



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

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April 09, 2012

Dear Council Member:

World Bank as the Implementing Agency for the project entitled: ***China: Technology Need Assessment on Climate Change***, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with World Bank procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by Council in March 2010 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by World Bank satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

Attachment: Project Document

cc: Country Operational Focal Point
GEF Agencies
STAP
Trustee



REQUEST FOR CEO ENDORSEMENT/APPROVAL

PROJECT TYPE:
THE GEF TRUST FUND

Submission Date: April 6, 2012

PART I: PROJECT INFORMATION

GEFSEC PROJECT ID: ID4188

GEF AGENCY PROJECT ID: P120932

COUNTRY(IES): China, People's Republic

PROJECT TITLE: Technology Needs Assessment on Climate Change

GEF AGENCY(IES): World Bank

OTHER EXECUTING PARTNER(S): In China – National Development and Reform Commission (NDRC)

GEF FOCAL AREA(s): Climate Change

GEF-4 STRATEGIC PROGRAM(s): Enabling Activities

NAME OF PARENT PROGRAM/UMBRELLA PROJECT: N/A

Expected Calendar (mm/dd/yy)	
Milestones	Dates
Work Program (for FSPs only)	3/2010
Agency Approval date	4/2012
Implementation Start	5/2012
Mid-term Evaluation (if planned)	
Project Closing Date	11/2015

A. PROJECT FRAMEWORK (Expand table as necessary)

Project Objective: The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and to adopt corresponding global best practices. It will do this by supporting China's efforts, within the context of the international climate change agenda, to assess mitigation and adaptation technology needs, build capacity and technology networks, and conduct pilot technology transfer programs.

Project Components	Indicate whether Investment, TA, or STA ²	Expected Outcomes	Expected Outputs	GEF Financing ¹		Co-Financing ¹		Total (\$) c=a+ b
				(\$ a	%	(\$ b	%	
1. Methodology Development, Technical Oversight, Synthesis and Dissemination	TA	<ul style="list-style-type: none"> • Identification and understanding of China's climate technology needs in mitigation and adaptation areas (in general – see below: Expected Outcomes of Component 2 – and also specifically in the context of: (a) international climate change negotiations and (b) international cooperation). • Database to serve as a national virtual data hub for needed climate technologies in China. • Establishment of a national stakeholder network on climate technologies in China. 	<ul style="list-style-type: none"> • Completed detailed methodologies for each technology assessment (to be carried out in Component 2) and for technology prioritization. • Final synthesis reports (one for mitigation, one for adaptation, and one for provincial level), and dissemination of the results from the technology assessments. • Establishment of a national database on priority technologies. • Four workshops for stakeholder input, evaluation, and dissemination. • Establishment of Project Committees (Steering Committee and Technical Committee) and stakeholder consultations. 	593,000	84	110,000	16	703,000

2. Technology Assessments at the Sector and Provincial Levels	TA	<ul style="list-style-type: none"> • Identification and understanding of China's climate technology needs in mitigation and adaptation areas – more precisely: • Identification and understanding of: <ul style="list-style-type: none"> - key performance / characteristics of prioritized technologies. - relative gap levels - for prioritized technologies - between global and Chinese best practice. - barriers - for prioritized technologies - impeding transfer and timely deployment of identified global best practice technologies in China. 	<ul style="list-style-type: none"> • Completion of 20 peer-reviewed technology assessments (potentially analyzing up to 50 key technologies: 16 assessments for identified mitigation and adaptation sectors and 4 assessment of identified provinces). • Peer-review of the technology assessments. • Stakeholder survey that evaluates the use of the completed technology assessments. • Analysis of barriers to technology transfer as a basis for designing transfer and innovation mechanisms that would accelerate the ultimate deployment of prioritized technologies in both mitigation and adaptation. 	2,332,000	95	120,000	5	2,452,000
3. Capacity Building to support Climate Technology Networks	TA	<ul style="list-style-type: none"> • Build up the capacity at the national, sectoral (limited to 2 sectors under the project), and provincial levels to support the technology assessment process, understand barriers in efficient technology transfer, and learn from domestic and international experience. 	<ul style="list-style-type: none"> • One national center, two sectoral centers, and four provincial networks established with their own climate technology databases and personnel to serve as knowledge centers or networks in their respective areas. • Stakeholder survey that confirms and evaluates the fulfillment of TNA-related functions provided by project-supported centers/ networks. 	975,000	82	220,000	18	1,195,000
4. Pilot Program to Accelerate Technology Transfer	Investment	<ul style="list-style-type: none"> • Measureable acceleration of technology transfer, diffusion, and scale-up. • Novel technology transfer and innovation mechanisms are designed for one or more priority technologies. • Lifetime direct GHG emissions avoided: 500,000 tonnes CO2 eq 	<ul style="list-style-type: none"> • 8-12 competitively selected “Technology improvement grants” made. • Evaluation of impacts and lessons learned from the pilot program, related to technology transfer, diffusion, and scale-up. • Concrete designs for follow-up programs to further accelerate technology transfer, diffusion and scale-up. 	850,000	45	1,050,000	55	1,900,000
5. Project Management				250,000	63	200,000	37	450,000
Total Project Costs				A 5,000,000	75	B 1,700,000	25	6,700,000

A. List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

² TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT (expand the table line items as necessary)

<i>Name of Co-financier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>%*</i>
Project Government Contribution	National Government	In-Kind	800,000	47%
Project Private Sector Contribution	Private companies	Cash expenditures	900,000	53%
Total Co-financing			B 1,700,000	100%

* Percentage of each co-financier's contribution at CEO endorsement to total co-financing.

C. FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	<i>Project Preparation a</i>	<i>Project b</i>	<i>Total c = a + b</i>	<i>Agency Fee</i>	<i>For comparison: GEF and Co-financing at PIF</i>
GEF financing		A5,000,000	5,000,000	500,000	5,000,000
Co-financing	\$125,000	B1,700,000	1,825,000		800,000
Total		6,700,000	6,825,000	500,000	5,800,000

D. GEF RESOURCES REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES)¹

<i>GEF Agency</i>	<i>Focal Area</i>	<i>Country Name/ Global</i>	<i>(in \$)</i>		
			<i>Project (a)</i>	<i>Agency Fee (b)²</i>	<i>Total c=a+b</i>
Total GEF Resources					

D. No need to provide information for this table if it is a single focal area, single country and single GEF Agency project.

² Relates to the project and any previous project preparation funding that have been provided and for which no Agency fee has been requested from Trustee.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

<i>Component</i>	<i>Estimated person weeks</i>	<i>GEF amount(\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
Local consultants*	2,209	3,314,000	600,000	3,914,000
International consultants*	79	236,000	0	236,000
Total	2,288	3,550,000	600,000	4,150,000

* Details to be provided in Annex C.

F. PROJECT MANAGEMENT BUDGET/COST

<i>Cost Items</i>	<i>Total Estimated person weeks/months</i>	<i>GEF amount (\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
Local consultants*	312 person-weeks	155,000	150,000	305,000
International consultants*	0	0	0	0
Office facilities, equipment, vehicles and communications*		95,000	50,000	145,000
Travel*				
Others**				
Total		250,000	200,000	450,000

* Details to be provided in Annex C. ** For others, it has to clearly specify what type of expenses here in a footnote.

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? ~~Yes~~ no

(If non-grant instruments are used, provide in Annex E an indicative calendar of expected reflows to your agency and to the GEF Trust Fund).

No.

H. DESCRIBE THE BUDGETED M & E PLAN:

The Project Management Office (PMO), located within the Executing Agency (NDRC), will be responsible for overall monitoring and evaluation (M&E) including regular data collection to assess progress towards achieving results. The PMO will furnish to the Implementing Agency (the World Bank) semi-annual progress reports on project implementation by February 15 and August 15 of each year, starting with August 15, 2012. In addition, it will prepare a mid-term review report by August 15, 2013. The PMO will also be responsible for the recruitment of local/national consultants and the execution and monitoring of the activities according to the work plan and expected outcomes. The Project Steering Committee will monitor the progress of the project and give advice as to implementation. The associated M&E budget is about \$30,000:

- \$20,000 from the GEF grant (about 10% of the time of key PMO staff involved with the management and supervision of the technical aspects of the project) and
- \$10,000 in-kind from the client (members of the Project Steering Committee financed by the Chinese administration).

For details see the World Bank Project Appraisal Document: Section IV B and Annex 1 (which provides a detailed description of the performance indicators to be tracked under the project).

PART II: PROJECT JUSTIFICATION: In addition to the following questions, please ensure that the project design incorporates key GEF operational principles, including sustainability of global environmental benefits, institutional continuity and replicability, keeping in mind that these principles will be monitored rigorously in the annual Project Implementation Review and other Review stages.

E. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

Technology transfer, diffusion, and application play a critical role in helping developing countries in GHG mitigation and adaption to the climate change. Technology development and transfer has long been a key issue in the agenda of UNFCCC and Kyoto Protocol. In the G8+5 and APP 6 initiatives, technology has also been attracting attention from all concerned parties. Developing countries, in particular, are in a certain stage of economic development, and if they fail to update their technology and adopt environmentally friendly technology, they will “lock in” poor performing equipment

with high GHG emissions. Therefore, it is perfect timing to implement large scale high efficient technology development and transfer now. If we fail to grab this opportunity, we will lose the chance to control GHG intensity for decades.

As a basis for implementing international cooperation in the area of technology transfer, technology needs assessments create a common basis for all sides to build from. From an early date, UNFCCC negotiations have highlighted the importance of technology in helping countries reduce GHG emissions and lowering emission growth trajectories, as well as in helping vulnerable populations adapt to the changes brought on by global warming. Many developing countries do not have access to the technologies required to obtain energy with fewer GHG emissions. Where those technologies do exist in the world, they need to be made available to those countries needing them most. Where they do not yet exist or are not yet available on a commercial basis, there is a need for further investment in research and development and demonstration to bring those technologies closer to maturity. The UNFCCC established the Expert Group on Technology Transfer (EGTT) in a decision that defined a five-part framework to increase and improve the transfer of environmentally sound technologies. Elements of the framework include:

1. Country-driven activities to determine technology needs and priorities through a widespread stakeholder consultation process;
2. Availability of thorough, actionable technology information;
3. Enabling environments defined by government actions, including the removal of technical, legal and administrative barriers to technology transfer; sound economic policy; and regulatory frameworks that facilitate private and public sector investment in technology transfer;
4. Capacity building, a process of building, developing and strengthening existing scientific and technical skills, capabilities and institutions in developing country Parties so they can assess, adapt, develop and manage environmentally sound technologies; and
5. A set of mechanisms that support financial, institutional, and methodological activities and enhance coordination among stakeholders.

Since its establishment, the EGTT has encouraged all non-Annex I Parties to the Convention to engage in a process of assessment, such as defined in the first element above, to identify what their specific technology needs are in order to develop and respond to the challenges of the climate change convention. The specific activities that have been supported are referred to as Technology Needs Assessments or TNAs.

As a developing country, China is a non-Annex I Party to the UNFCCC. Its population faces considerable vulnerabilities to the adverse effects of climate change. At the same time, due to its rapid economic growth, its large population, and its widespread use of indigenous coal resources, China's GHG emissions are the highest of any country. Since climate impacts are already being felt, China is increasingly aware that its efforts to reduce emissions will be beneficial in the form of reduced impacts. Since its current growth path is clearly not sustainable, China will have to aggressively develop, adopt, and utilize climate-relevant technologies. It is seeking to close the gap between its currently available technology and that available in the more developed countries.

Given China's vast size, its rapid economic growth, and its continued growth in GHG emissions, the technological needs of China are immense. This project will provide information on technology needs, barriers on technology transfer, capacity building needs, and technology transfer opportunities in different sectors and different areas. It will help China better understand: current technology gaps; technology priorities; what are the key technical, policy and market barriers; and how to promote environmental friendly technology transfer and diffusion in the area of mitigation and adaption. With this China can avoid the "lock in" effect in its urbanization and industrialization and contribute climate change mitigation and adaptation.

Given China's importance in the global economy and climate change equation, many public, private and multinational initiatives are researching issues within the scope of the proposed TNA. This project will ensure that it builds upon existing work, effectively links with other efforts, and provides key value-added by filling needs that are not currently being met. Getting a picture of these other efforts and linking to them through stakeholder networking will be a key component of this project. In the area of mitigation, investigations will be conducted in the following sectors: coal mining and oil & gas exploration, thermal power, renewable energy, iron & steel, building material manufacturing, chemical industry, nonferrous metallurgy, transportation, residential & commercial buildings, agriculture/forestry/land use, carbon capture and sequestration (CCS), and waste management. In the area of adaptation, the survey and

investigation should be conducted in the agriculture, forest and ecosystems, water resources, urban areas, and disaster forecast and weather monitoring.

In the implementation of this project, a broad stakeholder network will be established with experts, government officials, NGOs, and technology developers and users from energy, climate change, and adaption area. This network will facilitate information exchange and knowledge sharing among different stakeholders and will also increase the capacity of China to implement the technology needs assessment and build up the long standing mechanism to implement technology needs assessment.

Finally, the project will implement a pilot program to award “Technology Improvement Grants” on a competitive and cost-sharing basis to small and medium sized companies (defined as having up to 500 employees). The grants will support companies to procure outside expertise, whether Chinese or international, to accelerate the process of technology transfer, diffusion, and scale-up. It is expected that the grants will help accelerate the pace of technology transfer by providing technical design, operations, market information, or training services to companies currently involved in, but challenged by, the technology transfer process. Successful grants will lead to measurable improvements in technology access, design, and use.

F. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL AND/OR REGIONAL PRIORITIES/PLANS:

With the development of the international agenda, climate change has become one of the most important elements of China’s emerging green growth strategy. Primary elements of the 12th Five Year Plan include economic restructuring, promoting technology advancement and improving energy efficiency. In many fields, China has become a technology leader over the past 20 years. Technology has been and will continue to be key to both China’s economic development and its response to the challenges of climate change. To the extent that this project can close the climate technology gap between China and the rest of the world, both China and the world will benefit.

This Program clearly indicates the targets, basic principles, key areas and policy approaches. In particular, the Program states that technology development and innovation should play a leading and fundamental role in mitigation. Therefore it is necessary to enact efforts on technology development, innovation, and transfer to allow appropriate technologies to effectively mitigate climate change. In 2007, the Government of China issued a “Special Science and Technology Act on Climate Change” to support its national climate change program. At the same time, China has listed the key technologies for climate change into the Medium and Long Term National Science and Technology Development Plan as a priority. In August 27, 2009, in its eleventh meeting of the National People Congress, the “NPC Actively Facing Climate Change Act” was passed. The Act stressed that China should follow the principles of the Convention on Climate Change, dealing with mitigation and adaptation with the technology and capital support from advanced countries. At the same time, the Act also pointed out that China should enhance its own technology innovation, and use science and technology development as a key means to increase its capacity to face climate change.

China’s 12th Five Year Plan (2011-2015), passed in March 2011, reinforces these orientations by promoting the gradual development of a “green, low-carbon economy” – giving prime importance to environmental sustainability and combat against climate change. This is the first Five Year Plan to include a commitment to gradually introduce market mechanisms to control carbon pollution. Key points of the plan include:

Key energy and climate targets in the 12th Five Year Plan

- China announced several new carbon and energy targets from 2010 levels, namely:
- Increase the proportion of non-fossil fuels in energy consumption to 11.4 per cent by 2015;
- Reduce energy consumption per unit of gross domestic product (GDP) by 16 per cent from 2010 levels by 2015; and
- Reduce carbon dioxide emissions per unit of GDP by 17 per cent from 2010 levels by 2015.

Clean technology in the 12th Five Year Plan

The Five Year Plan highlighted priority “strategic emerging industries” for industrial innovation and development. These included:

- Energy efficiency technologies, recycling, and waste management;
- Advanced nuclear energy, wind, solar, smart grids and biomass; and
- Hybrid and pure electric vehicles.

Market mechanisms in the 12th Five Year Plan

The Five Year Plan refers to establishing low-carbon product standards, improving the statistical accounting systems for greenhouse gas emissions and the “step by step establishment of carbon emission trading markets”. The use of market mechanisms to incentivize energy savings was included in the Plan.

These development plans and scenarios recognize the importance of technology development. They recognize that wider economic and national development will in many ways rely on technology development. Assessing technology effectiveness, cost, and ease of diffusion are preconditions for making decisions on technology transfer. Therefore, the implementation of this TNA will very much help China to reach its Program targets under various future scenarios.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH [GEF STRATEGIES](#) AND STRATEGIC PROGRAMS:

As an enabling activity, this project is entirely consistent with the GEF’s strategy for technology transfer as defined in the document entitled “Elaboration of a Strategic Program to Scale-Up the Level of Investment in the Transfer of Environmentally Sound Technologies” (GEF/C.34/5.Rev.1), also referred to as the Poznan Strategic Program on Technology Transfer. The GEF has already financed numerous TNAs in developing countries but of a smaller scale.

The project supports the objective of the Climate Change focal area of the GEF Trust Fund, which is to help developing countries and economies in transition to contribute to the overall objective of the United Nations Framework Convention on Climate Change (UNFCCC).

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES.

The GEF resources will be provided as a grant to the Government of China to enable them to carry out a comprehensive assessment of the technologies relevant to development in a climate-constrained world. The GEF project will be part of core China’s planning process for addressing future national energy security and environmental degradation as well as climate change. It is not an investment project, but rather technical assistance designed to support assessments of current state-of-the-art climate-related technologies in China, and a detailed assessment of the obstacles preventing China from utilizing the most advanced, environmentally sound technologies. Generic TORs for the technology assessments were developed during preparation.

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

In the China Climate Change Program published in June, 2007, the following types of technologies were discussed: technology for measuring, forecasting, stimulating, and calculating climate change, including observation technology for atmosphere, ocean, and land; satellite technology for methodology, ocean, and natural resources; climate system simulation and calculation technology; energy technology, including efficient and low emission power generation technology, large hydro power generation unit technology, new nuclear power generation technology, renewable energy technology, building energy efficiency technology, clean energy vehicles, and hybrid fuel automobile; other technologies, including building energy efficiency, new materials, and modern transportation. Beside traditional technology, many new technologies were listed in the Program, e.g. fuel cell and hydrogen and the rehabilitation and construction of wetland, mangrove forests, and coral reefs. For implementing the Program, 31 provinces were requested to prepare their provincial level climate change programs, including establishing institutions and enhancing capacity on climate change. The provincial programs have all completed the draft and in the Program, technology needs in provinces were also listed.

The upcoming China’s Second National Communication (SNC) will contain a section devoted to assessing China’s technological needs. An initial overview of technological needs undertaken with GEF-UNDP support was finished in December 2009 (see below) – but the full SNC is not yet released. Fortunately, this GEF-funded enabling activity is also being implemented by NDRC, so coordination can be facilitated. This project will build upon and incorporate the results of this initial undertaking.

China has already implemented certain technology needs assessment activities in other projects, e.g. “China-EU Energy and Environment Project-Initial Technology Needs Assessment for the Ten Major Energy Saving Programs” and “National Climate Change Expert Group Consultation Program-Initial Technology Needs Assessment on Mitigation and Adaptation”. Eight working group were set up under the APP6 program, covering clean fossil fuel energy, renewable energy and distributed generation, iron and steel, aluminum, cement, coal mining, power generation and transmission, and transportation and home electric appliances. Experts were invited to do initial evaluation on the technology

development status and barriers for technology transfer. These activities laid a good foundation for the proposed project in terms of methodology and information.

This TNA project will work within the framework on technology transfer developed for the UNFCCC, and provide an example to inform evolution of the TNA approach for other countries. China is a member of the UNFCCC Technology Executive Committee and of the UNFCCC Climate Technology Center and Network, designed to facilitate a network of national, regional, sectoral and international technology networks.

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

Given that technology needs assessment can substantially advance technology transfer, cooperation, and utilization of climate technologies, the parties of the Convention have encouraged the GEF to enhance its support to the developing countries for technology needs assessment. In addition, given the uncaptured externality of GHG emissions, there is no direct economic benefit for investors to individually pursue technology needs assessments. It is a research work with fundamental public goods, and universal benefits. China, as a developing country, needs support from GEF to complete these assessments.

The initial assessment of technology needs done as part of the SNC was much more limited than the proposed TNA:

- It did not incorporate broad networking and capacity building activities from the beginning, so the stakeholder demand for and use of its outputs were not sustained;
- It did not include a technology prioritization exercise;
- It addressed only 6 mitigation sectors (the proposed TNA would address 12 mitigation sectors);
- It did not include any adaptation sectors (the proposed TNA would address 4 adaptation sectors) or provincial technology assessments (the proposed TNA would address technology gaps in 4 provinces);
- There was no barrier / gap analysis. In contrast, the proposed TNA would look in detail at the barriers for technology transfer in China and study the gaps with best available technologies worldwide;
- It did not use the findings of systematic technology assessments to design pilot programs for technology transfer;
- It did not include a pilot program to accelerate technology transfer through Technology Improvement Grants that will, when combined with the technology gaps and barriers analysis of the TNA, inform the design of major follow-on technology transfer programs. These programs may be implemented with through the technology networks being supported by the UNFCCC.

For these reasons, the TNA remains incremental to previous related activities in China. Given China's vast size, its rapid economic growth, and its continued growth in GHG emissions, the technological needs of China are immense – and detailed, forward-looking analysis (that is beyond the scope of the SNC) using GEF's resources would be incremental in this area.

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED AND OUTLINE RISK MANAGEMENT MEASURES:

The overall risk of the project has been rated “substantial”, primarily to reflect that developments in international climate change negotiations could influence the World Bank's ability to assist the Government of China in this project without creating the appearance of “taking sides” in those negotiations. This rating is also based on the fact that the project is by far the largest Technology Needs Assessment done anywhere, is the first to be implemented by the World Bank, and one that will deserve management attention.

The main risk associated with the project is “reputational”, i.e., “is the quality of the TNA outputs of the high quality that is to be expected from a World Bank-implemented project?” Given that this is a GEF-financed project implemented by a counterpart agency, and not a piece of analytical work using World Bank funds, a four point risk management strategy was developed by the World Bank Team during preparation: (i) it has clearly defined when, precisely, it would review draft documents; (ii) it has ensured that the project peer review process(as mentioned below) would be

adequately funded; (iii) it has ensured that the World Bank would have the right to include its comments on a report in case it would disagree with the main text; and (d) it has ensured that all final documents would be public with high visibility, to reduce the chances of partial releases. Finally, it is clearly in NDRC's interest to conduct the assessments in the best possible manner, to show a leadership role in international I.

As mentioned above in point (ii), a peer-review and quality assurance process will be put in place during implementation with several national and international experts, as follows:

- A number of national and international experts will be recruited to: (a) supervise the application of the technology assessment methodologies; (b) provide guidance to the consultant at the different stages of the sector-level assessments on a 'as needed' basis; and (c) gather the results of the sector assessments in a consistent way and prepare two final synthesis reports of good quality, that are satisfactory to the World Bank (one for mitigation and one for adaptation technologies).
- Several other national and international experts will be recruited as peer-reviewers for: (a) the peer-review of the elaboration of the detailed methodology at the sector and provincial level, and (b) the review of individual appraisal results.

World Bank procurement procedures will ensure that the recruitment of those experts is transparent and that their qualifications meet World Bank's requirements. The key products, including the consultant reports as well as the comments received from those reviewers will be made available to the World Bank Team. This peer-review and quality assurance process will be supervised during implementation. There will be several specialists / consultants on the World Bank Team (Environmental / Energy / and Climate Change Specialists) to review these outputs and provide comments during implementation.

Another risk in this project stems from the difficulty of guaranteeing broad stakeholder engagement. Inadequate support could result in the assessment not reflecting the real situation in technology development, and failing to reflect the real needs in technology transfer. In this case, the TNA would not reach consensus on national technology development scenarios or reach consensus without taking into account important points of view. To mitigate this risk, the project team will get full support from the National Climate Change Leading Group. With its support, stakeholders from different fronts will be more actively involved in this assignment. Secondly, large scale surveys and investigation will be preceded by consultations to better involve the people from policy research institutes, financial institutions, enterprises, and individuals. With this first hand information, knowledge sharing can be promoted. Thirdly, the technology needs assessment can be linked to policy making and development planning processes, e.g. energy-saving target setting and sectoral development planning. This will provide incentives to the stakeholders to take part in the relevant activities.

Given that the statistical system is still emerging in the energy and emissions sectors, risks also lie in proper information collection. In some cases, only traditional data is available. To guarantee the reliability of the data, the project team will cross check those data from sufficient samples, to eliminate or reduce the deviation.

Another risk is that this activity will repeat other technological assessments being undertaken independently in China. Three actions are helping to minimize this risk. The first relates to the fact that the same unit of NDRC supervised previous work done as part of China's Second National Communication and will therefore minimize duplication. The second is that the initial stock-taking exercise was systematic and designed to ensure that previous findings were considered and incorporated into the design of the TNA. The third is that the TNA will rely extensively on industrial associations for both information collection and information dissemination – something that has not been done to date with regard to climate change-related technologies.

H. EXPLAIN HOW COST-EFFECTIVENESS IS REFLECTED IN THE PROJECT DESIGN:

Technology need assessment is a cost-effective way to identify the most appropriate applicable and feasible technologies that China needs to close climate technology gaps. But the assessment is only the first part of the program. It is combined with capacity-building to create national, sectoral and provincial networks to promote technology transfer, and it is further linked to a competitive grants program to promote technology transfer. It is this combination of analysis, capacity-building and grant-making that makes this a cost-effective package. Upon completion of this project, China will have the networks and capacity to update the analysis of technology needs, gaps and barriers by itself.

The proposed project would indirectly benefit the whole world in areas related to climate change. The output of the TNA will be a “global public good” and therefore able to contribute not only to China’s domestic technology assessment needs, but also to the international agenda. International corporations will take an interest in the TNA findings. The experience and lessons learned in China through this Technology Needs Assessment, if applied in other developing countries, could also help the whole world achieve great cost-effectiveness in introducing climate technologies.

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

G. INSTITUTIONAL ARRANGEMENT:

The World Bank is the **GEF Implementing Agency** of the project. Although this is the first TNA implemented by the World Bank, the World Bank can bring important strengths to China in preparing its TNA. First, World Bank experience with lending, GEF programs and advisory services in the sectors covered by the TNA increases the prospect of follow-on activities. Second, the World Bank brings cutting-edge analysis of adaptation to climate change,¹ an area that has received less focus than mitigation as far as technology is concerned. Third, the World Bank has done substantial analytical work at the corporate level to define mechanisms for climate technology transfer, innovation and deployment.

The **Executing Agency** for the project is China’s National Development and Reform Commission (NDRC) representing China at the UNFCCC through its Division of International Policy and Negotiations. NDRC is also the Executing Agency that supervised China’s Second National Communication undertaken through GEF support via UNDP and finished in December 2009 (see above Part II – Section E).

Project Steering Committee – In order to provide overall leadership, guidance, and institutional coordination for project implementation, a Project Steering Committee will be established by NDRC and chaired by the Director General of the NDRC Climate Change Department. It will consist of representatives from both concerned government agencies, such as MOF, MOFCOM, MIIT, MOST, MOEP, and MOA, and national industry associations. The Project Steering Committee will be defined and constituted prior to project implementation, and will meet at least once a year and more often when important issues arise, upon request of the PMO.

Project Technical Committee – In addition to the Project Steering Committee, a national TNA expert team: “the Project Technical Committee” will be established under the project (Component 1) to provide:

- guidance for the prioritization for technology needs identified based on sector and provincial-level assessments;
- coordination for the national and sectoral centers and for the provincial networks on climate technology; and
- communication with the international technology community.

The Project Technical Committee will be composed of:

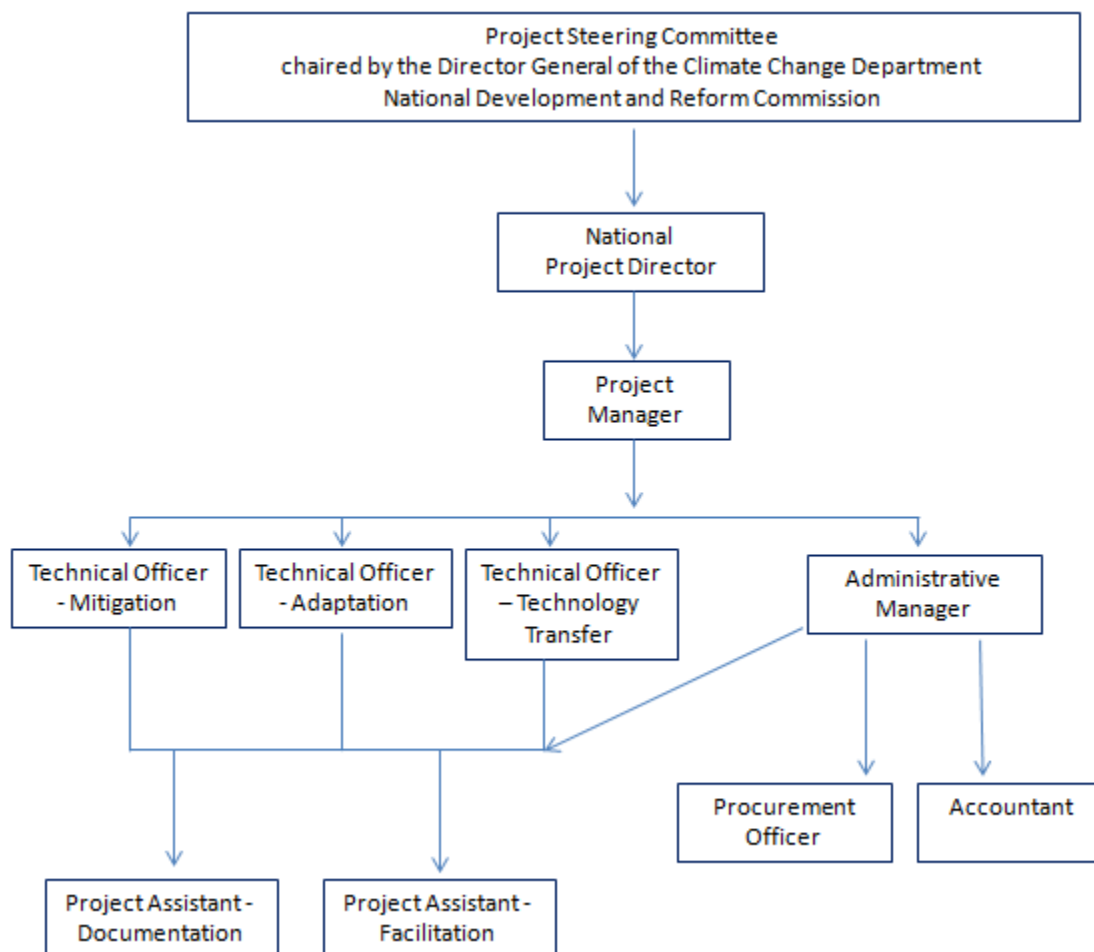
- three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts for the oversight and synthesis of technology appraisals (Component 1).
- representatives from the national industry associations.
- other technical experts drawn from academia or government on a ‘as needed’ basis.

Broad stakeholder network in China – In the implementation of this project, a broad stakeholder network will be established in China with experts, government officials, NGOs, and technology developers and users from energy, climate change, and adaption area. This network will facilitate information exchange and knowledge sharing among different stakeholders and will also increase the capacity of China to implement the technology needs assessment and build up the long standing mechanism to implement technology needs assessment.

H. PROJECT IMPLEMENTATION ARRANGEMENT:

The project will be implemented by NDRC, the agency chairing the National Climate Change Leading Group under the State Council and representing China at the UNFCCC. NDRC has appointed a senior official as National Project Director and hired a National Project Coordinator and has established a Project Management Office (PMO) under their leadership and coordination. The organizational chart of the PMO is shown here:

¹ For example, “The Economics of Adaptation to Climate Change”.



Legally and institutionally, the PMO resides within NDRC itself. The Project Director of the PMO is a Director within NDRC, and as such, can sign off on employment contracts, purchase of equipment and services and other commitments and obligations. Because of a lack of space, NDRC does not host the PMO directly but will rent a space from a commercial building.² PMO's operating expenses of up to US\$250,000 will be financed by the grant and additional expenses will be covered by NDRC as part of its in-kind contribution to the project. The PMO will be charged with ensuring that implementation is consistent with all relevant World Bank policies and procedures, as well as ensuring continuity and good coordination between the different project activities.

PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF:

A few changes were made compared to the latest version of the PIF (dated January 4, 2010), as follows:

1. The milestones were updated, taking into account the actual project preparation schedule. It was longer than anticipated at the PIF stage, mainly because of the unexpected changes of Task Team Leaders during project preparation (three changes since 2009, all under atypical circumstances).
2. The Project Objective was edited slightly for simplicity at the Decision Meeting / Appraisal Stage in agreement with World Bank Management. It remains, however, fully consistent with the PIF.
3. Expected outcomes, outputs, and grant allocation amounts are not exactly the same for original Components 1 and 2 (the "technology assessments"):
 - These two components were regrouped under Component 2 (now: "Technology Assessments at the Sector and Provincial Levels") with the scope of the assessment expanded to include provincial level assessments.

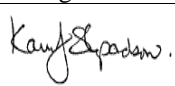
² During project preparation, the PMO is operating without a physical PMO set-up and will sign the commercial lease shortly after the Bank Board Approval (in order to save on cash flow and hedge risk on rental expense in case project preparation is delayed).

- The capacity building needs to be identified by the assessments at the PIF stage have been refined to focus building technology transfer networks, consistent with recent developments under the UNFCCC technology transfer process, and to address the barriers for the deployment of prioritized technologies in China. These barriers still theoretically encompass those listed in the PIF but are presented more succinctly in the CEO Form as “barriers – for prioritized technologies – impeding transfer and timely deployment of identified global best practice technologies in China”.
 - The use of an annual survey instrument to better analyze the market demand for and use of the TNA products was introduced. The same survey instrument will also be used as feedback to improve the need for capacity building support being extended to project-supported technology centers and networks.
4. A new component – now Component 1 (Methodology Development, Technology Synthesis, Oversight and Dissemination) was added to guide the conduct of the assessments and address the “Reputational Risk” (see Risk Section above) by putting in place a peer-review and quality assurance process for: (i) the elaboration of the detailed methodology at the sector/ provincial-level; (ii) the review of individual appraisal results; and (iii) the final synthesis exercise.
 5. The output expressed in the PIF as “Select two to three priority technologies to demonstrate technology R&D, transfer and diffusion,” is being implemented in the form of a competitive “Technology Improvement Grants” program to accelerate technology transfer and diffusion, particularly in SMEs (Component 4). To allow the pilot technology transfer program to begin implementation early in the project’s first year, the PMO will not pre-identify 2-3 priority technologies. Rather, the selected mechanism will use a competitive grants procedure – based on the successful experience in the GEF-financed CRESP project in China – to elicit the most promising technology transfer interventions. While the scope of the grants program will be limited to the four provinces where more details assessments will be made, it will not be limited, at least at the outset, by sector.

In light of this change, the relevant outcome expressed in the PIF (“technology transfer implementation process demonstrated and implemented for 2 to 3 priority technologies”) has been modified. The outcome indicator associated with the “Pilot Program to Accelerate Technology Transfer (US\$1,800,000)” now reads “Measurable financial and economic benefits of accelerating technology transfer through small grant support to companies. Evaluation of impacts and lessons learned related to technology transfer, diffusion, and scale-up.”

PART V: AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for CEO Endorsement.

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Karin Shepardson		April 6, 2012	Jiang Ru	202-473-8677	jru@worldbank. Org

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Development Objective (PDO): The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and adopt corresponding global best practices.

PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Indicator One: Technology assessments a. Technology assessments completed. b. Stakeholder demand for and use of the completed technology assessments	<input type="checkbox"/>	- Reports - Stakeholder survey findings and ratings	0	2	10	20	Annual Annual	PMO PMO
Indicator Two: Capacity-building support to climate technology assessment centers and networks. a. Capacity building activities completed. b. Stakeholder demand for and use of network functions provided by the project-supported centers and networks, including of future pilot technology transfer programs.	<input type="checkbox"/>	- Reports - Stakeholder survey findings and ratings		- 7 capacity building plans completed for the climate technology centers/ networks identified for project support (1 national, 2 sectoral, and 4 provincial) - Stakeholder survey identifies the stakeholder demand for TNA-related functions (e.g., databases, case studies, outreach) to be provided by project-supported centers/ networks, and preferred means to fulfill those functions.	- 7 capacity building plans implemented at least 80% according to plan (with Bank-approved variations) - Stakeholder survey confirms demand for and evaluates the fulfillment of TNA-related functions provided by project-supported centers/ networks	- 7 capacity building plans implemented at least 80% according to plan (with Bank-approved variations) - Stakeholder survey confirms demand for and evaluates the fulfillment of TNA-related functions provided by project-supported centers/ networks, including demand for implementing future pilot technology transfer programs.	Annual Annual	PMO PMO

Project Development Objective (PDO): The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and adopt corresponding global best practices.

PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Indicator Three: Measurable financial and economic benefits of accelerating technology transfer through small grant support to companies. Evaluation of impacts and lessons learned related to technology transfer, diffusion, and scale-up.	<input type="checkbox"/>	- Evaluation of results against established criteria	0			1	One-time evaluation	PMO
Indicator Four: Lifetime direct GHG emissions avoided		Tonnes CO ₂ eq				500,000		

Intermediate Results

	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Intermediate Indicator One: Production of 3 Synthesis Reports (1 for mitigation, 1 for adaptation, and 1 for province), collating and disseminating the results from the individual sector technology assessments.	<input type="checkbox"/>	Reports				Draft Final and Final Reports	Annual	PMO
Intermediate Indicator Two: Development of a database which houses information on priority technologies collected at the sector and provincial level. The database will be a national virtual data hub for facilitating the transfer of and investment in needed climate technologies for China.	<input type="checkbox"/>	Database		Design and construction.	Populate with the data from the sector-level assessments.	Database established.	Annual	PMO
Intermediate Indicator Three: Organization of workshops for dissemination and evaluation.	<input type="checkbox"/>	Workshops		One workshop (kick-off)	Two workshops	Four workshops (including close)	Annual	PMO
Intermediate Indicator Four: Competitively selected "Technology improvement grants" made.	<input type="checkbox"/>	Grants		4-6	8-12		Annual	PMO

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF)

GEFSEC PIF Review Comments: No substantial comments need to be responded.

Two Council Member Comments:

31. China : Technology Need Assessment on Climate Change (World Bank)

(GEF Project Grant : \$5,000,000)

COMMENTS FROM SWITZERLAND

Overall Commentaries

This project is designed to help China assess its technology needs in the context of the second national communication under UNFCCC. In addition, the project develops concrete pathways to speed up the adoption, development and transfer of key technologies that will be strategically critical in pursuing its national development needs in the face of climate change. The project is designed to develop a technology needs assessment indicator system and establishes operational procedures/measures adapted to the Chinese context but also contains internationally relevant technology information and should hence become replicable within the framework of the Convention. The project thus pursues a highly relevant goal. The relevant risks have been addressed considering the complexity of the task.

Questions, Concerns and Challenges for the further Project Preparation

► Though the project's size seems large for an enabling activity (compared to TNA assessments done in context of initial national communications under UNFCCC), the resources still will not allow all sectors in need of low carbon, climate resilient technologies (including agriculture) to be covered in greater depth. It is understood that the project, in recognition of this challenge, will investigate and demonstrate/test a technology transfer model for pilot cases of relevant mitigation and adaptation technologies. *The potential for replication in at least other major non-Annex I economies is an important indicator for selecting such cases for technology transfer demonstration and action learning.*

World Bank Response: The project will finance a pilot technology transfer program. The lessons from this program, combined with lessons from various the TNA findings – all strengthened through stakeholder consultations (including technology users, associations, government agencies and technology providers) – will be used to design follow-on (future) technology transfer programs for China. The potential for replication in other major non-Annex I economies could and should be considered both during the implementation of the pilot program, and following the final evaluation and recommendations for the future.

► The technology information database set up is one of the important expected outcomes of this project. *It is recommended assessing whether this activity can be made interactive and accessible to stakeholders and users from other Parties as well as to international organizations in order to enhance its global environmental benefits.*

World Bank Response: The database will be in Chinese. This is an important feature because it needs to be sustainable and therefore, easily updatable by its main users (the Chinese administration, academia, and business community). It could be disclosed, but it would be in Chinese.

► China has in many fields demonstrated the capability to acquire technologies it considers strategic for its economic development (examples in different fields of transport sector technologies, renewable energy etc.). The “lock in” problem of technologies falling significantly short of being “low carbon” prevails in some large and small scale industry sectors, transport, power generation (rate of technology change does not keep pace with growth), public sector infrastructure and particularly buildings. The key challenge in these sectors may rather be technology dissemination and “energy efficiency governance enforcement” of the technology transfer. *The study is encouraged to analyze carefully related barriers in a differentiated manner and report on findings. The findings could be highly relevant for EGTT, other Parties as well as for Convention processes.*

World Bank Response: The Project will do such an analysis. The assessments for mitigation technologies will cover the barriers for technology transfer and deployment in China in a differentiated manner. The results of these assessments will be gathered in a final synthesis report on mitigation technologies that will be made available to the GEF.

Conclusions and Recommendations

The project is recommended for approval. It is recommended to address and integrate the proposals as outlined above under “main questions and concerns” in the process up to CEO endorsement.

COMMENTS FROM THE UNITED STATES

The United States suggests that this project would be improved if it was part of the overall second phase of TNA support that UNEP is leading with UNDP. UNEP and UNDP have developed a rigorous, action oriented, and sustainable approach that could be applied to this effort with China.

World Bank Response: Key lessons of TNAs supported by UNEP and UNDP were reviewed as part of project preparation (see Section III C of the World Bank Project Appraisal Document) and included as appropriate in the design of the China TNA.

We suggest that the project use a rigorous analytic process for evaluating the potential development benefits and market potential for alternative mitigation and adaptation technologies that will build on and complement existing Chinese government and donor programs in China and opportunities to enhance private sector investment.

World Bank Response: The project will follow a rigorous analytic process for evaluating the potential development benefits and market potential for mitigation technologies. For adaptation technologies, which differ from mitigation technologies in the sense that they are often more site and sector specific ranging from best practices in system design and operation to actual technologies, the client and the World Bank have agreed to pursue a ‘case study’ approach.

We encourage the GEF to pursue priority technologies and identification of barriers to development and implementation of comprehensive technology action plans for each technology (as with the revised UNEP and UNDP methodology) to address policy, market, and capacity barriers to sustained investment and deployment of the priority technologies.

World Bank Response: As answered above (comment from Switzerland), the project will cover prioritization of technologies and identification of barriers. Barriers for technology transfer and deployment in China and ways to overcome them will be discussed.

We would like to see the full proposal describe how key implementing agencies in China (e.g. NDRC) will be engaged to lead development of programs for each sector that build on and will reinforce current government supported technology development and deployment programs.

World Bank Response: the WB Project Appraisal Document describes in Annex 3 (Implementation Arrangements) how key project’s stakeholders, in particular key implementing agencies like NDRC, will be engaged under the project. Their role is focused on the scope of the project, which mainly consists of technology assessments, capacity building activities, and design of pilot technology transfer programs.

The project should describe how it will engage the private sector in all phases of the work to ensure that the project will catalyze sustained private sector investment. The project should endeavor to engage all major multilateral and bilateral climate programs active in China in the consultation process to tap into these activities to support design of new technology initiatives and build on these existing activities in enhanced technology development and diffusion and transfer efforts.

World Bank Response: The World Bank Project Appraisal Document describes the project implementation arrangements. The project will be as inclusive as possible and various actors and experts will join the stakeholders / project technical group and participate in the meetings (especially the kick-off meeting). Major climate programs active in China (like for example, Climate Works) will be consulted during the TNA.

The proposed framework for ongoing technology needs assessment would be strengthened if it included development of clear performance metrics, an annual review process, a mechanism to engage all major donors and help coordinate work across donors, and describe how key government agencies and the private sector will be engaged in ongoing review. This framework could be of great value as the coordinating mechanism across donors, government agencies, and the private sector in advancing climate tech development, diffusion, and transfer in China.

World Bank Response: This was developed in the course of project preparation and is documented in the World Bank Project Appraisal Document (see Annex 1 for the performance metrics and Annexes 2 and 3 for the review processes and the project implementation mechanisms).

ANNEX C: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF RESOURCES

<i>Position Titles</i>	<i>\$/ person week*</i>	<i>Estimated person weeks**</i>	<i>Tasks to be performed</i>
For Project Management			
Local			
Project Manager	1500	33.33333333	PMO Project Manager reporting to the National Project Director, day to day management of the PMO. Not a full-time position.
Administrative Manager	750	60	Administrative manager overseeing staff of 7-10 people (not all financed by the GEF grant)
Procurement officer	1000	35	Management of procurement and contracting. Not a full-time position.
Accountant	750	33.33333333	Supervision of Financial Management. Not a full-time position.
International			
Justification for Travel, if any:			
For Technical Assistance			
Local			
Two Experts - Mitigation Technologies	1500	28 (2x14)	Design and summary report for mitigation
Information Systems prioritization expert	1500	20	Information system prioritization
Expert – Adaptation Technologies	1500	10	Design and summary report for adaptation
Technology Assessment Specialists – Mitigation 12 institutional contracts	1500	100	Coal mining and oil & gas exploration
	1500	100	Thermal power
	1500	63.33333333	Renewable energy
	1500	63.33333333	Iron and steel
	1500	83.33333333	Building materials manufacture
	1500	83.33333333	Chemical industry
	1500	100	Nonferrous metallurgy
	1500	100	Transportation
	1500	43.33333333	Residential & commercial buildings
	1500	63.33333333	Agriculture, forestry, and land use
	1500	43.33333333	CCS
	1500	43.33333333	Waste management
Technology Assessment Specialists – Adaptation 4 institutional contracts	1500	80	Water resources
	1500	63.33333333	Disaster forecast and Weather Monitoring
	1500	80	Agriculture, Forests and ecosystems
	1500	63.33333333	Urban
Provincial level assessment 1 institutional contract	1500	266.6666667	Conduct provincial assessments for four provinces
Technical Specialists (16)	1500	24 (16 x 1.5 PW)	Technical reviews – sector assessment
Technical Specialists	1500	4	Technical reviews – provincial assessment
Technical Specialists 1 institutional contract	1500	266.6666667	National TNA and Technology Transfer Capacity Building

Technology Assessment / Technology Transfer Experts 4 institutional contract	1500	266.6666667	Provincial TNA and Technology Transfer Capacity Building – Guangdong, Liaoning, Jiangxi and Shaanxi
Technology Assessment / Technology Transfer Experts 2 institutional contracts	1500	116.6666667	Sectoral TNA and Technology Transfer Capacity Building – Power and Building Sectors
Technology Transfer Experts 2 institutional contracts	1500	33.33333333	Management and evaluation of pilot program, and design of future technology transfer program
International			
Expert - Mitigation Technologies	3000	20	Methodology, design, synthesis
Information Systems prioritization expert	3000	9	Technical reviews – provincial assessment
Expert – Adaptation Technologies	3000	6.33333333	Methodology, design, synthesis
Sector Specialists (16)	3000	32 (16 x 2 PW)	Technology specialists, sectors
Technology Specialist (1)	3000	3.33333333	Technology specialist, provincial assessments
Technology specialists (10)	3000	8	Technology specialist, adaptation assessments

* Provide dollar rate per person week. ** Total person weeks needed to carry out the tasks.
Note: One person-week = 5 working days.

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

- EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.
- DESCRIBE FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION, IF ANY:
- PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:

Not Applicable

<i>Project Preparation Activities Approved</i>	<i>Implementation Status</i>	<i>GEF Amount (\$)</i>				<i>Co-financing (\$)</i>
		<i>Amount Approved</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>	<i>Uncommitted Amount*</i>	
Total						

* Any uncommitted amounts should be returned to the GEF Trust Fund. This is not a physical transfer of money, but achieved through reporting and netting out from disbursement request to Trustee. Please indicate expected date of refund transaction to Trustee.

ANNEX E: CALENDAR OF EXPECTED REFLOWS

Provide a calendar of expected reflows to the GEF Trust Fund or to your Agency (and/or revolving fund that will be set up)

Not Applicable

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The World Bank

FOR OFFICIAL USE ONLY

Report No: xx

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT FROM THE
GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF USD 5 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

CHINA CLIMATE TECHNOLOGY NEEDS ASSESSMENT (TNA) PROJECT
March 28, 2012

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CURRENCY EQUIVALENTS

(Exchange Rate Effective November 1, 2011)

Currency Unit = RMB (Chinese Yuan Renminbi)

RMB 6.30 = US\$1.00

US\$ 0.159 = RMB 1.00

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy	MOST	Ministry of Science and Technology
CPS	Country Partnership Strategy	NDRC	National Development and Reform Commission
EA	Environmental Assessment	ORAF	Operational Risk Assessment Framework
EGTT	UNFCCC's Expert Group on Technology Transfer	PDO	Project Development Objective
FDI	Foreign Direct Investment	PMO	Project Management Office
FM	Financial Management	RMB	Chinese Yuan Renminbi
GEF	Global Environment Facility	SA	Sub-grant Agreement
GHG	Greenhouse Gas	STAP	Scientific and Technical Advisory Panel
GOC	Government of China	TNA	Technology Needs Assessments
MEP	Ministry of Environmental Protection	TOR	Terms of Reference
MIIT	Ministry of Industry and Information Technology	TT	Technology Transfer
MOA	Ministry of Agriculture	TTL	Task Team Leader
MOF	Ministry of Finance	UNFCCC	United Nations Framework Convention on Climate Change
MOFCOM	Ministry of Commerce	WB	World Bank

Regional Vice President:	Pamela Cox
Country Director:	Klaus Rohland
Sector Director:	John Roome
Sector Manager:	Paul Kriss (Acting)
Task Team Leader:	Carter Brandon

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PAD DATA SHEET

China

Climate Technology Needs Assessment (TNA) Project

PROJECT APPRAISAL DOCUMENT

East Asia and Pacific Region (EAP)

China and Mongolia Sustainable Development Unit (EASCS)

Date: March 28, 2012 Country Director: Klaus Rohland Sector Director: John Roome Sector Manager: Paul Kriss (Acting) Team Leader: Carter Brandon Project ID: P120932 Lending Instrument: Specific Investment Loan	Sector(s): General energy sector (50%); Other industry (20%); General transportation sector (15%); Agriculture (15%) Theme(s): Climate Change (100%); Pollution management and environmental health (30%). EA Category: C - Not Required
Project Financing Data:	
Proposed terms: <input type="checkbox"/> Loan <input type="checkbox"/> Credit <input checked="" type="checkbox"/> Grant <input type="checkbox"/> Guarantee <input type="checkbox"/> Other:	
Source	Total Amount (US\$M)
Total Project Cost:	5.8
Cofinancing:	0.0
Borrower:	0.8
GEF:	5.0
 Total Bank Financing:	 0.0
IBRD	
IDA	
Borrower / Recipient: People's Republic of China	
Responsible Agency: National Development and Reform Commission (NDRC) / Climate Change Department / PR China	
Contact Person: Mr. Li Gao	
Telephone No.: +86 13910305905	
Email: ligao@ndrc.gov.cn	

Estimated Disbursements (Bank FY/US\$ m)					
FY	2012	2013	2014	2015	2016
Annual	0.1	1.1	1.8	1.6	0.4
Cumulative	0.1	1.2	3.0	4.6	5.0

Project Implementation Period: April 1, 2012 to November 30, 2015
Expected effectiveness date: July 2, 2012
Expected closing date: November 30, 2015

Does the project depart from the CAS in content or other significant respects?	<input type="radio"/> Yes <input checked="" type="radio"/> No
If yes, please explain: Not applicable	

Does the project require any exceptions from Bank policies? Have these been approved/endorsed (as appropriate by Bank management?) Is approval for any policy exception sought from the Board?	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No (Not applicable) <input type="radio"/> Yes <input checked="" type="radio"/> No
If yes, please explain: Not applicable	

Does the project meet the Regional criteria for readiness for implementation?	<input checked="" type="radio"/> Yes <input type="radio"/> No
If no, please explain: Not applicable	

Project Development Objective:

The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and to adopt corresponding global best practices.

Project description:

Component 1: Methodology Development, Technical Oversight, Synthesis and Dissemination. This component will support methodology development and technical oversight through the governmental Project Steering Committee, the Project Technical Committee, and the network of technical peer reviewers. It will also provide a results synthesis, and an outlet for dissemination through a series of workshops coordinating the steering committee and other stakeholders.

Component 2: Technology Assessments at the Sector and Provincial Levels. This component will support technology assessments of identified mitigation and adaptation sectors and several provinces. Each assessment will: prioritize specific technologies to target within sectors and provinces; analyze the performance gaps between Chinese best practice and global best practice for the identified technologies; and assess the barriers to technology transfer and deployment.

Component 3: Capacity Building to Support Climate Technology Networks. This component will consist of capacity building activities to support one national center, two sectoral centers, and four provincial networks with their own climate technology databases and personnel to serve as knowledge hubs in their respective areas. It will also include capacity building activities to better understand technology transfer mechanisms and the barriers to timely and widespread deployment of global best practice options.

Component 4: Pilot Program to Accelerate Technology Transfer. "Technology Improvement Grants" will be awarded on a competitive and cost-sharing basis to small and medium sized companies. The grants will support companies to procure goods and services required to accelerate the process of technology transfer, diffusion, and scale-up. Building on results of the pilot program and of TNA findings, this component will also design pilot programs for subsequent technology transfer programs in China. The grant sizes will not exceed US\$100,000.

Component 5: Project Management Office. This component will support the establishment and operation of the Project Management Office (PMO).

Safeguard policies triggered?		
Environmental Assessment (OP/BP 4.01)		● Yes ○ No
Natural Habitats (OP/BP 4.04)		○ Yes ● No
Forests (OP/BP 4.36)		○ Yes ● No
Pest Management (OP 4.09)		○ Yes ● No
Physical Cultural Resources (OP/BP 4.11)		○ Yes ● No
Indigenous Peoples (OP/BP 4.10)		○ Yes ● No
Involuntary Resettlement (OP/BP 4.12)		○ Yes ● No
Safety of Dams (OP/BP 4.37)		○ Yes ● No
Projects on International Waters (OP/BP 7.50)		○ Yes ● No
Projects in Disputed Areas (OP/BP 7.60)		○ Yes ● No
Conditions and Legal Covenants:		
Grant Agreement Reference	Description of Condition/Covenant	Date Due
	Finalization of the Financial Management Manual (FMM) is a condition of negotiations.	April 10, 2012
	Maintain throughout the period of implementation of the Project, in a manner and substance satisfactory to the Bank, a Project Steering Committee assigned with such powers, functions, funds and other resources as shall be necessary to enable it to provide overall leadership, guidance and coordination for the purpose of implementing the Project.	Established not later than June 1, 2012, and maintained throughout the period of Project implementation.
	Establish and maintain throughout the period of implementation of the Project, in a manner and substance satisfactory to the Bank, a Project Technical Committee assigned with such powers, functions, funds and other resources as shall be necessary to enable it to provide overall oversight and technical guidance for the purpose of implementing the Project.	Established not later than July 1, 2012, and maintained throughout the period of Project implementation.
	Engage international and domestic peer-reviewers in adequate numbers, with expertise, terms of reference, qualification and experience, acceptable to the Bank, as required for the implementation of the Project.	Throughout the period of implementation of the Project.

I. STRATEGIC CONTEXT

A. Country Context

1. **China has achieved economic growth in recent decades although many imbalances remain.** In the past decade, GDP grew by 9.9 percent per annum with broadly effective macroeconomic management. Inflation has been kept broadly under control. While China's real economy was affected by the global financial crisis through its trade and FDI, a forceful fiscal and monetary stimulus kept China's growth rate at a high level. Per capita income rose rapidly in urban and rural areas, and dozens of millions of people were lifted out of poverty. At the same time, approximately 200 million people still live below the World Bank poverty line¹, giving China the second-largest poor population (after India). In addition, some economic and social imbalances have emerged and are growing, in particular:

- widening disparities in regional development and incomes, between urban and rural areas and between coastal and inland provinces; and
- growing environmental challenges, in particular increased GHG emissions making China the largest global carbon emitter, as well as one of the countries most vulnerable to the adverse impacts of climate change.

2. **Addressing climate change – both mitigation and adaptation – will be of growing importance to China.** On the mitigation side, China's rapidly growing coal-dependent economy has made it the world's largest emitter of CO₂ (although per capita emissions remain a fraction of the average developed country level). Projections under business-as-usual conditions show continually growing emissions. On the adaptation side, with its long coastline and vast expanses of arid and semi-arid land, China is vulnerable to the adverse impacts of climate change, which could intensify water shortages in northern China, increase the incidence of extreme temperature events and consequent flooding and droughts, and reduce the yields of major crops.

3. **A number of factors specific to China impede its response to climate change.** The primary factor will be the effect of continued rapid economic growth. Economic development, if it continues to be fueled by a fossil-fuel based economy, will be a strong driver for growing CO₂ emissions. Increasing energy demand also raises energy security concerns as the share of China's imports in energy supply continues to rise. These concerns strengthen China's resolve to make use of domestic energy options, which are currently dominated by high-carbon coal, even as it pursues other renewable and nuclear options. While China has been purposely pursuing a full range of technologies, the majority of its existing energy infrastructure – generation, transmission and use – is coal-dominated, and its overall energy use is much higher, per unit of GDP, than other middle and high income countries. In general, China has yet to meet the technological standards of OECD countries. In addition, the country's large size and overall diversity make it vulnerable to a wide variety of climate change threats, as noted above. Formulating mitigation and adaptation strategies is complex, interlinked, and dependent on both technological and policy innovation.

¹ US\$ 1.25 per person per day.

B. Sectoral and Institutional Context

4. **The Government of China (GOC) has taken numerous steps to address climate change.** In November 2009, the State Council announced that by 2020, China would cut CO₂ emissions intensity per unit of GDP by 40 to 45 percent compared to 2005 levels. Numerous efforts were made during the 11th Five-Year Plan with the release of the “China’s National Climate Change Program” (June 2007), and the passing of the “Actively Facing Climate Change Act” by the National People’s Congress (August 2009). On the adaptation side, the National Climate Change Program outlines a number of strategies, including improving agricultural infrastructures; breeding stress-resistant animal and crop varieties; addressing land degradation; strengthening protection of forests and other natural ecosystems; enhancing water resources and management; and improving capability in monitoring and early warning systems for coastal zones.

5. **The GOC continually stresses the role of advanced technologies for both mitigation and adaptation** to meet its goals in a timely fashion and at a minimum cost that does not threaten economic development and poverty alleviation. Making the most relevant and advanced technologies available for widespread deployment will involve both transfer of best available global technologies to China (when not already available domestically) and enhancement of China’s own science, technology, innovation capacity and diffusion. Given China’s vast size, its rapid economic growth, its large, growing GHG emissions, and diverse massive vulnerability to climate change, the climate technology needs of China are immense.

6. **Over the last few years, the GOC has issued several plans which have significant implications for the development of climate change technologies.** The most prominent are:

- (a) The Medium and Long-Term Development Plan for Renewable Energy;
- (b) The 12th Five Year Plan (2011-2015) with a focus on the development of seven strategic emerging industries (SEIs); and
- (c) The Medium to Long Term Plan for the Development of Science and Technology.

(a) The Medium and Long-Term Development Plan for Renewable Energy

7. China’s comprehensive policy begins with ambitious targets for clean energy deployment. In 2007, the National Development and Reform Commission (NDRC) created a “Medium and Long-Term Development Plan for Renewable Energy,” which raised the nation’s renewable energy target to 10 percent by 2010 and 15 percent by 2020. It also established technology-specific targets for renewable energy, including targets of 30GW of wind power, 300 GW of hydropower, and 1.8 GW of solar PV by 2020. As a result of the rapid development of many of China’s clean energy technology industries, government officials have officially revised these earlier targets. The government more than tripled its wind energy target to 100GW by 2020 and is considering increasing it even further to 150 GW. The government has officially increased its 2020 solar PV target more than ten times, to 20GW.

8. These ambitious national clean energy targets are backed up by major public investments and targeted incentives for clean energy R&D, manufacturing, market creation, and infrastructure. China is rapidly developing its domestic capacity for indigenous innovation, and has targeted clean energy as a priority R&D sector. Over all sectors of the economy, China’s investments in R&D grew by over 20% annually between 1996 and 2007.

9. China's clean energy manufacturing industry has also benefited from targeted government incentives to boost domestic demand. The deployment of wind turbines, for example, has been boosted by variable feed-in tariffs for wind-generated electricity, mandated market shares for renewable energy, and value-added tax rebates. As a result of this support for the domestic industry, China's installed annual capacity has doubled in each of the last five years, and in 2009 China installed a world-leading 13 GW of new capacity.

(b) China's 12th Five Year Plan, Indigenous Innovation, and Technology Transfers

10. China's 12th Five Year Plan (2011-2015) includes support to the development of seven strategic emerging industries (environmental protection and energy efficiency, new energy, next generation information technology, biotechnology, high-end manufacturing, clean-energy vehicles, and high-tech materials) which are all highly correlated with emissions reduction. Within those seven industries, 35 projects have been identified including: high-efficiency energy saving technologies like lighting; high-end manufacturing in aerospace, rail, nuclear, renewable power technologies, smart grids, and advanced materials and composites; and smart assembly in electric and fuel cell cars.

(c) The Medium to Long Term Plan for the Development of Science and Technology

11. China's 12th Five Year Plan is strongly aligned with the other guiding policies from the GOC, in particular the "Medium to Long Term Plan for the Development of Science and Technology" issued in 2006, which articulated the goal of making China an innovation-oriented society. These are in response to a perception that opening the country to foreign direct investment has not led to improvement of domestic innovation capabilities and that foreign technologies continue to dominate the high value parts of high-tech products, with China relegated to low value-added labor intensive roles in global production networks. A great deal of China's advanced production capabilities rely on imported tools that embody technology and know-how, or the licensing of foreign technologies that are often a generation or more behind. By calling out specific projects, the government can target areas for investment and capability development. This is implemented through the research agendas of universities and research institutes, the strategies of state-owned enterprises (SOEs), and through projects, policies and incentives that favor the areas mentioned.

12. The most important driver for the roll-out of plans is through the annual goal setting cycles at all levels in the government. Meeting emissions reduction targets for a city, region, or province, for example, is the path to advancement for officials in the party. To better meet these targets, local and provincial governments in China are accelerating the pace of innovation throughout the domestic clean energy industry by creating clean energy clusters—dense regional networks of inventors, investors, manufacturers, suppliers, universities, local government officials and other actors that can confer a lasting competitive advantage to the region as a whole. Governments in China are offering clean energy companies generous subsidies to establish operations in their localities, including free land, low-cost financing, tax incentives, and money for R&D. One prime example is the city of Baoding, which has transformed from an automobile and textile town into the fastest growing hub of wind solar energy equipment makers in China. The city is home to "Electricity Valley," an industry cluster modeled after Silicon Valley, composed of nearly 200 clean energy companies focusing on wind, solar PV, solar thermal, biomass and other technologies.

C. Higher Level Objectives to which the Project Contributes

13. **The United Nations Framework Convention on Climate Change (UNFCCC) negotiations has long highlighted the importance of technology transfer and development** in helping countries address climate change mitigation and adaptation. The UNFCCC's Expert Group on Technology Transfer (EGTT) has encouraged all non-Annex I Parties to the Convention, such as China, to identify their climate technology needs through "Technology Needs Assessments" (TNAs). A number of countries have undertaken and are now undertaking such projects.

14. **This project fully supports GEF's strategy for technology transfer** as defined in the document entitled "Elaboration of a Strategic Program to Scale-Up the Level of Investment in the Transfer of Environmentally Sound Technologies" (GEF/C.34/5.Rev.1), also referred to as the Poznan Strategic Program on Technology Transfer. The GEF has already financed numerous TNAs in developing countries but of a smaller scale.

15. **The project supports the objective of the Climate Change focal area of the GEF Trust Fund**, which is to help developing countries and economies in transition to contribute to the overall objective of the United Nations Framework Convention on Climate Change (UNFCCC).

16. **The project supports the 2006-10 Country Partnership Strategy for China (CPS – approved by the Board on May 23, 2006)**, which seeks among other objectives, to help the country manage resource scarcity and environmental challenges (Pillar 3). Specifically, the TNA addresses the issue of climate change and supports the CPS objectives of: (a) reducing air pollution; (b) optimizing energy use; and (c) observing international environmental conventions. In terms of climate change, the current CPS calls for: supporting research, transfer and application of low-carbon technologies; and facilitating knowledge transfer and research on climate change impacts and adaptation technologies. The new CPS is scheduled to be finalized by the end of FY12. The GOC has requested that it be aligned with the new 12th Five Year Plan, covering 2011-2015, which places an ever higher priority on climate change. Therefore, it is fully expected that the TNA will be fully aligned with the new CPS as well.

17. **The project is also consistent with the World Bank Group's *Strategic Framework on Development and Climate Change (SFDCC)***, approved by the Board in October 2008. One of the six actions areas to assist client countries in addressing climate change is: "Support accelerated development and deployment of new technologies".

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

18. The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and to adopt corresponding global best practices. It will do this by supporting China's efforts, within the context of the international climate change agenda, to assess mitigation and adaptation technology needs, build capacity and technology networks, and conduct pilot technology transfer programs.

B. Project Beneficiaries

19. The TNA will develop a better process by which relevant stakeholders can identify and eventually deploy priority, best-practice climate technologies to allow for expedited and cost-effective solutions to climate change. Given the extremely wide range of sectors that touch upon climate change mitigation and adaptation, the beneficiaries of this project will be widespread:

- First and foremost the global environment, given that China is the world's largest emitter of CO₂.
- Deployment of technology will have spillover effects for the Chinese population in terms of: (a) local environmental co-benefits in the form of reduced air pollution due to reduced use of coal, and (b) benefits in terms of adaptation to climate change.
- Chinese citizens most vulnerable to climate change will benefit directly from application of global best-practice technologies for adaptation. This will include those in the sectors affected by climate change, such as agriculture, and those living in areas vulnerable to climate change (e.g., coastal communities).

C. PDO Level Results Indicators

20. The results indicators for the project are given in Annex 1. Achievement of the development objective will be evaluated through: (a) the impact of the technology needs assessments conducted; (b) the impact of the capacity strengthened at the national, sectoral and provincial levels related to climate technology assessments; and (c) the impact of the pilot technology transfer scheme. The results will be measured by indicators of:

- Stakeholder demand for and use of the completed technology assessments;
- Stakeholder demand for and use of the technology-related functions of the national, sectoral, and provincial climate technology centers or networks, including of future pilot technology transfer programs;
- Measureable acceleration of technology transfer, diffusion, and scale-up at the pilot scale;
- Reduction of Lifetime direct GHG emissions.

III. PROJECT DESCRIPTION

A. Project components

21. The project consists of the following five components (see Annex 2 for the schematic of the project design and more details on each project component). Consistent with the overall objective, the project focuses on the completion of TNA reports, the strengthening of national and provincial centers equipped to provide services to relevant stakeholders, and the piloting of a program to facilitate technology transfer, diffusion and scale-up.

22. **Component 1: Methodology Development, Technical Oversight, Synthesis and Dissemination (US\$703,000; GEF: US\$593,000).** This component will support the development of methodologies and provide technical oversight through the governmental Project Steering Committee, the Project Technical Committee, and the network of technical peer reviewers. This component will also provide a results synthesis, and an outlet for dissemination through a series of workshops coordinating the steering committee and other stakeholders. It will

ensure a consistency of approach in application of the methodologies while still accounting for the differences in specifics of each sector.² It will also gather together results from each sector-level assessment in order that they may be presented in a comparable fashion. There are two specific subcomponents, as follows (see Annex 2 for details):

- Methodology development, technical oversight, peer review and synthesis of technology methodologies and assessments;
- Workshops and consultations.

23. Component 2: Technology Assessments at the Sector and Provincial Levels (US\$2,452,000; GEF: US\$2,332,000). This component will support the technology assessments of identified mitigation and adaptation sectors and several provinces. There are 20 planned assessments in total, divided into 12 mitigation sectors, 4 adaptation sectors, and 4 provincial assessments (see Annex 2). The assessments will cover the following steps:

1. Technology identification:
 - Overview of climate technologies in the selected sectors/provinces in China and identification of a shortlist of key climate technologies for each sector/province. It is estimated that each full technology assessment will prioritize and analyze up to five key technologies.
 - Collection, analysis, and summary of the current performance (environmental performance, operating and cost parameters, etc) of these shortlisted technologies.
2. Technology gaps:
 - Identification of the corresponding global best practice technologies.
 - In the case of a mitigation technology, estimation of GHG emission reduction potential if the corresponding global best practice technology is introduced in China.
 - Identification and analysis of gaps between Chinese best practice and global best practice for the identified technologies.
3. Barriers to technology transfer and deployment:
 - Identification and analysis of barriers impeding transfer and timely deployment of identified global best practice technologies in China (with presentation of specific cases of technology development and transfer).
4. Submission of all data and reports for the compilation of the database and the preparation of the synthesis reports.

Throughout the preparation of each individual assessment, two or more peer reviewers – both local and international -- will be assigned to review and comment at each stage, i.e., concept review, working draft, and final draft. These reviewers will be selected and hired under the project for expertise specific to the most critical (and prioritized) technologies within each assessment.³

² In this TNA document, the word “sector” is often used to denote the sectors being assessed, such as those listed in Annex 2, Component 2. Strictly speaking, not all of these “sectors” coincide with what are typically considered sectors. While some are, such as agriculture and transportation, others might more properly be called “sub-sectors”, such as “iron & steel” and “residential and commercial buildings.” For simplicity, however, the term “sector” is used for both.

³ It is furthermore agreed that if the World Bank’s own review team has reservations over the final drafts produced under this project, then its comments may be included in the final published reports.

24. Component 3: Capacity Building to Support Climate Technology Networks (US\$1,195,000; GEF: US\$975,000). This component will include capacity building activities to support one national center, two sectoral centers, and four provincial networks with their own climate technology databases and personnel to serve as knowledge centers or networks. The capacity building counterparts will be selected from existing centers of excellence in government institutions, universities, or industry associations. This component will also create a series of technology databases available to all project stakeholders; disseminate indicators based on data and trends in the database; and support capacity building activities to understand technology transfer mechanisms and the barriers to timely and widespread deployment of global best practice options.

25. The purpose of the capacity-building is three-fold: first, to improve the capacity of the TNA centers themselves in order to better understand and meet the demand for high-quality TNAs; second, to improve the capacity of TNA stakeholders to use and network around TNA findings; and third, train professional experts to independently carry out technology needs assessment. There are three subcomponents (see Annex 2 for details):

- National Technology Transfer Capacity Building and Database
- Sector Capacity Building
- Provincial Capacity Building.

26. Component 4: Pilot Program to Accelerate Technology Transfer (US\$1,900,000; GEF: US\$850,000). "Technology Improvement Grants" will be awarded on a competitive and cost-sharing basis to small and medium sized companies (defined as having up to 500 employees). The grants will support companies to procure goods and services required to accelerate the process of technology transfer, diffusion, and scale-up. The grants scheme will be focused on the four provinces targeted by the TNA, and not be limited to any predetermined industrial subsector. Examples could include: (a) companies (or a group of companies) that need technical advice or feasibility-level cost analysis as part of acquiring a new foreign emissions-reducing technology; (b) companies that need design or process engineering to integrate a new technology; (c) companies that need management or employee training to operate newly acquired technology up to international benchmarked standards; (d) companies that need process engineering support to improve or achieve international certification of priority technologies; and/or (e) groups of companies, such as commercial building managers, that would benefit from targeting training to accelerate the diffusion of energy efficient building technologies and management systems.

27. The maximum grant size would be US\$100,000, and the average would be about US\$80,000 or RMB 500,000. It is estimated that the pilot demonstration program would make 8-12 such grants over 1-2 years. The expenditures eligible under the pilot program include (a) purchase of design and production know-how, (b) purchase of a license, testing and certification, (c) hardware and software directly related to product design or testing, and (d) other. These are all costs that a private company would ascribe to R&D and related investment expenditures. All grants would be monitored to both ensure proper management and cost-sharing, and to measure results. The pilot program would be completed in the first two years of the TNA, allowing adequate time for evaluating results. The findings will help determine whether or not this model of "Technology Improvement Grants" merit scale-up in order to better implement the final recommendations of the TNA.

28. By combining the evaluation of the pilot competitive grants scheme with overall TNA findings – particularly the barriers to technology transfer identified in the assessments -- this component will also design one or more technology transfer mechanisms that would accelerate the ultimate deployment of prioritized technologies in both climate mitigation and adaptation. Through the TNA process, the demand for and ownership of follow-up actions will be better understood. The NDRC Climate Change Department is committed to seeing TNA follow-up actions implemented. Furthermore, the capacity building elements of the project (Component 3) will be designed to support not only technology assessments, but also the implementation of follow-up actions.

29. **Component 5: Project Management Office (US\$450,000; GEF: US\$250,000).** This component will support the establishment and operation of the Project Management Office (PMO). The PMO will coordinate and guide the implementation of project activities, undertake central project management and reporting/ monitoring functions.

B. Project Financing

30. The GOC, through NDRC and the national GEF focal point, has requested a US\$5 million grant from the Global Environment Facility (GEF) to conduct the TNA project. This grant size, approved in 2010 by the GEF, is much larger than any of the previous TNA's conducted worldwide, and is the amount deemed commensurate with the scope and complexity of issues in China. It also includes funding for a major capacity building effort designed to make the TNA process sustainable in China. To supplement the grant, the GOC will contribute US\$800,000 in in-kind support, as follows:

Project Components	GEF (000 USD)	%	Counter- part (000 USD)	%	Total Cost	% of Total Costs
I. Technical Oversight, Synthesis and Dissemination	593	12%	110	6%	703	10%
- Oversight and synthesis of technology appraisals	193		10		203	
- Workshops and consultations	400		100		500	
II. Technology Assessments at the Sector and Provincial Levels	2,332	47%	120	7%	2,452	37%
- Mitigation: sector appraisals (12)	1,330		60		1390	
- Adaptation: sector appraisals (4)	430		20		450	
- Provincial-level appraisals (4)	400		40		440	
- Peer-review of technology appraisals	172		0		172	
III. Capacity Building to Support Climate Technology Networks Transfer	975	20%	220	13%	1,195	18%
- National Technology Transfer Capacity Building	400		100		500	
- Sector Capacity Building (2 sectors)	175		40		215	
- Provincial Capacity Building (4 provinces)	400		80		480	

IV. Pilot Program to Accelerate Technology Transfer	850	17%	1,050	62%	1,900	28%
- Technology Improvements Grant Program	800		1000		1800	
- Design of followup tech transfer programs	50		50		100	
V. Project Management Office	250	5%	200	12%	450	7%
Totals	5,000		1,700		6,700	100%

C. Lessons Learned and Reflected in the Project Design

31. Ninety-two countries have already conducted TNAs,⁴ and based on post-evaluation exercises, most have found the assessments useful not only to identify specific technology needs, but also to provide some indications of future direction for policy formulation and enactment of regulations. Many aspects of previous TNAs are of little relevance to the process in an economy as large, complex, dynamic, and globally competitive as China. However a couple of general lessons can be drawn that inform the whole process. The UNFCCC second synthesis report (UNFCCC, 2009) identified the following general issues:

- There are two crucial steps in the process: (a) the identification of criteria to evaluate technologies; and (b) the selection of key technologies.
- Forming the national team responsible for the TNA process is a key aspect of the TNA management process.
- It is a good practice to consider technology needs together with national development plans. Therefore, it is desirable to include experts from national development planning authorities and from sectoral ministries in the TNA expert team.
- Organizing workshops and conducting interviews have been identified as the favored approaches to engaging stakeholders in all steps of the TNA process.

32. The project development objective and resulting project design have been shaped by these prior lessons learned, and by close collaboration between the GOC, the World Bank, and the GEF. The government stressed that it views the technology identification and prioritization of climate technologies as key to this project. It also acknowledged that China's own innovation capability will play a role in making advanced technologies available for deployment, but that for this project, which they see in the context of the UNFCCC, they want to focus on technology transfer. At a practical level, it is impossible to completely separate transfer from domestic innovation, and the approach taken, particularly with regard to design of mechanisms for technology transfer, will include aspects of both.

33. Key lessons drawn from OECD and Middle Income Countries on technology gap analysis and diffusion and on technology centers include the following:

- Communication and information sharing among providers and users is integral to the selection of appropriate technical solutions and their successful roll out. Technology innovation and diffusion should be implemented through a comprehensive and iterative

⁴ The Global Environmental Facility (GEF) has provided funding to some 92 non-Annex I Parties to conduct TNAs. Out of these, 78 TNAs were supported by the United Nations Development Program (UNDP), and 14 by the United Nations Environment Program (UNEP).

process with industry. This will establish practical and achievable technical goals as well as improve industries' capacity to produce, distribute and market the technology. *The industry associations will be part of the National Project Steering Committee and will be involved in the consultative process for the TNA.*

- Technology centers are pivotal to connecting and properly leveraging domestic and international research sources, such as, universities, private and public institutes as well as those in the private sector. Information sharing platforms, such as an open-source database, is key in fostering cooperation among diverse stakeholders. Centers should be designed and organized to meet the specific needs of the targeted industry. *The national and sectoral centers and the provincial networks will be closely linked to the national and provincial industry associations.*
- Proactive database management should focus on "matchmaking": Centers with databases should identify compatible technology sources and potential users, effect introductions, assist in negotiations and provide technical support as required by SMEs. *The sectoral centers will carry out "state-of-the-art foreign technology reviews and screenings" along these lines.*

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

34. The project will be implemented by NDRC, the agency chairing the National Climate Change Leading Group under the State Council and representing China at the UNFCCC. NDRC has established a Project Management Office (PMO), reporting to the Director of the Division of International Policy and Negotiations of the NDRC Climate Change Department. The structure and staffing of this entity is described in Annex 3.

35. The PMO will be entrusted with overall project management and with coordinating the implementation of procurement, contract management, disbursement requests, fiduciary compliance, evaluation and results monitoring, and overall reporting to the Bank. The PMO will be the primary coordinating entity responsible for communicating with the Bank, ensuring that implementation is consistent with all relevant Bank policies and procedures, and ensuring continuity and good coordination between the different project activities.

36. In order to provide overall leadership, guidance, and institutional coordination for project implementation, a Project Steering Committee will be established by NDRC and chaired by the Director General of the NDRC Climate Change Department. It will consist of representatives from both concerned government agencies, such as MOF, MOFCOM, MIIT, MOST, MEP, and MOA, and national industry associations. The Project Steering Committee will be defined and constituted, by virtue of an invitation letter, prior to project negotiations, and will meet at least once a year and more often when important issues arise, upon request of the PMO.

37. In addition to the Project Steering Committee, a TNA expert team: "the Project Technical Committee" will be established under the project (Component 1) to provide:

- technical guidance for the sector and provincial-level assessments;
- coordination for the national and sectoral centers and for the provincial networks on climate technology; and

- communication with international technology transfer community.

38. The Project Technical Committee will be established before the kick-off workshop, and will be composed of:

- technical experts, including three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts for the oversight and synthesis of technology assessments (Subcomponent 1.1).
- representatives from national industry associations.
- other technical experts drawn from academia or government on a 'as needed' basis.

39. In addition, for the sectoral and provincial assessments, approximately 20 international experts and 20 national experts will be recruited as peer-reviewers⁵ for: (a) the peer-review of the elaboration of the detailed methodology at the sector and provincial level and (b) the review of the assessments results.

B. Results Monitoring and Evaluation

40. Annex 1 provides a detailed description of the performance indicators to be tracked under the project, and specifies the source and schedule for data collection. The PMO will be responsible for the overall M&E system, including regular data collection to assess progress towards achieving results. It will furnish to the Bank semi-annual progress reports on project implementation by February 15 and August 15 of each year, starting with August 15, 2012. In addition, it will prepare a mid-term review report by August 15, 2013. Based on the recommendations of these reports and the Bank's reviews and comments thereon, the PMO will take actions, satisfactory to the Bank, to address any emerging issues in order to meet the targets set in the results framework.

C. Sustainability

41. Sustainability of the TNA is a key objective of the project. Among other goals, the project will enhance China's capacity (at industry and government levels) to regularly perform technology appraisal and prioritization and to facilitate transfer of prioritized technologies. Components 1 and 3 will specifically contribute to this objective by:

- Setting up a broad stakeholder network for TNA in China;
- Designing and establishing methodologies for TNA in China;
- Providing capacity building activities;
- Facilitating dissemination and evaluation workshops;
- Creating demand for the ongoing functions of the technology centers such as networks, database, and assessments.

Effective participation of key stakeholders (in particular: government, industry associations, and experts) through the Project Steering Committee and the Project Technical Committee will help embed the TNA process into the ongoing national development process.

⁵ See Subcomponent 1.2 in Annex 2 for more information on the peer-review process.

42. In addition, Chinese climate change negotiators have repeatedly raised the importance of facilitating technology transfer to lower income countries as part of the combat against climate change. As a major negotiator, the counterpart intends to use the TNA process in the context of the UNFCCC. Since the international technology transfer issue is a long-term one, China's involvement in this issue may provide further impetus for the TNA process to remain sustainable.

V. KEY RISKS AND MITIGATION MEASURES

43. As discussed in detail in Annex 4 Operational Risk Assessment Framework (ORAF), the overall risk of the project is High. The risk for preparation was perceived as High during the project concept review meeting, primarily to reflect that developments in international climate change negotiations could influence the World Bank's ability to assist the GOC in this project without creating the appearance of "taking sides" in those negotiations, thus undermining World Bank neutrality in this matter. This rating was also based on the fact that the project is the first Technology Needs Assessment (TNA) done by the Bank, and therefore deserves Bank Management attention.

44. To mitigate this risk, a peer-review and quality assurance process is proposed to be put in place with several national and international experts, all to be hired based on TORs agreed with the Bank:

- In Subcomponent 1.1: three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts will be recruited to, together with other members of the Project Technical Committee: (a) supervise the application of the technology assessment methodologies; (b) provide guidance to the consultant at the different stages of the sector-level assessments on a 'as needed' basis; (c) gather all the results of the 16 sector assessments in a consistent way and prepare two final synthesis reports of good quality, that are satisfactory to the Bank (one for mitigation and one for adaptation technologies).
- In Subcomponent 1.2: 16 international experts and 16 national experts will be recruited as peer-reviewers for (a) the peer-review of the elaboration of the detailed methodology at the sector and provincial level and (b) the review of individual assessment results.

45. The key products, including the consultant reports as well as the comments received from those reviewers will be made available to the Bank Team. This peer-review and quality assurance process will be supervised during implementation. As indicated in the Implementation Support Plan (Annex 5), there will be three specialists / consultants on the Bank Team (Environmental / Energy / and Climate Change Specialists) to review these outputs and provide comments.

VI. APPRAISAL SUMMARY

A. Economic Analysis

46. The project objective is to support China's efforts to assess climate mitigation and adaptation technology needs. As such, the bulk of the project will not generate direct economic impacts but only potential indirect economic impacts based on the future adoption of some of the

priority climate technologies identified. Economic benefits will consist of: (a) potential GHG emissions reduction (local and global environmental benefits) in the case of mitigation technologies, and (b) developmental benefits to be identified by the sectoral assessments in the case of adaptation technologies.

47. The potential economic benefits resulting from the adoption of each climate technology identified and prioritized will be assessed and discussed in the sectoral assessments. They will be summarized in the Synthesis Report (collating and disseminating results from individual sector technology assessments) and in the ICR. In addition, the pilot technology transfer program, through small grants made to Chinese companies, may generate financial and economic benefits. These benefits will be assessed based on the criteria developed for the grants scheme, and as estimated in the evaluation of the pilot program during year three of the project.

B. Technical⁶

TNA methodology and conducting the sector- and provincial-level assessments

48. Three generic TORs (one each for mitigation, adaptation, and provincial-level assessments) were agreed with the client during appraisal for the sector-level and provincial-level assessments. The TOR will call for proposals from interested parties (individual consultants, consulting firms, industry associations, research institutes, or universities) to finalize the methodology for the respective sector or province and carry out the assessment. The technical approach of each proposal will be reviewed and evaluated by the relevant peer-reviewers. The best candidate will then be selected through the Bank procurement guidelines. The peer-reviewers may provide inputs for finalizing the methodology, and will peer-review the results of the assessment at the draft final stage.

49. Three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts will be recruited as part of the Project Technical Committee to: (a) supervise the application of the technology assessment methodologies, ensuring that the methodologies are properly applied to the specifics of each sector and province; (b) provide guidance during the different stages of the sector-level assessments on a ‘as needed’ basis; and (c) gather all the results of the sector assessments in a consistent way and prepare the final synthesis reports (one each for mitigation and adaptation technologies, and for the provincial assessments).

50. The results of the assessments will be organized to provide, as much as possible, standard templates by which the technologies can be compared across sectors. A database which houses information on priority technologies collected at the sector and provincial level will be established. The database will serve as a national virtual data hub for needed climate technologies for China.

51. Workshops will be organized at different key points during implementation (kick-off, two interim workshops, and one project concluding workshop) to gather input to guide project execution and disseminate results. These workshops will also provide a venue for the larger stakeholder community (including government ministries, Chinese industrial groups, domestic

⁶ See as well Annex 2 for the Project Technical Design.

technology users, and foreign manufacturers) to interact with the project. In particular, the first workshop will gather input from the different stakeholders to finalize the project approach and guide project execution.

Capacity Building to support Climate Technology Networks, TNA, and Technology Transfer

52. This component will build capacity to ensure that the TNA will be sustainable and embedded into national institutional processes. Eight climate technology centers or networks are proposed to be supported by the project: one national center, two sectoral centers, and four provincial networks with their own climate technology databases and personnel to serve as knowledge centers or networks in their respective areas. In addition, this subcomponent will also provide capacity building at the national / sector / and provincial levels to understand in greater depth technology transfer mechanisms; to support networks that can learn from domestic and international experience; and to develop a community of practice of professionals able to independently carry out technology needs assessments.

53. At the national level, the National Strategic Research and International Cooperation Center for Climate Change was established in November, 2011, as part of NDRC.⁷ This new Center is a service oriented, public-sector, non-profit organization (non-government department – like NDRC’s Energy Research Institute). It will perform think tank, management support, project administration, and international cooperation functions. This Center is expected to host the national network and database to be established under the TNA project. The capacity building activities supported by this project are expected to contribute to the initial functioning of the new Center.

54. At the sector and provincial levels, it could be envisaged at some point of time (during or after the implementation of the project) that a larger group of similar climate change networks be established with sponsors in NDRC and provincial DRCs. The four provincial networks supported by the project with their own climate technology databases and personnel will pilot such an approach.

55. All of the centers and networks strengthened by the project will be key to the project’s sustainability, and their role with regard to future technology assessments will be based largely on the methodologies and experiences developed through the project.

Pilot Program to Accelerate Technology Transfer

56. This component will draw from the successful competitive grants scheme introduced in the World Bank and GEF-financed China Renewable Energy Scale-up Program (CRESP). That project supported Wind Turbine Technology Transfer grants on a cost-sharing basis, with grant recipients being selected competitively. The CRESP program was oriented towards making grants for the development and commercialization of Chinese brand name wind turbines for which there is market demand. To implement the program, careful statements of objectives,

⁷ The rank of the center is at the level of the climate change department, even though the center will be supervised politically and technically by the climate change department.

ranking guidelines, eligibility, application procedures, selection process, code of ethics, and grant agreements were all developed.

57. The above procedures and draft documents have been modified under this project to support the specific goal of accelerating technology transfer. The pilot program will be announced and implemented in up to four provinces early in the first project year. It is expected that there will be two rounds of grant-making, totaling 8-10 grants over the first two years of the TNA. The results will be evaluated during the third project year, and the results used to guide the design of follow-up technology transfer programs.

C. Financial Management

58. The Project Management Office (PMO) established under the Climate Change Department of NDRC will be responsible for overall project implementation, management, coordination, and project financial management related matters. The GEF grant proceeds, including overseeing the Designated Account (DA), will be managed by the Ministry of Finance (MOF). A financial management capacity assessment was conducted by the Bank during the appraisal process and actions to strengthen project financial management capacity were agreed with the relevant implementing agency. The assessment concluded that with the implementation of these proposed actions, financial management arrangements would satisfy the Bank's minimum requirements under OP/BP 10.02. Annex 3 provides additional information on financial management.

D. Procurement

59. The Project Management Office (PMO) was established on July 11, 2011 by the Climate Change Department of NDRC. It is responsible for preparing the procurement plan and bidding documents/requests for proposals, organizing the bidding/selection/evaluation process, signing and managing contracts, and complying with all domestic and Bank review procedures. Although the PMO is a newly established office for the proposed Project with no previous Bank procurement experience, it has a designated full-time procurement officer with previous procurement experience of projects from international organizations (ADB and UN agencies). In addition, the Climate Change Department of NDRC undertook several projects financed by the GEF and administered by the Bank, and will provide guidance and leadership for carrying out the procurement activities for the proposed Project.

60. The procurement capacity assessment concluded that the PMO had adequate capacity to carry out procurement activities for the proposed Project. The project will finance a large number of small value consulting services assignments and a key challenge will be managing the selection processes for these contracts and contract monitoring and supervision to ensure that deliverables from the assignments are of high quality. Measures to further strengthen the PMO's procurement capacity and mitigate potential procurement risks were agreed and will be implemented during project implementation (see details in Annex 3). All procurement activities were documented in a Procurement Plan, which was reviewed and cleared by the Bank at Appraisal.

E. Social (including safeguards)

Not applicable.

F. Environment (including safeguards)

61. It is a category C project since no adverse environmental impacts are foreseen from project activities. Although OP4.01 (Environmental Assessment) applies as per Bank practice, no further environmental safeguard action is required.

G. Other Safeguards Policies triggered (if required)

Not applicable.

Annex 1: Results Framework and Monitoring

Project Development Objective (PDO): The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and adopt corresponding global best practices.								
PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Indicator One: Technology assessments a. Technology assessments completed. b. Stakeholder demand for and use of the completed technology assessments	<input type="checkbox"/>	- Reports	0	2	10	20	Annual	PMO
		- Stakeholder survey findings and ratings		- Stakeholder survey confirms stakeholder demand for selected mitigation, adaptation and provincial TNA reports	- Stakeholder survey confirms demand for and evaluates the use of the completed 10 technology assessments that analyze up to 25 key technologies.	- Stakeholder survey evaluates the use of the completed 20 technology assessments that analyze up to 50 key technologies.	Annual	PMO
Indicator Two: Capacity-building support to climate technology assessment centers and networks. a. Capacity building activities completed. b. Stakeholder demand for and use of network functions provided by the project-supported centers and networks, including of future pilot technology transfer programs.	<input type="checkbox"/>	- Reports		- 7 capacity building plans completed for the climate technology centers/ networks identified for project support (1 national, 2 sectoral, and 4 provincial)	- 7 capacity building plans implemented at least 80% according to plan (with Bank-approved variations)	- 7 capacity building plans implemented at least 80% according to plan (with Bank-approved variations)	Annual	PMO
		- Stakeholder survey findings and ratings		- Stakeholder survey identifies the stakeholder demand for TNA-related functions (e.g., databases, case studies, outreach) to be provided by project-supported centers/ networks, and preferred means to fulfill those functions.	- Stakeholder survey confirms demand for and evaluates the fulfillment of TNA-related functions provided by project-supported centers/ networks	- Stakeholder survey confirms demand for and evaluates the fulfillment of TNA-related functions provided by project-supported centers/ networks, including demand for implementing future pilot technology transfer programs.	Annual	PMO

Project Development Objective (PDO): The proposed project development objective is to support China's efforts to assess climate mitigation and adaptation technology needs and adopt corresponding global best practices.								
PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Indicator Three: Measurable financial and economic benefits of accelerating technology transfer through small grant support to companies. Evaluation of impacts and lessons learned related to technology transfer, diffusion, and scale-up.	<input type="checkbox"/>	- Evaluation of results against established criteria	0			1	One-time evaluation	PMO
Indicator Four: : Lifetime direct GHG emissions avoided		Tonnes CO ₂ eq				500,000		PMO

Intermediate Results

	Core	Unit of Measure	Baseline	Cumulative Target Values**			Frequency	Responsibility for Data Collection
				June 2013	June 2014	June 2015		
Intermediate Indicator One: Production of 3 Synthesis Reports (1 for mitigation, 1 for adaptation, and 1 for province), collating and disseminating the results from the individual sector technology assessments.	<input type="checkbox"/>	Reports				Draft Final and Final Reports	Annual	PMO
Intermediate Indicator Two: Development of a database which houses information on priority technologies collected at the sector and provincial level. The database will be a national virtual data hub for facilitating the transfer of and investment in needed climate technologies for China.	<input type="checkbox"/>	Database		Design and construction.	Populate with the data from the sector-level assessments.	Database established.	Annual	PMO
Intermediate Indicator Three: Organization of workshops for dissemination and evaluation.	<input type="checkbox"/>	Workshops		One workshop (kick-off)	Two workshops	Four workshops (including close)	Annual	PMO
Intermediate Indicator Four: Competitively selected "Technology improvement grants" made.	<input type="checkbox"/>	Grants		4-6	8-12		Annual	PMO

Annex 2: Detailed Project Description

1. The China TNA will include five separate project components. These are described below, along with the activities to be undertaken under each and their respective budget amounts.

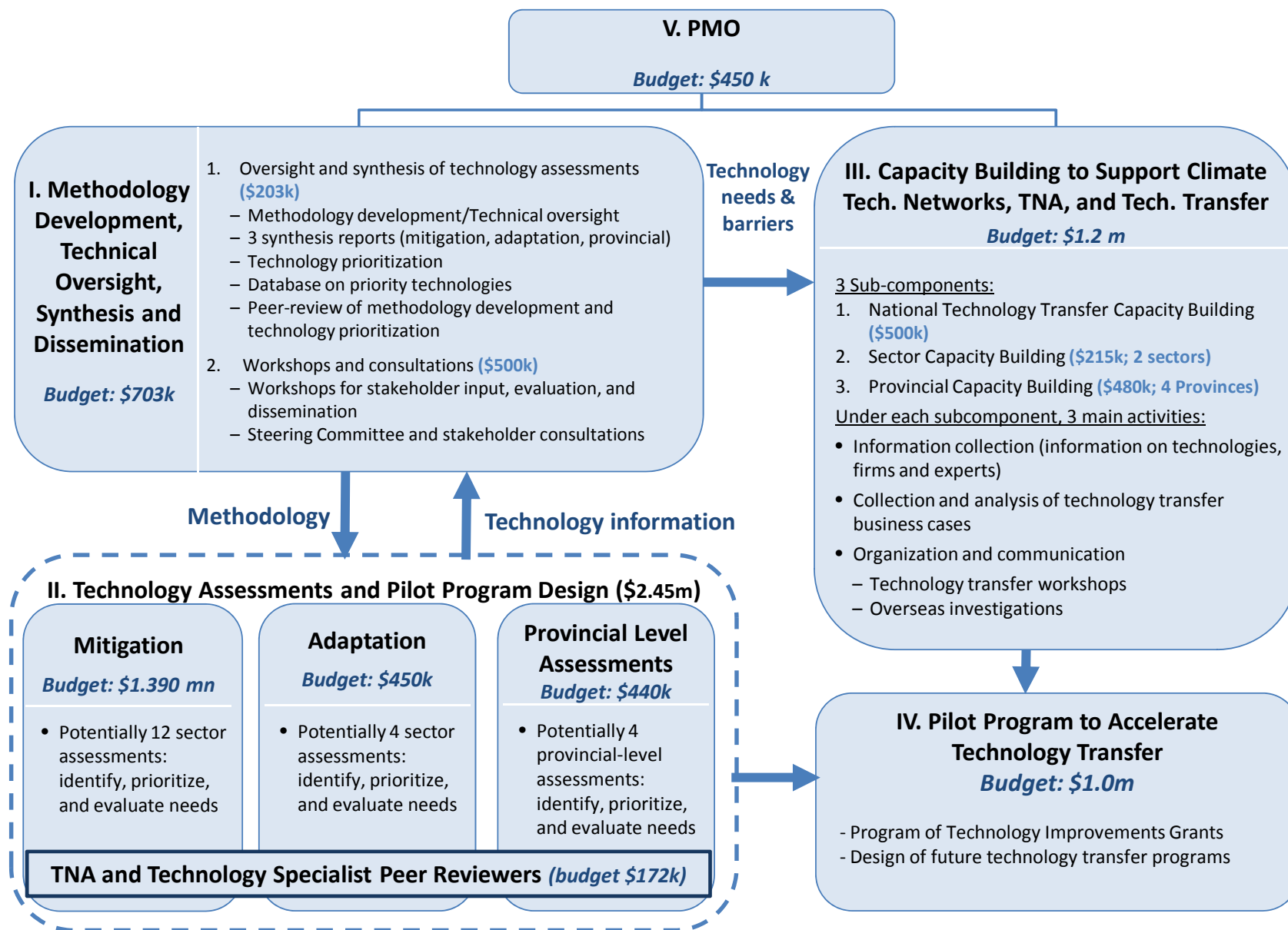
Component 1: Methodology Development, Technical Oversight, Synthesis and Dissemination (US\$703,000; GEF: US\$593,000). This component will provide technical oversight and results synthesis of the technology assessments (potentially 16 at the sector-level, including 12 for mitigation and 4 for adaptation; and 4 at the provincial-level). It will ensure a consistency of approach in application of the methodologies while still accounting for the differences in specifics of each sector. It will also act to gather results from each sector-level assessment in order that they may be presented in a comparable fashion. An important component of this task will be peer review of the sector level results. This component will also provide an outlet for dissemination through a series of workshops coordinating the steering committee and other stakeholders. There are three specific subcomponents, as follows:

2. **Subcomponent 1.1: Methodology development, oversight and synthesis of technology assessments (US\$203,000; GEF: US\$193,000).** Three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts will be recruited as part of the Project Technical Committee to:

- attend the workshops (one kick-off, two intermediate, and one final) organized by the Project Technical Committee for stakeholder input, methodology development, evaluation, and dissemination.
- supervise the application of the technology assessment methodologies in each of the sectors and provinces selected, ensuring that the methodologies are properly applied to the specifics of each sector and province.
- provide guidance to the consultant at the different stages of the sector-level assessments (in particular for the gaps and barriers analysis) on a ‘as needed’ basis.
- for the sector assessments: gather all the results, including:
 - information on the prioritized technologies.
 - results from gaps analysis to understand relative levels of global and Chinese best practice for prioritized technologies.
 - barriers impeding timely and widespread deployment of global best practice for prioritized technologies.
- based on this information, prepare three final synthesis reports (one each for mitigation adaptation, and provincial assessments), collating and disseminating the results from the individual sector technology assessments. These reports will also include a discussion on the economic implications of the adoption of the priority climate technologies, to facilitate decision making. Finally, the synthesis reports will include an annex with possible suggestions for future revisions to the “Handbook for Conducting Technology Needs Assessment for Climate Change” (UNDP, UNFCCC, UN, 2009).

In addition, two national experts will be recruited:

China Technology Needs Assessment (TNA) Schematic - Components with Budget



- one to assist on the work of selecting mitigation technology priorities to analyze in depth within the selected mitigation sectors.
- one for the information system: to design, collect information, create, and maintain a national-level database on priority technologies. The database will serve as a national virtual data hub accessible to the public, and in support of other technology centers within China and beyond.

3. Subcomponent 1.2: Workshops and consultations (US\$500,000; GEF: US\$400,000).

This subcomponent will provide means by which the project can (i) gather input to guide project execution, and (ii) disseminate results. It will include:

- Seven workshops for stakeholder input, evaluation, and dissemination (US\$420,000; GEF: US\$370,000): one kick-off, three interim workshops, and three project concluding workshops (mitigation, adaptation, and provincial networks). These workshops will provide a venue for the larger stakeholder community (including national agencies, industry associations, and international / national experts) to interact with the project. In particular, the first workshop will gather input from the different stakeholders to finalize the project approach and guide project execution.
- Project Steering Committee and stakeholder consultations (US\$80,000; GEF: US\$30,000): in order to provide overall leadership, guidance, and institutional coordination for project implementation, a Project Steering Committee will be established by NDRC and chaired by the Director General of the NDRC Climate Change Department. It will consist of representatives from concerned government agencies (MOF, MOFCOM, MIIT, MOST, MEP, MOA, etc) and national industry associations and will meet at least once a year in Beijing and more often, upon request of the PMO, when important issues arise.

Component 2: Technology Assessments at the Sector and Provincial Levels (US\$2,452,000; GEF: US\$2,332,000)

4. This component will support the technology assessments of potentially 16 identified mitigation and adaptation sectors and 4 provinces. Within each mitigation or adaptation “sector”, there may be up to five key technologies prioritized for analysis within any one full assessment. As shown in the chart below, Subcomponents 2.1, 2.2 and 2.3 total US\$1.4m, US\$0.45m and \$0.44m, respectively.

5. The PMO will award contracts competitively via 17 Calls for Proposals (potentially 16 contracts for the 16 sector assessments and one contract for the four provincial assessments), and the selected consultants will propose assessment methodologies. The peer-review and quality assurance mechanism is presented above in subcomponents 1.1 (for general oversight of the methodology) and subcomponent 2.4 (for specific peer review of the technologies under review).

6. The assessments will cover the following steps:

- Technology identification:
 - Overview of climate technologies in the sector / province in China and identification of a shortlist of key climate technologies for each sector / province.

- Collection, analysis, and summary of the current performance (environmental performance, operating and cost parameters, etc) of these shortlisted technologies.

Subcomponent 2.1 Mitigation (US\$1,390,000; GEF: US\$1,330,000)	Subcomponent 2.2 Adaptation (US\$450,000; GEF: US\$430,000)	Subcomponent 2.3 Provincial-Level Assessments (US\$440,000; GEF: US\$400,000)
1. Coal mining and oil & gas exploration ⁸ 2. Thermal Power 3. Renewable energy 4. Iron & Steel 5. Building materials manf. 6. Chemical industry 7. Nonferrous metallurgy 8. Transportation 9. Residential & commercial buildings 10. Agriculture, forestry, and land use 11. Carbon capture and sequestration (CCS) 12. Waste management	1. Agriculture, forests and ecosystems 2. Water resources 3. Urban 4. Disaster forecast and weather monitoring	1. Guangdong 2. Liaoning 3. Jiangxi 4. Shaanxi

b. Technology gaps:

- Identification of the corresponding global best practice technologies.
- In the case of a mitigation technology, estimation of GHG emission reduction potential if the corresponding global best practice technology is introduced in China.
- Identification and analysis of gaps between Chinese best practice and global best practice for the identified technologies.

c. Barriers to technology transfer and deployment:

- Identification and analysis of barriers impeding transfer and timely deployment of identified global best practice technologies in China (with presentation of specific cases of technology development and transfer).

d. Submission of all data and reports for the compilation of the database and the preparation of the synthesis reports.

7. In the case of mitigation technologies, the client will develop a list of priority technologies for China, based on a solid understanding of the current use of key technologies for climate change mitigation in China, the status of domestic development of new technologies, international best practice (including energy efficiency bench-marking), and gaps and barriers for international technology transfer. For each of the selected mitigation sectors, several (one to five) key technologies will be targeted for in-depth assessment, and the selection of specific technologies for assessment will be determined by the Project Technical Committee and the PMO after the kick-off workshop.

⁸ The World Bank Operational Guidance on Coal Screening Criteria does not apply to this case, because the scope of activities of the proposed project falls outside the scope covered by the Operational Guidance (assessment provided by the Energy Anchor – available in the project files).

8. In the case of adaptation technologies, it was agreed that only case studies would be carried out for certain technologies in the four selected adaptation sectors, with no formal comparison (or priority setting) between different technologies, and without national-level aggregation except for a couple of technologies in the agricultural sector where such an exercise is feasible. The case studies would each target one adaptation sector in one or two regions and identify potential technology needs based on projection of potential climate change impacts in China. Both domestic and international practices will be reviewed and compared, and policy recommendations will be developed for both domestic technology innovation and international technology transfer. The Project Technical Committee and the PMO will decide on the depth and the breadth of each case study. The case studies will serve as initial investigations of a long-term endeavor in climate adaptation in China.

9. Finally, in the case of provincial assessments – four provinces, Guangdong, Liaoning, Jiangxi, and Shaanxi -- were selected for pilot studies. The assessments will provide guidance to those provinces for promoting advanced climate change technologies. At least five key technologies will be assessed in each province. The following criteria were considered for the selection of the provinces:

- inclusion of provinces that are both national low-carbon “pilot” provinces (Guangdong, Liaoning, and Shaanxi) and non-pilot provinces (Jiangxi), as already defined by NDRC under the 12th Five Year Plan;
- geographical distribution: inclusion of eastern provinces (Guangdong, Liaoning), central provinces (Jiangxi), and western provinces (Shaanxi);
- provinces with different levels of economic development;
- provinces with different levels of energy production and consumption;
- provinces with different climate change impacts, such as significant agricultural impacts (Jiangxi); coastal zones (Guangdong and Liaoning); desertification: (Shaanxi); and flood / drought and other extreme weather events (Jiangxi).

10. **Subcomponent 2.4: Peer-review of technology assessments (US\$172,000; GEF: US\$172,000).** This peer review function will span the full TNA process, from methodology development, to report preparation, to final review. The body of peer reviewers asked to ensure the technical quality and objectivity of the assessments will include three groups: (a) 17 international experts (16 for the sector-level assessments, and one for the provincial level assessments) involved throughout the cycle for each of the assessment reports; (b) 16 national experts who will also be involved throughout the cycle for each of the assessment reports; and (c) a third pool of technology specialists who will be recruited as specialist peer-reviewers on an as-needed basis for complex topics. The basic functions of this pool of peer review are to:

- review and evaluate the proposed detailed methodology for each sector/provincial-level assessment received by the candidates (cf. the process of the call for proposals in Section VI B – Technical Design).
- once the candidate is selected, if needed, provide inputs for the finalization of the methodology.
- review the outputs produced by the consultant and provide comments; in particular review results from the individual sectoral and provincial assessments (at the draft final stage).

11. To ensure the quality of the peer review process, World Bank procurement procedures will ensure that the recruitment of those experts is transparent and that their qualifications meet Bank requirements. The contracts for all peer reviewers will follow standard Bank procurement procedures for Individual Consultants based on TORs agreed with the Bank. It is furthermore agreed that if the World Bank's own review team has reservations over the final drafts produced under this project, then its comments may be included in the final published reports.

Component 3: Capacity Building to support Climate Technology Networks; (US\$1,195,000; GEF: US\$975,000)

12. This component will include capacity building activities to support one national center, two sectoral centers, and four provincial networks with their own climate technology databases and personnel to serve as knowledge centers or networks in their respective areas. The provinces selected to be part of the project have committed to the establishment of such centers. This component will create a series of technology databases available to all project stakeholders; disseminate indicators based on data and trends in the database; and support capacity building activities to understand technology transfer mechanisms and the barriers to timely and widespread deployment of global best practice options. The purpose of the capacity-building is three-fold: first, to improve the capacity of the TNA centers themselves in order to better understand and meet the demand for high-quality TNAs; second, to improve the capacity of TNA stakeholders to use and network around TNA findings; and third, train professional experts to independently carry out technology needs assessment. There are three subcomponents.

13. **Subcomponent 3.1: National Technology Transfer Capacity Building: (US\$500,000; GEF: US\$400,000).** This subcomponent will provide capacity building at the national level to support the technology assessment process, understand barriers in efficient technology transfer, and learn from domestic and international experience. The main counterparts will be the NDRC Climate Change Department and the National Strategic Research and International Cooperation Center for Climate Change, a new institute affiliated with the NDRC (see paragraph 52). More precisely, this subcomponent will include the following activities:

- Information collection (information on technologies, firms and experts):
 - Design and management of a national climate technology database and network platform
 - Information collection, analysis, and dissemination
- Collection and analysis of technology transfer business cases
 - Identification and collection of both successful and unsuccessful experiences (business cases) of domestic enterprises with technology transfer
- Organization and communication
 - Organization of workshops on technology transfer mechanisms
 - Organization of overseas investigations.

14. **Subcomponent 3.2: Sector Capacity Building (US\$215,000; GEF: US\$175,000).** This subcomponent will support two sectoral climate technology centers, one each in the power and building sub-sectors. These two sectors were chosen since, combined, they account for 71% of China's energy-related carbon emissions: power accounts for 40% and buildings for 31%. China constructs approximately 2 billion m² of new buildings each year, and this scale of construction

is expected to continue for another 20-30 years. China's power sector has an emissions intensity that in 2009 was 46% higher than the world average. The world will not achieve its climate change targets without these two sectors improving their future emissions intensities.

15. The counterparts for this sub-component will be existing technology centers of excellence, most likely in government institutes, universities or industry associations, which can confirm financial sustainability beyond the period of the project. The capacity building activities will include:

- Information collection (information on technologies, firms and experts):
 - Review of technology status and needs for each sector
 - Foreign technology scanning to find state-of-the-art meeting needs
 - Design and management of sector climate technology database and network platform
 - Information collection, analysis, and dissemination
- Collection and analysis of technology transfer business cases
 - Identification and collection of both successful and unsuccessful experiences (business cases) of domestic enterprises with technology transfer
- Organization and communication
 - Organization of workshops on technology transfer mechanisms
 - Organization of overseas investigations.

16. Subcomponent 3.3: Provincial Capacity Building (US\$480,000; GEF: US\$400,000).

This subcomponent will support four provincial climate technology networks. The counterparts will be existing centers of excellence with confirmed ongoing provincial financial support. Project activities will include:

- Information collection (information on technologies, firms and experts):
 - Design and management of provincial climate technology database and network platform
 - Information collection, analysis, and dissemination
- Collection and analysis of technology transfer business cases
 - Identification and collection of both successful and unsuccessful experiences (business cases) of provincial enterprises with technology transfer
- Organization and communication
 - Participation of provincial companies in domestic and international technology transfer and training activities
 - Organization of a provincial technology transfer workshop on climate technologies.
 - Coordination and assistance to relevant provincial institutes in technology development and transfer.

17. Component 4: Pilot Program to Accelerate Technology Transfer (US\$1,900,000; GEF: US\$850,000). This component will build on the successful competitive grants scheme introduced in the World Bank and GEF-financed China Renewable Energy Scale-up Program (CRESP). Although that project was more focused on technology innovation and commercialization by Chinese companies themselves, the grants program under the TNA will be focused on accelerating technology transfer involving technology suppliers outside of China. Nevertheless, the CRESP program developed careful grant-making eligibility criteria, ranking

guidelines, application procedures, selection process, code of ethics, and grant agreements – and these materials have been adapted for use in the TNA, consistent with the TNA objective.

18. Subcomponent 4.1: “Technology Improvement Grants” (US\$1,800,000; GEF: US\$800,000). "Technology Improvement Grants" will be awarded on a competitive and cost-sharing basis to small and medium sized companies (defined as having up to 500 employees). The grants will support companies to procure outside expertise, whether Chinese or international, to accelerate the process of technology transfer, diffusion, and scale-up. The grants scheme will be focused on the four provinces targeted by the TNA, and (for now) not be limited to any predetermined industrial subsector. Examples could include: (a) companies (or a group of companies) that need technical advice or feasibility-level cost analysis as part of acquiring a new foreign emissions-reducing technology; (b) companies that need design or process engineering to integrate a new technology; (c) companies that need management or employee training to operate newly acquired technology up to international benchmarked standards; (d) companies that need process engineering support to improve or achieve international certification of priority technologies; and/or (e) groups of companies, such as commercial building managers, that would benefit from targeting training to accelerate the diffusion of energy efficient building technologies and management systems.

19. The maximum grant size would be US\$100,000, and the average would be about US\$80,000 or RMB 500,000. It is estimated that the pilot demonstration program would make 8-12 such grants over 1-2 years. The expenditures eligible under the pilot program include:

- Purchase of design and production know-how
- Purchase of a license, testing and certification
- Hardware and software directly related to product design or testing
- Other consultants and/or travel expenses related to technology transfer, diffusion, and scale-up.

All grants will be monitored to both ensure proper management and cost-sharing, and to measure results. The pilot program would be completed in the first two years of the TNA, allowing adequate time for evaluating results. The findings will help determine whether or not this model of Technology Improvement Grants merit scale-up in order to better implement the final recommendations of the TNA.

20. Subcomponent 4.2: Management of Pilot Program and Design of Future Technology Transfer Programs (US\$100,000; GEF: US\$50,000). This component will implement the pilot competitive grants scheme during the first two years, and evaluate its impact in the third project year. By combining the evaluation of the pilot program with overall TNA findings – particularly the barriers to technology transfer identified in the assessments -- this component will also design one or more technology transfer mechanisms that would accelerate the ultimate deployment of prioritized technologies in both climate mitigation and adaptation. Through the TNA process, the demand for and ownership of follow-up actions will be better understood. The NDRC Climate Change Department is committed to seeing TNA follow-up actions implemented. Furthermore, the capacity building elements of the project (Component 3) will be designed to support not only technology assessments, but also the implementation of follow-up actions.

21. Component 5: Project Management Office (US\$450,000; GEF: US\$250,000). This component will support the establishment and operation of the Project Management Office

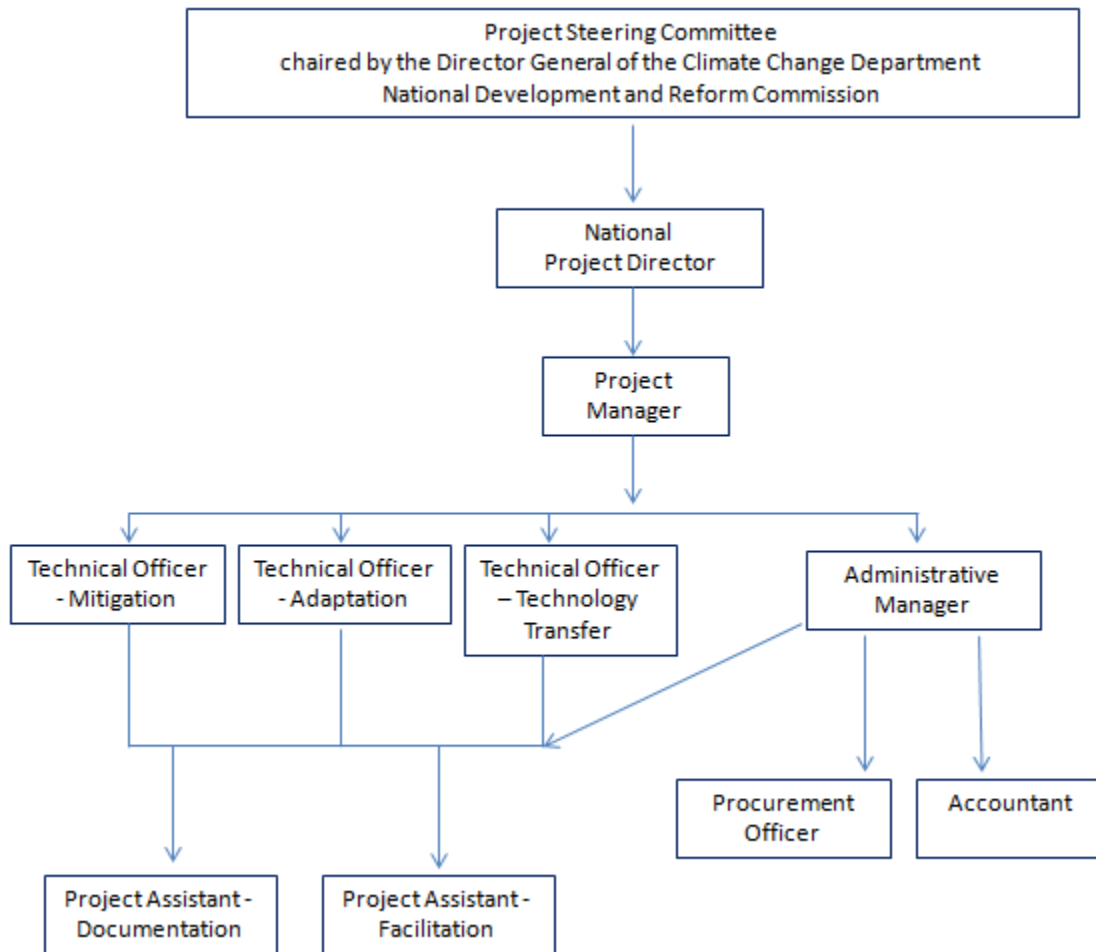
(PMO). The PMO will coordinate and guide the implementation of project activities, undertake central project management and reporting/ monitoring functions, and disseminate successful ideas and results.

Annex 3: Implementation Arrangements

1. Project Administration Mechanisms

1.1 Project Implementation Institutional Arrangements

1. The project will be implemented by NDRC, the agency chairing the National Climate Change Leading Group under the State Council and representing China at the UNFCCC.⁹ NDRC has appointed a senior official as National Project Director and hired a National Project Coordinator and has established a PMO under their leadership and coordination. The organizational chart of the PMO is shown here:



2. Legally and institutionally, the PMO resides within NDRC itself. As such, the Executive Director of the PMO is empowered directly by NDRC to sign documents on behalf of the PMO. This includes employment contracts, purchase of equipment and services and other commitments

⁹ Through its Division of International Policy and Negotiations.

and obligations. Because of a lack of space, NDRC does not host the PMO directly but will¹⁰ rent a space from a commercial building. PMO's operating expenses of up to US\$400,000 will be financed by the grant and additional expenses will be covered by NDRC as part of its contribution¹¹ to the project.

3. The PMO will be the primary coordinating entity responsible for communicating with the Bank, ensuring that implementation is consistent with all relevant Bank policies and procedures, and ensuring continuity and good coordination between the different project activities. More precisely, the PMO will be entrusted with overall project management and with coordinating the implementation of procurement, contract management, disbursement requests, fiduciary compliance, evaluation and results monitoring, and overall reporting to the Bank.

4. In order to provide overall leadership, guidance, and institutional coordination for project implementation, a Project Steering Committee will be established by NDRC and chaired by the Director General of the NDRC Climate Change Department. It will consist of representatives from both concerned government agencies, such as MOF, MOFCOM, MIIT, MOST, MEP, and MOA, and national industry associations. The Project Steering Committee will be defined and constituted prior to project negotiations, and will meet at least once a year and more often when important issues arise, upon request of the PMO.

5. In addition to the Project Steering Committee, a national TNA expert team: "the Project Technical Committee" will be established under the project (Component 1) to provide:

- guidance for the prioritization for technology needs identified based on sector and provincial-level assessments;
- coordination for the national and sectoral centers and for the provincial networks on climate technology; and
- communication with the international technology community.

6. The Project Technical Committee will be composed of:

- three international experts (one for mitigation, one for adaptation, and one for the provincial assessments) and four national experts for the oversight and synthesis of technology assessments (Subcomponent 1.1).
- representatives from the national industry associations.
- other technical experts drawn from academia or government on a 'as needed' basis.

The contracts for the seven experts are each less than US\$60,000. They will follow standard Bank procurement procedures for Individual Consultants (ICs) based on TORs agreed with the Bank. The Technical Committee will be established before the kick-off workshop.

1.2 Measures to Address Capacity Constraints

7. No major capacity constraints were identified in the course of project preparation. The PMO is staffed with a Procurement Officer and a Financial Manager / Accountant who were familiarized with Bank's Procurement and Financial Management Guidelines and will receive specific training before and during the project implementation.

¹⁰ During project preparation, the PMO is operating without a physical PMO set-up and will sign the commercial lease shortly after the Bank Board Approval (in order to save on cash flow and hedge risk on rental expense in case project preparation is delayed).

¹¹ NDRC is contributing up to US\$800,000 to the project as a mixture of in-kind and funding support.

2. Financial Management, Disbursements and Procurement

2.1 Financial Management

8. The FM capacity assessment identified the following principal risk: the project financial staffs in the PMO do not have experience with Bank financed projects.
9. Mitigation measures agreed include: a) FM training plan to be prepared and all project financial staff to be trained before and during project implementation; b) a FM Manual (FMM) will be prepared and issued which can standardize project FM procedures and provide guidance to project financial staff.
10. The FM risk, both pre and post-mitigation, has been assessed as “Moderate”.
11. **FM conditions:** Finalization of the FMM will be a condition for negotiations.
12. **Budgeting:** The annual project implementation plan will be prepared by the PMO. Budget variance analysis will be conducted on a semi-annual basis by the PMO and necessary actions will be taken to make sure that the project will be implemented as planned.
13. **Funds Flow:** The GEF grant proceeds will flow from the Bank to the project DA to be set up at and managed by MOF. MOF will be directly responsible for the management, maintenance and reconciliation of DA activities. Supporting documents required for Bank disbursements will be prepared and submitted by the PMO to MOF for review and disbursement processing.
14. **Accounting and Financial Reporting:** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: “Accounting Regulations for World Bank Financed Projects” issued in January 2000 by MOF. The standard set of project financial statements has been agreed between the Bank and MOF.
15. The PMO will be responsible for the overall project implementation, management, monitoring and coordination. Original accounting documents for project activities will be retained by the PMO. The PMO will work together with MOF to prepare the project financial statements. The unaudited semi-annual project interim financial reports (IFRs) (format in accordance with the aforementioned Circular #13 agreed with MOF) will be prepared and furnished to the Bank by the PMO no later than 45 days following each semester (the due dates will be August 15th and February 15th), in form and substance satisfactory to the Bank.
16. **Internal Control:** The related accounting policy, procedures and regulations were issued by MOF and a FMM will be prepared and issued to standardize and regularize the financial management and disbursement requirements related works.
17. **Audit:** The Audit Service Center of the China National Audit Office for Foreign Loans and Assistance Projects has been identified as auditor for the grant. Annual audit reports will be issued by the above audit center. The Bank currently accepts audit reports issued by the China National Audit Office (CNAO) or provincial/regional audit bureaus/offices for which CNAO is ultimately responsible.

18. The annual audit report of project financial statements will be due to the Bank within 6 months after the end of each calendar year. This requirement is stipulated in the grant agreement. The responsible agency and timing is summarized as follows:

Audit Report	Submitted by	Due Date
Project Financial Statements	PMO	June 30 of each calendar year

2.2 Disbursements

19. Four disbursement methods are available for the project: advance, reimbursement, direct payment and special commitment. Supporting documents required for Bank disbursement under different disbursement methods will be documented in the Disbursement Letter issued by the Bank.

20. One DA in US dollar will be opened at a commercial bank acceptable to the Bank and will be managed by MOF. The ceiling of the DA will be determined and documented in the Disbursement Letter.

21. The Bank loan would be disbursed against eligible expenditures (taxes inclusive) as in the following table:

Category	GEF Grant	
	Allocated Amount (USD)	Percentage of Expenditures to be financed
(a) Goods, consultants' services, Training, Workshops, and Study tours and Incremental Operating Costs	4,200,000	100%
(b) Sub-grant	800,000	100%
Total	5,000,000	

22. Retroactive financing will be applied for this project, commencing April 1, 2012.

23. Disbursement Mechanism for the Sub-grant: For the Pilot Program to Accelerate Technology Transfer (component 4) to be implemented by the selected pilot companies in accordance with the Sub-grants Operations Manual agreed with the Bank. The sub-grants will finance activities directly relevant to the beneficiary companies implementing the pilot proposal, including goods, technical know-how, consulting services and non-consulting services, and other necessary inputs and operating support.

24. The sub-grant will be reimbursed from Designated Account (DA) maintained by MOF to beneficiary companies against actual expenditures up to the agreed sub-grant ceiling agreed with the Bank. Under the sub-grant, payments from DA to beneficiary companies will be made with following process,

a. Signing of Sub-grant Agreement (SA): the PMO will sign a detailed sub-grant agreement (SA) with each beneficiary company, in accordance with the Sub-grants Operations Manual. The SA will specify: (1) the scope of work, implementation schedule and expected output; (2) total budget and source of financing; (3) terms of supervision, verification, final acceptance and payment.

b. Payment and Verification:

- Initial Down Payment: When requested, an initial down payment of no more than 20% of the sub-grant ceiling shall be disbursed to the beneficiary companies to enable it to carry out the activities defined in the SA. The initial payment shall be disbursed based on a request by the beneficiary company, the certification by the PMO that the SA has been signed between PMO and the beneficiary company, and a no objection issued by the Bank.
- Payment and Verification: Once the activities implemented by the beneficiary companies are completed or meet the milestone payment conditions specified in the SA, the company will request the PMO to verify the output and payment conditions. The PMO will conduct the verification by itself or through a contracted qualified third party. The PMO will certify that: (a) procurement of all goods, services required to implement the proposal have been carried out in accordance with the SA and the Bank's procurement procedure; (b) the output/deliverables by milestones have met the payment conditions; (c) the beneficiary company submits Statement of Expenditures (SOE) to report the incurred cumulative expenditures equal to or more than the sub-grant amount. The PMO or qualified third party agencies may conduct on-site supervision, as needed, as part of verifying the sub-grant output and payment conditions.

When requesting disbursements under the SA from the Bank, the Statement of Expenditures (SOEs) will be required to be submitted together with the certification from the PMO or qualified third party agencies. Other supporting documents, such as specified in the Sub-grants Operations Manual, need to be well maintained at the PMO and at the beneficiary companies. Reimbursements from the Bank will be suspended or terminated if the agreed activities are not carried out in accordance with the provisions of legal agreements and the SA agreed upon by the Bank.

2.3 Procurement

25. The procurement capacity assessment concluded that the Implementing Agency has adequate capacity to carry out procurement activities for the proposed Project. The overall risk for procurement is rated as Moderate. The project will finance a large number of small value consulting assignments and the key challenge will be to ensure that the processing of the contracts is handled efficiently and there are adequate arrangements for contract monitoring and supervision to ensure that the deliverables from the assignments are of high quality. Identifying,

preventing and mitigating conflict of interest in the selection and employment of consultants will also be a challenge. To strengthen the procurement capacity of the agency and to mitigate potential procurement risks, the following measures have been agreed:

- The PMO will send its procurement staff and officials responsible for approving procurement decisions to attend workshops on procurement in Bank financed projects and, especially in the selection and employment of consultants.
- The PMO will prepare a Procurement Management Manual (PPM), which will be reviewed by the Bank and finalized before negotiations, including Bank's requirements for selection of consultants and procurement of goods. The PPM will include sections on ethics, on conflict of interest and unfair competitive advantage.

26. The procurement for the proposed Project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants" dated January 2011; and "Guidelines: Selection and Employment of Consultants Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, and the provisions stipulated in the grant agreement.

27. **Frequency of Procurement Supervision.** In addition to prior-review supervisions carried out from the Bank office, Bank procurement supervision missions will visit the field to carry out post review of procurement actions every 12 months. The post review sampling ratio will be one out of five contracts.

28. **Procurement Plan.** The PMO has developed an acceptable Procurement Plan for project implementation following the Bank template. It is available at the PMO, and will also be available in the Project's database and in the Bank's external website during project implementation. The Procurement Plan will be updated in agreement with the Bank task team annually, or as required, to reflect actual project implementation needs and improvements in institutional capacity.

29. **Retroactive financing** is subject to the payments being made starting from the end of the mission but within 12 months of the expected signing date of the legal agreement. The amount of retroactive financing shall be less than 20% of the total grant amount.

30. **Selection and Procurement Methods and Prior Review Thresholds.** The following table indicates the selection methods and prior review thresholds for consultant selection and goods procured by the PMO under the Grant:

Selection Method and Prior Review Thresholds for
Consultants Procured by the PMO

	Selection Method	Prior Review Threshold (US\$)	Selection Method Threshold (US\$)
1.	Competitive Methods (Firms)	≥ 100,000	QCBS/ QBS; SSS (Firms); CQS may be only used for small assignment contracts (i.e. < 300,000); Individual Consultant (IC); Sole Source Selection for Individual Consultant
2.	Single Source (Firms)	All SSS	
3.	Individual Consultant	≥ 50,000; All Sole-Source Selection for IC	
4.	Other	All terms of reference for consultant contracts, regardless of contract value,	

	Selection Method	Prior Review Threshold (US\$)	Selection Method Threshold (US\$)
		will be subject to Bank prior review	

Procurement Methods and Prior Review Thresholds for
Goods Procured by the PMO

	Procurement Method	Prior Review Threshold (US\$)	Procurement Method Threshold (US\$)
1.	ICB	All ICB	For goods contracts, $\geq 1,000,000$, ICB shall be used; $< 1,000,000$, NCB may be used; $< 100,000$, shopping may be used; DC
2.	NCB	$\geq 500,000$	
3.	Shopping	NA	
4.	Direct Contracting (DC)	All DC	

3. Environmental and Social (including safeguards)

31. **Environmental Safeguards.** It is a category C project since no adverse environmental impacts are foreseen from the project activities. Although OP4.01 (Environmental Assessment) applies as per Bank practice, no further environmental safeguard action is required.

32. **Social Safeguards.** Not applicable.

4. Monitoring and Evaluation

33. Annex 1 provides a detailed description of the performance indicators to be tracked under the project, and specifies the source and schedule for data collection. The PMO will be responsible for the overall M&E system, including regular data collection to assess progress towards achieving results. It will furnish to the Bank semi-annual progress reports on project implementation by February 15 and August 15 of each year, starting with August 15, 2012. In addition, it will prepare a mid-term review report by February 15, 2014. Based on the recommendations of these reports and the Bank's reviews and comments thereon, the PMO will take actions, satisfactory to the Bank, to address any emerging issues in order to meet the targets set in the results framework.

Annex 4: Operational Risk Assessment Framework (ORAF)

CHINA: Technology Needs Assessment for Climate Change

Stage: Appraisal

ORAF Sections 2 & 3.2-F&C should be removed when the PAD is sent to the Client per the instructions below}

**OR
Board**

{For Board ORAF Sections 2 & 3.2-F&C should be removed per the instructions below}

{For Board ORAF Numbering should be removed as well }

Project Development Objective(s)	
development objective is to support China’s efforts to assess climate mitigation and adaptation technology needs and global best practices.	
1. Technology assessments	
a. Technology assessments completed.	
b. Stakeholder demand for and use of the completed technology assessments	
2. Capacity-building support to climate technology assessment centers and networks.	
a. Capacity building activities completed.	
b. Stakeholder demand for and use of network functions provided by the project-supported centers and networks, including of future pilot technology transfer programs.	
3. Measurable financial and economic benefits of accelerating technology transfer through small grant support to companies. Evaluation of impacts and lessons learned related to technology transfer, diffusion, and scale-up.	

Risks	Rating	Moderate
of guaranteeing broad stakeholder holder engagement would play a NA but the risk of not guaranteeing it e mitigation measures proposed by	Risk Management: (i) Get full support from the National Climate Change Leading Group. (ii) Surveys and investigation will be preceded by consultations to better involve the people from policy research institutes, financial institutions, enterprises, and individuals. With this first hand information, knowledge sharing can be promoted. (iii) Methodologies and procedures will be developed to implement the assessment. Quality	

	the results of the assessments.			
	Resp: Client	Stage: Imp	Due Date : 09/30/2015	Status: Not yet Due
2. Operating Environment Risks (not disclosed) Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval				
2.1. Country (description and rating are not disclosed)	Rating:	Low		
Description : (this description and rating are not disclosed) The potential fiscal risks at both local and national levels are considered low, but if they occur, they would have a significant impact on Bank operations in China. China has strong recent record of macroeconomic management. Quick, forceful response to the recent crisis mitigated the most negative immediate impacts, but at the cost of heightened future macroeconomic risks. Main pillar of the stimulus package has been massive growth of bank credits to all sectors of the economy. Rapid growth of loans raises concerns on rising non-performing loans, and feasibility of reducing credit growth to sustainable levels without excessively impacting economic activity. As any other open economy, China faces risks related to negative developments in the global economy.	Risk Management : A sound regulatory framework for public financial management is in place (budget preparation, classification, treasury management, accounting, reporting and audit). Government funds, including project counterpart, are integrated into the overall budget, within the government’s accounting system. Donor funds are outside the budgetary/accounting system but included as a separate line item reported to the National People’s Congress. Reporting and transparency of fiscal activities outside the budgetary framework is limited, particularly at local levels. Public accounts are consistently audited by the National Audit Office with results generally publicly available, except for national security or commercial secrecy items.			
	Resp: Client	Stage: Imp	Due Date : No project specific action required	Status: No project specific action required
2.2. Sector/multi-sector (description and rating are not disclosed)	Rating:	Moderate		
Description : (this description and rating are not disclosed) Developments in international or national climate change policies that shift away from advanced technology transfer, development and deployment being a key component to addressing climate change. Based on latest developments in international climate change policies, the risk is considered moderate.	Risk Management : Monitor developments in national policies on climate change and adjust accordingly; client will be well positioned to assess and respond.			
	Resp: Client	Stage: Imp	Due Date : Ongoing	Status: Ongoing
3. Implementing Agency Risks (including fiduciary)				
3.1. Capacity	Rating:	Moderate		
Description : 1) Risk that the PMO lacks adequate staffing, processes and/or systems sufficient to allow for successful achievement of the results envisaged by the project. 2) The GEF grant proceeds will not be used for the intended purposes or without due efficiency and effectiveness, such as misuse of project funds, loss of project assets, improper reporting, and insufficient funds. All of the above will	Risk Management : 1) During project preparation, the Bank team assessed the capacity of the PMO and ensured that the staffing arrangements and project management procedures are adequate. PMO capacity will be monitored by the Bank Team throughout project implementation and remedial actions recommended on an as-needed basis.			
	2) A project financial management manual including the pre-determined subsidy standard, verification procedures for the output based disbursement will be prepared by the PMO to guide their daily work. Additionally, financial management training will be provided to			

negatively impact project implementation.	provide them with the required knowledge in managing the GEF grant proceeds. And annual project audit will be conducted as external monitoring mechanism to safeguard Bank loan proceeds and project assets.			
	Resp: Bank / Client	Stage: Imp	Due Date : 06/30/2012	Status: Not yet Due
3.2. Governance	Rating:		Moderate	
Description : Risk that the PMO lacks ownership, appropriate decision making, and accountability in its management system required to achieve project outputs and outcomes. During project preparation, the Bank team ensured that the management and organization of the PMO was adequate to carry out the Project. A Project Steering Group, under the influence of NDRC, was established above the PMO to provide overall leadership, policy guidance and coordination for the purpose of implementing the Project.	Risk Management : The Bank Team will closely monitor the ownership and performance of the PMO during project implementation and recommend remedial actions on an as-needed basis.			
	Resp: Bank	Stage: Imp	Due Date : 06/30/2012	Status: Not yet Due
Fraud & Corruption (sub-category of Governance risk) Remove Risk Description and Rating when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval Risk management measures below to be merged with those in 3.2 above.	Rating:	Moderate		
Description : (this description and rating are not disclosed) The main risk is that the PMO will award contracts on a non competitive basis.	Risk Management : Each contract will be procured under World Bank Procurement Guidelines and will be subject to prior or post review depending on country level thresholds. Furthermore, financial management and technical progress will be routinely supervised during implementation.			
	Resp: Client / Bank	Stage: Imp	Due Date : Ongoing	Status: Ongoing
4. Project Risks				
4.1. Design	Rating:	Moderate		
Description : Risk that the design of the project does not address the “Reputational Risk”. During preparation, the team has furthered the design with the client to address the “Reputational Risk”. Peer-review and quality assurance processes are proposed to be put in place with several national and international experts for: -the elaboration of the detailed methodology at the sector/ provincial-level; -the review of individual assessment results; and -the final synthesis exercise.	Risk Management : World Bank Procurement Procedures will ensure that the recruitment of those experts is transparent and that their qualifications meet Bank’s requirements. This peer-review process will be regularly supervised during implementation by the Bank team.			
	Resp: Client / Bank	Stage: Imp	Due Date : Ongoing	Status: Ongoing
4.2. Social & Environmental	Rating: Low			

Description : Risk that the World Bank Environmental/Social Safeguards Mitigation Measures will not be followed properly during project implementation. The project specific risk is assessed as low since it is a Category C.	Risk Management : Although OP4.01 (Environmental Assessment) applies as per Bank practice, no further environmental safeguard action is required.			
	Resp: Client	Stage: Imp	Due Date : Ongoing	Status: Ongoing
4.3. Program & Donor	Rating:	N/A		
Description : N/A	Risk Management :			
	Resp:	Stage:	Due Date :	Status:
4.4. Delivery Monitoring & Sustainability	Rating:	Moderate		
Description : Quality of the work does not meet Bank requirements. For the sector and provincial-level assessments, a quality and peer-review process is proposed to be put in place with several national and international experts for: -the elaboration of the detailed methodology at the sector/provincial-level; -the review of individual assessment results; and -the final synthesis exercise.	Risk Management : World Bank Procurement Procedures will ensure that the recruitment of those experts is transparent and that their qualifications meet Bank’s requirements. This peer-review process will be regularly supervised during implementation by the Bank team. In addition, the Bank will closely supervise the implementation of the capacity building component and provide any technical assistance needed to ensure satisfactory quality.			
	Resp: Client / Bank	Stage: Imp	Due Date : Ongoing	Status: Ongoing
4.5. Other	Rating: High			
Description : Reputational Risks Risk that the World Bank is perceived as “taking sides” in international climate change negotiations thus undermining its neutrality in this area. This risk was assessed as “high” during the PCN Review Meeting.	Risk Management : Approach activities of project components objectively to produce factual analyses of: -the relevant climate technologies; -the gaps with global best practice climate technologies; and -the barriers preventing timely application and deployment of global best practice climate technologies in China.			
	Resp: Bank	Stage: Imp	Due Date : Ongoing	Status: Ongoing
4.6. Other	Rating:			
Description :	Risk Management :			
	Resp:	Stage:	Due Date :	Status:
Nondisclosable Information for Management Attention (Optional) Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval				
Comments:				
5. Project Team Proposed Rating Before Review Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval				
5.1. Preparation Risk Rating: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval		5.2 Implementation Risk Rating: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval		
High		High		

<p>Comments: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p> <p>Risk that the World Bank is perceived as “taking sides” in international climate change negotiations thus undermining its neutrality in this area. This risk was assessed as “high” during the PCN Review Meeting, therefore, during preparation; the team reinforced the project design to address this risk. But this risk remains “high” during implementation.</p>	<p>Comments: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>
<p>6. Risk Team Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>	
<p>6.1. Preparation Risk Rating Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>	<p>6.2 Implementation Risk Rating Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>
<p>Comments: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>	<p>Comments: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p>
<p>7. Overall Risk Following Review</p>	
<p>7.1. Preparation Risk Rating: Section to be removed when the PAD is (i) sent to the client for negotiation or (ii) sent to the Board for approval</p> <p>Substantial</p>	<p>7.2 Implementation Risk Rating:</p> <p>Substantial</p>
<p>Comments: The overall risk of the project has been rated “substantial” by the World Bank, primarily to reflect that developments in international climate change negotiations could influence its ability to assist the Government of China in this project without creating the appearance of “taking sides” in those negotiations, thus undermining its neutrality in this matter. This rating is also based on the fact that the project is the first Technology Needs Assessment (TNA) done by the World Bank, and therefore deserves attention from its management.</p> <p>The main risk associated with the project is “reputational”, i.e., “is the quality of the TNA outputs of the quality to be expected from a World Bank-implemented project?” Given that this is a GEF-financed project implemented by a counterpart agency, and not a piece of analytical work using World Bank funds, a four point risk management strategy was developed by the World Bank Team during</p>	<p>Comments: A peer-review and quality assurance process will be put in place during implementation with several national and international experts, as follows:</p> <ul style="list-style-type: none"> • A number of national and international experts will be recruited to: (a) supervise the application of the technology assessment methodologies; (b) provide guidance to the consultant at the different stages of the sector-level assessments on a ‘as needed’ basis; and (c) gather the results of the sector assessments in a consistent way and prepare two final synthesis reports of good quality, that are satisfactory to the World Bank (one for mitigation and one for adaptation technologies). • Several other national and international experts will be recruited as

<p>preparation: (i) it has clearly defined when, exactly, it would review draft documents; (ii) it has ensured that the project peer review process(as mentioned below) would be adequately funded; (iii) it has ensured that the World Bank would have the right to include its comments on a report in case it would disagree with the main text; and (d) it has ensured that all final documents would be public with high visibility, to reduce the chances of partial releases. Finally, it is clearly in NDRC's interest to conduct the assessments in the best possible manner, to show a leadership role in international fora.</p>	<p>peer-reviewers for: (a) the peer-review of the elaboration of the detailed methodology at the sector and provincial level, and (b) the review of individual appraisal results.</p> <p>World Bank procurement procedures will ensure that the recruitment of those experts is transparent and that their qualifications meet World Bank's requirements. The key products, including the consultant reports as well as the comments received from those reviewers will be made available to the World Bank Team. This peer-review and quality assurance process will be supervised during implementation. There will be several specialists / consultants on the World Bank Team (Environmental / Energy / and Climate Change Specialists) to review these outputs and provide comments during implementation.</p>
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Note : Include on average no more than 3 Risk Management Measures per Risk Category

Annex 5: Implementation Support Plan

1. Strategy and Approach for the Implementation Support

1. The strategy for implementation support has been developed based on the nature and risk profile of the proposed project. It will aim at making implementation support to the client more flexible and efficient, and will focus on the implementation of risk mitigation measures defined in the ORAF.

- **Procurement:** Most contracts will be to procure services of less than US\$300,000, therefore procurement will be relatively straightforward. However, the Bank team will provide implementation support by: (a) providing training to the PMO's Procurement Officer and other relevant PMO staff who might be involved in the procurement process (like the two Technical Officers and the Administrative Assistant); (b) reviewing procurement documents and providing timely feedback to the PMO; (c) providing detailed guidance on Bank's procurement guidelines to the PMO; and (d) monitoring procurement progress against the detailed procurement plan developed by the PMO.
- **Financial management:** The supervision strategy for this project is based on its FM risk rating, which will be evaluated on regular basis by the financial management staff. The financial management staff uses periodic site visits, desk reviews, and correspondence with borrowers to provide technical support to and work closely with borrowers to resolve problems as they arise, and to monitor the continuing adequacy of FM arrangements including accounting, auditing, budgeting, financial reporting, internal control and funds flow. Financial management staff also follows up on action plans agreed during project appraisal and negotiations, as well as on observations derived from reviews of audit reports, management letters and IFRs.

2. Implementation Support Plan

2. The Task Team will include a substantial Beijing-based staff, including an Energy Specialist, and financial management and procurement specialists. The Task Team Leader will maintain regular contact with key officials of the PMO and the Climate Technology Group to exchange views on strategic issues of project implementation and address any critical issues. Staffing and resources will be reviewed from time to time as is standard Bank practice.

3. The following table indicates the focus areas and skill needs required to provide implementation support during the initial and subsequent periods of the project:

Focus	Staff Position and Resource Estimate (in staff weeks)				
		1 st Year (partial)	2 nd Year	3 rd Year	4 th Year (partial)
Team leadership.	Task Team Leader.	2	10	8	4
Technical support.	Environment/Energy/Climate Change Specialists (3 different staff).	3	12	9	3
Project implementation support: project documents and missions.	Operations Officer.	2	5	3	2
Procurement: (a) review of procurement documents; and (b) delivery of training.	Procurement Specialist.	2	4	3	1
FM training and supervision.	FM Specialist.	0.5	1	1	0.5

4. The travel requirements are summarized below:

Skills Needed	Number of Trips (per Fiscal Year)	Comments
Task Team Leader.	One or two (to provincial networks).	Country office based.
Environment/Energy/ Climate Change Specialists (3 different staff).	One or two (to provincial networks).	International staff for technical inputs.
Operations Officer.	One or two (to provincial networks).	Either country office based or Washington based.
Procurement Specialist.	Fields trips as required.	Country office based.
FM Specialist.	Fields trips as required.	Country office based.

Annex 6: Team Composition

World Bank staff and consultants who worked on the project:

Name	Title	Unit
Carter J. Brandon	Lead Environmental Specialist (TTL from November 1, 2011)	EASCS
Hua Wang	Senior Environmental Economist (TTL from March, 2011 through October, 2011)	DECEE
Jonathan Coony	Senior Energy Specialist (First TTL)	ETWES
Gailius J. Draugelis	Lead Energy Specialist	EASCS
Frederic Asseline	Senior Energy Specialist	EASCS
Yanqin Song	Energy Specialist	EASCS
Emmanuel Py	Infrastructure Specialist	EASIN
Jean-Louis Racine	Private Sector Development Spec.	ECSF2
Xin Ren	Environmental Specialist	EASCS
Guoping Yu	Procurement Specialist	EAPPR
Fang Zhang	Financial Management Specialist	EAPFM
Alan Miller	Principal Project Officer (Peer Reviewer)	CBGSM
Richard Hosier	Senior Climate Change Specialist (Peer Reviewer)	ENVGC
Cristina Hernandez	Program Assistant	EASIN
Zijing Niu	Team Assistant	EASCS

Annex 7: Incremental Cost Analysis

Not applicable

Annex 8: STAP Roster Review