. Based on the experience and lessons learned from the Initial National Communication (INC), the Project has been designed to broaden and consolidate the network of stakeholders, including those in the government, social groups, research and education institutions, industries, individuals, and NGOs, and to enhance technical capacity of national experts, and strengthen the institutional framework for the preparation of national communications. Furthermore, compared to the INC, the SNC Project is designed to place greater emphasis on relevant policies on mitigation and adaptation to climate change and the results of their implementation, so as to enable China to effectively address climate change in the process of pursuing national and sectoral sustainable development.

The development goal of the Project is to *formulate and submit the SNC Report to UNFCCC*. This would include the development of a more comprehensive national Greenhouse Gas (GHG) inventory, with a report of extended categories and sources of GHG emissions and applying the IPCC Good Practice Guidance and Uncertainty Management to reduce uncertainties in the inventory. A preliminary national GHG inventory database management system would be established with a view to administering inventory data in a more scientific manner, making the preparation of GHG inventories a continual process, and to setup an approach to forecast GHG emissions in China. In addition, the assessment of the impacts of and vulnerability to climate change and dissemination of China’s relevant policies and measures to address climate change would be strengthened and public awareness on climate change would be further enhanced. The Project will lead to the submission of the SNC to the UNFCCC in a timely manner.

The Project’s **immediate objective** is to strengthen capacity in China to integrate climate change concerns into national and sectoral development priorities while fulfilling obligations to the UNFCCC.

The full-scale project started in December 2008 with the signing of the Project Document, with original project implementation duration of 4 years; the Project was extended once with June 30, 2013 as the formal project terminal date for this Final Evaluation.

### Context and Purpose of the Terminal Evaluation

In accordance with UNDP and GEF regulations, an evaluation of a project needs to be carried upon completion of the project. The purpose of this Final Evaluation (FE) is to evaluate project implementation and management performance, determine if the project is on track to achieve its objectives or needs additional guidance and assistance. In addition, the FE will also determine and report on the experiences and lessons learnt during the project implementation that should provide guidance in determining the targets and strategies for the planned Third National Communication (TNC) Project. In this regard, the findings and recommendations of the FE will

contribute to complete China's Second National Communication to the UNFCCC on time and strengthen the capacity to address climate change in China.

The scope of the Final Evaluation includes:

- An assessment on the Project component level on:
  - a) Whether there is effective relationship and communication between/among components so that data, information, lessons learned, best practices and outputs are shared efficiently, including cross-cutting issues;
  - b) Whether the performance measurement indicators and targets used in the project monitoring system are specific, measurable, achievable, reasonable and time-bounded to achieve desired project outcomes; and
  - c) Whether the use of consultants has been successful in achieving component outputs.
- An evaluation on the Project level of:
  - a) Progress towards achievement of results;
  - b) Factors affecting successful implementation and achievement of results;
  - c) The Project Management framework, and
  - d) Strategic partnerships in terms of project positioning and leveraging.

The two key issues of this Evaluation are as follows:

1. Evaluation findings were extrapolated from information collected from four out of ten subcontractors working on the SNC Project, and their presentations. In addition, many of the SNC reports were not translated due to difficulties of translation of technical information into English, and the substantial effort required to conduct the translation;
2. The Evaluation needed to assess the state of preparedness of the NDRC to deliver the future National Communications that includes a new UNFCCC requirement, a Biennial Update Report (BUR) that increases the frequency of NC reporting from every four years to every two years.

An FE mission was fielded to Beijing, China between the 25<sup>th</sup> and 29<sup>th</sup> of March 2013.

## **Assessment of Project Outcomes and Sustainability**

The overall rating of the project results is satisfactory (S). This is based on the following outcomes:

- All outputs being delivered on time and on budget;
- The high quality of the outputs that were available during the Evaluation mission;
- The efficient management of collecting relevant information and organizing the numerous scientists and climate change specialists within the 4-year time frame of the SNC Project; and
- The knowledge of stakeholders met during the Evaluation mission on climate change issues.

Overall project ratings are provided on Table A.

**Table A: Ratings for Each Project Outcome<sup>1</sup>**

	Relevance	Effective-ness	Efficiency	Overall Rating
<b>Monitoring and Evaluation:</b>				
M&E design at entry	-	-	-	5
M&E plan implementation	-	-	-	5
Overall quality of M&E	-	-	-	5
<b>UNDP and Executing Partner Performance:</b>				
Quality of UNDP implementation	-	-	-	5
Quality of Execution – NDRC	-	-	-	5
Overall quality of implementation/execution	-	-	-	5
Overall Results	5	5	5	5.0
<b>Outcomes:</b>				
<b>Outcome 1:</b> Completed 2005 National GHG Inventory	5	6	5	5.3
<b>Outcome 2:</b> Assessment of sectoral impacts and V&A to climate change	5	5	5	5.0
<b>Outcome 3:</b> Enhanced public awareness on climate change in China	5	5	5	5.0
<b>Outcome 4:</b> Clear understanding of the GHG emissions and climate change situation in the Hong Kong and Macao SARs	5	5	5	5.0
<b>Outcome 5:</b> Improved capacity and technical inputs for CC-integrated development planning both at the local and national levels	5	5	5	5.0
<b>Outcome 6:</b> China's fulfillment of its obligation under the UNFCCC	5	5	5	5.0
<b>Overall Rating:</b>	5.0	5.1	5.0	5.1

*The overall Project sustainability rating is likely (L).* The Government of China now has specific funding allocations for the preparation of the 2014 BUR and TNC reports within a compressed time frame. As recently as April 2013, there was uncertainty of available resources and available time to prepare the 2014 BUR and the TNCs, primarily due to the uncertainty of the level of efforts required to collect and process GHG and climate change data necessary for the 2014 BUR report. These efforts include improving emission factors across the country and the measurements required to obtain this data over a wide geographic area and a longer time frame; these efforts will require a substantial labor investment as well as the procurement and use of a wide range of specialized equipment. Notwithstanding that NDRC can access test equipment and databases from institutions involved with the SNC at little or no cost, the Government will still require technical guidance from the UNFCCC and GEF for preparation of the 2014 BUR and the TNC for 2016.

<sup>1</sup> 6 = HS or Highly Satisfactory: There were no shortcomings;  
5 = S or Satisfactory: There were minor shortcomings,  
4 = MS or Moderately Satisfactory: There were moderate shortcomings;  
3 = MU or Moderately Unsatisfactory: There were significant shortcomings;  
2 = U or Unsatisfactory: There were major shortcomings;  
1 = HU or Highly Unsatisfactory

SNC Project activities<sup>2</sup> have been setup to be functional after completion of the SNC Project. As such, NDRC and their subcontractors are in a state of readiness for preparation of the 2014 BUR and the TNC. This is based on the outcomes of the SNC Project which has generated improvements from the INC in its approaches, methodologies and tools for GHG inventories, impact and V&A assessments. The strategy of the SNC Project was to take available information from priority issues from the INC and various related scientific studies, conduct research into these areas and improve the understanding of these issues. The outputs of the SNC Project has been the documentation of the various climate change issues, most them critical to the formulation of the SNC. These outputs will be useful for scientific literature reviews with the IPCC and other peer organizations, enhancing the replicability of the Project.

## Conclusions

- The Chinese Government at the highest levels has expressed its support for full compliance to the UNFCCC. As such, the INC and SNC have been effectively used as platforms on which to improve understanding of climate change in China and to inform CC policies across all important economic sectors;
- The SNC Project has been implemented according to approved annual work plans, budget lines and schedule. This demonstrates NDRC's strong commitment to the NC process, and improving its institutional capacity and managerial skills to ensure sustainable cooperation between various subcontractors, research institutions, universities and laboratories. The key action contributing to this outcome has been the organization and conduct of more than 80 workshops during the course of the SNC Project to foster academic exchanges and the sharing of research between key actors. The final outcome of the SNC Project has been the delivery of the SNC Report 4 years after the commencement of the SNC Project in December 2012, as per the schedule in the ProDoc;
- The short-term impacts of the SNC Project are the following:
  - Improved and comprehensive understanding of GHG emissions from the different source categories as indicated by the UNFCCC Guidelines for non-Annex I National Communications;
  - China's fulfillment of its obligation under the UNFCCC for the Second National Communication;
  - Institutional mechanisms supported with climate change knowledge products that effectively integrate climate change into development planning both at the local and national levels; and
  - Increased number of government officers and research personnel in China to be able to model, analyze and project future GHG emissions using GHG inventory tools, inventory information and analyses;
- The long-term impacts of the SNC Project are the following:
  - Improved understanding of China's vulnerability to the threats of climate change and predicted impacts in five sectors: agriculture, water resources, coastal resources, terrestrial ecosystems and human health;
  - Improved public awareness and availability of technically sound information to inform policy-decision making on climate change;

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<sup>2</sup> This would include GHG inventory development, the methodological frameworks for V&A and mitigation assessments, participatory strategies and experiences, and activities to integrate climate change into regional and sector development processes

- Operational institutional mechanisms for the provision of GHG emissions and climate change situations in the Hong Kong and Macao SARs; and
- Knowledge in China that improves its ability to manage its drive towards sustainable development with climate change;
- There are clear efforts by the Chinese Government to raise the profile of climate change issues through prominent and visible public events and media messaging;
- While the SNC Project has enabled the Chinese Government to provide a strong NC submission to the UNFCCC in a timely manner, there is a clear need to improve the quality of their CC information, and its capacity to comply with the Convention as the country moves forward to the TNC. The Chinese Government has acknowledged these needs that include:
  - Efforts to bridge the gap of uncertainties of GHG inventories;
  - More research on the physical impacts of climate change;
  - Assessments of cross-sectoral impacts of climate change;
  - A methodology and indices for vulnerability assessments for various sectors such as agriculture, ecosystems, coastal zones and human health;
  - Methodologies for assessment of adaptation measures and their corresponding effectiveness; and
  - Assessment of impacts of climate change to human health due to extreme weather events, relevant pathogens, intermediate hosts, vectors with temperature changes;
- The outcomes of the SNC Project have strengthened the position of NDRC as the coordination and management agency for the preparation of the TNC. The Chinese Government through NDRC and its partner organizations are intent on complying with the new UNFCCC BUR reporting requirements based on:
  - Government confirmation of ongoing efforts to collect as much 2010 GHG emissions data as possible by late 2013 for the 2014 BUR. Notwithstanding that there is a small risk that the 2010 data collection is not completed by late 2013, the NDRC stated that the Government will comply with UNFCCC obligations by issuing the 2014 BUR on time by late 2014;
  - The availability of a strong consultant network within research institutes and universities to support the required work; and
  - Government acknowledgement of the need to make the NC process efficient to meet this obligation. The Government, however, is uncertain of the nature and level of incremental effort required to improve the GHG data collection quality, to assess what should be included in the inventory (types of GHGs, consideration of sector and sub-sector GHG sources) and subsequently, what budget allocations are required for incremental efforts;
- There have been a number of needs identified for reducing uncertainties of the GHG inventory. This could involve additional reviews of the inventory; impact modeling; validation and strengthening of calculation procedures; and additional sampling to verify default emission factors or to validate new emission factor values. TNC designers, however, will face a challenge to prepare an NC project design that complies with UNFCCC requirements with a clearly presented and justified budget;

- External assistance would be useful in guiding NDRC in formulation of adaptation activities. This would include examples from other countries on their formulation and adoption in a high level adaptation policy program;
- China's development of GHG inventories appears advanced to the extent that China is in a position to share its experiences on GHG inventory formulation and establishment with similar countries;
- Although the SNC Project has no agenda on gender issues, the Evaluation team has observed significant contributions from women on the SNC Project, notably with two out of the three subcontractors with whom meetings were held. This included key researchers who were female on sub-contracts for energy activities, agriculture cropland and livestock GHG emission inventories, and the GHG emission inventory database.

## Recommendations

With a new termination date for the GEF-funded SNC project on December 31, 2013, the following recommendations are provided to NDRC on actions to strengthen and sustain climate change activities in advance of a GEF-supported Third National Communications (TNC) Project planned for 2014. These recommendations are based on extensive discussions with NDRC and three of their subcontractors interviewed during the Evaluation Mission. It is understood by the Evaluation Team that preparations for the TNC Project have already commenced; as such, these recommendations are provided to improve or validate the TNC Project design.

### **Recommendation 1: The following GHG activities all related to reducing GHG emission uncertainties should be considered for inclusion into a TNC Project.**

- Increasing the sample sizes of coal usages through additional field surveys that will verify or change default values for coal and other energy sectors. This is important given that coal comprises more than 70% of China's GHG emissions. The additional field surveys may include monitoring of fugitive emissions from coal mines<sup>3</sup>, additional sampling of boilers for a wider range of coal oxidation rates by different boilers used across China<sup>4</sup>, and surveys of coal types used in different regions in China which may lead to regional or provincial emission factors.
- Estimation of emissions from flaring in oil & gas and specialized O&G products such as LNG and lubricant oils through field measurements. Currently, there are no emission inventories for flaring and a growing number of O&G-related products;
- Increasing research through field surveys of N<sub>2</sub>O emissions from croplands and forestry. Current estimation methods for N<sub>2</sub>O emission are reliant on IPCC default factors and a small number of research measurements being made by IAP-CAS for N<sub>2</sub>O emissions from wheat, maize, green onions and orchard growing activities. The TNC Project should consider supporting increased research work on N<sub>2</sub>O emissions:
  - Over a wider geographic area of dryland crops and wider time frame to establish if there are seasonal variations on N<sub>2</sub>O emissions in different regions;
  - On forest lands if there is cost effectiveness in obtaining this data. TNC designers will need to consider the cost of obtaining of N<sub>2</sub>O equipment, conducting the field readings in

<sup>3</sup> This may involve the increased frequency of sampling and monitoring of coal mines where there are safety concerns over CH<sub>4</sub> emissions from underground coal mines. Current monitoring of CH<sub>4</sub> emissions is on an annual basis.

<sup>4</sup> Oxidation rates will vary according to climatic zone, the seasons and the types of coal used in a particular region.

- remote virgin forest areas, and analyzing the data. Currently, N<sub>2</sub>O emissions are not even included in the LUCF calculations due to the lack of empirical data and information on the subject, and could potentially add 10% to LUCF emissions;
- For determining a standard method to estimate N<sub>2</sub>O emissions from agricultural activities and LUCF;
  - Field sampling of paddy fields for CH<sub>4</sub> emissions to determine emission factors that vary with seasons, climatic zones and soil types. This information can be used for further calibration of the CH4MOD model.

**Recommendation 2: Assistance in climate change vulnerability assessments and adaptation measures under a TNC Project should include:**

- Research work on the physical impacts of climate change. This may include impacts to coastal areas such as saltwater intrusion, changes in fluvial morphology from changes in hydrology and accelerated glacial melt, and ecosystem changes from changing weather patterns;
- Assessments of cross-sectoral impacts of climate change. For example, impacts of climate change on agriculture will have an impact on urban development and socio-economic indicators; this has not yet been assessed in China;
- A methodology and indices for vulnerability assessments for various sectors such as agriculture, ecosystems, coastal zones and human health;
- Methodologies for assessment of adaptation measures and their corresponding effectiveness;
- Assessment of impacts of climate change to human health due to extreme weather events, relevant pathogens, intermediate hosts, vectors with temperature changes. The SNC Project only assessed impacts of climate change on human health on vector-borne diseases such as malaria, schistosomiasis and dengue;
- Increasing international exchanges and study tours to improve understanding of the methods of other countries in GHG inventories and CC impact and V&A assessments and to share methods that have already been developed in China. The process for selection of countries for international exchange and study tours should be similar to the SNC where Australia was selected on the basis of common ground on managing coal GHG inventories;
- Capacity building and technical training courses on climate change impact and V&A assessments, and advanced methodologies on preparing GHG inventories using experiences from Annex I countries.

**Recommendation 3: The TNC Project should include assistance to improve efficiencies in updating GHG inventories for 2010 and 2012 and to enable timely delivery of the 2014 BUR.**

The commencement of a GEF-supported TNC Project is expected by early 2014. There are ongoing NC activities by the Chinese Government that target submission of a BUR by December 2014. This would include expanding the expert roster in an effort to accelerate Government-backed research and field verification of emission factors from other sectors<sup>5</sup>, and to assist in the management of data and information collection and analysis to ensure there is sufficient information for the 2014 BUR. NDRC will need to assess its capacity to fulfill the new BUR reporting obligations to improve the cost effectiveness of future funding from a TNC project and other donors.

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<sup>5</sup> This would include CO<sub>2</sub> and CH<sub>4</sub> from oil and gas flaring, LNG, lubricant oils, and N<sub>2</sub>O emissions from forestry and agricultural activities.

## ABBREVIATIONS

Acronym	Meaning
APR	Annual Progress Report
BUR	Biennial Update Report
CAF	Chinese Academy of Forest
CAS	Chinese Academy of Sciences
CCA	Climate change adaptation
CCM	Climate change mitigation
CDM	Clean Development Mechanism
CICETE	China International Center For Economic And Technical Exchanges
CNCCP	China's National Climate Change Program
CO <sub>2</sub>	Carbon dioxide
COD	Chemical Oxygen Demand
COP	Conference of Parties
DEFRA	Department for Environment, Food and Rural Affairs of the United Kingdom
DOC	Degradable organic composition
EA	Executing agency
EEP	EU-China Energy Environment Programme
ERI	Energy Research Institute (of the National Development Reform Commission)
4NC	Fourth National Communication
FE	Final Evaluation
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GWP	Global warming potentials
HFCs	Hydrofluorocarbons
IAP	Institute of Atmospheric Physics (of Chinese Academy of Sciences)
ICE	Information, Communication and Education
IFEFP	Institute of Forest Ecology, Environment and Protection (of Chinese Academy of Forestry)
INC	Initial National Communication
IPCC	Intergovernmental Panel on Climate Change
LFA	Logical framework analysis
LNG	Liquid natural gas
LULUCF	Land use, land use change and forestry
MDGs	Millennium Development Goals
MoF	Ministry of Finance
MoST	Ministry of Science and Technology
MSW	Municipal solid waste
N <sub>2</sub> O	Nitrogen monoxide
NC	National Communication
NDRC	National Development and Reform Commission
NEX	National Execution
NGO	Non-governmental Organization
NLGCC	National Leading Group on Climate Change
NPD	National Project Director

<b>Acronym</b>	<b>Meaning</b>
ODS	Ozone depleting substances
OECD	Organization for Economic Cooperation and Development
O&G	Oil and gas
NPC	National Project Coordinator
NPD	National Project Director
PC	Project Coordinator
PDF	Project Development Fund of GEF
PFCs	Perfluorocarbons
PIR	Project Implementation Report
PMO	Project Management Office
ppm	Part per million
PRC	People's Republic of China
PSC	Project Steering Committee
R&D	Research and Development
SAR	Special Administrative Regions
SCCF	Special Climate Change Fund (under UNFCCC)
SEPA	State Environmental Protection Administration
SF <sub>6</sub>	Sulfur hexafluoride
SMART	Specific, measureable, attainable, relevant and time-sensitive
SNC	Second National Communication
SOC	Soil organic carbon
TNC	Third National Communication
ToR	Terms of Reference
TPR	Tripartite review
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
V&A	Vulnerability and Adaptation

# 1. INTRODUCTION

## 1.1 Background

The United Nations Framework Convention on Climate Change (UNFCCC) was an international treaty signed at the Earth Summit in Rio de Janeiro in 1992 that provides a framework of cooperation between countries on actions that could be taken to limit average global temperature increases and the impacts of the resulting climate change. The UNFCCC entered into force in 1994 with 195 Parties now signed to the Convention.

The Convention's overall framework for intergovernmental efforts to tackle the challenges of climate change recognizes the climate system as a shared global resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases (GHGs). The UNFCCC Secretariat supports all institutions involved in the international climate change negotiations, particularly the Conference of the Parties (COP), the Subsidiary Bodies (which advise the COP), as well as Kyoto Protocol bodies (such as the Executive Board of the CDM) and other Convention bodies.

The commitments of the Parties to the UNFCCC are described under Article 4 (Para. 1) of the Convention, which establishes common obligations for all Parties, taking into account the common but differentiated responsibilities of industrialized, and developing countries, and their specific national and regional development priorities, objectives and circumstances. One of the main commitments is to develop, periodically update, publish and make available to the COP, inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol by means of "National Communications" (NCs). These include the above mentioned inventory of net anthropogenic emissions of GHGs and a general description of the steps taken or envisaged to implement the Convention.

Article 4.3 of the Convention also states that "the developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties". Industrialized nations agreed under the Convention to support climate change activities in developing countries by providing financial support for action on climate change (in addition to any financial assistance they already provide to these countries). The Convention supports a system of grants and loans managed by the Global Environment Facility (GEF) as the financial mechanism of the Convention (under Article 11). GEF supports projects and programs as well as "enabling activities" that aim to help countries prepare national inventories, strategies, action plans, and reports under the Convention.

As a non-Annex I Party to the UNFCCC, China has fulfilled and continues to fulfill its obligations to formulate, implement, publish and update its National Climate Change Program as provided by the UNFCCC, and in accordance with its national circumstances and the requirements for sustainable development:

- China officially submitted its Initial National Communications (INC) to COP 10 of the UNFCCC in December 2004. GEF provided assistance to the Government of China through the project on "Enabling China to Prepare Its Initial National Communication". This project was a 3-year effort involving more than 400 experts from about 100 organizations. The main contents of the INC include national circumstances, national GHG inventory, impacts of climate change and adaptation, policies and measures related

to climate change mitigation, research and systematic observation, education, training and public awareness. The INC also identified the need for funds, technologies and capacity building to improve its future NCs. The report provides a 1994 national greenhouse gas inventory in Chapter 2, and general descriptions in other chapters on China's situation of years up to 2000, with some up to 2003. The contents and nationwide data in the INC report did not cover that of the Hong Kong Special Administrative Region, the Macao Special Administrative Region and Taiwan Province except for division of administrative areas, territory and other points as specified;

- GEF assistance was provided to the Government of China (GoC) on “Enabling China to Prepare Its Second National Communication” (herein referred to as the “SNC Project” or “Project”). The Project was based on the resources and guidance identified during the INC project that would improve China's ability to comply with the UNFCCC's reporting requirements for a Second National Communication (SNC). This report provides a Final Evaluation of the SNC Project.

## 1.2 Final Evaluation

### 1.2.1 Purpose of the Evaluation

In accordance with UNDP and GEF regulations, an evaluation of a project needs to be carried upon completion of the project. The purpose of this Final Evaluation (FE) is to evaluate project implementation and management performance, determine if the project is on track to achieve its objectives or needs additional guidance and assistance. In addition, the FE will also determine and report on the experiences and lessons learnt during the project implementation that should provide guidance in determining the targets and strategies for the planned Third National Communication (TNC) Project. In this regard, the findings and recommendations of the FE will contribute to complete China's Second National Communication to the UNFCCC on time and strengthen the capacity to address climate change in China.

An FE mission was fielded to Beijing, China between the 25<sup>th</sup> and 29<sup>th</sup> of March 2013. The document on the Terms of Reference (ToR) for the FE is found in Appendix A.

### 1.2.2 Evaluation Scope and Methodology

The ToR provides a clear scope of the Final Evaluation approach to be adopted:

- On the Project component level, assess:
  - Whether there is effective relationship and communication between/among components so that data, information, lessons learned, best practices and outputs are shared efficiently, including cross-cutting issues;
  - Whether the performance measurement indicators and targets used in the project monitoring system are specific, measurable, achievable, reasonable and time-bounded to achieve desired project outcomes; and
  - Whether the use of consultants has been successful in achieving component outputs.
- On the Project level, evaluate:
  - Progress towards achievement of results;

- Factors affecting successful implementation and achievement of results;
- The Project Management framework, and
- Strategic partnerships in terms of project positioning and leveraging.

The methodology employed in the preparation of this FE:

- Review of project documentation and progress reports (such as the APR-PIRs), the National Communication and the supporting technical reports;
- Meetings with stakeholders from Government entities and key institutions responsible for the technical inputs into the National Communication including the Project Coordinator, past Project Coordinators, technical advisors (domestic and international), and relevant UNDP staff;
- Meetings with 4 selected project subcontractors out of a total of 10 subcontractors;
- Reviewing Project achievements against the intended specified objectives and outcomes and establishing the relevance, performance and success of the Project, including the sustainability of results;
- Preparation of the FE report that is a collation and analysis of specific lessons and best practices pertaining to the strategies employed, and implementation arrangements, which may be of relevance to other projects in the country and elsewhere in the world.

There are two key issues of this FE:

- ⇒ Evaluation findings were extrapolated from information collected from four out of ten subcontractors working on the SNC Project, and their presentations. In addition, many of the SNC reports were not translated due to difficulties of translation of technical information into English, and the substantial effort required to conduct the translation;
- ⇒ The Evaluation needed to assess the state of preparedness and capacity of the NDRC to deliver the future National Communications including a new UNFCCC requirement, a Biennial Update Report (BUR) that increases the frequency of NC reporting from every four years to every two years.

The Evaluation Mission for the UNDP-GEF project was comprised of one international expert and one national expert. A detailed itinerary of the Mission is shown in Appendix B. A full list of documents reviewed and people interviewed is given in Annex C and D. Some of the SNC technical reports were reviewed by the National Consultant since these reports were only available in Chinese.

### 1.2.3 Structure of the Evaluation

This evaluation report is presented as follows:

- An overview of project achievements from the commencement of operations in December 2008;
- An assessment of project results based on project objectives and outcomes through relevance, effectiveness and efficiency criteria;
- Assessment of sustainability of Project outcomes;
- Assessment of monitoring and evaluation systems;
- Assessment of progress that affected Project outcomes and sustainability; and
- Lessons learned and recommendations.

This evaluation report is designed to meet GEF’s “Guidelines for GEF Agencies in Conducting Terminal Evaluations, Evaluation Document No. 3” of 2008:

<http://www.thegef.org/gef/sites/thegef.org/files/documents/Policies-TEguidelines7-31.pdf>

The Evaluation also meets conditions set by the UNDP Document entitled “UNDP GEF – Terminal Evaluation Guideline” (<http://erc.undp.org/resources/docs/UNDP-GEF-TE-Guide.pdf>) and the UNDP Document entitled “Handbook on Planning, Monitoring and Evaluating for Development Results”, 2009:

(<http://www.undp.org/evaluation/handbook/documents/english/pme-handbook.pdf>)

and the “Addendum June 2011 Evaluation”:

<http://www.undp.org/evaluation/documents/HandBook/addendum/Evaluation-Addendum-June-2011.pdf>

#### **1.2.4 Project Implementation Arrangements**

UNDP-China has been responsible to GEF for the SNC Project. With the Project being executed under UNDP National Execution (NEX) modality, the National Development and Reform Commission of China (NDRC) is the national executing agency for the SNC Project. Their role was to prepare and execute annual work plans, hire various subcontractors, provide oversight for their technical outputs, and coordinating the technical outputs of the subcontractors into the SNC report. UNDP as the implementing agency for the SNC Project has managed the disbursement of the GEF funds for this project in a timely manner, and ensured that the required reporting of expenditure and audit of Project funds complies with national laws and regulations as well as UNDP rules and procedures. The UNDP China country office undertook these roles with oversight and supervision of the Project from the UNDP-GEF Asia-Pacific Regional Coordination Unit on behalf of the GEF.

The National Project Director (NPD) is an NDRC-appointed official at the Director-General level in charge of the Project and mainly responsible for ensuring that the outputs of the Project comply with those stated in the Project Document; supervising the implementation process; and ensuring timely completion of activities in close coordination with other relevant government departments and stakeholders.

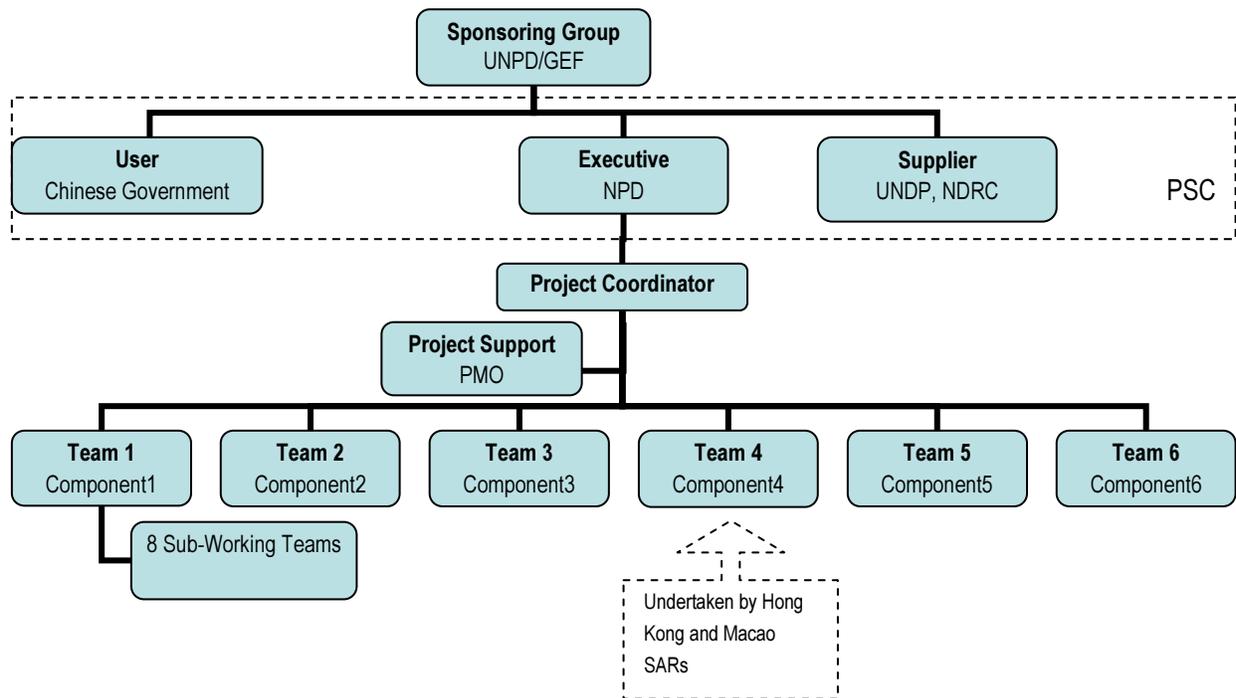
A Project Steering Committee (PSC) for the SNC Project was setup to provide Project oversight of all planned activities and delivery of outputs and outcomes. The members of the PSC included the Ministry of Foreign Affairs, Ministry of Science and Technology, Ministry of Environmental Protection, National Bureau of Statistics, China Meteorological Administration, Ministry of Agriculture, and the National Bureau of Forestry. The PSC has a high profile as they are all on the “National Leading Group on Climate Change” (NLGCC) that was set up by the State Council in 2007 and headed by Premier Wen Jiabao.

A Project Management Office (PMO) was also setup for project coordination and routine management. The PMO was staffed with a Project Coordinator (PC) who works under the direction of the NPD and the PSC, and an Assistant to the PC. The PMO operates under UNDP administrative and financial procedures for the utilization of UNDP-GEF funds. The PMO has also undertaken the role of daily management of Project documents, records, and

files as well as the management of the selection process for sub-contractors and recruitment of Project consultants.

Project implementation arrangements are illustrated on Figure 1.

**Figure 1: SNC Project Implementation Arrangements in 2012 (see page 69 in ProDoc)**



## 2. SNC PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

### 2.1 SNC Start and Duration

The Project Document for the SNC Project was approved by GEF in August 2008 and the Project Document was signed in September 2008. The project was launched in December 2008. While the original project design envisioned a 4-year project, the SNC Project was extended 12 months to its current terminal date of December 31, 2013, notwithstanding that the main SNC deliverable, the SNC Report was delivered 4 years after the commencement of the SNC Project. The SNC Project extension and remaining SNC Project resources are mainly being used to prepare the TNC ProDoc and CEO Endorsement document.

### 2.2 Problems that SNC Sought to Address

The issues of climate change are of great importance to the Chinese Government. This has been demonstrated by the Government setting up of the National Coordination Committee on Climate Change (NCCCC) in 1990 that was renamed in 1998 to the current National Development and Reform Commission (NDRC). Despite these developments, China had a relatively low capacity to address climate change in 2000 related to the increasing complexity of climate change issues and specific requirements of reporting to the UNFCCC. These complexities were and still are related to China's large population, coal-dominant energy mix, rapid development of urban and industrial sectors, associated GHG emission growth, and greater consequences related to climate change. This has served as rationale for GEF assistance to the Government of China.

Resources in 2000 from GEF were provided to the Government of China to prepare its Initial National Communications (INC). More than 400 officials and experts of over 100 relevant government departments, social groups, research institutes, universities and enterprises were engaged over a 3-year period in the development of the Initial National Communication (INC) from the People's Republic of China on Climate Change in 2001 in accordance with the UNFCCC *Guidelines for the preparation of national communications from non-Annex I Parties*. The INC was adopted by the NDRC and approved by the State Council, and submitted to the UNFCCC in October 2004. The issues identified under the INC were mainly related to quality issues on GHG inventories and V&A assessments; these issues included imperfect methods of GHG estimation, insufficient representative data and limited participation. The INC laid the foundation for China's need to improve its subsequent National Communications, namely the SNC.

In 2007, the State Council set up the "National Leading Group on Climate Change" (NLGCC) headed by Premier Wen Jiabao, giving climate change prominence in China. During the same year, the NDRC in cooperation with 17 departments formulated *China's National Climate Change Program* (CNCCP). That was China's first policy document on climate change and the first national program on climate change among all developing countries. The CNCCP identifies the specific objectives, principles, priority areas, policies and measures of China in combating climate change, demonstrating China's high priority and commitment to this area. The SNC was designed to complement and strengthen the efforts generated by CNCCP, focusing on priority areas and enhancing stakeholders' participation. The GEF-supported SNC Project sought to address these issues in 2008 by:

- Establishing systems for collecting, processing and on-site testing of regular energy activities data. Using existing data from five key industrial products (including carbon dioxide emissions from the production processes of cement, lime, iron and steel and calcium carbide and nitrous oxide emissions from adipic acid production), a need to expand the industrial GHG emissions database in accordance with the requirements of SNC was identified;
- Applying CH4MOD<sup>18</sup> and IAP-N models for agricultural activities, expanding site measurement of selected emission factors and making further data improvements;
- Continuously utilizing remote sensing data to monitor forest area and land use change for land use change and forestry, and further expanding studies on the change of soil carbon levels of different land use;
- Improving sample analysis on urban solid waste and the database of wastewater activities to estimate emissions from the urban waste sector;
- Enhancing public awareness on sustainable development to meet targets set by the CNCCP. This would include continual efforts to raise awareness of climate change adaptation and mitigation in public and various sectors;
- Improve vulnerability and adaptation assessments through conducting targeted studies for the design of China's climate observation system; developing climate change scenarios used for comprehensive assessment; supporting development of comprehensive assessment models and analyses of regional vulnerability of the society, economy, environment and health of the region; enhancing research on extreme climate events; and supporting integration of adaptation strategy into national, regional and local goals of sustainable development.

In summary, the SNC project sought to strengthen China's capacity to establish a robust national system and methodological framework for developing a national GHG inventory<sup>19</sup>, and conducting assessments on the impacts of climate change and identify long and short-term adaptation options.

## 2.3 Immediate and Development Objectives of SNC Project

The Project's development **goal** is to *formulate and submit the SNC Report to UNFCCC*. This would include the development of a more comprehensive national Greenhouse Gas (GHG) inventory, with a report of extended categories and sources of GHG emissions and applying the IPCC Good Practice Guidance and Uncertainty Management to reduce uncertainties in the inventory. A preliminary national GHG inventory database management system would be established with a view to administering inventory data in a more scientific manner, making the preparation of GHG inventories a continual process, and to setup an approach to forecast GHG emissions in China. Assessments of the impacts of and vulnerability to climate change and dissemination of China's relevant policies and measures to address climate change would be strengthened, and the public awareness on climate

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<sup>18</sup> The CH4MOD model is described in the paper "Modelling Methane Emissions from Rice" by Huang, Y., W. Zhang, X. Zheng, J. Li, and Y. Yu (2004). Predecessor models to CH4MOD were developed to estimate CH<sub>4</sub> emission from rice paddies. However, several of these models have not been validated against field measurements with various parameters of soil, climate and agricultural practice. Thus, reliability of these models has been questionable particularly when extrapolating the model from a site-scale to a regional scale. The original CH4MOD model was modified by focusing on the effect of the water regime on CH<sub>4</sub> production and emissions and CH<sub>4</sub> transport via bubbles, and subsequently validated against 94 field observations.

<sup>19</sup> This would include improvements in the accuracy of emission factors through field measurements, quality control of the inventory, and tools to project future GHG emissions.

change would be further enhanced. The Project will lead to the submission of the SNC to the UNFCCC in a timely manner.

The Project's **immediate objective** is to strengthen capacity in China to integrate climate change concerns into national and sectoral development priorities while fulfilling obligations to the UNFCCC.

The SNC Project was designed to enable China to fulfill its obligations under the UNFCCC, strengthen its capacity to compile national communications, further facilitate China's capacity building on tackling climate change, and assist China in making new contributions to protect global climate. The main beneficiaries of the SNC Project are Chinese Government personnel who will have increased their knowledge and experience in the integration of climate change into socio-economic development planning and policy making processes. In addition, the SNC project will support and augment strategic partnerships amongst appropriate governmental and academic agencies on national GHG reporting, mostly with those whose technical and managerial capacities were built during the INC Project.

The SNC Project was also designed to:

- Strengthen the NLGCC to access more information to build their capabilities in decision-making;
- Improve NLGCC abilities to promote public awareness on climate change by linking the means to combat climate change with their daily life and work; and
- Build capacity of a wider range of stakeholders and relevant players in preparing GHG emission inventories, establishing models for GHG emissions projection and analysis, and developing and managing a GHG database.

## 2.4 Main Stakeholders

The main stakeholders involved in the SNC Project are listed in Table 1.

**Table 1: Main Stakeholders of the SNC Project**

Organization	Role in the SNC Project
The State Council, PRC	Approval of the final SNC report
National Leading Group on Climate Change	Adoption of the final SNC report
NDRC	Project Executing Agency
Office of National Leading Group on Climate Change	Organizing Agency and PSC member
Ministry of Foreign Affairs	PSC member
MoST	PSC member
MoF	PSC member
Ministry of Land and Resources	Participation in the discussions of major issues
Ministry of Construction	Participation in the discussions of major issues
Ministry of Communications	Participation in the discussions of major issues
Ministry of Water Resources	Participation in the discussions of major issues
Ministry of Agriculture	Participation in the discussions of major issues
Ministry of Health	Participation in the discussions of major issues
Ministry of Environmental Protection	PSC member
Civil Aviation Administration of China	Participation in the discussions of major issues

Organization	Role in the SNC Project
National Bureau of Statistics	PSC member
State Forestry Administration	Participation in the discussions of major issues
Chinese Academy of Sciences	Participation in the discussions of major issues
China Meteorological Administration	PSC member
State Oceanic Administration	Participation in the discussions of major issues
Research institutes, colleges and universities	Responsible for research activities such as compilation of national GHG inventory and assessment of the impact of and vulnerability to climate change
Social groups	Participation in the publicity of the project
Others	Participation in the research and publicity of the project
UNDP China	Implementing Agency of GEF - overall supervision on the project on behalf of GEF
Supporting institutions of GEF and UNDP	On behalf of GEF and UNDP, provision of technical guidance to the implementation of the Project

## 2.5 Expected Results

To achieve the overall goal and objective, the SNC Project was designed with the following expected **project outcomes**:

- Outcome 1: Comprehensive understanding of the GHG emissions from the different source categories as indicated by the UNFCCC Guidelines for non-Annex I National Communications with improved in-country capacity for modeling, analyzing and projecting future GHG emissions, and country effective uses of GHG inventory tool, inventory information analysis and management *through the following outputs*:
  - Output 1.1: Inventory of GHG Emissions:
    - Output 1.1.1: GHG Inventory of the Energy Sector;
    - Output 1.1.2: Inventory of GHG emissions from industrial processes;
    - Output 1.1.3: Inventory of GHG emissions from agricultural sector;
    - Output 1.1.4: GHG inventory of land use change and forestry sector;
    - Output 1.1.5: Inventory of GHG emissions from waste treatment;
    - Output 1.1.6: National GHG Inventory Report;
  - Output 1.2: China GHG emissions inventory database;
  - Output 1.3: GHG Emissions Projection Methodology.
- Outcome 2: Completed assessments on impact of, vulnerability and adaptation to climate change *through the following outputs*:
  - Output 2.1: Characteristics of climate change and analysis of future trends in China;
  - Output 2.2: Assessments of impact of climate change on China's food production and associated vulnerability;
  - Output 2.3: Impact assessment of climate change on water resources and its vulnerability;
  - Output 2.4: Assessment of vulnerability to, and impacts of, climate change on forest and other natural ecosystems;
  - Output 2.5: Impact assessment of climate change on sea-level rise and the coastal social economy;

- Output 2.6: Impact of climate change on human health.
- Outcome 3: Improved public awareness and informing policy-decision making on climate change *through the following outputs*:
  - Output 3.1: Sustainability of China Climate Change Info-Net;
  - Output 3.2: Compilation and dissemination of publication series on China's efforts to address climate change;
  - Output 3.3: Summary report on education, training and public awareness;
- Outcome 4: Inventory of GHG emissions and other relevant information on climate change for Hong Kong and Macao SAR *through the following outputs*:
  - Output 4.1: GHG Inventory of Hong Kong SAR;
  - Output 4.2: Report of information on climate change in Hong Kong SAR;
  - Output 4.3: Macao SAR's GHG Inventory;
  - Output 4.4: Report of information on climate change in Macao SAR;
- Outcome 5: Supplementary support for achieving Convention objectives *through the following outputs*:
  - Output 5.1: National circumstances report;
  - Output 5.2: Formulated policies and measures for climate change mitigation;
  - Output 5.3: Overview of policies and measures for climate change adaptation;
  - Output 5.4: Overview of research and systematic observation;
  - Output 5.5: Technology transfer and cooperation for the implementation of the Convention
  - Output 5.6: Capacity Building Activities
- Outcome 6: *Publication and dissemination of the SNC Document*:
  - Output 6.1: Draft SNC Report;
  - Output 6.2: Final report of the SNC in both Chinese and English.

Section 3 provides details on the actual SNC outcomes and outputs.

## 3. FINDINGS

### 3.1 Project Design and Formulation

#### 3.1.1 Analysis of the Project Planning Matrix (PPM) / Results Framework

The Logical Framework Analysis (LFA) for the SNC Project was completed with the full collaboration and support of the NDRC and other NC stakeholders during the design of the SNC Project. The LFA was carried out through a LFA workshop and came up with the SNC's Project Planning Matrix (PPM). With regards to the SNC Project, the PPM indicators meeting SMART criteria<sup>20</sup>, the indicators were, by design, less specific given the difficulties of knowing the quality of outputs that would be achieved. This is noted for research-oriented work in Component 1 for emission factor outputs and Component 2 for assessments on impacts and V&A to climate change. One indicator that could be used for future NC projects would be the attainment of a confidence level measurement for GHG inventories for which developed countries strive for +/- 5% using IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventory (2000) as a guideline. According to the NDRC, China is striving for a +/-10% confidence level, a level considered acceptable for developing countries such as China.

In general, however, it should be noted that the PPM design for the SNC Project meets SMART criteria in that the indicators were measurable, attainable, relevant to the requirements of NCs and time-bound given that the outputs were delivered within reasonable time frames.

#### 3.1.2 Planned Stakeholder Participation

One of the climate change issues identified in the INC was to substantially increase cooperation and collaboration amongst a broader network of stakeholders for the development of a national inventory on GHG emissions with sound data, and consistent formatting and results based on best available scientific methodologies. The outcome would be a GoC submission of an SNC report that accurately reflects China's national circumstances related to climate change. The SNC Project was designed to involve strengthening of relations with national institutions to create a more proactive network and new collaborative relationships within the government and with other stakeholders, and to generate information and data with a high degree of confidence. Moreover, the SNC Project approach would target activities where there would be a multi-purpose usefulness of the information and data generated beyond reporting to the UNFCCC; for example, national GHG inventory data could be also utilized for improving national energy efficiency programmes. This rational approach would result in stronger participation of key stakeholders including local governments, social groups, research institutes, universities and non-governmental organizations (NGOs), all of whom would have a stronger stake on the SNC Project.

#### 3.1.3 Replication Approach

For all countries that are signatory to the UNFCCC, the compliance to the requirements of National Communications is continuous. As such, this SNC Project was designed to provide

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<sup>20</sup> Specific, measurable, attainable, relevant and time-bound

replication approaches to ensure that China meets its obligation for periodic communications to the UNFCCC. This included the generation of information covering a wide range of representative national conditions that affect climate change and GHG emissions. Moreover, the processes for generating information were to be retained as replicable assets that can be utilized for future NCs with similar information needs. This would include protocols for updating GHG and other climate change inventories, methodological frameworks for V&A and mitigation assessments, framework for evaluating climate impacts as a requirement prior to investment, participatory strategies, and a system to incorporate climate change into regional and sector development processes. Climate change and environmental tools would be developed for usage on a continual basis and assist in preparation of future NCs.

### **3.1.4 UNDP Comparative Advantage**

The strength of UNDPs involvement to implement the SNC Project is its long-term involvement in providing climate change technical assistance in CC adaptation and mitigation areas in developing countries with a focus on poverty alleviation and energy security. UNDP is able to draw in appropriate resources from its network in a number of developing countries and drawing from the experience of implementing more than 2,000 such projects for more than 20 years. UNDP China has an excellent relationship with the Government of China in the areas of developing local capacity, effectively working with multiple stakeholders from public and private sectors, technical experts, civil society, and grassroots level organizations. In the context of capacity building for the Government, UNDP has a multi-dimensional development perspective, an ability to address cross-sectoral issues and inclusiveness in constituency building, and a strong international technical support network on which to provide aid to such projects.

### **3.1.5 Linkages between SNC Project and Other Interventions within the Sector**

The SNC Project was to provide close coordination with other projects and institutions that are relevant to the formulation of China's SNC to the UNFCCC including:

- The EU-China Energy Environment Programme (EEP);
- Climate Change Research sponsored by the UK's Department for Environment, Food and Rural Affairs (DEFRA);
- The Chinese Ministry of Science and Technology (MoST) for assessing the impact of climate change on agriculture in China using advanced computer models developed in the UK;
- UNDP's Millennium Development Goals (MDG) Programme sponsored by the UNDP/Spain MDG Achievement Fund;
- The SCCF Adaptation project on "Mainstreaming Adaptation to Climate Change into Water Resources Management and Rural Development", which focuses on a study of improved irrigation schemes in agriculture as a means of adapting to the impacts of climate change.

## **3.2 Project Implementation**

### **3.2.1 Progress towards Achievement of Results**

The SNC Project has made satisfactory progress towards delivery of all of its outputs. Delivery of these outputs has been according to the target timelines set in the project

planning matrix (log frame). These timely deliveries have largely been the responsibility of the executing agency, NDRC and its associate research institutions and universities.

Overall, with the satisfactory progress of the Project, the development goal of the Project to “formulate and submit an SNC report to the UNFCCC” has been achieved as of December 2012, 4 years after the commencement of the Project. As well, the immediate objective of “strengthening capacity in China to integrate climate change concerns into national and sectoral development priorities while fulfilling obligations to the UNFCCC” has been achieved based on the fact the SNC report was of high quality and compiled by the Chinese Government and their subcontractors. Beneficiaries of the SNC Project capacity building activities included:

- The NLGCC who now have access to more information for decision-making and to promote public awareness on climate change by linking the means to combat climate change with their daily life and work; and
- A wide range of stakeholders (as listed in Section 2.4) and relevant players who prepared GHG emission inventories, established models for GHG emissions projection and analysis, and developed and managed a GHG database.

Given the satisfactory delivery of the outputs, the use of consultants, subcontractors and experts has been effective and critical in achieving these results. Moreover, no critical issues have been identified vis-à-vis delivery of the SNC outputs. Given the new increased reporting requirements for the next round of NCs that includes the 2014 BUR and the TNC in 2016, the Chinese Government are now reviewing their management arrangements with NDRC and their subcontractors to improve their efficiencies to deliver this higher volume of national communications. The Government, however, is also aware that the BUR report will not have the same level of comprehensiveness of the SNC Report<sup>21</sup>, and that the TCN will have a higher degree of comprehensiveness than the SNC report; as such, the GoC will have a better estimate of the level of effort to prepare these reports.

### 3.2.2 Factors Affecting Successful Implementation and Achievement of Results

The successful implementation of the SNC Project is due in large part to its institutional arrangement under which NDRC’s role as the coordinating agency for climate change issues in China is essential. Their leadership has resulted in the SNC Project efficient and effective implementation and delivery of outputs according to the ProDoc and the annual work plans.

This strong leadership during the SNC Project has resulted in:

- Strengthened leadership and guidance capacity of the NDRC with respect to GHG inventories, climate change assessments and adaptation policy issues, and raising public awareness of climate change issues;
- Valuable experience for the participating universities and research institutes in establishing GHG accounting systems;
- Improved NDRC outreach to provincial governments on compiling GHG emission inventories;
- A strengthened National Communication process and defined linkages with national development priorities through:

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<sup>21</sup> The BUR is covered under one section of the TNC report

- A consolidated network of stakeholders;
- An enhanced technical capacity of national experts;
- A strengthened institutional framework for the preparation NCs;
- A greater emphasis on relevant policies on mitigation and adaptation to climate change; and
- A results-based management during implementation.

At the time of this Final Evaluation, the log-frame of the SNC project is still very relevant with all outputs from the five major components having been delivered in a timely manner. Details are covered under Section 3.3 - Project Results. Moreover, critical assumptions made in the Project's log-frame as key factors to efficient implementation were true during the course of the Project including:

- Continuous support from NDRC on the NC process including building and maintaining the national GHG inventory and analysis process, and preparing climate change impacts and assessments and V&A analyses. Achievements of the Project would not have occurred without the coordination support of NDRC;
- Full cooperation of various industrial and government entities including those from Hong Kong and Macau in sharing information on energy consumption and other relevant climate change issues as required for the SNC report. Without this cooperation, late delivery of the SNC report that is of lesser quality would have been the most likely outcome of this Project;
- Upgrading of Info-Net to raise public awareness of climate change. The China Climate Change Info-Net (<http://en.ccchina.gov.cn/>) has been upgraded to an attractive modern website containing archives of all climate change related issues of China to raise public awareness of climate change issues;
- Continuous and sustained support and the provision of required resources for the NC process. This continuous support has been evident through the timely completion of the subcontracts and deliverables. NDRC has also stated that all subcontractors have contributed their professional time beyond the Terms of Reference to deliver high quality outputs.

The SNC Report of December 2012 provides the best proof of the success of the SNC Project and its integration with national government development strategies. For example, with respect to climate change adaptation policies, the SNC report on pages 99-100 states that China will:

- Further enhance its capacity in adaptation to climate change during the 12th FYP period (2011-2015);
- Enhance scientific research, observation and impact assessment on climate change; taking into full account climate change factors in designing and accomplishing productivity distribution, infrastructures and key projects;
- Enhance capacity building for climate change adaptation, especially in coping with extreme climate events;
- Accelerate R&D and deployment of adaptation technologies; and improving climate change adaptations in key sectors like agriculture, forestry and water resources and in coastal regions and ecologically vulnerable areas;
- Enhance monitoring, early warning of and preparedness for extreme weather and climate events to improve its capacity for natural disaster prevention and mitigation.

With respect to climate change mitigation policies, the SNC report on page 102 reports that China will:

- Further incorporate the responses to climate change in its economic and social development plans; and,
- Take GHG emission control action targets by 2020 as its strategic tasks for addressing climate change in both current and future periods, and significantly reduce energy consumption intensity and CO<sub>2</sub> emissions through multiple means (such as adjusting industrial structure and energy mix in combination with energy conservation, improved energy efficiency, and increased forest carbon sinks) to effectively control GHG emissions, and to make a new contribution to safeguarding the global climate.

As such, these are the impacts of the SNC Project with the significant impact being the enabling of China to integrate its CCM and CCA issues with its socio-economic development programs.

### 3.2.3 Project Management

The SNC Project has been well managed by the executing agency, NDRC through their Project Coordinators under the direction of the NPD. Indications of a well-managed SNC Project include the quality of the outputs, the timeliness of their delivery and budgets expended as planned.

One achievement of the SNC Project that required strong management skills was the Component 1: Completion of the 2005 National GHG Inventory. This required significant coordination efforts by the PMO to foster cooperation of the various industrial entities and institutes to share their information and research on GHG emissions. In addition, owing to the sheer volume of GHG-related data collected, collating the data and compiling the report was likely a complex undertaking requiring astute management of all stakeholders. To ensure the timely delivery of outputs, NDRC needed to invest in substantial efforts to meet with the wide variety of various government-related entities and various sectoral and industry experts to organize, compile and discuss information needed for the SNC Report. During the 4.5-year Project period, more than 80 workshops and seminars were held with research institutions, universities and experts to discuss findings and progress of 10 sub-contracts of the SNC Project.

Given the cutting edge nature of GHG inventory formulation and the V&A an assessment, the components were managed based on the findings and results of these workshops and seminars. Moreover, the sub-contracts were structured with milestones, facilitating easier monitoring of the sub-contracts; for some of the more research-oriented subcontracts such as the one with the Chinese Academy of Forest for LUCF inventories, adaptive management was practiced. NDRC were able to report progress of these sub-contracts in the APRs/PIRs following the Project PPM (log frame) with no notable financial irregularities. Some of the notable adaptive management practices demonstrated by the Project include:

- High degree of autonomy for the Project team in preparing detailed plans and recruitment of the Chinese scientific community that involved over 300 institutions and experts for GHG emission inventories and its subsequent impact and vulnerability modeling studies. This autonomy facilitated efficiencies in achieving progress as per the ProDoc work plans;

- Engagement of the best scientific minds in China and the encouragement of interaction with the international scientific community through the use of GEF resources that has improved input data, developed more precision of existing models such as the CH4MOD, and improved quality of imported testing equipment;
- The use of international expert assistance to determine inputs to local experiments using various models and improved methodologies;
- Fostering of effective cooperation between all the government agencies (local and central levels) by NDRC. This was accomplished through more than 80 workshops and meetings over the course of the Project and involving high level experts and government officials on their review of all project components and their implementation;
- Use of surplus GEF funds for preparing the TNC Project Document in 2013. With the outcomes of the SNC Project of improved capacity of the NDRC and its associates to address climate change concerns, the Chinese Government as well as the NDRC, are actively participating in the design of the TNC Project with UNDP. These efforts of 2013 will also assist the Chinese Government to comply with the new BUR requirements of the UNFCCC.

### 3.2.4 Strategic Partnerships

The SNC Project has provided support to setup and improve the domestic network of strategic partnerships (includes technical staff from various research institutes, academies, and universities across China) and international contacts to generate information required for the SNC document. While the Evaluation team did not meet all 10 subcontractors, it did get a sampling of the work being done by the subcontractors engaged on the SNC Project:

- The Energy Research Institute (ERI) of the NDRC who were the main agency responsible for the determination of emission factors and the assembling the GHG inventories for energy generation activities, industrial activities, agricultural activities, LUCF, and solid waste generation. Given the wide range of expertise and data sources, the ERI set up task forces with relevant institutes to obtain data. With the knowledge that coal usage contributes close to 50% of China's GHG emissions, a natural emphasis was placed on institutes with data on coal consumption such as:
  - The China Coal and Transportation and Marketing Association with regards to coal properties and coal transport routes;
  - The Xi'an Thermal Power Research Institute Co. Ltd. and the National Administrative Center for Energy-Savings (affiliated to the National Institute of Metrology of PRC) with regards to the carbon oxidation rate of various coal consuming devices such as boilers;
  - The Shenyang Branch of China Coal Research Institute with regards to fugitive emissions from coal mining activities;
  - National Bureau of Statistics with regards to fuel consumption (mainly coal) for various industrial sectors;
  - Several industrial associations for iron and steel, building materials and nonferrous metals that use coal as a primary fuel.
- The Department of Environmental Science and Engineering of Tsinghua University amongst other institutes was involved in the determination of emission factors for various biomass materials;

- The Institute of Atmospheric Physics within the Chinese Academy of Sciences (IAP-CAS) who served as the main agency for GHG inventories from croplands, mainly CH<sub>4</sub> and N<sub>2</sub>O emissions from the tilling of soils and flooding for paddy lands. Given the inexact nature of these emissions, the work performed under this subcontract was largely research-oriented and associated with 12 research institutes that cover the numerous and diverse agricultural practices in China. This included dry land farming, sub-tropical agriculture and agriculture in mountainous areas. Institutes such as the Doncun Farm in Yuncheng of Shanxi Province, the Institute of Agriculture in Sub-Tropical Areas and the Chengdu Institute of Mountain Hazards and Environment are just a sampling of the diverse array of relevant institutes involved with research into GHG emissions from croplands; and
- The Institute of Forest Ecology, Environment and Protection (IFEED) under the Chinese Academy of Forest (CAF) who served as the apex agency for GHG emission estimation from land use, land use changes, and forestry (LULUCF). Their assignment also involved more than 36 experts representing a wide range of expertise including the Institute of Agricultural Environment and Sustainable Development of the CAS, the Institute of Atmospheric Physics of the CAS. The State Forestry Administration, the Academy of Forest Inventory and Planning, Beijing Forest University, the Institute of Geographical Sciences and Resources of the CAS, the Institute of Resources Information, the Institute of Forestry, and the Institute of Agricultural Meteorology of the CAS.

These lead institutes all made strong impressions of their relevance to the GHG inventory assignment and were clearly technically competent in achieving the GHG inventory goals of the SNC Project. These agencies met on a regular basis with NDRC and the PMO to discuss progress with a frequency of 3 to 6 months. Given the research nature of these assignments, the assignments were adaptively managed based on the findings of these teams from previous work. There is a strong likelihood of a continuation of involvement with these institutes into the TNC Process that will enhance the results and outcomes of the TNC, especially given their strong collaborative mechanisms. The SNC Report also provides details of other collaborative relationships developed during the SNC process, notably with other multilateral and international scientific programs and organizations. This provides strong indications of China's desire to actively participate on international forums on climate change and leverage their participation to into resources to improve climate change mitigation and adaptation activities.

The Project also arranged a study tour to Australia with their Department of Climate Change and Energy Efficiency. The purpose of the tour was to provide an opportunity for academic exchange and sharing of research in the area of GHG inventories and energy saving activities. The tour served to validate Chinese approaches and methodologies to GHG inventory formulation, and to strengthen future ties with a similar agency in a developed country. Australia was strategically chosen for the study tour due to its similar reliance on coal for power generation, their expertise on GHG inventory development for coal and uncertainty analysis, and their recent successes in the formation of a national carbon emission trading scheme.

In summary, the SNC Project fostered strategic partnerships that have led to effective communications and strengthened relationships between subcontractors and experts of the various components of the SNC Project to the extent that the sharing of data, information, lessons learned and best practices were efficiently shared. This included cross-cutting issues which enhanced the quality of the findings.

### 3.2.5 Project Finance

The SNC Project has a total budget of USD 5.65 million with the Government of China committing USD 0.65 million in kind. Actual GEF budget expenditures by year and by component are provided on Table 2. Actual SNC Project expenditures up to December 31, 2012 show that USD 482,466 still remained in the SNC Project budget. The 2013 AWP indicated that the Project was planning to utilize this entire amount primarily to prepare for the TNC and BUR including the following supporting activities:

- Preparing documentation required for approval of a Third National Communication (TNC) Project financed by GEF;
- Collection of GHG and adaptation information to 2010 to advance progress for the 2014 BUR due in December 2014;
- Other GHG data collection activities that will improve confidence level of various GHG inventories for energy and industrial emissions.

The Project reports that the co-financing is closer to USD 1.0 million (than the actual USD 0.65 million in the ProDoc) that is attributed to in-kind technical assistance from subcontractors on their additional work related to improved field testing and the collection of emission factors for various coal consuming activities and devices. The Evaluation team backs this finding given the high quality of work in the GHG emission factors demonstrated by the three institutes that are discussed in Section 3.2.4.

**Table 2: GEF Project Budget and Expenditures for 2008-2012 (in USD as of December 31, 2012)**

Outcome	Planned in ProDoc	2008	2009	2010	2011	2012	2013 (planned)	Total Disbursed	Total Remaining
Outcome 1: Inventory of GHG Emissions, Development of GHG Inventory and Database and Emission Projection & Modeling Systems	\$3,000,000	\$0	\$1,086,785	\$1,543,392	\$110,889	\$55,880	\$0	\$2,796,946	\$203,054
Outcome 2: Impact of, vulnerability and adaptation to climate change assessed	\$500,000	\$0	\$170,241	\$167,700	\$79,151	\$0	\$0	\$417,092	\$82,908
Outcome 3: Improved public awareness and informing policy-decision making on climate change	\$150,000	\$0	\$59,481	\$60,102	\$1,063	\$28,044	\$0	\$148,691	\$1,310
Outcome 4: Inventory of GHG emissions and other relevant information on climate change for Hong Kong and Macao	\$200,000	\$0	\$0	\$32,971	\$0	\$0	\$0	\$32,971	\$167,029
Outcome 5: Supplementary support for achieving Convention objectives	\$650,000	\$36,051	\$1,862	\$45,847	\$255,397	\$288,313	\$346,490	\$973,961	-\$323,961
Outcome 6: Publication and dissemination of the SNC Report	\$50,000	\$0	\$293	\$0	\$0	\$0	\$0	\$293	\$49,707
Project Management, M&E	\$450,000	\$8,236	\$157,537	\$143,337	\$108,285	\$86,487	\$136,075	\$639,956	-\$189,956
Unrealized Loss		\$0	\$0	\$3,855	\$0	\$2,872		\$6,727	-\$6,727
Unrealized Gain		\$0	-\$195	-\$2,847	-\$8,484	-\$5,110		-\$16,637	\$16,637
<b>TOTAL (cumulative actual)</b>		\$44,288	\$1,520,291	\$3,514,649	\$4,060,949	\$4,517,435	\$5,000,000		\$0
<b>TOTAL (planned)</b>								\$0	\$0
<b>% expended of Total Planned Disbursement</b>		1%	30%	70%	81%	90%	100%		

**Table 3: Summary of SNC Project Budget (in USD as of December 31, 2012)<sup>22</sup>**

Activities		Planned in ProDoc	Actual	% of Project Budget
Planned	Actual			
Outcome 1: Inventory of GHG Emissions, Development of GHG Inventory and Database and Emission Projection & Modeling Systems	Inventory of GHG Emissions, Development of GHG Inventory and Database and Emission Projection & Modeling Systems	\$3,000,000	\$2,796,946	56%
Outcome 2: Impact of, vulnerability and adaptation to climate change assessed	Impact of, vulnerability and adaptation to climate change assessed	\$500,000	\$417,092	8%
Outcome 3: Improved public awareness and informing policy-decision making on climate change	Improved public awareness and informing policy-decision making on climate change	\$150,000	\$148,691	3%
Outcome 4: Inventory of GHG emissions and other relevant information on climate change for Hong Kong and Macao	Inventory of GHG emissions and other relevant information on climate change for Hong Kong and Macao	\$200,000	\$32,971	1%
Outcome 5: Supplementary support for achieving Convention objectives	Supplementary support for achieving Convention objectives	\$650,000	\$627,471	13%
Outcome 6: Publication and dissemination of the SNC Report	Publication and dissemination of the SNC Report	\$50,000	\$293	0%
Project Management, M&E		\$450,000	\$503,881	10%
<b>TOTAL (actual)</b>		<b>\$5,000,000</b>	<b>\$4,527,345</b>	<b>91%</b>

<sup>22</sup> The remaining USD 482,566 is being used during 2013 for the preparation of the TNC Project that is proposed to be supported by GEF

### 3.2.6 M&E Design at Entry and Implementation

M&E design in the ProDoc was not too detailed providing flexibility for the PMO to manage the Project in a manner deemed appropriate for the level of resources being deployed. The M&E functions of NDRC involved managing subcontracts of 10 major research institutes for GHG inventories and V&A assessments and impact statements. Technical reports from the subcontractors comprised the backbone of deliverable outputs and information required for the SNC Report. More than 80 workshops were organized during the course of the Project to discuss and review project progress and proceedings by sub-contracts, a detail not covered under the M&E design. Technical information generated from these workshops was used for preparing quarterly and annual PIRs. Given that all Project activities were carried out according to AWP, implementation of the M&E plan was satisfactory.

Ratings of the Project's Monitoring and Evaluation system<sup>23</sup> are as follows:

- M&E design at entry – 5;
- M&E plan implementation – 5;
- Overall quality of M&E – 5.

### 3.2.7 Comparisons of Other NC Projects

There are other National Communications being prepared by other non-Annex 1 countries of comparable size such as India, Brazil and Indonesia. With the completion of their SNC Project, China is in the midst of preparing the Project document for the preparation of its TNC. Comparable National Communication preparations from other countries include:

- India where GEF assistance is being utilized to assist their TNC preparations for:
  - Improving GHG inventory estimates and reducing uncertainty for 2011 to 2014 using Tier II and III methodologies and 2006 IPCC inventory guidelines wherever appropriate;
  - Improving regional emission factors for specific sectors and emission sources;
  - Building the capacity of sectoral institutions and network of supporting research institutions in an effort to establish a National Inventory Management System to manage GHG inventories;
  - Improving CC modeling by using multiple climate change models (both regional and global models) using higher spatial resolution simulations up to 20 to 25 km<sup>2</sup> to improve CC projections for water resource availability, forests and human health<sup>24</sup>;
- Brazil where GEF assistance is being utilized to deliver a TNC Report by late 2014 as well as BURs for 2016 and a 4NC Report by 2018 for:

<sup>23</sup> 6 = HS or Highly Satisfactory: There were no shortcomings;  
 5 = S or Satisfactory: There were minor shortcomings,  
 4 = MS or Moderately Satisfactory: There were moderate shortcomings;  
 3 = MU or Moderately Unsatisfactory: There were significant shortcomings;  
 2 = U or Unsatisfactory: There were major shortcomings;  
 1 = HU or Highly Unsatisfactory.

<sup>24</sup> The Indian SNC had used 50 km<sup>2</sup> spatial resolution for its one and only CC model

- Improving GHG inventories for the 2000-2010 period using Tier III methodologies;
- Improved understanding of GHG emissions from deforestation in the LUCF sector, the most significant source of GHG emissions from Brazil; and
- Regional CC modeling using 40 km<sup>2</sup> spatial resolution that was deemed adequate for monitoring and modeling deforestation.

Given China's lack of information and data collection within the LUCF sector on N<sub>2</sub>O emissions from forest clearing and Brazil's advances in monitoring its primary source of GHG emissions from deforestation, China should consider learning from the experiences, methodologies and practices that Brazil have in developing GHG inventories in the LUCF sector. Their methods and field data collected for N<sub>2</sub>O emissions could be a useful comparison to efforts now being undertaken by IFEEP-CAS.

### 3.2.8 UNDP and Executing Partner Performance

There are no issues with the performance of UNDP (Implementing Agency) and the NDRC (Executing Agency). UNDP China managed the SNC Project within the framework of UNDP/GEF project management rules, ensured timely Project disbursements, and bridged a communications between national implementation partners and the UNDP-GEF Regional Coordination Unit in Bangkok and GEF. The project steering committee regularly called meetings to monitor and provided suggestions for smooth project implementation.

Ratings on their performance on this Project are as follows<sup>25</sup>:

- Quality of UNDP Implementation – 5
- Quality of Execution – NDRC –5
- Overall Quality of Implementation/Execution –5

## 3.3 Project Results

Assessment of SNC achievements and shortcomings are provided in this section against the 2008 Project log-frame. Each outcome was evaluated against individual criterion of:

- *Relevance* – the extent to which the outcome is suited to local and national development priorities and organizational policies, including changes over time;
- *Effectiveness* – the extent to which an objective was achieved or how likely it is to be achieved;
- *Efficiency* – the extent to which results were delivered with the least costly resources possible.

The Project outcomes were rated based on the following scale:

- *6: Highly Satisfactory (HS)*: The project has no shortcomings in the achievement of its objectives;

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<sup>25</sup> Ibid 23

- 5: *Satisfactory (S)*: The project has minor shortcomings in the achievement of its objectives;
- 4: *Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives;
- 3: *Moderately Unsatisfactory (MU)*: The project has significant shortcomings in the achievement of its objectives;
- 2: *Unsatisfactory (U)*: The project has major shortcomings in the achievement of its objectives;
- 1: *Highly Unsatisfactory (HU)*: The project has severe shortcomings in the achievement of its objectives.

### 3.3.1 Overall Results

#### Intended EOP Outcome:

- ⇒ Formulated and submitted SNC Report
- ⇒ Strengthened capacity to enable China integrate climate change concerns & issues into national & sectoral development priorities through the SNC process<sup>26</sup>

#### Actual EOP Outcome:

- ⇒ SNC Report draft report submitted in June 2012 with final draft delivered at the Doha COP meeting in December 2012
- ⇒ Capacity of various research institutes and universities involved with climate change issues from the INC has been strengthened during the SNC Project through various Project-supported activities such as technical exchanges with international GHG inventory groups and professional time to formulate appropriate equations and methodologies for estimation of GHG emissions from various sources. The output of the SNC Report has strengthened the NLGCC in its capacity for policymaking and to more effectively promote climate change in China with the public-at-large.

Rating:            *Relevance: 5*  
                       *Effectiveness: 5*  
                       *Efficiency: 5*  
                       *Overall rating: 5*

This Project has achieved its intended outcomes in an effective and timely manner which was mainly to deliver the Second National Communications Report to fulfill its obligation to the UNFCCC. This was achieved in December 2012. In addition, this Project has enabled China to enhance its capacity to integrate climate change with its socio-economic development planning and policymaking processes. A significant proportion of the technical information in the SNC Report was provided by 10 sub-contractors engaged to work on the project as shown in Table 3.

<sup>26</sup> This strengthened capacity will enable China to prepare its SNC in accordance with the Guidelines for the Preparation of National Communications from non-Annex I Parties (17/CP.8) adopted by the Conference of the Parties (COP) to the UNFCCC

**Table 3: List of Sub-Contractors and Assignments during the SNC Project**

Component/Activity	Sub-contract	Sub-contractor
1.1.1 GHG Inventory of Energy Sector	Sub-contract 1	Energy Research Institute, NDRC
1.1.2 GHG Inventory of Industrial Processes	Sub-contract 2	Tsinghua University
1.1.3.1 GHG Inventory of Croplands	Sub-contract 3	Chinese Academy of Sciences
1.1.3.2 GHG Inventory of livestock and poultry	Sub-contract 4	Chinese Academy of Agricultural Sciences
1.1.4 GHG Inventory of Land Use Change and Forestry	Sub-contract 5	Chinese Academy of Forestry Sciences
1.1.5 GHG Inventory of Waste Treatment	Sub-contract 6	Chinese Research Academy of Environmental Sciences
1.2: China's GHG inventory database	Sub-contract 7	Energy Research Institute, NDRC
1.3: China's GHG projection methodology	Sub-contract 8	Energy Research Institute, NDRC
Component 2: Assessment on impact of, vulnerability and adaptation to climate change	Sub-contract 9	Chinese Academy of Agricultural Sciences
Component 3: Improving public awareness and informing policy-decision making on climate change	Sub-contract 10	China Economic Information Network

Notwithstanding that the timely delivery in December 2012 of the crucial deliverable of the SNC Project, i.e., the SNC Report to the UNFCCC, it had surplus funds (over USD 482,565) by the time of its scheduled completion date (December 31, 2012). The Evaluation team learned during the March 25-29, 2013 period that these surplus funds were being allocated to fund a 12-month Project extension to December 31, 2013 to undertake:

- Preparation of the TNC Project Document; and
- Other related work such as compilation of the 2010 GHG emissions for the 2014 BUR.

On May 31, 2013, the Evaluation team learned that the extension of the SNC Project for another 6 months ending December 31, 2013 was approved by UNDP and CICETE.

### 3.3.2 Component 1: Completed 2005 National GHG Inventory

Output 1.1: Inventory of GHG Emissions

<p><b>Intended Output 1.1.1: Energy Sector GHG Inventory:</b></p> <p>⇒ Fossil fuel combustion inventory (Output 1.1.1.1)</p> <p>⇒ Biomass energy consumption inventory (Output 1.1.1.2)</p> <p>⇒ Coal mining and post-mining activities inventory (Output 1.1.1.3)</p>	<p><b>Actual Output 1.1.1:</b></p> <p>⇒ Output 1.1.1 completed as planned. Since this sector is the source of the largest GHG emissions in China, the CO<sub>2</sub> emissions data from this sector have been sourced from work from a number of prominent coal research and marketing institutes in China as well as energy technology and environmental</p>
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<p>⇒ Inventory of fugitive emissions from oil and gas systems (Output 1.1.1.4); and</p> <p>⇒ Summary of the 2005 GHG emissions inventory in the energy sector in China:</p>	<p><i>departments at Tsinghua University. New capacities have been built at these institutions for emissions modeling, analysis and predicting GHG emission inventories for the energy sector</i></p>
<p><b>Intended Output 1.1.2: Industrial Sector GHG Emission Inventory:</b></p> <p>⇒ Cement production (Output 1.1.2.1);</p> <p>⇒ Lime production (Output 1.1.2.2);</p> <p>⇒ Iron &amp; steel production (Output 1.1.2.3);</p> <p>⇒ Calcium carbide production (Output 1.1.2.4);</p> <p>⇒ Adipic acid production (Output 1.1.2.5);</p> <p>⇒ Nitric acid production (Output 1.1.2.6);</p> <p>⇒ Aluminum production (Output 1.1.2.7);</p> <p>⇒ Magnesium production (Output 1.1.2.8);</p> <p>⇒ Electrical equipment production (Output 1.1.2.9);</p> <p>⇒ Semiconductor production (Output 1.1.2.10);</p> <p>⇒ Ozone depleting substances (ODS) production (Output 1.1.2.11);</p> <p>⇒ Summary analysis and China's 2005 GHG inventory of the industry sector:</p>	<p>⇒ <i>Output 1.1.2 completed as planned. This output was compiled by Tsinghua University through its contacts with the various industrial sectors who have access to energy consumptive records for these sectors, and using a number of methods and models to estimate industry sectoral GHG emissions including:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Production rates and in-site surveys for cement clinker and lime industries;</i></li> <li>▪ <i>Carbon balance-base approach for iron and steel production using activity data from National Statistical Yearbooks for the sector;</i></li> <li>▪ <i>Production rates and the use of the 1996 IPCC Inventory Guidelines to estimate CO2 emissions from calcium carbide production processes with emission factors estimated from the Cleaner Production Standard – Calcium Carbide Industry;</i></li> <li>▪ <i>Tier 2 methods and surveys of production from 50 enterprises are used to estimate N2O emissions from adipic acid and nitric acid production processes</i></li> <li>▪ <i>IPCC Good Practice Guidance is used to estimate perfluorocarbon (PFC) emissions from aluminum production processes;</i></li> <li>▪ <i>Tier 1 method of the 2006 IPCC Inventory Guidelines used to estimate the sulfur hexafluoride (SF6) emissions from the magnesium production processes;</i></li> <li>▪ <i>Tier 2 method of the 1996 IPCC Inventory Guidelines used to estimate SF6 emissions from electrical equipment manufacturing processes</i></li> <li>▪ <i>Tier 1 method from the 1996 IPCC Inventory Guidelines used to estimate emissions from of manufacturing process alternatives to ODS with trifluoromethane (HFC-23) emissions. Emissions from the chlorodifluoromethane (HCFC-22) production processes are estimated separately using Tier 2 method.</i></li> </ul>
<p><b>Intended Output 1.1.3: Agricultural Sector GHG Inventory for:</b></p> <p>⇒ Rice paddies (Output 1.1.3.1);</p> <p>⇒ Croplands (Output 1.1.3.2);</p> <p>⇒ Enteric fermentation (Output 1.1.3.3);</p> <p>⇒ Animal waste management systems</p>	<p>⇒ <i>Output 1.1.3 completed as planned with Project resources used to support:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Compiling emissions inventories for rice paddies through field experiments and development of CH4MOD, a model developed for by integrating the model</i></li> </ul>

<p>(Output 1.1.3.4);  ⇒ Summary analysis and China's 2005 GHG inventory of the agriculture sector (Output 1.1.3.5).</p>	<p>with GIS on various spatial databases of climate, soil and agronomic practices. Field surveys were also supported to calibrate empirical calculations. The CH4MOD model is recommended in the 2006 IPCC Guidelines for National GHG Inventories as a methodological option for making rice paddy GHG inventories;</p> <ul style="list-style-type: none"> <li>▪ Compiling cropland emission inventories through the collection of N<sub>2</sub>O emissions from various dryland crops such as wheat, green onions and maize<sup>27</sup>;</li> <li>▪ Enteric fermentation inventories using methodologies as suggested by the IPCC Good Practice Guidance and considering non-dairy cattle, buffalos, goats, sheep, dairy cattle and pigs as key sources of CH<sub>4</sub> emissions from enteric fermentation;</li> <li>▪ Estimating GHG inventories for animal waste management systems that considers pigs, non-dairy cattle, dairy cattle and poultry as key CH<sub>4</sub> emission sources, and using methodologies recommended by IPCC for both N<sub>2</sub>O and CH<sub>4</sub>.</li> </ul>
<p>Intended Output 1.1.4: LUCF Sectoral GHG Emission Inventory:  ⇒ Inventory of carbon stocks in forests and other woody biomass (Output 1.1.4.1);  ⇒ Inventory of GHG emissions from forest conversions (Output 1.1.4.2);  ⇒ Inventory of changes in soil organic carbon (Output 1.1.4.3);  ⇒ Summary analysis and China's 2005 GHG inventory of the LUCF sector (Output 1.1.4.4)</p>	<p>⇒ Output 1.1.4 completed as planned with Project resources used to support:</p> <ul style="list-style-type: none"> <li>▪ Review of forest inventory and land use change data during the 1999-2008 period from 31 provinces and municipalities, field measurements, and methodologies recommended by the 1996 IPCC Guidelines to assemble a GHG inventory for carbon stock changes in forests and other woody biomass;</li> <li>▪ Literature review, field measurements and surveys to estimate GHG emissions induced by forest conversions;</li> <li>▪ Estimation of inventory of soil organic changes under cropland and grassland management mainly through literature research. This activity has resulted in numerous discussions at various workshops in efforts to reduce the uncertainties of GHG from this source from 50% to 30%.</li> </ul>
<p>Intended Output 1.1.5: Waste Landfills Sectoral GHG Emission Inventory:  ⇒ Inventory of CO<sub>2</sub> emissions in waste landfills (Output 1.1.5.1);  ⇒ Inventory of CO<sub>2</sub> emissions in waste incineration treatment (Output 1.1.5.2);  ⇒ Inventory of CH<sub>4</sub> emissions in industrial</p>	<p>⇒ Output 1.1.5 completed as planned with Project resources utilized to support:</p> <ul style="list-style-type: none"> <li>▪ The inventory for CH<sub>4</sub> emissions from municipal solid waste landfills using methods from the 2006 IPCC Inventory Guidelines, considering differences in city sizes and regional economic</li> </ul>

<sup>27</sup> Using N<sub>2</sub>O equipment procured by the Project

<p>wastewater treatment (Output 1.1.5.3);  ⇒ Inventory of GHG emissions in residential wastewater treatment (Output 1.1.5.4);  ⇒ Inventory of N<sub>2</sub>O emissions in waste and sewage treatment (Output 1.1.5.5);  ⇒ Summary analysis and China's 2005 GHG inventory in waste treatment (Output 1.1.5.6).</p>	<p><i>development, identification of differences in management of waste treatment sites and lifestyles of local residents, and the generation rate of methane based on the location of the landfills and available research papers;</i></p> <ul style="list-style-type: none"> <li>▪ <i>CO<sub>2</sub> emissions inventory from waste incinerations based on the IPCC Good Practice Guidance, and recommended methods in the 2006 IPCC Inventory Guidelines, and estimations of the proportion of organic and inorganic wastes;</i></li> <li>▪ <i>GHG inventory from the industrial and residential wastewater treatment based on the calculation methods from the 2006 IPCC Inventory Guidelines, China's population and food protein content per capita</i></li> </ul>
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*Outputs 1.2 and 1.3: GHG Inventory Database and GHG Emission Methodologies*

<p>⇒ Output 1.2: China GHG emissions inventory database that includes a completed GHG emission inventory database design, operating manuals and training on use &amp; maintenance of database</p>	<p>⇒ <i>Output 1.2 completed as planned according to NDRC. The Evaluation Team was unable to independently verify the existence of the database</i></p>
<p>⇒ Output 1.3: GHG Emissions Projection Methodology that includes a completed GHG emission projection and analysis model design, a finalized model design, and a forecast for 2010 GHG emissions</p>	<p>⇒ <i>Output 1.3 completed as planned with a model to predict GHG emissions for 2010 and 2020 based on economic and industrial development, population growth, expected improvements in living standards, and future energy mixes and technology advances.</i></p>

Rating:      *Relevance: 5*  
                 *Effectiveness: 6*  
                 *Efficiency: 5*  
                 *Overall rating: 5*

Component 1 is the largest of the components in the SNC Project. All outputs were delivered on time (according to the target schedules as set in the PPM) to the Project including the 2005 GHG emission inventories and GHG of database and emission forecasting modeling systems. All inventories are summarized in Part II, Chapter 2 of the SNC Report. Uncertainties of the GHG inventories were covered under Part II, Chapter 3. More than 50 working seminars were conducted to report on progress as well to refine the inventories. During the first half of 2010, two workshops were held to review completion of the ten sub-contracts with the completion of all 5 inventories by late 2010. This was a good achievement for NDRC in coordination and management considering the complexity and substantial effort to obtain all activity data and emission factors that were transformed into a comprehensive GHG inventory of China.

The major efforts of this component were placed into significant emission sources such as those from energy generation and significant industrial sectors. Emissions from energy generation alone account for more than 75% of all of China's GHG emissions in 2005. Moreover, since coal comprises more than 50% of China's primary energy consumption, a significant proportion of Project resources were dedicated to the reducing the uncertainties of coal-related GHG emissions. This included data collection and analysis of the life-cycle of coal consumption including fugitive emissions from coal mining activities (underground and open pit mining activities), coal types by province and region, carbon contents of the various coal types, the location of their usage in energy generation, oxidation rates based on the various uses of coal within each province and region, and data, and provincial and regional emission factors. The contribution of the various coal mining associations in each province was significant, notably fugitive emission data that has been available to improve the safety record of underground coal mining activities. In summary, the GHG inventories assembled by the SNC Project for the energy and industrial sectors has levels of uncertainty that permit its use and integration into China's socio-economic development planning.

Although GHG emissions from agriculture and LUCF activities comprise less than 20% of all GHG emissions in China, substantial efforts were also placed into improving the confidence of estimates of these GHG sources. As a result, GEF-supported activities for these GHG inventories were more research-oriented, mainly to establish baseline methodologies and to determine emission factors. In many cases, methodologies and emission factors were determined through the use of empirical formulae and IPCC default factors. Some of the Project activities were used to support Institute of Atmospheric Physics of the Chinese Academy of Science (IAP-CAS) research into field data to refine emission factors such as the N<sub>2</sub>O emissions for maize, wheat, green onions, and orchards. IAP-CAS also developed the first methane emission model, CH4MOD, for rice paddy cultivation that has been recognized in the 2006 IPCC Guideline as one of the two "Tier 3 methodologies" in the estimation of CH<sub>4</sub> emissions into an emissions inventory<sup>28</sup>. This is an excellent achievement of the SNC Project. During the SNC Project, the CH4MOD model has been used and further calibrated for GHG emission estimates from agricultural activities on dryland and paddy fields.

Research into the LUCF inventory was led by the Institute of Forest Ecology, Environment & Protection of the Chinese Institute of Forestry (CAF). Their basic approach to the inventory has been to update forestry data from the INC, collect more data from recent publications, and to conduct field testing if it was deemed more data accuracy was required. The LUCF inventories accounted for soil organic changes (SOC or carbon stock changes) in forests and other woody biomass, GHG emissions resulting from changes from forest to non-forest, and soil stock carbon changes resulting from cropland and grassland management. A GHG estimation that was not made was N<sub>2</sub>O emissions from conversion of forest to non-forest land use. This was primarily due to the lack of empirical data for its calculation, the lack of funds to conduct field testing of N<sub>2</sub>O content in forest soils and the purported high costs of N<sub>2</sub>O field tests data which includes equipment and field tests in remote virgin forest. CAF reports that the addition of N<sub>2</sub>O emissions from conversion of forest to non-forest land use might add as much as 20% to the current estimation of GHG emissions from this source. Much of this information was shared at the 2013 meeting in Oslo, Norway on IPCC Supplementary good practice guidance on LUCF from the Kyoto Protocol. The outcome of these activities has been

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<sup>28</sup> Ding & Wang, 1996, and CH4MOD 1.0 by Huang et al., 2004

LUCF inventories with uncertainties of 50%. Field surveys or the use and analysis of infra-red imagery will be useful in confirming or validating new emission factors to improve this confidence level. However, the cost effectiveness of such efforts needs to be carefully examined considering the high cost of conducting field work in forestry emissions. The targeted uncertainty level of the LUCF inventory is 27 to 30% in developed countries.

In summary, the outcome of SNC Project resources invested in agriculture and LUCF activities is an improved understanding of GHG emissions from these sectors. However, given the large 50% uncertainty levels of these GHG inventories, models and the tools for estimation such as infra-red imagery, are still required to improve these uncertainty levels, and to forecast future GHG emissions (notably N<sub>2</sub>O emissions) from these activities. Furthermore, these GHG inventories still cannot be integrated with development planning until these confidence levels are improved.

More than USD 2.7 million was expended on this component. This was cost effective considering the volume of work to deliver 28 GHG inventories within Years 1 and 2 (2010 and 2011), the timeliness of these deliveries and the satisfactory quality of the inventories. This was an excellent achievement for NDRC and its subcontractors.

Trends of GHG emission growth from 2005 were forecast under Part II, Chapter 4 of the SNC Report. These forecasts were based on analysis of available information from economic activities and demographics from 2005 to 2010, and serve as a valuable output for the TNC report and future NCs.

### 3.3.3 Component 2: Assessment of sectoral impacts and vulnerability & adaptation to climate change

#### Intended Outputs of Component 2:

- ⇒ Summary of the forecast of climate change characteristics and analysis in China
- ⇒ Assessments of impact and vulnerability of climate change on China's food production
- ⇒ Impact and vulnerability assessments of climate change on water resources
- ⇒ Impact and vulnerability assessments of climate change on forests and other natural ecosystems
- ⇒ Impact and vulnerability assessments of climate change on sea-level rise and coastal social economy
- ⇒ Impact and vulnerability assessments of climate change on human health.
- ⇒ Integrated assessment report on climate change impacts, vulnerability and adaptation

#### Actual Outputs of Component 2:

- ⇒ Summarized in SNC report in Part III, Chapter 2
- ⇒ CC impact and vulnerability on China's food production in Part III of SNC report Section 2.1 covering cropping systems, agricultural diseases, extreme weather events, major crop yields, and agricultural production
- ⇒ CC impact and vulnerability on water resources in Part III of SNC report Section 2.2 covering distribution of water resources, droughts and floods, glaciers and lakes, and vulnerability of water resource climate change impacts
- ⇒ CC impact and vulnerability on terrestrial resources in Part III of SNC report, Section 2.3 covering forest ecosystems, grassland ecosystems, wetlands and lake ecosystems, biodiversity, terrestrial ecosystems and geological environment

- ⇒ *CC impact and vulnerability on coastal zones and regions in SNC report Section 2.4 covering sea level, storm surges, coastal erosion, seawater intrusion, river deltas and offshore ecosystems*
- ⇒ *CC impact and vulnerability on human health in SNC report Section 2.5 covering direct and indirect impacts on human health.*
- ⇒ *Policies and actions in adaptation to CC in Part III of SNC report Chapter 3 covering agriculture, water resources, terrestrial ecosystems, coastal zones and regions, and human health*

*Rating:           Relevance:    5*  
*Effectiveness: 5*  
*Efficiency:     5*  
*Overall rating: 5*

The outputs from this project component are covered in Part II of the SNC Report and were prepared using information and analyses from 9 major research institutions that includes the Institute of Environment and Sustainable Development in Agriculture of the Chinese Academy of Agricultural Sciences, the Climate Center of the Chinese Meteorological Association, the Water Information and Forecasting Division of the Ministry of Water Resources, Institute of Geological Sciences and Natural Resources, and the Chinese Center for Disease Control.

In comparison to the 2004 INC, the SNC V&A and impact assessments to climate change were based on increased availability of data and an improved global understanding of climate change. While the INC V&A assessments were mainly based on the use of IPCC models from 2000, these assessments did catalyze the development of domestically developed CC models. Moreover, the SNC assessments were more comprehensive and included:

- Impacts of climate change on crop yields, crop distribution and rotation, crop pests and diseases, vulnerability in agriculture, and a summary of the main advances associated to agricultural adaptation;
- Summary of research results of CC impacts on water resource, including methodology and tools, issues and gaps as well as the impacts of climate change on water supply and demand and distributions of vulnerability;
- Summary of observed impacts of climate change on natural ecosystem with regard to changes in structure, function and distribution pattern;
- Review of the progress in research of sea level rise, the impacts of sea level rise and climate change on coastal ecosystem; and
- Review of recent research into climate change effects on cardio-cerebrovascular and vector-borne diseases.

These assessments were augmented through the development and establishment of:

- An agricultural economic database that included soil information, area of cultivated land, crop yields, phenology, agricultural management practices, and fertilizer usage. The data was organized to county levels and processed into 50 km×50 km grids;
- A hydro-meteorological database that included daily precipitation data, evaporation, temperature and discharge from the past 40 years on selected river basins;
- Sea level monitoring database;

- A database of historical climate change related diseases that includes various diseases, heat wave and extreme climate events, and disease vectors for malaria, schistosomiasis, dengue and other selected diseases;
- An integrated crop model framework to simulate integrated impacts of climate change, water availability, and socio-economic development on Chinese food production;
- An improved hydrological model with a resolution of 50 km x 50 km for 100 selected catchments in the different climate zones;
- A temperature-snail survival model to set up a schistosoma-climate model as an indicator for predicting climate change impacts on human health

Adaptation measures recommended in the INC included developing water-conservation agriculture and industry, ecological protection, cultivation of disease and pest-resistant varieties, curbing and stopping deforestation and ecological damage, the setup and strengthening of monitoring, forecasting, and early warning systems for control of fire, disease, and pests of pasture and forest, and raising the standard flood control embankments and coastal infrastructure against rising sea levels.

Adaptation measures in the SNC were a carryover from those in the INC report but with China providing stronger language to express its commitments towards promulgating effective policies and measures to enhance climate change adaptation capability by developing an overall national strategy for climate change adaptation; and enhancing scientific research on climate change, observations and impact assessments. Moreover, the Government has pledged to fully integrate climate change factors into the design of key infrastructural and adaptation projects and to enhance their preparedness for extreme climatic events.

The outcome from the outputs that were delivered from the implementation of the activities in this component is an improvement from the INC in the understanding of China's vulnerability to the threats of climate change to agriculture, water resources, coastal resources, terrestrial ecosystems and human health. The outputs were delivered on schedule as per the time frame stated in the indicators in the Project Planning Matrix (PPM). The expenditure of USD 417,000 for this component considering the satisfactory quality of the outputs can be considered cost effective.

Notwithstanding these positive findings, NDRC has also acknowledged gaps in these V&A assessments that were carried out under the SNC Project, including:

- Gaps in the understanding of socio-economic impacts;
- No cross sectoral impacts of climate change such as impacts on urban development from changes in agricultural practices under a changed climate regime. Only direct sectoral impacts of climate change were assessed in some areas;
- No established vulnerability assessment methodologies and indices for agriculture, ecosystems, coastal zone and human health;
- No methodologies for assessment of adaptation measures and corresponding effectiveness; and
- No impacts of climate change on diseases related to extreme climate events, relevant pathogens, intermediate hosts, and vectors with temperature changes. The SNC only focused on impacts of climate change on human health on vector-borne diseases such as malaria, schistosomiasis and dengue.

### 3.3.4 Component 3: Enhanced public awareness on climate change in China

#### Intended Outputs of Component 3:

- ⇒ Improved and fully staffed Climate Change Info-Net by Quarter 6
- ⇒ Action plans concerning promoting and enhancing public awareness and knowledge on climate change in China by Quarter 13

#### Actual Outputs of Component 3:

- ⇒ Comprehensive climate change website <http://en.ccchina.gov.cn> was completed in Quarter 6 that is regularly updated with staff dedicated to maintaining the website
- ⇒ Summary of action plans for promoting and enhancing public awareness and knowledge on climate change completed by Quarter 13 that is summarized in Part V, Chapter 3 of the SNC Report

Rating:           Relevance:   5  
                       Effectiveness: 5  
                       Efficiency:   5  
                       Overall rating: 5

In 2002, the Government setup the Climate Change Info-Net website in both English and Chinese. GEF resources have been used during the SNC Project to improve the website documenting China's actions and plans for mitigating and adapting to climate change. The site is comprehensive, informative and includes news on the country's climate change actions, laws and regulations, research articles dating back to 2002, workshops and events on climate change, and news regarding international climate change cooperation.

The country has also made improvements to public education and outreach on climate change based on the action plan prepared during the SNC Project. Climate change education has now been extended to the elementary schooling system as well as colleges and universities. Climate change outreach has been improved from the INC through TV, radio and the internet. The Evaluation Team has had several examples of NDRC and its collaborative government agencies and research institutes on disseminating the findings and conclusions of the SNC Report. In October 2010, China hosted a number of high profile meetings on climate change including the UNFCCC Climate Change Conference in Tianjin where numerous experts on the ad-hoc working groups had gathered for discussions on the further commitments for Annex I countries on the Kyoto Protocol as well as Long Term Cooperative Action under the Convention. Another example is the ERI organizing a "National Energy Saving Week" in June, on which one day is designated as a "Low Carbon Day", designed to raise the public awareness of GHG issues in the general public.

In summary, outputs of this component have been delivered on time, are of satisfactory quality and were cost effective considering the USD 148,000 expended on this component. Moreover, the outcomes of this component are more government activities to improved public awareness of climate change issues in China and improved climate change resources that inform policymaking decisions.

### 3.3.5 Component 4: Clear understanding of the GHG emissions and climate change situation in the Hong Kong and Macao SARs

#### Intended Outputs of Component 4:

- ⇒ 2005 GHG emissions inventory of Hong Kong & Macau SARs by Quarter 13.
- ⇒ Report on the CC information in Hong Kong & Macau SARs by Quarter 13

#### Actual Outputs of Component 4:

- ⇒ 2005 GHG emissions inventory for Hong Kong and Macau SARs completed by Quarter 13;
- ⇒ Report on CC information in Hong Kong and Macau SARs completed by Quarter 13.

Rating:	Relevance:	5
	Effectiveness:	5
	Efficiency:	5
	Overall rating:	5

GEF resources expended to obtain these inventories and CC reports were far below the budgeted amount. Cooperation between the SAR administrations and the Central Government was excellent leading to the timeliness of the delivery of high quality outputs. Climate change information of the SARs is higher quality given that they have been undertaking their own climate change initiatives based on the fact they have access to more of their own administration resources. The SAR administrations report that their current energy intensities have been reduced by 40 to 45% from energy intensities from 2005.

In summary, outputs of this component have been delivered on time, are of satisfactory quality and were cost effective considering the USD 32,971 expended on this component. Moreover, the outcome of this component is improved understanding of GHG emission and climate change issues of the Hong Kong and Macau SARs.

### 3.3.6 Component 5: Improved capacity and technical inputs for CC-integrated development planning both at the local and national levels

#### Intended Outputs of Component 5:

- ⇒ 2005 National Circumstances by Quarter 13
- ⇒ CC Mitigation Strategy Report by Quarter 13
- ⇒ CC Adaptation Strategy Report by Quarter 13
- ⇒ Report on Systematic Climate Observations by Quarter 13
- ⇒ Guidelines & Action Framework for Technology Transfer & Cooperation by Quarter 13
- ⇒ Capacity Development on NC by Quarter 13
- ⇒ Results & outcomes of NC capacity development activities by Quarters 6, 9 & 12

#### Actual Outputs of Component 5:

- ⇒ 2005 National Circumstances was completed by Q13 and presented in SNC Report under Part I
- ⇒ CC Mitigation Strategy Report was completed by Q13 and presented in SNC Report under Part IV
- ⇒ CC Adaptation Strategy Report was completed by Q13 and is presented in the SNC Report under Part III, Chapter 3
- ⇒ Report on Systematic Climate Observations was completed by Quarter 13 and presented in the SNC Report under Part V, Chapters 1 and 2
- ⇒ Guidelines & Action Framework for Technology Transfer and Cooperation was

*completed by Q13 and is presented in the SNC Report under Part VI, Chapters 1 and 2*  
 ⇒ *Capacity Development for NC completed by Q13 and presented in Part VI, Chapter 3*  
 ⇒ *The results and outcomes of NC capacity development activities were only reported in Quarter 12.*

*Rating:           Relevance:    5*  
                       *Effectiveness: 5*  
                       *Efficiency:     5*  
                       *Overall rating: 5*

The seven outputs of this component were delivered on time, are of satisfactory quality and were cost effective considering the USD 627,470 expended on this component. Based on the outputs from this component, there is improved technical understanding and inputs for climate change-integrated development at both local and national levels of government.

### **3.3.7 Outcome 6: China’s fulfillment of its obligation under the UNFCCC**

#### **Intended Outputs of Component 6:**

- ⇒ **Completed SNC Report (in Chinese & English) by Quarter 12**
- ⇒ **China SNC Report for submission to UNFCCC by Quarter 13**

#### **Actual Outputs of Component 6:**

- ⇒ *The SNC Report was completed in Quarter 14*
- ⇒ *The completed SNC Report delivered at COP 18 in Doha in December 2012 (Q16)*

*Rating:           Relevance:    5*  
                       *Effectiveness: 5*  
                       *Efficiency:     5*  
                       *Overall rating: 5*

The quality of the SNC Report is satisfactory and clearly conveys China’s CC information as well as plans and needs for future climate change mitigation and adaptation measures.

### **3.3.8 Overall Evaluation of Project**

The overall rating of the project results is satisfactory (S). This is based on the following outcomes:

- All outputs from all components were delivered on time and according to the budgets as presented in the ProDoc;
- The high quality of the outputs that were available during the Evaluation mission;
- The efficient management of collecting relevant information and organizing the numerous scientists and climate change specialists within the 4-year time frame of the SNC Project. Information exchanges were facilitated by the more than 80 workshops between the various universities and research institutes with the able coordination of NDRC; and
- The knowledge of stakeholders met during the Evaluation mission on climate change issues that includes research personnel from the Energy Research Institute (ERI) of the NDRC, Institute of Atmospheric Physics within the Chinese Academy of Sciences (IAP-CAS) and the Institute of Forest Ecology, Environment and Protection under the Chinese Academy of Forest (CAF).

Overall project ratings are provided on Table 4.

**Table 4: Ratings for Each Project Outcome<sup>29</sup>**

	Relevance	Effective-ness	Efficiency	Overall Rating
<b>Monitoring and Evaluation:</b>				
M&E design at entry	-	-	-	5
M&E plan implementation	-	-	-	5
Overall quality of M&E	-	-	-	5
<b>UNDP and Executing Partner Performance:</b>				
Quality of UNDP implementation	-	-	-	5
Quality of Execution - NDRC	-	-	-	5
Overall quality of implementation/execution	-	-	-	5
Overall Results	5	5	5	5.0
<b>Outcomes:</b>				
<b>Outcome 1:</b> Completed 2005 National GHG Inventory	5	6	5	5.3
<b>Outcome 2:</b> Assessment of sectoral impacts and V&A to climate change	5	5	5	5.0
<b>Outcome 3:</b> Enhanced public awareness on climate change in China	5	5	5	5.0
<b>Outcome 4:</b> Clear understanding of the GHG emissions and climate change situation in the Hong Kong and Macao SARs	5	5	5	5.0
<b>Outcome 5:</b> Improved capacity and technical inputs for CC-integrated development planning both at the local and national levels	5	5	5	5.0
<b>Outcome 6:</b> China's fulfillment of its obligation under the UNFCCC	5	5	5	5.0
<b>Overall Rating:</b>	5.0	5.1	5.0	5.1

### 3.3.9 Country Ownership and Drivenness

The strength of the SNC Project has been the China's drivenness to be a responsible party and to fulfill its obligations to the UNFCCC. This has been demonstrated through:

- The Chinese Government setting up the National Coordination Committee on Climate Change (NCCCC) under the previous Environmental Protection Committee of the State Council as early as 1990. In 1998, the NCCCC was restructured and renamed as NDRC. NDRC represents the Chinese Government during international negotiations on global climate change and during its work with the IPCC;
- China being a signatory to the UNFCCC on June 11, 1992 that was then ratified by the Standing Committee of the National People's Congress on January 5, 1993;

<sup>29</sup> 6 = HS or Highly Satisfactory: There were no shortcomings;  
 5 = S or Satisfactory: There were minor shortcomings,  
 4 = MS or Moderately Satisfactory: There were moderate shortcomings;  
 3 = MU or Moderately Unsatisfactory: There were significant shortcomings;  
 2 = U or Unsatisfactory: There were major shortcomings;  
 1 = HU or Highly Unsatisfactory.

- China preparing its INC in July 2001 with technical assistance from GEF, and officially submitting the INC Report to the UNFCCC during COP10 in December 2004 as a non-Annex I Party;
- Addressing climate change as outlined in the Chinese Government's 11<sup>th</sup> Five-Year Plan (2006-2010) and 12<sup>th</sup> Five-Year Plan (2011-2015) for National Economic and Social Development and the Mid and Long-Term National Development Plan for Science and Technology;
- The State Council setting up the "National Leading Group on Climate Change" (NLGCC) in 2007, headed by Premier Wen Jiabao, giving climate change more prominence in China, and the formulation of *China's National Climate Change Program* (CNCCP) by the NDRC in cooperation with 17 departments, the country's first policy document on climate change and the first national program on climate change among all developing countries.

Country ownership of the SNC Project has been amply demonstrated by the Government's participation in the design and management of the Project. During the preparation of the SNC Project, NDRC provided the details of work programs that they could achieve against available resources. They also prepared the AWP for the SNC Project, and have implemented and managed these annual work programs efficiently and with minor deviations.

### 3.3.10 Sustainability and Replicability of Project Outcomes

In assessing Project sustainability, we asked "how likely will the Project outcomes be sustained beyond Project termination?" Sustainability of these objectives was evaluated in the dimensions of financial resources, socio-political risks, institutional framework and governance, and environmental factors, using a simple ranking scheme:

- 4 = *Likely (L)*: negligible risks to sustainability;
- 3 = *Moderately Likely (ML)*: moderate risks to sustainability;
- 2 = *Moderately Unlikely (MU)*: significant risks to sustainability; and
- 1 = *Unlikely (U)*: severe risks to sustainability.
- *Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.*

The overall Project sustainability rating is moderately likely (ML). This is primarily due to the uncertainty of available resources and available time to prepare the 2014 BUR and the TNCs. The reason for the uncertainty of available resources is the due to uncertainty of incremental effort required to show improvements in the GHG and climate change data from the SNC Project, and to prepare 2014 BUR report, all within a compressed time frame. Some of the incremental efforts include improving emission factors across the country and the measurements required to obtain this data over a wide geographic area and a longer time frame; these efforts would require an uncertain amount of substantial labor investment as well as the procurement and use of a wide range of specialized equipment. Notwithstanding that NDRC can access test equipment and databases from institutions involved with the SNC at little or no cost<sup>30</sup>, the Government of China does not have specific funding allocations for the preparation of the BUR and SNC reports considering the remaining time to submit these reports and the uncertainty of incremental efforts required.

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<sup>30</sup> For example, Tsinghua University has N<sub>2</sub>O testing equipment.

To this extent, the Government would welcome technical guidance from GEF for preparation of the 2014 BUR and the TNC for 2016. If there are no further substantial and comprehensive changes in NC preparation efforts and reporting requirements beyond 2016, the Chinese government should have sufficient capacity and knowledge to routinely prepare future NCs. Details of sustainability ratings are shown on Table 5.

SNC Project activities<sup>31</sup> have been setup so that they are functional after completion of the SNC Project. Moreover, NDRC and their subcontractors will be in a state of readiness for preparation of subsequent NCs and meeting the continual obligations to the UNFCCC. This is based on the outcomes of the SNC Project which have generated improvements from the INC in its approaches, methodologies and tools for GHG inventories, impact and V&A assessments. The strategy of the SNC Project was to take available information from priority issues from the INC and various related scientific studies, conduct research into these areas and improve the understanding of these issues. The outputs of the SNC Project has been documentation of the various climate change issues, most them critical to the formulation of the NC. These outputs will be useful for scientific literature reviews with the IPCC and other peer organizations, enhancing the replicability of the Project.

The replicability of certain practices of the SNC Project was enhanced through a study tour to Australia in June 2010 to meet with their Department of Climate Change and Energy Efficiency and share their practices for GHG inventory building. The study tour served to validate the Chinese approaches to GHG inventories (which have been based on IPCC guidelines), and to provide the confidence that Chinese practices could be shared and replicated in other countries in the region, especially those which have similar national circumstances to China. The recognition of domestically-developed CH4MOD model for estimation of rice paddy GHG emissions in the 2006 IPCC Guidelines is also an excellent achievement that will encourage replication of best practices from the SNC Project.

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<sup>31</sup> This would include GHG inventory development, the methodological frameworks for V&A and mitigation assessments, participatory strategies and experiences, and activities to integrate climate change into regional and sector development processes

**Table 5: Assessment of Sustainability of Outcomes**

Actual Outcomes (as of March 2013)	Assessment of Sustainability	Dimensions of Sustainability
<b>Actual Outcome 1:</b> The 2005 national GHG inventory is completed	<ul style="list-style-type: none"> <li>• <i>Financial Resources:</i> The Chinese Government has funds to operate and maintain the GHG inventories;</li> <li>• <i>Socio-Political Risks:</i> Fulfillment of UNFCCC obligations and the reporting of GHG emissions is a top priority of the Chinese Government;</li> <li>• <i>Institutional Framework and Governance:</i> The NDRC is the appropriate government agency for coordinating and managing GHG emission inventories;</li> <li>• <i>Environmental Factors:</i> GHG emissions involve increased understanding of information on climate change that influences decision making processes that can help improve environmental quality for China.</li> </ul> <p style="text-align: right;"><b><i>Overall Rating</i></b></p>	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;"><b>4</b></p>
<b>Actual Outcome 2:</b> Sectoral impacts and vulnerability & adaptation to climate change have been assessed for China	<ul style="list-style-type: none"> <li>• <i>Financial Resources:</i> The Chinese Government has financial resources to continue research into climate change impacts, and assessment of vulnerability and adaptation to climate change;</li> <li>• <i>Socio-Political Risks:</i> Fulfillment of UNFCCC obligations and the assessment of sectoral impacts and V&amp;A to climate change is a priority of the Chinese Government;</li> <li>• <i>Institutional Framework and Governance:</i> The NDRC is the appropriate government agency for coordinating and managing the assessment of sectoral impacts and V&amp;A to climate change;</li> <li>• <i>Environmental Factors:</i> Assessment of sectoral impacts and V&amp;A to climate change that influences decision making processes that can help improve environmental quality for China.</li> </ul> <p style="text-align: right;"><b><i>Overall Rating</i></b></p>	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;"><b>4</b></p>
<b>Actual Outcome 3:</b> Public awareness on climate change in China is enhanced	<ul style="list-style-type: none"> <li>• <i>Financial Resources:</i> Government financial resources are available to continue raising public awareness on climate change;</li> <li>• <i>Socio-Political Risks:</i> Fulfillment of UNFCCC obligations and the maintaining a high level of public awareness of climate change is a priority of the Chinese Government;</li> <li>• <i>Institutional Framework and Governance:</i> The NDRC is the appropriate government agency for coordinating, managing and maintaining the high level of public awareness of climate change;</li> <li>• <i>Environmental Factors:</i> Maintaining a high level of public awareness of</li> </ul>	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p>



**Table 5: Assessment of Sustainability of Outcomes**

Actual Outcomes (as of March 2013)	Assessment of Sustainability	Dimensions of Sustainability
Project	obligations that now require the submission of BURs; <ul style="list-style-type: none"> <li>• <i>Socio-Political Risks:</i> Fulfillment of UNFCCC obligations is a priority of the Chinese Government;</li> <li>• <i>Institutional Framework and Governance:</i> The NDRC is the appropriate government agency for coordinating, managing and maintaining all efforts for China to meet its UNFCCC obligations</li> <li>• <i>Environmental Factors:</i> Efforts for China to meet its UNFCCC obligations will help improve environmental quality for the country.</li> </ul> <p style="text-align: right;"><b><i>Overall Rating</i></b></p>	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;"><b>3</b></p>
	<b><i>Overall Rating of Project Sustainability:</i></b>	<b>3</b>

## 4. CONCLUSIONS, RECOMMENDATIONS AND LESSONS

### 4.1 Conclusions

- The Chinese Government at the highest levels has expressed its support for full compliance to the UNFCCC. As such, the INC and SNC have been effectively used as platforms on which to improve understanding of climate change in China and to inform CC policies across all important economic sectors;
- The SNC Project has been implemented according to approved annual work plans, budget lines and schedule. This demonstrates NDRC's strong commitment to the NC process, and improving its institutional capacity and managerial skills to ensure sustainable cooperation between various subcontractors, research institutions, universities and laboratories. The key action contributing to this outcome has been the organization and conduct of more than 80 workshops during the course of the SNC Project to foster academic exchanges and the sharing of research between key actors. The final outcome of the SNC Project has been the delivery of the SNC Report 4 years after the commencement of the SNC Project in December 2012, as per the schedule in the ProDoc;
- The short-term impacts of the SNC Project are the following:
  - Improved and comprehensive understanding of GHG emissions from the different source categories as indicated by the UNFCCC Guidelines for non-Annex I National Communications;
  - China's fulfillment of its obligation under the UNFCCC for the Second National Communication;
  - Institutional mechanisms supported with climate change knowledge products that effectively integrate climate change into development planning both at the local and national levels; and
  - Increased number of government officers and research personnel in China to be able to model, analyze and project future GHG emissions using GHG inventory tools, inventory information and analyses;
- The long-term impacts of the SNC Project are the following:
  - Improved understanding of China's vulnerability to the threats of climate change and predicted impacts in five sectors: agriculture, water resources, coastal resources, terrestrial ecosystems and human health;
  - Improved public awareness and availability of technically sound information to inform policy-decision making on climate change;
  - Operational institutional mechanisms for the provision of GHG emissions and climate change situations in the Hong Kong and Macao SARs; and
  - Knowledge in China that improves its ability to manage its drive towards sustainable development with climate change;
- There are clear efforts by the Chinese Government to raise the profile of climate change issues through prominent and visible public events and media messaging;
- While the SNC Project has enabled the Chinese Government to provide a strong NC submission to the UNFCCC in a timely manner, there is a clear need to improve the

quality of their CC information, and its capacity to comply with the Convention as the country moves forward to the TNC. The Chinese Government has acknowledged these needs that include:

- Efforts to bridge the gap of uncertainties of GHG inventories;
  - More research on the physical impacts of climate change;
  - Assessments of cross-sectoral impacts of climate change;
  - A methodology and indices for vulnerability assessments for various sectors such as agriculture, ecosystems, coastal zones and human health;
  - Methodologies for assessment of adaptation measures and their corresponding effectiveness; and
  - Assessment of impacts of climate change to human health due to extreme weather events, relevant pathogens, intermediate hosts, vectors with temperature changes;
- The outcomes of the SNC Project have strengthened the position of NDRC as the coordination and management agency for the preparation of the TNC. The Chinese Government through NDRC and its partner organizations are intent on complying with the new UNFCCC BUR reporting requirements based on:
    - Government confirmation of ongoing efforts to collect as much 2010 GHG emissions data as possible by late 2013 for the 2014 BUR. Notwithstanding that there is a small risk that the 2010 data collection is not completed by late 2013, the NDRC stated that the Government will comply with UNFCCC obligations by issuing the 2014 BUR on time by late 2014;
    - The availability of a strong consultant network within research institutes and universities to support the required work; and
    - Government acknowledgement of the need to make the NC process efficient to meet this obligation. The Government, however, is uncertain of the nature and level of incremental effort required to improve the GHG data collection quality, to assess what should be included in the inventory (types of GHGs, consideration of sector and sub-sector GHG sources) and subsequently, what budget allocations are required for incremental efforts;
  - There have been a number of needs identified for reducing uncertainties of the GHG inventory. This could involve additional reviews of the inventory; impact modeling; validation and strengthening of calculation procedures; and additional sampling to verify default emission factors or to validate new emission factor values. TNC designers, however, will face a challenge to prepare an NC project design that complies with UNFCCC requirements with a clearly presented and justified budget;
  - External assistance would be useful in guiding NDRC in formulation of adaptation activities. This would include examples from other countries on their formulation and adoption in a high level adaptation policy program;
  - China's development of GHG inventories appears advanced to the extent that China is in a position to share its experiences on GHG inventory formulation and establishment with similar countries;
  - Although the SNC Project has no agenda on gender issues, the Evaluation team has observed significant contributions from women on the SNC Project, notably with two out of the three subcontractors with whom meetings were held. This included key

researchers who were female on sub-contracts for energy activities, agriculture cropland and livestock GHG emission inventories, and the GHG emission inventory database.

## 4.2 Recommendations

With a new termination date for the GEF-funded SNC project on December 31, 2013, the following recommendations are provided to NDRC on actions to strengthen and sustain climate change activities in advance of a GEF-supported Third National Communications (TNC) Project planned for 2014. These recommendations are based on extensive discussions with NDRC and three of their subcontractors interviewed during the Evaluation Mission. It is understood by the Evaluation Team that preparations for the TNC Project have already commenced; as such, these recommendations are provided to improve or validate the TNC Project design.

**Recommendation 1: The following GHG activities all related to reducing GHG emission uncertainties should be considered for inclusion into a TNC Project:**

- Increasing the sample sizes of coal usages through additional field surveys that will verify or change default values for coal and other energy sectors. This is important given that coal comprises more than 70% of China's GHG emissions. The additional field surveys may include monitoring of fugitive emissions from coal mines<sup>20</sup>, additional sampling of boilers for a wider range of coal oxidation rates by different boilers used across China<sup>21</sup>, and surveys of coal types used in different regions in China which may lead to regional or provincial emission factors;
- Estimation of emissions from flaring in oil & gas and specialized O&G products such as LNG and lubricant oils through field measurements. Currently, there are no emission inventories for flaring and a growing number of O&G-related products;
- Increasing research through field surveys of N<sub>2</sub>O emissions from croplands and forestry. Current estimation methods for N<sub>2</sub>O emission are reliant on IPCC default factors and a small number of research measurements being made by IAP-CAS for N<sub>2</sub>O emissions from wheat, maize, green onions and orchard growing activities. The TNC Project should consider supporting increased research work on N<sub>2</sub>O emissions:
  - Over a wider geographic area of dryland crops and wider time frame to establish if there are seasonal variations on N<sub>2</sub>O emissions in different regions;
  - On forest lands if there is cost effectiveness in obtaining this data. TNC designers will need to consider the cost of obtaining of N<sub>2</sub>O equipment, conducting the field readings in remote virgin forest areas, and analyzing the data. Currently, N<sub>2</sub>O emissions are not even included in the LUCF calculations due to the lack of empirical data and information on the subject, and could potentially add 10% to LUCF emissions;
  - For determining a standard method to estimate N<sub>2</sub>O emissions from agricultural activities and LUCF; and
  - Field sampling of paddy fields for CH<sub>4</sub> emissions to determine emission factors that vary with seasons, climatic zones and soil types. This information can be used for further calibration of the CH4MOD model.

<sup>20</sup> This may involve the increased frequency of sampling and monitoring of coal mines where there are safety concerns over CH<sub>4</sub> emissions from underground coal mines. Current monitoring of CH<sub>4</sub> emissions is on an annual basis.

<sup>21</sup> Oxidation rates will vary according to climatic zone, the seasons and the types of coal used in a particular region.

**Recommendation 2: Assistance in climate change vulnerability assessments and adaptation measures under a TNC Project should include:**

- Research work on the physical impacts of climate change. This may include impacts to coastal areas such as saltwater intrusion, changes in fluvial morphology from changes in hydrology and accelerated glacial melt, and ecosystem changes from changing weather patterns;
- Assessments of cross-sectoral impacts of climate change. For example, impacts of climate change on agriculture will have an impact on urban development and socio-economic indicators; this has not yet been assessed in China;
- A methodology and indices for vulnerability assessments for various sectors such as agriculture, ecosystems, coastal zones and human health;
- Methodologies for assessment of adaptation measures and their corresponding effectiveness;
- Assessment of impacts of climate change to human health due to extreme weather events, relevant pathogens, intermediate hosts, vectors with temperature changes. The SNC Project only assessed impacts of climate change on human health on vector-borne diseases such as malaria, schistosomiasis and dengue;
- Increasing international exchanges and study tours to improve understanding of the methods of other countries in GHG inventories and CC impact and V&A assessments and to share methods that have already been developed in China. The process for selection of countries for international exchange and study tours should be similar to the SNC where Australia was selected on the basis of common ground on managing coal GHG inventories;
- Capacity building and technical training courses on climate change impact and V&A assessments, and advanced methodologies on preparing GHG inventories using experiences from Annex I countries.

**Recommendation 3: The TNC Project should include assistance to improve efficiencies in updating GHG inventories for 2010 and 2012 and to enable timely delivery of the 2014 BUR.** The commencement of a GEF-supported TNC Project is expected by early 2014. There are ongoing NC activities by the Chinese Government that target submission of a BUR by December 2014. This would include expanding the expert roster in an effort to accelerate Government-backed research and field verification of emission factors from other sectors<sup>22</sup>, and to assist in the management of data and information collection and analysis to ensure there is sufficient information for the 2014 BUR. NDRC will need to assess its capacity to fulfill the new BUR reporting obligations to improve the cost effectiveness of future funding from a TNC project and other donors.

### 4.3 Lessons Learned and Best Practices

- Compilation of a climate change national communication is a large and challenging undertaking especially in a developing country such as China. Successful implementation of such an undertaking requires an experienced and responsible project implementation partner with competent management staff. NDRC has demonstrated the benefits of effective management leading to successful project implementation. The NPDs and NPMs who have served on the Project provided excellent direction and have

<sup>22</sup> This would include CO<sub>2</sub> and CH<sub>4</sub> from oil and gas flaring, LNG, lubricant oils, and N<sub>2</sub>O emissions from forestry and agricultural activities.

taken responsibility for its outputs and outcomes. They have provided a conducive working and collaborative environment for a wide range of specialists from various government departments and agencies to compile and share information for the NC report;

- GEF is a key financial mechanism to governments of developing nations, in this case to assist developing countries in meeting their obligations to the UNFCCC through National Communications issues that requires adherence to international norms of reporting. The SNC Project has demonstrated this lesson with the Chinese Government stating its intention to meet its obligations under the UNFCCC, not having the full capacity or knowledge to meet these obligations, and utilizing GEF assistance to meet these obligations. Moreover, GEF support is a key resource for developing countries in their attempts to comply with changing UNFCCC reporting requirements such as the new requirement for the Biennial Update Report.

Best practices that can be cited from this Project include:

- The selection of an implementation partner for a National Communications project should include a government agency that has support at the highest levels of government. The NDRC characterizes such a government-entity; it has the support of the Chinese Premier, houses the NLGCC that is chaired by the Premier, and has excellent managerial and coordination capacity for an NC project. The leadership of NDRC to coordinate and manage the NC process has attracted the best domestic professionals to be involved with activities of the NC process, and maximized cooperation between other government departments and local government agencies. In the case of the SNC Project, NDRC's high profile enables it to effectively coordinate and guide all relevant government agencies, research institutes and universities to provide their best technical professionals to an NC preparation. It also enabled NDRC to conduct more than 80 workshops and meetings that were well attended with the involvement of high level experts and government officials, who reviewed and provided expert guidance to all SNC Project components. Several of NDRC's subcontractors have also provided in-kind technical assistance in addition to their contractual obligations to ensure high quality of their outputs and to establish and secure their agency's reputations for climate-change related work;
- The use of international expertise on the SNC Project was conducted in an effective manner by conducting much of the work internally prior to presenting the findings in an international workshop or study tour setting. During the SNC Project, GHG emissions and climate change V&A assessments and impacts were conducted internally and within the framework of the various related IPCC Guidelines. NDRC also encouraged more interaction between domestic subcontractors to improve the outputs which led to improvements and in some cases, the development of more precise models such as the CH4MOD model for rice paddies. Interactions with international experts during the SNC Project expertise were conducted when GHG emission inventory formulation methods were being compared with those prepared by other countries (such as Australia which has similar coal emissions from power projects). In addition, foreign assistance was also used when there was a need for modifications on testing equipment (GHG monitoring equipment) that was imported into China.

## APPENDIX A: MISSION TERMS OF REFERENCE FOR PROJECT FINAL EVALUATION

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### UNDP/GEF Project

Enabling China to Prepare Its Second National Communication to the UNFCCC

#### 1. Introduction:

In order to enable China to fulfill the commitments under the United Nations Framework Convention on Climate Change (UNFCCC) by enabling it to prepare its Second National Communication (SNC) in accordance with the Guidelines for the Preparation of National Communications from non-Annex I Parties (17/CP.8) adopted by the Conference of Parties (COP) to the UNFCCC, the project of Enabling China to Prepare Its Second National Communication to the UNFCCC (SNC) was supported by the Global Environment Facility (GEF) and UNDP, and implemented by the National Development and Reform Commission (NDRC). The project will strengthen the National Communication process and its linkage with national development priorities. Based on the experience and lessons learned from the Initial National Communication (INC), the project will broaden and consolidate the network of stakeholders, including those in the government, social groups, research and education institutions, industries, individuals, and NGOs, enhance technical capacity of national experts, and strengthen the institutional framework for the preparation of national communications. Furthermore, compared to the INC, the project will place greater emphasis on relevant policies on mitigation and adaptation to climate change and the results of their implementation, so as to enable China to effectively address climate change in the process of pursuing national and sectoral sustainable development.

The Project Document for the SNC Project was approved by GEF in August 2008 and the Project Document was signed in September 2008. The project was launched in December 2008. The goal of the project is to develop a more comprehensive national Greenhouse Gas (GHG) inventory, with a report of extended categories and sources of GHG emissions and applying the IPCC Good Practice Guidance and Uncertainty Management to reduce uncertainties in the inventory. It will establish a preliminary national GHG inventory database management system, with a view to administering inventory data in a more scientific way and making the preparation of GHG inventories a continuing process. The project will develop an approach for projecting GHG emissions in China. It will further strengthen the assessment of the impacts of and vulnerability to climate change and dissemination of China's relevant policies and measures to address climate change. It will further enhance the public awareness on climate change. The project will lead to the submission of the SNC to the Conference of the Parties (COP) to the UNFCCC.

#### 2. Description of the Assignment

As part of its project management activities, the SNC project is up for final evaluation (FE). The purpose of the FE is to evaluate the project implementation and management performances. It will determine whether the project is on track to achieve the project objective and therefore just need to be sustained; or needs additional guidance/assistance to keep it on track. The project evaluation will also determine and report on the experiences and lessons learnt during the project implementation so as to provide guidance in determining the targets and strategies for the planned Third National Communication (TNC) Project. In this regard, the findings and

recommendations of the evaluation will contribute to complete China's Second National Communication to the UNFCCC on time and strengthen the capacity to address climate change in China.

### **3. Scope of the Evaluation**

The scope of the FE covers the entire GEF-funded SNC project and its components.

The FE will assess the SNC Project implementation taking into account the status of the project activities and outputs and the resource disbursements made up to 31 December 2012.

The evaluation will involve analysis at two levels: component level and project level. On the component level, the following shall be assessed:

- Whether there is effective relationship and communication between/among components so that data, information, lessons learned, best practices and outputs are shared efficiently, including cross-cutting issues;
- Whether the performance measurement indicators and targets used in the project monitoring system are specific, measurable, achievable, reasonable and time-bounded to achieve desired project outcomes; and,
- Whether the use of consultants has been successful in achieving component outputs.

The FE will also include such aspects as appropriateness and relevance of work plan, compliance with the work and financial plan with budget allocation, timeliness of disbursements, procurement, coordination among project team members and committees, and the UNDP country office support. Any issue or factor that has impeded or accelerated the implementation of the project or any of its components, including actions taken and resolutions made should be highlighted.

At the project level, the FE will assess the project performance in terms of: (a.) Progress towards achievement of results, (b.) Factors affecting successful implementation and achievement of results, (c.) Project Management framework, and (d.) Strategic partnerships.

(a) Progress towards achievement of results (internal and within project's control)

- Is the Project making satisfactory progress in achieving project outputs vis-à-vis the targets and related delivery of inputs and activities?
- Are the direct partners and project consultants able to provide necessary inputs or achieve results?
- Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its purpose/objective and contribute to the realization of its goal?
- Are there critical issues relating to achievement of project results that have been pending and need immediate attention in the next period of implementation?

(b) Factors affecting successful implementation and achievement of results (beyond the Project's immediate control or project-design factors that influence outcomes and results)

- Is the project implementation and achievement of results proceeding well and according to plan, or are there any outstanding issues, obstacles, bottlenecks, etc. on the government (national and local), research institutes (sub-contractors) or private sector

as a whole that are affecting the successful implementation and achievement of project results?

- To what extent does the broader policy environment remain conducive to achieving expected project results, including existing and planned legislations, rules, regulations, policy guidelines and government priorities?
- Is the project logical framework and design still relevant in the light of the project experience to date?
- To what extent do critical assumptions/risks in project design make true under present circumstances and on which the project success still hold? Has the project team validated these assumptions as presently viewed by the project management and determine whether there are new assumptions/risks that should be raised?
- Is the project well-placed and integrated within the national government development strategies, such as community development, poverty reduction, etc., and related global development programs to which the project implementation should align?
- Do the Project's outcomes remain valid and relevant, or are there items or components in the project design that need to be reviewed and updated?
- Are the Project's institutional and implementation arrangements still relevant and helpful in the achievement of the Project's objective and outcomes, or are there any institutional concerns that hinder the Project's implementation and progress.

(c) Project management (adaptive management framework)

- Are the project management arrangements adequate and appropriate?
- How effectively is the project managed at all levels? Is it results-based and innovative?
- Do the project management systems, including progress reporting, administrative and financial systems and monitoring and evaluation system, operate as effective management tools, aid in effective implementation and provide sufficient basis for evaluating performance and decision making?
- Is technical assistance and support from project partners and stakeholders appropriate, adequate and timely?
- Validate whether the risks originally identified in the project document and, currently in the APR/PIRs, are the most critical and the assessments and risk ratings placed are reasonable.
- Describe additional risks identified during the evaluation, if any, and suggest risk ratings and possible risk management strategies to be adopted.
- Assess the use of the project logical framework and work plans as management tools and in meeting with UNDP-GEF requirements in planning and reporting.
- Assess the use of electronic information and communication technologies in the implementation and management of the project.
- On the financial management side, assess the cost effectiveness of the interventions and note any irregularities.
- How have the APR/PIR process helped in monitoring and evaluating the project implementation and achievement of results?

(d) Strategic partnerships (project positioning and leveraging)

- Are the project partners and their other similar engagements in the SNC project, strategically and optimally positioned and effectively leveraged to achieve maximum effect of the sustainable transport and Energy Efficiency program objectives for the country?

- How do the project partners, stakeholders and co-financing institutions involved in the Project's adaptive management framework?
- Are there further opportunities for stronger collaboration and substantive partnerships identified to enhance the project's achievement of results and outcomes?
- Are the project information and progress of activities disseminated to project partners and stakeholders? Are there areas to improve in the collaboration and partnership mechanisms?

#### 4. Specific Tasks for the Evaluation

Through the review of pertinent documents related to the project such as project document, quarterly and annual progress reports, other activity/component specific deliverables and evaluation, if there are any, etc.; conduct of structured interview with knowledgeable parties (e.g., PMO, Sub-Contracting Parties/Entities, UNDP Country Office Counterparts, members of the Project Steering/Advisory Committee/s, etc.); and the evaluation mission will carry out the following tasks:

- 4.1 Review of the project design, and planning to find out whether: (a) the project approaches and strategy are sound; (b) the immediate objectives and outputs are properly stated and verifiable in the project logical framework; (c) the timeframe of the project is feasible and practicable; and, (d) Others.
- 4.2 Review of project performance: timeliness and quality of inputs; timeliness and cost-effectiveness of activities undertaken; quality and quantity of outputs produced; achievement of outcomes; and a financial review against the project budget.

The project is now more or less closure of its time line and as such progress should be measured against outputs stated in the project document. The evaluation will focus on such aspects as appropriateness and relevance of work plan, compliance with the work plan alongside with budget allocation; timeliness of disbursements; procurement, quantity and quality of goods and services created; coordination among different project actors and UNDP country office support. Any issue that has impeded or advanced the implementation of the project or any of its components, including actions taken and resolutions made should be highlighted.

*[Note: Whatever format is deemed appropriate for the presentation of the assessment results in the evaluation report, the evaluation should come up with a summary of information as in the following table.]*

Activities		Budget		
Planned	Actual	As per ProDoc	Actual Expenditures	% of Project Budget

- 4.3 Review the project impact: determine the extent to which the project objectives are expected to be achieved and what are the short-term and long-term impact of the project, including efficiency of the project, cost-effectiveness of the project;

- 4.4 Study the government policies in development of national communications and assess the relevance of the project against the national development priorities and objectives;
- 4.5 Analyze the current NC projects in other countries, and the domestic and international greenhouse gas (GHG) inventory compilation methodologies and institutional arrangement which could be of reference in China's Third National Communication compilation;
- 4.6 Analyze and report on the good practices and lessons learnt in compiling national communication and especially in the compilation of national GHG emissions inventories.
- 4.7 Provide recommendations on the improvement or sustenance of the implementation of the remaining activities of the project; potential aspects of SNC project that can be covered in a planned The Third National Communication (TNC) project; and actions to be taken to support the sustainable development of GHG database in China.

## **5. Qualifications**

The FE assignment requires an evaluation team that will consist of: one national expert and one international expert. Both experts should have basic knowledge of national communications globally and practical experience in compilation and execution of national communications and GHG inventories.

The experts should hold an advanced degree in studies related to the subject, and have at least 10 years of working experience in the area of climate change and GHG emission inventory. The national expert will act as the team leader and the international expert will support in GEF/UNDP project implementation rules and compilation of evaluation report in English. The final version of the FE report should be finalized by the evaluation team.

It is desired that the national and international consultants have as many as possible the following qualifications:

- 1) Project development, implementation and evaluation experience;
- 2) Professional experience with national communications compilation and GHG emission inventory calculation;
- 3) Knowledgeable about the relevant policies of the GEF;
- 4) Good communications and writing skills in English;
- 5) Knowledge of GEF projects and project requirements;
- 6) Good experiences in working in China and with Chinese counterparts.

## **6. Roles and Responsibilities**

The UNDP-GEF Regional Technical Advisor (based in Bangkok, Thailand) who oversees the SNC project will assist the UNDP CO and the FE team in preparing for the FE of the project. The FE Team reports to the UNDP CO and NDRC. The project's executing agency (NDRC) shall coordinate all relevant national agencies and institutes and provide in advance copies of the necessary documents needed by the evaluation expert/s. Likewise, the NDRC shall arrange and finalize the itinerary/schedule for the FE in consultation with all parties concerned. The project's Project Coordinator (PC) and Assistant to PC will provide insights of the Second National Communication of China to the FE Team and discuss with them in detail the national

communication compilation. The EA and UNDP CO will coordinate the logistical arrangements for the evaluation.

## 7. Support to the Evaluation Team:

UNDP will provide policy guidance to the FE Team, and the PMO will arrange necessary briefings, background materials, meetings and other logistical support.

The following documents and reports shall be provided to the FE Team to assist them in the conduct of the final term evaluation:

- a) SNC Project document (UNDP)
- b) Evaluation Guideline (UNDP)
- c) Project Implementation Report (UNDP)
- d) Comprehensive reports including subcontracts, executive reports, study tour reports, newsletters etc. (PMO)

## 8. FE Schedule and Budget

The FE is scheduled to be conducted in 18 March - 6 April 2013, for a period of 20 working days. A preliminary schedule for the FE assignment in China is proposed as follows and shall be finalized by the PMO in consultation with respective agencies. The terms of payment for the services rendered by the consultants (evaluators) are based conformity on the UNDP standards.

### Schedule

Day	Activity	Lead Agency
1-5	Home-based review of the background materials for both the national and international consultants while Day 4 for travelling of the international consultant from his/her home country to China	PMO
6	Briefing at UNDP office and meetings with the project management office	UNDP and PMO
7	Meetings with the sub-contractor institutes and visits to labs in Beijing	PMO
8-9	Drafting of the evaluation report	FE Team
10	Debriefing to share recommendations and findings of the evaluation (departure of the IC back home)	UNDP
11-20	Finalizing the final version of the FE report	FE Team

## 9. Outputs

The FE Team is expected to deliver the following outputs:

- Inception report: evaluator provides a very short report on clarifications on timing and method, showing how will meet TOR expectations.
- **Debriefing at UNDP:** Presentation of initial findings to Project Team and Country Office prior to departure to home station
- **Draft final report for comment:** within 3 weeks of mission

- **Final Report:** the Final Evaluation report presenting the final -term evaluation results of the project, recommendations for the implementation of the remaining activities until end-of-project, and suggestions for implementation of the Third National Communication. The report should be submitted to UNDP CO and NDRC before departure from Beijing. The documents should be submitted in electronic format.

The final report should keep the tracking of the details how all received comments have or have not been addressed in the final report.

The findings of the evaluation will be used by NDRC as the implementing partner and UNDP to better adjust project strategy and approaches to guide the project implementation in a possible followed up phase, i.e. the 3NC.

## **10. Payment Schedule**

Upon signing of the Individual Contract, travel related costs, including tickets, estimated DSA and terminals for the entire mission will be paid to the contracted consultant. Travel tickets (national and international) will be booked and paid by consultant first and be disbursed through UNDP according to the actual expenditure.

100% of the consultant fees will be paid to the consultants upon acceptance by UNDP of the evaluation report in its final form.

## **11. Documents to be provided to the Consultants:**

- China SNC Project document;
- Project implementation reports (PIR);
- Executive reports of subcontracts; and
- Other related documents

## APPENDIX B – MISSION ITINERARY (FOR MARCH 25-30, 2013)

The evaluation mission was comprised of an international consultant Mr. Roland Wong, national consultant, Mr. Zhang Xiaohua and his assistant, Ms. Hu Xiao in accordance with objectives of the evaluation and obtained relevant information for evaluating the SNC Project.

<i>March 24, 2013 (Sunday)</i>			
#	Activity	Stakeholder involved	Place
	Arrival of Mr. Roland Wong		Beijing
<i>March 25, 2013 (Monday)</i>			
1	Briefing meeting at UNDP along with the project management office	UNDP China, NDRC	Beijing
2	Presentation and meeting on GHG Emissions from Croplands in China	NDRC, IAP-CAS	Beijing
3	Meeting with UNDP China Programme Manager for Energy and Environment	UNDP China	Beijing
<i>March 26, 2013 (Tuesday)</i>			
4	Presentation and meeting on GHG Inventory Development from Energy Activities in China	NDRC - ERI	Beijing
<i>March 27, 2013 (Wednesday)</i>			
5	Presentation and meeting on China's Inventory on Greenhouse Gas Emissions from Land Use and Forest Sector	NDRC, Institute of Forest Ecology, Environment and Protection under the Chinese Academy of Forestry	Beijing
6	Phone call with UNDP-GEF Regional Office in Bangkok	UNDP-GEF Regional, Bangkok	Beijing
<i>March 28, 2013 (Thursday)</i>			
7	Final Evaluation de-briefing meeting	NDRC, UNDP China	Beijing
<i>March 29, 2013 (Friday)</i>			
	Preparation of the Evaluation Report		Beijing
<i>March 30, 2013 (Saturday)</i>			
	Preparation of the Evaluation Report		Beijing
<i>March 31, 2013 (Sunday)</i>			
	Departure of Mr. Roland Wong		

Total number of meetings conducted: 7

## APPENDIX C – LIST OF PERSONS INTERVIEWED

This is a listing of persons contacted in Beijing, China (unless otherwise noted) during the Final Evaluation Period only. The Evaluators regret any omissions to this list.

- 1) Mr. Carsten Germer, Assistant Country Director, UNDP China
- 2) Ms. Maria May Chen, Senior Climate Change Advisor, UNDP China
- 3) Mr. Zhang Weidong, Programme Manager, Energy & Environment, UNDP China
- 4) Ms. Shuhua Fan, Programme Associate, Energy & Environment, UNDP China
- 5) Mr. Wang Shu, National Project Director, SNC Project, and Deputy Director, Department of Climate Change, NDRC
- 6) Mr. Miao Weijie, National Coordinator, SNC Project, Department of Climate Change, NDRC
- 7) Dr. Shenghui Han, Institute of Atmospheric Physics of the Chinese Academy of Sciences (IAP-CAS)
- 8) Dr. Wen Zhang, Institute of Atmospheric Physics of the Chinese Academy of Sciences (IAP-CAS)
- 9) Ms. Zhu Songli, Deputy Director, Center for Energy, Environment and Climate Change, ERI- NDRC
- 10) Dr. Gao Xiang, Associate Professor, Center for Energy, Environment and Climate Change, ERI- NDRC
- 11) Mr. Xiaoqiang Hu, Associate Professor, ERI-NDRC
- 12) Dr. Jianhua Zhu, Associate Professor, Institute of Forest Ecology, Environment & Protection of the Chinese Academy of Forest (CAF)
- 13) Dr. Lixiong Zeng, Associate Professor, Institute of Forest Ecology, Environment & Protection of the Chinese Academy of Forest (CAF)

## **APPENDIX D – LIST OF DOCUMENTS REVIEWED**

1. UNDP-GEF Project Document for the SNC Project
2. SNC Mid-Term Evaluation Report
3. Project Implementation Reports (2009 to 2012)
4. Annual Project Progress Reports (2009 to 2011)
5. Two-Year Work Plans (2012-13)
6. Annual Work Plans (2009 to 2011)
7. Second National Communication on Climate Change of The People's Republic of China (December 2012)
8. Presentation on GHG Inventory Development for Energy Activities by the ERI-NDRC
9. Presentation on GHG Emissions from Croplands in China by the IAP-CAS
10. Presentation on China's Inventory of GHG Emissions from Land Use and Forest Sector by the Institute of Forest Ecology, Environment & Protection, Chinese Academy of Forestry

## APPENDIX G – PROJECT PLANNING MATRIX

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
<b>Goal:</b> Formulation & submission of SNC Report	SNC Report	INC Report	Formulated and submitted SNC Report	SNC Report submitted to the UNFCCC	
<b>Objective:</b> Strengthened capacity to integrate climate change concerns into national and sectoral development priorities while fulfilling obligations to the UNFCCC	Level of technical and institutional capacity on NC formulation	Existing capacity with INC is not sufficient to the new NC formulation requirements	Strengthened capacity to enable China integrate climate change concerns & issues into national & sectoral development priorities through the SNC process	Operational CC framework at the central and local government levels	
<b>COMPONENT 1: Inventory of GHG Emissions, Development of GHG Inventory Database and Forecasting &amp; Modeling Systems</b>					
Output 1.1.2.1: Inventory of GHG emissions from fossil fuel combustion	<ul style="list-style-type: none"> <li>● Activity data for fossil fuel combustion</li> <li>● CO<sub>2</sub> emission factors for fossil fuel combustion</li> <li>● CO<sub>2</sub> emissions for fossil fuel combustion</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for fossil fuel combustion in INC</li> <li>● CO<sub>2</sub> emission factors for fossil fuel combustion used in INC</li> <li>● CO<sub>2</sub> emissions from fossil fuel combustion as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for fossil fuel combustion by Quarter 2;</li> <li>● Improved emission factors for fossil fuel combustion by Quarter 6</li> <li>● Completed inventory of CO<sub>2</sub> emissions from fossil fuel combustion by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CO<sub>2</sub> emissions inventory from fossil fuel combustion.</li> </ul>	National Bureau of Statistics and relevant entities in the coal, oil, and natural gas & electricity sectors fully cooperate in the provision of data fossil fuel consumption
Output 1.1.2.2: Inventory of GHG emissions from biomass energy combustion	<ul style="list-style-type: none"> <li>● Activity data for biomass energy combustion</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emission factors for biomass energy combustion</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emissions for biomass energy combustion</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for biomass energy combustion in INC</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emission factors for biomass energy combustion used in INC</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emissions from biomass energy combustion as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for biomass energy combustion by Quarter 2;</li> <li>● Improved emission factors for biomass energy combustion by Quarter 6</li> <li>● Completed inventory of CH<sub>4</sub> &amp; N<sub>2</sub>O emissions from biomass energy combustion by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> &amp; N<sub>2</sub>O emissions inventory from biomass energy combustion.</li> </ul>	National Bureau of Statistics and relevant entities in the agriculture and biomass-using companies fully cooperate in the provision of data on biomass energy consumption.
Output 1.1.2.3: Inventory of GHG emissions from coal mining & post mining activities	<ul style="list-style-type: none"> <li>● Activity data for coal mining &amp; post mining activities</li> <li>● CH<sub>4</sub> emission factors for coal mining &amp; post mining activities</li> <li>● CH<sub>4</sub> emissions for coal mining &amp; post mining</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for coal mining &amp; post mining activities in INC</li> <li>● CH<sub>4</sub> emission factors for coal mining &amp; post mining activities used in INC</li> <li>● CH<sub>4</sub> emissions from coal mining &amp; post mining</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for coal mining &amp; post mining activities by Quarter 2;</li> <li>● Improved emission factors for coal mining &amp; post mining activities by Quarter 6</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> emissions inventory from coal mining &amp; post mining activities.</li> </ul>	National Bureau of Statistics and relevant entities in the coal sector fully cooperate in the provision of data for use in the inventory.

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
	activities	activities as reported in INC	<ul style="list-style-type: none"> <li>Completed inventory of CH<sub>4</sub> emissions from coal mining &amp; post mining activities by Quarter 9.</li> </ul>		
Output 1.1.2.4: Inventory of fugitive GHG emissions from oil & gas systems	<ul style="list-style-type: none"> <li>Activity data for oil &amp; gas systems</li> <li>CH<sub>4</sub> emission factors for oil &amp; gas systems</li> <li>Fugitive CH<sub>4</sub> emissions for oil &amp; gas systems</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for oil &amp; gas systems in INC</li> <li>CH<sub>4</sub> emission factors for oil &amp; gas systems used in INC</li> <li>Fugitive CH<sub>4</sub> emissions from oil &amp; gas systems as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for oil &amp; gas systems by Quarter 2;</li> <li>Improved emission factors for oil &amp; gas systems by Quarter 6</li> <li>Completed inventory of fugitive CH<sub>4</sub> emissions from oil &amp; gas systems by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 fugitive CH<sub>4</sub> emissions inventory from oil &amp; gas systems.</li> </ul>	National Bureau of Statistics and relevant entities in the oil & gas sector fully cooperate in the provision of data for use in the inventory.
Output 1.1.1.5: Summary analysis and China's GHG inventory of the energy sector	<ul style="list-style-type: none"> <li>The 2005 GHG inventory from energy activities in China</li> </ul>	<ul style="list-style-type: none"> <li>Summary of GHG emissions inventory in the INC Report</li> </ul>	<ul style="list-style-type: none"> <li>Summary of the 2005 GHG emissions inventory in the energy sector in China by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>Completed summary document of the 2005 GHG emission inventory in the energy sector</li> </ul>	
Output 1.1.2.1: Inventory of GHG emissions in cement production	<ul style="list-style-type: none"> <li>Activity data for cement production</li> <li>CO<sub>2</sub> emission factors in cement production</li> <li>CO<sub>2</sub> emissions from cement production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for cement production in INC</li> <li>CO<sub>2</sub> emission factors in cement production used in INC</li> <li>CO<sub>2</sub> emissions from cement production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for cement production by Quarter 2;</li> <li>Improved emission factors for cement production by Quarter 6</li> <li>Completed inventory of CO<sub>2</sub> emissions from cement production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 CO<sub>2</sub> emissions inventory in cement production.</li> </ul>	Cement plants cooperate in the provision of data required in the surveys.
Output 1.1.2.2: Inventory of GHG emissions in lime production	<ul style="list-style-type: none"> <li>Activity data for lime production</li> <li>CO<sub>2</sub> emission factors in lime production</li> <li>CO<sub>2</sub> emissions from lime production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for lime production in INC</li> <li>CO<sub>2</sub> emission factors in lime production used in INC</li> <li>CO<sub>2</sub> emissions from lime production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for lime production by Quarter 2;</li> <li>Improved emission factors for lime production by Quarter 6</li> <li>Completed inventory of CO<sub>2</sub> emissions from lime production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 CO<sub>2</sub> emissions inventory in lime production.</li> </ul>	Lime plants cooperate in the provision of data required in the surveys.
Output 1.1.2.3: Inventory of GHG emissions in iron & steel production	<ul style="list-style-type: none"> <li>Activity data for iron &amp; steel production</li> <li>CO<sub>2</sub> emission factors in iron &amp; steel production</li> <li>CO<sub>2</sub> emissions from iron &amp; steel production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for iron &amp; steel production in INC</li> <li>CO<sub>2</sub> emission factors in iron &amp; steel production used in INC</li> <li>CO<sub>2</sub> emissions from iron &amp;</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for iron &amp; steel production by Quarter 2;</li> <li>Improved emission factors for iron &amp; steel production by</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 CO<sub>2</sub> emissions inventory in iron &amp; steel production.</li> </ul>	Iron & steel plants cooperate in the provision of data required in the surveys.

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
		steel production as reported in INC	Quarter 6 ● Completed inventory of CO <sub>2</sub> emissions from iron & steel production by Quarter 9.		
Output 1.1.2.4: Inventory of GHG emissions in calcium carbide production	<ul style="list-style-type: none"> <li>● Activity data for calcium carbide production</li> <li>● CO<sub>2</sub> emission factors in calcium carbide production</li> <li>● CO<sub>2</sub> emissions from calcium carbide production</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for calcium carbide production in INC</li> <li>● CO<sub>2</sub> emission factors in calcium carbide production used in INC</li> <li>● CO<sub>2</sub> emissions from calcium carbide production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for calcium carbide production by Quarter 2;</li> <li>● Improved emission factors for calcium carbide production by Quarter 6</li> <li>● Completed inventory of CO<sub>2</sub> emissions from calcium carbide production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CO<sub>2</sub> emissions inventory in calcium carbide production.</li> </ul>	Calcium carbide plants cooperate in the provision of data required in the surveys.
Output 1.1.2.5: Inventory of GHG emissions in adipic acid production	<ul style="list-style-type: none"> <li>● Activity data for adipic acid production</li> <li>● N<sub>2</sub>O emission factors in adipic acid production</li> <li>● N<sub>2</sub>O emissions from adipic acid production</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for adipic acid production in INC</li> <li>● N<sub>2</sub>O emission factors in adipic acid production used in INC</li> <li>● N<sub>2</sub>O emissions from adipic acid production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for adipic acid production by Quarter 2;</li> <li>● Improved emission factors for adipic acid production by Quarter 6</li> <li>● Completed inventory of N<sub>2</sub>O emissions from adipic acid production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 N<sub>2</sub>O emissions inventory in adipic acid production.</li> </ul>	Adipic acid plants cooperate in the provision of data required in the surveys.
Output 1.1.2.6: Inventory of GHG emissions in nitric acid production	<ul style="list-style-type: none"> <li>● Activity data for nitric acid production</li> <li>● N<sub>2</sub>O emission factors in nitric acid production</li> <li>● N<sub>2</sub>O emissions from nitric acid production</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for nitric acid production in INC</li> <li>● N<sub>2</sub>O emission factors in nitric acid production used in INC</li> <li>● N<sub>2</sub>O emissions from nitric acid production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for nitric acid production by Quarter 2;</li> <li>● Improved emission factors for nitric acid production by Quarter 6</li> <li>● Completed inventory of N<sub>2</sub>O emissions from nitric acid production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 N<sub>2</sub>O emissions inventory in nitric acid production.</li> </ul>	Nitric acid plants cooperate in the provision of data required in the surveys.
Output 1.1.2.7: Inventory of GHG emissions in aluminum production	<ul style="list-style-type: none"> <li>● Activity data for aluminum production</li> <li>● PFC emission factors in aluminum production</li> <li>● PFC emissions from aluminum production</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for aluminum production in INC</li> <li>● PFC emission factors in aluminum production used in INC</li> <li>● PFC emissions from</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for aluminum production by Quarter 2;</li> <li>● Improved emission factors for</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 PFC emissions inventory in aluminum production.</li> </ul>	Aluminum plants cooperate in the provision of data required in the surveys.

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
		aluminum production as reported in INC	aluminum production by Quarter 6 <ul style="list-style-type: none"> <li>Completed inventory of PFC emissions from aluminum production by Quarter 9.</li> </ul>		
Output 1.1.2.8: Inventory of GHG emissions in magnesium production	<ul style="list-style-type: none"> <li>Activity data for magnesium production</li> <li>SF<sub>6</sub> emission factors in magnesium production</li> <li>SF<sub>6</sub> emissions from magnesium production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for magnesium production in INC</li> <li>SF<sub>6</sub> emission factors in magnesium production used in INC</li> <li>SF<sub>6</sub> emissions from magnesium production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for magnesium production by Quarter 2;</li> <li>Improved emission factors for magnesium production by Quarter 6</li> <li>Completed inventory of SF<sub>6</sub> emissions from magnesium production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 SF<sub>6</sub> emissions inventory in magnesium production.</li> </ul>	Magnesium plants cooperate in the provision of data required in the surveys.
Output 1.1.2.9: Inventory of GHG emissions in electrical equipment production	<ul style="list-style-type: none"> <li>Activity data for electrical equipment production</li> <li>SF<sub>6</sub> emission factors in electrical equipment production</li> <li>SF<sub>6</sub> emissions from electrical equipment production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for electrical equipment production in INC</li> <li>SF<sub>6</sub> emission factors in electrical equipment production used in INC</li> <li>SF<sub>6</sub> emissions from electrical equipment production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for electrical equipment production by Quarter 2;</li> <li>Improved emission factors for electrical equipment production by Quarter 6</li> <li>Completed inventory of SF<sub>6</sub> emissions from electrical equipment production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 SF<sub>6</sub> emissions inventory in electrical equipment production.</li> </ul>	Electrical equipment plants cooperate in the provision of data required in the surveys.
Output 1.1.2.10: Inventory of GHG emissions in semiconductors production	<ul style="list-style-type: none"> <li>Activity data for semiconductors production</li> <li>SF<sub>6</sub>, PFC &amp; HFC emission factors in semiconductors production</li> <li>SF<sub>6</sub>, PFC &amp; HFC emissions from semiconductors production</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for semiconductors production in INC</li> <li>SF<sub>6</sub>, PFC &amp; HFC emission factors in semiconductors production used in INC</li> <li>SF<sub>6</sub>, PFC &amp; HFC emissions from semiconductors production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for semiconductors production by Quarter 2;</li> <li>Improved emission factors for semiconductors production by Quarter 6</li> <li>Completed inventory of SF<sub>6</sub>, PFC &amp; HFC emissions from semiconductors production by Quarter 9.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 SF<sub>6</sub>, PFC &amp; HFC emissions inventory in semiconductors production.</li> </ul>	Semiconductors plants cooperate in the provision of data required in the surveys.
Output 1.1.2.10: Inventory of GHG emissions in ODS	<ul style="list-style-type: none"> <li>Activity data for semiconductors</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for ODS production in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 PFC &amp; HFC emissions inventory in</li> </ul>	ODS plants cooperate in the provision of data required in

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
production	<ul style="list-style-type: none"> <li>production</li> <li>● PFC &amp; HFC emission factors in ODS production</li> <li>● PFC &amp; HFC emissions from ODS production</li> </ul>	<ul style="list-style-type: none"> <li>● PFC &amp; HFC emission factors in ODS production used in INC</li> <li>● PFC &amp; HFC emissions from ODS production as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>completed activity data for ODS production by Quarter 2;</li> <li>● Improved emission factors for ODS production by Quarter 6</li> <li>● Completed inventory of PFC &amp; HFC emissions from ODS production by Quarter 9.</li> </ul>	ODS production.	the surveys.
Output 1.1.2.12: Summary analysis and China's GHG inventory of the industry sector	<ul style="list-style-type: none"> <li>● The 2005 GHG inventory from industry activities in China</li> </ul>	<ul style="list-style-type: none"> <li>● Summary of GHG emissions inventory in the industry sector in the INC Report</li> </ul>	<ul style="list-style-type: none"> <li>● Summary of the 2005 GHG emissions inventory in the industry sector in China by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document of the 2005 GHG emission inventory in the industry sector</li> </ul>	
Output 1.1.3.1: Inventory of GHG emissions in rice paddies	<ul style="list-style-type: none"> <li>● Activity data for rice paddies</li> <li>● CH<sub>4</sub> emission factors rice paddies</li> <li>● CH<sub>4</sub> emissions from rice paddies</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for rice paddies in INC</li> <li>● CH<sub>4</sub> emission factors in rice paddies in INC</li> <li>● CH<sub>4</sub> emissions from rice paddies as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for rice paddies by Quarter 4;</li> <li>● Improved emission factors for rice paddies by Quarter 9</li> <li>● Completed inventory of CH<sub>4</sub> emissions from rice paddies Quarter 13.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> emissions inventory in rice paddies</li> </ul>	Survey respondents fully cooperate in the provision of data required in the surveys.
Output 1.1.3.2: Inventory of GHG emissions in croplands	<ul style="list-style-type: none"> <li>● Activity data for croplands</li> <li>● N<sub>2</sub>O emission factors in croplands</li> <li>● N<sub>2</sub>O emissions from croplands</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for croplands in INC</li> <li>● N<sub>2</sub>O emission factors in croplands used in INC</li> <li>● N<sub>2</sub>O emissions from croplands as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for croplands by Quarter 4;</li> <li>● Improved emission factors for croplands by Quarter 9</li> <li>● Completed inventory of N<sub>2</sub>O emissions from croplands by Quarter 13.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 N<sub>2</sub>O emissions inventory in croplands</li> </ul>	Survey respondents fully cooperate in the provision of data required in the surveys.
Output 1.1.3.3: Inventory of GHG emissions from enteric fermentation	<ul style="list-style-type: none"> <li>● Activity data for enteric fermentation</li> <li>● CH<sub>4</sub> emission factors for enteric fermentation</li> <li>● CH<sub>4</sub> emissions from enteric fermentation</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for enteric fermentation in INC</li> <li>● CH<sub>4</sub> emission factors for enteric fermentation used in INC</li> <li>● CH<sub>4</sub> emissions from enteric fermentation as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for enteric fermentation by Quarter 4;</li> <li>● Improved emission factors for enteric fermentation by Quarter 9</li> <li>● Completed inventory of CH<sub>4</sub> emissions from enteric fermentation by Quarter 13.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> emissions inventory from enteric fermentation</li> </ul>	Survey respondents fully cooperate in the provision of data required in the surveys.
Output 1.1.3.4: Inventory of GHG emissions in	<ul style="list-style-type: none"> <li>● Activity data for animal waste management</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for animal waste management systems</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> &amp; N<sub>2</sub>O emissions inventory in</li> </ul>	Calcium carbide plants cooperate in the provision of

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
animal waste management systems	systems <ul style="list-style-type: none"> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emission factors in animal waste management systems</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emissions from animal waste management systems</li> </ul>	in INC <ul style="list-style-type: none"> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emission factors in animal waste management systems used in INC</li> <li>● CH<sub>4</sub> &amp; N<sub>2</sub>O emissions from animal waste management systems as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● completed activity data for animal waste management systems by Quarter 4;</li> <li>● Improved emission factors for animal waste management systems by Quarter 9</li> <li>● Completed inventory of CH<sub>4</sub> &amp; N<sub>2</sub>O emissions from animal waste management systems by Quarter 13.</li> </ul>	animal waste management systems.	data required in the surveys.
Output 1.1.3.5: Summary analysis and China's GHG inventory of the agriculture sector	The 2005 GHG inventory from agriculture activities in China	Summary of GHG emissions inventory in the agriculture sector in the INC Report	Summary of the 2005 GHG emissions inventory in the agriculture sector in China by Quarter 13.	Completed summary document of the 2005 GHG emission inventory in the agriculture sector	
Output 1.1.4.1: Inventory of carbon stocks in forests and other woody biomass	<ul style="list-style-type: none"> <li>● Activity data for forests and other woody biomass</li> <li>● Carbon stock from forest and other woody biomass</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for forest and other woody biomass in INC</li> <li>● Carbon stock from forest and other woody biomass as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for forest and other woody biomass by Quarter 7;</li> <li>● Completed inventory of carbon stocks from forest and other woody biomass by Quarter 13.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 carbon stocks inventory in forest and other woody biomass.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.4.2: Inventory of GHG emissions from forest conversions	<ul style="list-style-type: none"> <li>● Activity data for forest conversions</li> <li>● CO<sub>2</sub> &amp; non-CO<sub>2</sub> emission factors in forest conversions</li> <li>● CO<sub>2</sub> &amp; non-CO<sub>2</sub> emissions from forest conversions</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for forest conversions in INC</li> <li>● CO<sub>2</sub> &amp; non-CO<sub>2</sub> emission factors in forest conversions used in INC</li> <li>● CO<sub>2</sub> &amp; non-CO<sub>2</sub> emissions from forest conversions as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for forest conversions by Quarter 4;</li> <li>● Improved emission factors for forest conversions by Quarter 8</li> <li>● Completed inventory of CO<sub>2</sub> &amp; non-CO<sub>2</sub> emissions from forest conversions by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CO<sub>2</sub> &amp; non-CO<sub>2</sub> emissions inventory in forest conversions.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.4.3: Inventory of changes in soil organic carbon	<ul style="list-style-type: none"> <li>● Activity data for changes in soil organic carbon</li> <li>● Carbon stock in the form of soil organic carbon</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for soil organic carbon in INC</li> <li>● Carbon stock in the form of soil organic carbon as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for soil organic carbon by Quarter 7;</li> <li>● Completed inventory of changes in soil organic carbon by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 inventory of changes in soil organic carbon.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.4.4: Summary analysis and China's GHG inventory of the LUCF	The 2005 GHG inventory from LUCF sector in China	Summary of GHG emissions inventory in the LUCF sector in the INC Report	Summary of the 2005 GHG emissions inventory in the LUCF sector in China by Quarter 13.	Completed summary document of the 2005 GHG emission inventory in the LUCF sector	

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
sector					
Output 1.1.5.1: Inventory of CO <sub>2</sub> emissions in waste landfills	<ul style="list-style-type: none"> <li>● Activity data for waste landfills</li> <li>● CO<sub>2</sub> emission factors in waste landfills</li> <li>● CO<sub>2</sub> emissions from waste landfills</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for waste landfills in INC</li> <li>● CO<sub>2</sub> emission factors in waste landfills used in INC</li> <li>● CO<sub>2</sub> emissions from waste landfills as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for waste landfills by Quarter 4;</li> <li>● Improved emission factors for waste landfills by Quarter 8</li> <li>● Completed inventory of CO<sub>2</sub> emissions from waste landfills by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CO<sub>2</sub> emissions inventory in waste landfills.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.5.2: Inventory of CO <sub>2</sub> emissions in waste incineration treatment	<ul style="list-style-type: none"> <li>● Activity data for waste incineration treatment</li> <li>● CO<sub>2</sub> emission factors in waste incineration treatment</li> <li>● CO<sub>2</sub> emissions from waste incineration treatment</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for waste incineration treatment in INC</li> <li>● CO<sub>2</sub> emission factors in waste incineration treatment used in INC</li> <li>● CO<sub>2</sub> emissions from waste incineration treatment as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for waste incineration treatment by Quarter 4;</li> <li>● Improved CO<sub>2</sub> emission factors for waste incineration treatment by Quarter 8</li> <li>● Completed inventory of CO<sub>2</sub> emissions from waste incineration treatment by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CO<sub>2</sub> emissions inventory in waste incineration treatment.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.5.3: Inventory of CH <sub>4</sub> emissions in industrial wastewater treatment	<ul style="list-style-type: none"> <li>● Activity data for industrial wastewater treatment</li> <li>● CH<sub>4</sub> emission factors in industrial wastewater treatment</li> <li>● CH<sub>4</sub> emissions from industrial wastewater treatment</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for industrial wastewater treatment in INC</li> <li>● CH<sub>4</sub> emission factors in industrial wastewater treatment used in INC</li> <li>● CH<sub>4</sub> emissions from industrial wastewater treatment as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for industrial wastewater treatment by Quarter 4;</li> <li>● Improved CH<sub>4</sub> emission factors for industrial wastewater treatment by Quarter 8</li> <li>● Completed inventory of CH<sub>4</sub> emissions from industrial wastewater treatment by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> emissions inventory in industrial wastewater treatment.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.5.4: Inventory of GHG emissions in residential wastewater treatment	<ul style="list-style-type: none"> <li>● Activity data for residential wastewater treatment</li> <li>● CH<sub>4</sub> emission factors in residential wastewater treatment</li> <li>● CH<sub>4</sub> emissions from residential wastewater</li> </ul>	<ul style="list-style-type: none"> <li>● Activity data for residential wastewater treatment in INC</li> <li>● CH<sub>4</sub> emission factors in residential wastewater treatment used in INC</li> <li>● CH<sub>4</sub> emissions from residential wastewater treatment as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>● Improved activity data collection and quantification methods, and completed activity data for residential wastewater treatment by Quarter 4;</li> <li>● Improved CH<sub>4</sub> emission factors for residential wastewater treatment by Quarter 8</li> </ul>	<ul style="list-style-type: none"> <li>● Completed 2005 CH<sub>4</sub> emissions inventory in residential wastewater treatment.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
	treatment		<ul style="list-style-type: none"> <li>Completed inventory of CH<sub>4</sub> emissions from residential wastewater treatment by Quarter 12.</li> </ul>		
Output 1.1.5.5: Inventory of N <sub>2</sub> O emissions in waste and sewage treatment	<ul style="list-style-type: none"> <li>Activity data for waste &amp; sewage treatment</li> <li>N<sub>2</sub>O emission factors in waste &amp; sewage treatment</li> <li>N<sub>2</sub>O emissions from waste &amp; sewage treatment</li> </ul>	<ul style="list-style-type: none"> <li>Activity data for waste &amp; sewage treatment in INC</li> <li>N<sub>2</sub>O emission factors in waste &amp; sewage treatment used in INC</li> <li>N<sub>2</sub>O emissions from waste &amp; sewage treatment as reported in INC</li> </ul>	<ul style="list-style-type: none"> <li>Improved activity data collection and quantification methods, and completed activity data for waste &amp; sewage treatment by Quarter 4;</li> <li>Improved N<sub>2</sub>O emission factors for waste &amp; sewage treatment by Quarter 8</li> <li>Completed inventory of N<sub>2</sub>O emissions from waste &amp; sewage treatment by Quarter 12.</li> </ul>	<ul style="list-style-type: none"> <li>Completed 2005 N<sub>2</sub>O emissions inventory in waste &amp; sewage treatment.</li> </ul>	Relevant government agencies fully cooperate in the provision of data required in the inventory.
Output 1.1.5.6: Summary analysis and China's GHG inventory in waste treatment	The 2005 GHG inventory in waste treatment activities in China	Summary of GHG emissions inventory in waste treatment in the INC Report	Summary of the 2005 GHG emissions inventory in waste treatment in China by Quarter 13.	Completed summary document of the 2005 GHG emission inventory in waste treatment	
Output 1.1.6: National GHG Inventory Report	Completing the National GHG Inventory	The 1994 National GHG Inventory has already been reported in the INC.	Completing the Report on National GHG Inventory and reporting the Inventory in SNC, to be finished within Quarter 12~13.	Formulating the outline of the report and the final report to be submitted	Completed by invited experts
Output 1.2: China GHG emissions inventory database	Database for GHG emissions inventory	Database framework developed in INC (5 sub-databases)	<ul style="list-style-type: none"> <li>Completed GHG emission inventory database design by Quarter 9;</li> <li>Completed operating manuals and training on use &amp; maintenance of database by Quarter 10;</li> <li>Established database by Quarter 11</li> </ul>	<ul style="list-style-type: none"> <li>Documentation of the completed GHG emissions inventory database;</li> <li>Database installed, operated and maintained at NDRC</li> </ul>	NDRC to continue funding the maintenance and updating of the database after the SNC.
Output 1.3: GHG Emissions Projection Methodology	GHG emission forecasting tool	None	<ul style="list-style-type: none"> <li>Completed GHG emission projection and analysis model design by Quarter 6;</li> <li>Reviewed model design by Quarter 8;</li> <li>Finalized model design by Quarter 9;</li> <li>Forecast 2010 GHG emissions by Quarter 10;</li> </ul>	Documentation of: <ul style="list-style-type: none"> <li>GHG emission projection and analysis model design;</li> <li>Reviewed model design;</li> <li>Finalized model design;</li> <li>Forecast 2010 GHG emission levels;</li> <li>Verified 2010 GHG emission projections</li> </ul>	NDRC to continue enhancing the forecasting model using the updated GHG emission database.

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
			<ul style="list-style-type: none"> <li>● Verified 2010 GHG emission projections by Quarter 12</li> </ul>		
<b>COMPONENT 2: Assessment on Impacts of, Vulnerability and Adaptation to, Climate Change</b>					
Output 2.1: Characteristics of climate change and analysis of future trends in China	Bases for future policies and actions on climate change in China	Summary of forecast climate change characteristics and analysis in the INC Report	Summary of the forecast of climate change characteristics and analysis in China by Quarter 4.	Completed summary document of forecast of climate change characteristics and analysis in China	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies
Output 2.2: Assessments of impact and vulnerability of climate change on China's food production	Bases for future policies and actions on climate change adaptation in food production in China	None - V&A in food production sector was not covered in the INC Report	<ul style="list-style-type: none"> <li>● Climate change V&amp;A report on China's food supply by Quarter 8</li> <li>● Climate change impact report on China's agriculture by Quarter 10</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document on V&amp;A and impact analyses in China's food production and agriculture.</li> </ul>	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies in the country's agriculture & food sectors.
Output 2.3: Impact and vulnerability assessments of climate change on water resources	Bases for future policies and actions on climate change adaptation on water resources in China	Summary of V&A analysis in 7 large rivers in the INC Report	<ul style="list-style-type: none"> <li>● Climate change V&amp;A report on China's water resources by Quarter 8</li> <li>● Climate change impact report on China's water resources by Quarter 10</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document on V&amp;A and impact analyses on China's water resources.</li> </ul>	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies in the country's water resources
Output 2.4: Impact and vulnerability assessments of climate change on forests and other natural ecosystems	Bases for future policies and actions on climate change adaptation on forests and other natural ecosystems in China	Summary of preliminary V&A analysis of forests and other natural ecosystems in the INC Report	<ul style="list-style-type: none"> <li>● Climate change V&amp;A report on China's forests and other natural ecosystems by Quarter 8</li> <li>● Climate change impact report on China's forests and other natural ecosystems by Quarter 10</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document on V&amp;A and impact analyses on China's forests and other natural ecosystems.</li> </ul>	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies in the country's forests and other natural ecosystems.
Output 2.5: Impact and vulnerability assessments of climate change on sea-level rise and coastal social economy	Bases for future policies and actions on climate change adaptation on sea level rise and coastal social economy in China	Summary of preliminary V&A analysis of sea level rise and coastal social economy (Zhujiang River delta inundated area) in the INC Report	<ul style="list-style-type: none"> <li>● Climate change V&amp;A report on sea level rise and coastal social economy by Quarter 8</li> <li>● Climate change impact report on sea level rise and coastal social economy by Quarter 10</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document on V&amp;A and impact analyses on sea level rise and coastal social economy.</li> </ul>	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies concerning sea level rise and coastal social economy.
Output 2.6: Impact and vulnerability assessments of climate change on human health	Bases for future policies and actions on climate change adaptation on human health in China	Summary of preliminary V&A analysis of human health in the INC Report	<ul style="list-style-type: none"> <li>● Climate change V&amp;A report on human health by Quarter 8</li> <li>● Climate change impact report on human health by Quarter 10</li> </ul>	<ul style="list-style-type: none"> <li>● Completed summary document on V&amp;A and impact analyses on human health.</li> </ul>	GOC is serious in utilizing the findings and recommendations on CC Adaptation policies concerning human health.
Output 2.7: Integrated assessment report on climate change impacts,	The 2005 vulnerability & adaptation strategy and plan of China	Summary of results of V&A analyses and impact assessments in the INC Report	Summary of the 2005 report on the results and recommendations of V&A analyses and CC impact	Completed summary document of the 2005 V&A analyses and CC impact assessments	

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
vulnerability and adaptation			assessments in China by Quarter 12.		
<b>COMPONENT 3: Improving Public Awareness and Informing Policy Decision Making on Climate Change</b>					
Output 3.1: Sustainability of China Climate Change Info-Net	Established information sharing structure on climate change issues	Initiation of the CC Info-Net design & operation as stated in the INC report	<ul style="list-style-type: none"> <li>Identified and recommended improvements and new features by Quarter 3</li> <li>Fully-staffed and operational Info-Net by Quarter 6</li> </ul>	<ul style="list-style-type: none"> <li>Documented reports on the organization, plans, services and operations of the Info-Net</li> </ul>	<ul style="list-style-type: none"> <li>Existing Info-Net will just be upgraded</li> <li>GOC to continuously finance the operations of the Info-Net even after the SNC.</li> </ul>
Output 3.2: Compilation & dissemination of publications on China's efforts to address climate change	<ul style="list-style-type: none"> <li>Number of publications produced annually</li> <li>No. of promotional materials distributed annually</li> </ul>	<ul style="list-style-type: none"> <li>1500 promotional materials produced during the INC project</li> <li>1500 promotional materials distributed during the INC project</li> </ul>	<ul style="list-style-type: none"> <li>2000 yearly starting from Quarter 9</li> <li>2000 yearly starting from Quarter 12</li> </ul>	<ul style="list-style-type: none"> <li>Publications produced each year</li> <li>Promotional materials distributed each year</li> </ul>	Office of National Leading Group on Combating Climate Change will take lead and sustain the activities.
Output 3.3: Summary report on education, training and public awareness	Bases for future policies and actions on promoting and enhancing public awareness and knowledge on climate change in China	Education, communication and public awareness enhancement activities on climate change as reported in the INC	Summary of the 2005 report on action plans concerning promoting and enhancing public awareness and knowledge on climate change in China by Quarter 13.	Document on the 2005 report on the plans and actions concerning promoting and enhancing public awareness and knowledge on climate change	
<b>COMPONENT 4: Inventory of GHG emissions and other relevant information on climate change for Hong Kong and Macao SARs</b>					
Output 4.1: GHG Inventory of Hong Kong SAR	The 2005 GHG inventory of Hong Kong SAR	None	Summary of the 2005 GHG emissions inventory of Hong Kong SAR by Quarter 13.	Completed document of the 2005 GHG emission inventory of Hong Kong SAR	Relevant HK SAR government agencies fully cooperate in the provision of data required in the inventory.
Output 4.2: Report of information on climate change in Hong Kong SAR	Bases of future actions and plans on CC mitigation & adaptation in Hong Kong SAR	None	Report on the CC information in Hong Kong SAR by Quarter 13.	Completed document on CC information in Hong Kong SAR	Relevant HK SAR government agencies fully cooperate in the provision of CC information
Output 4.3: GHG Inventory of Macau SAR	The 2005 GHG inventory of Macau SAR	None	Summary of the 2005 GHG emissions inventory of Macau SAR by Quarter 13.	Completed document of the 2005 GHG emission inventory of Macau SAR	Relevant HK SAR government agencies fully cooperate in the provision of data required in the inventory.
Output 4.4: Report of information on climate change in Macau SAR	Bases of future actions and plans on CC mitigation & adaptation in Macau SAR	None	Report on the CC information in Macau SAR by Quarter 13.	Completed document on CC information in Macau SAR	Relevant Macau SAR government agencies fully cooperate in the provision of CC information
<b>COMPONENT 5: Supporting the Implementation of the Convention at Local and National Levels</b>					
Output 5.1: National circumstances	Bases of future actions and plans on CC mitigation &	Summary of National Circumstances in the INC	Summary of updated national circumstances by Quarter 13.	Document on the updated national circumstances report	GOC, NGO and private sector entities fully cooperate in the

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
	adaptation in the Chinese context	Report			provision of data for the updating of the national circumstances
Output 5.2: Overview of policies and measures for climate change mitigation	Climate Change mitigation policies and measures	Climate change mitigation measures (implemented & planned) in the INC Report	Climate Change Mitigation Strategy Report by Quarter 13	Reviewed and GOC-endorsed Climate Change Mitigation Strategy Report	China will continuously update CC mitigation policies and actions as part of NC process
Output 5.3: Overview of policies and measures for climate change adaptation	Climate Change adaptation policies and measures	Climate change adaptation measures (implemented & planned) in the INC Report	Climate Change Adaptation Strategy Report by Quarter 13	Reviewed and GOC-endorsed Climate Change Adaptation Strategy Report	China will continuously update CC adaptation policies and actions as part of NC process
Output 5.4: Overview of research and systematic observation	Guidance on research and systematic observation of climate	Basic research work on observation of meteorological systems in China in the INC Report	Status Report on Systematic Climate Observations by Quarter 13	Reviewed and GOC-endorsed Systematic Climate Observation Report	China will utilize systematic climate observations for CC policy making & decisions
Output 5.5: Technology transfer and cooperation for execution of the Convention	Guidance on climate change technology transfer & cooperation	<ul style="list-style-type: none"> <li>● CC technology transfer &amp; cooperation in the INC Report</li> <li>● China Capacity Building Demand Self Evaluation Report</li> </ul>	Guidelines and action framework for future technology transfer and cooperation in China on climate change by Quarter 13	Reviewed and GOC-endorsed guidelines on technology transfer and cooperation in China on climate change.	China will continuously update guidelines on CC technology transfer & cooperation as part of the NC process
Output 5.6: Capacity Building in national communication formulation	<ul style="list-style-type: none"> <li>● Capacity needs assessment on NC formulation</li> <li>● No of trained nationals on NC formulation</li> <li>● No of trained nationals involved in the SNC project</li> <li>● Additional skilled nationals employed for NC-related activities on a regular basis</li> </ul>	<ul style="list-style-type: none"> <li>● China Capacity Building Demand Self Evaluation Report</li> <li>● 20 trained local staff in total 5 training courses, workshops and study tours during INC</li> <li>● 20 trained local staff during INC</li> </ul>	<ul style="list-style-type: none"> <li>● Report on capacity development needs on NC formulation by Quarter 4</li> <li>● 50 trained local staff in total 5 training courses, workshops and study tours by Quarter 6</li> <li>● 30 trained local staff by Quarter 9</li> <li>● 60 local experts employed by Quarter 12</li> </ul>	<ul style="list-style-type: none"> <li>● Summary of report on capacity development needs in the SNC Report</li> <li>● Documentation of training courses, workshops and study tours</li> <li>● Documentation of SNC project personnel (including consultants)</li> <li>● Documentation of employment of trained staff doing NC-related tasks</li> </ul>	GOC will continuously support the NC process and provide the required resources (including manpower) in a sustainable manner.
<b>COMPONENT 6: Publication and Dissemination of the SNC Report</b>					
Output 6.1: Draft SNC Report	Compilation of the SNC Report	● INC Report	<ul style="list-style-type: none"> <li>● Draft SNC report by Quarter 10</li> <li>● Review comments on the SNC Report by Quarter 11</li> </ul>	<ul style="list-style-type: none"> <li>● Draft SNC report for review</li> <li>● Reviewed and commented draft report</li> </ul>	Relevant stakeholders fully cooperate in the review & commenting of the draft report
Output 6.2: Final report of the SNC in both Chinese and English	Finalized SNC Report	● INC Report	<ul style="list-style-type: none"> <li>● Proceedings of workshop on SNC Report review by Quarter 11</li> <li>● Final SNC Report (in Chinese &amp; English) by Quarter 12</li> <li>● China SNC Report ready for</li> </ul>	<ul style="list-style-type: none"> <li>● Proceedings of SNC Report Review workshop</li> <li>● Completed SNC Report (in Chinese and English)</li> </ul>	

Strategy	Objectively Verifiable Indicators			Means of Verification	Critical Assumptions
	Indicator	Baseline	Target		
			submission to UNFCCC by Quarter 13		

## **APPENDIX H– EVALUATION CONSULTANT AGREEMENT FORM**

### **Evaluators:**

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

**Evaluation Consultant Agreement Form<sup>35</sup>****Agreement to abide by the Code of Conduct for Evaluation in the UN System****Name of Consultant:** Roland Wong**Name of Consultancy Organization** (where relevant): \_\_\_\_\_**I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.**Signed at Surrey, BC, Canada on September 3, 2013

Signature: \_\_\_\_\_

**Evaluation Consultant Agreement Form<sup>36</sup>****Agreement to abide by the Code of Conduct for Evaluation in the UN System****Name of Consultant:** Dr. Zhang Xiaohua**Name of Consultancy Organization** (where relevant): National Center for Climate Change**I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.**Signed at Beijing, China on September 3, 2013

Signature: \_\_\_\_\_

<sup>35</sup> [www.unevaluation.org/unegcodeofconduct](http://www.unevaluation.org/unegcodeofconduct)<sup>36</sup> [www.unevaluation.org/unegcodeofconduct](http://www.unevaluation.org/unegcodeofconduct)