Energy Partnership Programme between China and Denmark Programme Document

Draft April 5 2017

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AMG	Aid Management Guidelines (DANIDA)
CEM	Clean Energy Ministerial
CIFF	Children's Investment Fund Foundation
CNREC	China National Renewable Energy Centre
DANIDA	Danish International Development Assistance
DE	Development Engagement
DEA	Danish Energy Agency
DED	Development Engagement Document
DEPP	Danish Energy Partnership Programme
ECC	Energy Conservation Centre
RDE	Royal Danish Embassy
EE	Energy Efficiency
ERI	Energy Research Institute
FYP	Five Year Plan
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IEA	International Energy Agency
INDC	Intended Nationally Determined Contributions
IRENA	The International Renewable Energy Agency
LTA	Long-Term Adviser
MEUC	Ministry of Energy Utilities and Climate
MFA	(Danish) Ministry of Foreign Affairs
NDRC	National Development and Reform Commission
NEA	National Energy Administration
NECC	National Energy Conservation Centre
NREL	National Renewable Energy Laboratory
RE	Renewable Energy
TA	Technical Assistance

1. INTRODUCTION AND NATIONAL CONTEXT

Over the past two-and-a-half decades, China has undergone a process of rapid industrialisation and urbanisation. Average per-capita income has grown more than seven times and energy demand is almost 3.5 times higher than it was in 1990. More than 90% of the increase in energy use has been met by fossil fuels with high costs for the environment. Levels of air pollution are high resulting in urgent social and public health challenges, accounting for around 1 million premature deaths per year. China is the world´s greatest energy consumer and greenhouse gas (GHG) emitter. In 2014, China consumed twice as much coal as USA, EU, Russia and Japan combined, and China's total GHG emissions are now larger than any other country, overtaking those of the USA in 2006, and its emissions per head of population overtook those of the EU in 2014.

The energy economy of China is at a critical juncture with increased pressure to combat local air pollution, continue to support economic growth, and address climate issues through a carbon-intensity reduction target. Efforts to combat air pollution are complemented by policies to reduce fossil fuel use in the energy sector, supporting China's ongoing transition towards a less energy-intensive model for economic growth.

China ratified the Paris Agreement on 3 September 2016. There are four components in the National NDC: 1) a peak in GHG emissions around 2030; 2) a reduction of carbon intensity by 60-65 % in 2030 compared to 2005 3) an increase in the share of non-fossil fuels in primary energy consumption to 20%[1] and 4) an increase in the forest stock volume by 4.5 billion m3 compared to 2005.

Renewable energy is one of the key areas that will enable China to achieve the targets in the NDC and an important emerging industry for China. Installed capacity of grid-connected wind power has reached 129 GW with annual power generation 185 TWh, accounting for 3.3% of total power consumption throughout China, becoming the third largest power source nationwide. China has evolved into the largest market in the world in terms of newly-added photovoltaic (PV) capacity, exceeding a total of 43 GW by the end of 2015. These successes are due to government policies and targets, including those in the 12th Five-Year-Plan (FYP) that have been formulated in accordance with data and analysis from CNREC supported by the previous cooperation with DEA.

The Chinese government introduced the *Renewable Energy Law* in 2006 and imposed targets in the subsequent national planning documents. The target set in the recently completed 12th FYP was exceeded when the non-fossil energy share reached 12% in 2015. The 13th FYP places an absolute limit on gross energy consumption by 2020 and China aims for 15% to be supplied by non-fossil sources. In this context the selected engagements are highly relevant, targeting respectively Renewable Energy and Energy Efficiency, China's two top energy priorities.

For a considerable time, China has attached great importance to addressing climate change, making it a significant national strategy for China's social and economic development. Likewise, promoting a green and low-carbon development is an important component of China's development pathway. According to the 13th FYP, China will accelerate the transformation of energy production and consumption and continue to restructure its economy, optimize the energy mix, improve energy efficiency and increase its forest carbon sinks, with a view to efficiently mitigating GHG emissions.

[1] The current share of non-fossil fuels in the primary energy consumption was 12% in 2015 and the goal in the 13th FYP is 15% in 2020.

China, however, is facing huge challenges with regards to integration of variable renewable energy (Wind and Solar) in the power system and reducing coal consumption in district heating.

Looking ahead, China has defined as its strategic goals to complete the development of a moderately prosperous society by 2020 and to create a prosperous, strong, democratic, culturally developed and harmonious modern socialist country by the middle of this century. China is making efforts to embark on a sustainable development path that is in line with its national circumstances and leads to multiple wins in terms of economic development, social progress and combating climate change. These priorities and China's policies and plans to realise them, as learned from the previous cooperation and as assessed in the screening notes (see programme annexes), are in accordance with Danish foreign policy, human rights, gender equality, and the application of the human rights-based approach.

Programme partners and other stakeholders
The Danish energy programme with China is a partnership with China National Renewable Energy Centre (CNREC) and China National Energy Efficiency Centre (NECC).

The ongoing cooperation with CNREC began in January 2015, but their partnership with DEA goes back to 2012, when the Centre was established under the Sino-Danish Renewable Energy Development programme (RED) which expired in 2014. Since that time CNREC has emerged as a key player in the development of policy and setting of targets for RE. CNREC is a hybrid organisation. It is part of the Energy Research Institute (ERI), under the National Development and Reform Commission (NRDC) with one third of its staff seconded from the ERI and the remainder hired directly. It has a dual function. Operating as an independent think tank it provides research-based information services on to stakeholders in the field of RE policy research, and as a government agency it provides consolidated analysis and advice in support of national and regional governmental decision making in the renewable energy sectors. In particular CNREC provides the NEA with research results for energy planning and energy administration regarding the decisions on the future targets for renewable energy and for coal reduction and the NDRC with policy advice and the ambitious RE goals and targets that now form part of the 13th FYP. For future cooperation NEA has specifically highlighted offshore wind power and RE for heating as priority areas.

The NRDC instructed NECC to work with DEA on this project. NECC are responsible for EE in China, they provide policy advice on the issue directly to the NRDC. They regulate the most energy intensive industries in China, set targets for energy intensity and monitor progress towards those targets.

The current co-operation between DEA and NECC has been comparatively small scale with the point of entry being the international division of the NECC and activities centred around awareness-raising on potential opportunities in EE, the capabilities and technologies of Danish companies and information exchange. Work also started on the identification of pilot projects which could be used to demonstrate the use of excess heat from industry for district heating. NECC has expressed the desire to cooperate with DEA on Energy management systems, and policy, regulatory instruments, standards, monitoring systems, software, and pilot projects in companies. This would require a considerable scaling-up of the ongoing cooperation, including a half time long-term advisor.

NECC has broad influence on energy conservation in China because it is affiliated to NDRC's, Department of Resources Conservation & Environmental Protection directly. So NECC has priority to get national information and data, and also has the power to reflect their research

result in the policy suggestions to policy makers. Besides that, there are 45 provincial level ECC, 300 municipal level ECC and more than 1700 county level ECC. This network makes NECC have a comprehensive understanding of the difference in the whole country, and organize specific trainings and workshops to different technical demanding from different regions.

For further description of these institutions please refer to Annex A.

As part of the long-standing cooperation with China, DEA helped establish CNREC in 2012, and has supported its development into the leading think-tank globally regarding renewable energy in China. The current programme builds on that cooperation and is essentially linked to the Centre's strategic position and ability to feed into policy development and planning, including power market reform, processes in China.

There is also an ongoing co-operation between DEA and NECC. Activities have centred around awareness-raising on potential opportunities in EE, the capabilities and technologies of Danish companies and information exchange. Through the existing cooperation it is clear that Danish expertise would be very valuable in the feasibility assessment of the use of excess heat from industry for district heating. On this background, NECC has requested to extend the cooperation with DEA. NECC is an ideal partner for future cooperation on energy efficiency for a number of reasons: the body responsible for the formulation of comprehensive industrial policies, National Development and Reform Commission (NDRC), has instructed NECC to work with DEA on this project; NECC regulates the most energy intensive industries in China, sets targets for energy intensity and monitors progress towards those targets; and finally, there is an ongoing and fruitful cooperation with NECC.

There are numerous stakeholders involved and engaged in the development of RE, EE and ultimately the reduction of the environmental impact of the energy sector in China. There is thus an extensive need for coordination between civil society, universities, multilateral organisations (e.g. IEA, IRENA and CEM) and international funders. Furthermore, there are international funders engaged with both CNREC and NECC. The Boosting RE programme at CNREC is funded by the British Children's Investment Fund Foundation (CIFF) and German Gesellschaft für Internationale Zusammenarbeit (GIZ) is engaged with both CNREC and NECC. Coordination within the CNREC programme is to a large degree undertaken by the management group in CNREC (including the DEA). Coordination between stakeholders within the NECC programme is undertaken by the DEA and the EDK. The EDK has furthermore taken upon itself to coordinate between stakeholders that are not directly involved in the programmes. These include civil society organisations such as Greenpeace; World Resource Institute; Regulatory Assistance Project; Paulson Institute and National Resource and Defence Council. EDK and DEA have regular meetings with various international funders such as Energy Foundation; ADB and the World Bank.

2. PRESENTATION OF THE PARTNERSHIP COUNTRY PROGRAM

2.1. Programme Rationale and Justification

The ongoing programme, Denmark's Energy Agency's Energy Partnership Program (DEPP I) had the purpose of assisting partner countries with transition to low carbon economies in the long run and to prepare the countries to participate in a new, global climate agreement. The targeted outcome was that China, and other partners, were further enabled in reaching ambitious climate and energy goals through knowledge sharing and support within planning, regulation and implementation of EE, RE and climate change mitigation policy. Early results show some success. CNREC has succeeded in generating support from top level political decision makers

and is repeatedly being invited to provide input to the NDRC and the NEA. Likewise, NECC has succeeded in influencing the energy consumption and energy intensity targets of China's 13th FYP and has requested to extend the cooperation with DEA in both scale and scope, recognising that Danish expertise is highly relevant to their immediate aims. Both partners have learned that the cooperation's influence and effect can be increased by applying policy research at the local level and working with local authorities in relation to RE and EE planning and implementation.

The currently proposed programme (DEPP) will build on the successes of the ongoing cooperation. The overall objective remains to assist China with the transition to low carbon an economy. Priority of the DEPP is given to interventions where transformational change to RE and EE can be achieved through cost-neutral or even financially advantageous changes to policies and market structures. This includes particularly changes to existing systems and structures where partners have already expressed the desire to implement reform, including in policy, plans and technological renewal. Interventions are identified where Denmark adds value in terms of national strengths and competence, in particular in relation to renewable energy, energy planning, energy efficiency and the reform of policy frameworks.

Thus, most of the China-cooperation has been targeting further deployment of renewable energy and directed to China National Renewable Energy Centre (CNREC). There is also an ongoing co-operation between DEA and National Energy Conservation Centre (NECC) that has been comparatively smaller in scale. In response to an NECC request, the proposed programme will extend the cooperation to energy management systems, and policy, regulatory instruments, standards, monitoring systems, software, and pilot projects in companies aimed at greater EE through the utilization of surplus heat for district heating.

2.2. Country Programme Objective

The development objective of the programme is: "To assist China in moving to a less carbon-intensive energy sector including through increased share of RE and sustainable district heating"

Priority of the partnership programme is given to interventions where transformational change to renewable energy can be achieved through cost-neutral or financially advantageous changes to policies and market structures. This includes particularly changes to existing systems and structures where the partners have already expressed the desire to implement reform, including in policy, planning and technological renewal. Interventions are identified where Denmark adds value in terms of capacity and expertise, in particular in relation to renewable energy, energy planning and the design of enabling policy frameworks.

The achievement of these objectives will be supported through two Development Engagements as follows:

1) Transformation of the Chinese energy system with the China National Renewable Energy Centre (CNREC).
2) Energy Efficiency with the National Energy Conservation Centre (NECC).

2.3. Theory of Change

The support from Denmark is based on Chinese counterparts' own requests and demand for new and more intelligent energy solutions. The rationale is that Denmark offers unique experience from energy sector transition, which is in demand and valuable to share, disseminate and adapt into the national context of countries embarking on ambitious policies for energy efficiency, renewable energy and climate change mitigation.

The theory of change of DEA's engagement with CNREC is essentially linked to the Centre's strategic position and ability to feed into policy development and planning, including power market reform processes in China. If CNREC convincingly advocates the rationale behind increasing RE shares in the Chinese energy mix; and sets out evidence for sound RE development pathways to NEA and NDRC as the executing agencies; then the high-level decision makers will support increasing RE targets and other necessary policy adjustments to ensure effective integration of variable RE power in the next Five-year-plan, the main instrument in the Chinese policy making process at the national level. The resulting greater use of energy generated from RE will contribute directly to reducing CO_2-emissions.

When it comes to increasing RE deployment over the longer term, 2030- and 2050-RE planning scenarios will in the coming years become new important tools in the formal planning process in China. CNREC has already developed a new long term and recurring planning and policy instrument, the China Renewable Energy Outlook (CREO), which identifies different pathways for China's expansion of RE through establishing a national framework for RE development up to 2030. The first edition of CREO was published in November 2016 at the International Forum on Energy Transition in Suzhou.

Though there may not be a straight line from policy recommendations to implementation, early results support the change theory. CNREC has succeeded in generating support from top level political decision makers and is repeatedly being invited to provide input to NDRC and NEA.

DEA has since 2014 used its own internal resources to fund the initial cooperation with NECC. Activities have centred around awareness-raising on potential opportunities in EE, the capabilities and technologies of Danish companies and information exchange.

The theory of change for the DEA's engagement with NECC is that by informing central policy decisions through evidence of economic and environmental benefits of more sustainable district heating, NDRC can make decisions with greater certainty about key concerns such as the economic costs of phasing out of coal in district heating and industries, and the environmental costs associated with the sector's coal consumption.

Furthermore, by strengthening NECCs capacity in generating convincing policy and planning input for sustainable district heating, NECC can successfully influence local level planning frameworks to consider sustainable alternatives for investment decisions. Sustainable district heating solutions will expectedly more often become the preferred solution chosen by local level decision makers for implementation.

The targeted output in this regard is that NECC and associated local ECs are capacitated in sustainable district heating analysis through the development of new assessment tools and best practice guidelines for district heating planning procedures that are extended to include assessment of long term economic and environmental impact of technology solutions of all relevant supply options. For this to happen, planning tool and best practice planning procedures developed as part of this DE will be tailored to the local context and informed by real cases of district heating projects under development where actual data from pilot projects is analysed using Danish project planning tools. From these pilots, specific tools suitable for local authorities will be developed and if the Danish support is successful they will further be used by NECC to inform their guidelines and policy recommendations.

In addition, improved knowledge in China of the expertise, technologies and manufacturing

capabilities of Danish companies will promote technical and commercial partnerships that benefit both Chinese and Danish private sector companies.

2.4. Development Engagements

DE 1: Transformation of the Chinese energy system with CNREC

The objective of this particular DE is to help facilitate the development of a less carbon intensive energy sector, by working with CNREC to develop convincing RE policy and planning input for Chinese policy makers.

China National Renewable Energy Centre (CNREC) is a research centre and think tank for policy research on renewable energy. CNREC is part of the Energy Research Institute under the National Development and Reform Commission and it provides the National Energy Administration with research results for energy planning and energy administration.

The targeted outcome of the Development Engagement is that: "Energy policy assistance and analyses is provided to relevant policy makers (NEA, and NDRC) showing clear pathways for setting more ambitious RE targets in the 14th FYP."

This outcome will be achieved by realising four outputs:

1. Ambitious RE scenarios and sector specific analysis published in CREO
   Ambitious RE long-term scenarios for China are generated and published in the CREO that includes identification of main barriers and effects on stakeholders of full RE penetration such as social, economic and environmental effects, and sector specific analysis of main barriers for RE deployment (e.g. RE for heating, offshore wind etc.)

2. Thermal Power Flexibility
   CNREC has presented to NEA and the power sector convincing evidence for a power system that can accept variable inputs without curtailment including suitable incentive systems for thermal plants to manage their output so as to accommodate variable RE inputs; technological and management solutions available to thermal plants to increase flexibility.

3. Grid Development Strategies
   CNREC has established cooperation with grid companies and provides inputs to their grid development strategies using the research methodology and tools developed in the BRE-programme.

4. Wider anchoring of research results
   CNRECs results, presented in the CREOs, are recognized domestically and internationally and CNREC is a recognized centre of excellence for research on transition of Chinese power system.

This development engagement will have no cash transferred or disbursed directly to the development engagement partner. Hence, there are no requirements for accounting of funds and financial reporting at development engagement level.

The technical assistance will be delivered by an international half time long-term adviser (LTA) to be stationed at CNREC, by experts from the DEA and by other international and/or national experts as required during implementation. Study tours can be part of this Development Engagement as deemed necessary during implementation. A complete description of this development engagement is found in Annex E.

DE 2: Energy Efficiency with the NECC

The objective for this DE is to help facilitate the development of a less carbon intensive district heating- and industrial sector by working with NECC to develop a more efficient planning- and implementation framework.

NECC has broad influence on energy conservation in China because it is affiliated to NDRC's, Department of Resources Conservation & Environmental Protection directly. So NECC has priority to get national information and data, and also has the power to reflect their research result in the policy suggestions to policy makers. Besides that, there are 45 provincial level ECCs, 300 municipal level ECCs and more than 1700 county level ECCs. This network makes NECC have a comprehensive understanding of the difference in the whole country, and organize specific trainings and workshops to different technical demanding from different regions.

The targeted outcome of this Development Engagement is to create an: "Enabling environment that is more conducive for development of sustainable district heating systems including through utilisation of industrial excess heat, is established".

This outcome will be achieved by realising three outputs:

1. <u>NECC has strengthened capacity in district heating planning</u>
   NECC has additional capacity to advise on sustainable district heating solutions including by means of an assessment tool, and has developed district heating guidelines/policy recommendations.

2. <u>NECC has expanded its local level district heating engagement</u>
   NECC cooperates with local level authorities and district heating companies on utilization of excess heat for district heating and the guidelines and tools developed are widely disseminated to NECC local level facilities.

3. <u>Analysis of stated policies</u>
   NECC has extended capacity to evaluate stated EE policies related to EE in district heating and this is reflected in guidelines and policy notes that are disseminated to the NDRC and local the ECC's.

This development engagement will have no cash transferred or disbursed directly to the development engagement partner. Hence, there are no requirements for accounting of funds and financial reporting at development engagement level.

The technical assistance will be delivered by an international half time long-term adviser (LTA) to be stationed at CNREC, by experts from the DEA and by other international and/or national experts as required during implementation. Study tours can be part of this Development Engagement as deemed necessary during implementation. A complete description of this development engagement is found in Annex E.

2.5. Assumptions and Risk Analysis

China is a stable partner country and contextual risk level is assessed as being low. The contextual risk factors considered for the programmatic and institutional risk assessment are corruption and economic recession. China is ranked 83 of 168 countries on the Transparency International 2015-Corruption Perception Index. There are known incidences of top-level changes in the Chinese system due to excessive use of public funds. Consequently, the Chinese leadership has significantly increased its focus on corruption and excessive use of public funds and DEA has facilitated a study tour to Denmark for NEA's vice-administrator focusing on good governance

and anti-corruption measures and sharing Danish experience from the DEA, the Danish Energy Regulatory Authority, the Danish Parliamentary Ombudsman and the Danish Agency for Modernization under the Ministry of Finance.

On the economic side, economic recession in China, or the global economy may temporarily, poses a risk for the programme as it could lead to lower ambitions on RE and EE, but the overall direction of Chinese policy, including the multiple secondary objectives supported by this programme (i.e. energy security, pollution control as well as economic benefits) mitigate this risk considerably.

Moreover, a risk analysis using the Risk Matrix of the AMG identified no significant residual risks to the programme. Common risks such as lack of partner absorption capacity and changes in overall government policy has been addressed as part of the programme design. As described above, this means that priority has been given to interventions where transformational change to renewable energy and energy efficiency can be achieved through cost-neutral or even financially advantageous changes to policies and market structures; and multiple other non-energy national objectives are supported in addition to climate change mitigation. Any residual risk and new potential risks will be monitored closely throughout implementation and measures to address any arising issues will be developed as necessary and findings included in the regular programme reports. The risks analysed included the following.

The Chinese government does not retain its commitment to low carbon development

This would negatively affect the longer term impact of the cooperation, but the risk is assessed to be minor. Multiple studies including CNRECs own analysis indicates that China's INDC is manageable and the cooperation is focused on assisting China with identifying implementation routes for short- and long term targets.

Lack of ownership to the cooperation from key partner institutions

MEUC has recently put cooperation opportunities with two Chinese ministries on hold due to insufficient level of buy-in from the Chinese side. For the cooperation under the DEPP it is different and the risk is minor. The Danish support is in high demand and the direct partners, CNREC and NECC, have expressed and demonstrated a genuine ownership of the cooperation. Discontinuation of support to the Sino-Danish cooperation from the leadership of DEA's partner institutions would constitute a risk of programme failure. There is potentially a minor risk of diminished support from Chinese top-level leadership arising from upcoming retirement of key-persons at China's NEA, the NECC and the ERI, key-persons who are all strongly supportive of the Sino-Danish cooperation. The risk, however, is considered to be minor, not least because CNREC already has been appointed to undertake specific tasks with regards to the 13th Five Year Plan that are also in line with the objectives of this programme. Further, DEA will do targeted work towards anchoring the work and results of DEA within the Chinese system. This effort would be increased in case any signs of diminished support are identified. Such increased level of effort will on the other hand potentially result in less TA delivered to CNREC and NECC.

Staff turnover and resource constraints with partner institutions

Demand for the programme is high and the risk is considered to be minor. The risk is mitigated through a flexible approach to provision of technical input. The DEA will in the programme period continue to reallocate resources towards tasks where the Chinese counterpart has expressed highest demand and capacity to absorb the DEA's technical assistance.

Poor coordination and lack of progress of Boosting Renewable Energy Programme

The major part of DEAs technical input to CNREC is largely relying on the progress of the Boosting Renewable Energy Programme and the success of the programme is also relying on coordination with and contribution from other partners and CNREC. The management committee coordinates effectively within Boosting Renewable Energy Programme. DEA has a permanent seat in CNREC's management committee, which meets twice a year and holds the responsibility for overall progress, coordination and resource allocation. The management committee includes representatives from all donors. However, there are limited resources available at CNREC. In order to ensure optimum utilisation of these resources CNREC's programme manager/coordinator on the Boosting Renewable Energy Programme is part of CNREC's management team. The programme manager also coordinates programme activities and DEA activities. Whenever possible, the programme manager attends DEA's weekly China coordination meetings. The risk of programme failure due to inefficient progress and poor coordination is therefore minor.

Corruption and excessive use of public funds

There is no indication of corrupt practice by Chinese partners in general and corruption with Danish funds is not an option as funds flow solely to Danish consultants/entities participating in the cooperation. Corrupt practice in general of Chinese partners would constitute a risk of reputational loss and a risk of programme failure if activities were to be postponed or abandoned to reduce reputational losses. Changes in leadership from supporting institutions - arising from excessive use of public funds - will in the best case not have a significant and lasting impact on programme success, but postponement of tasks could be the consequence.

3. OVERVIEW OF PARTNERSHIP PROGRAMME MANAGEMENT

The Partnership Programme between China and Denmark is part of the DEA Energy Partnership Programme (DEPP) supported by the Danish Climate Envelope with four countries including South Africa, China, Vietnam and Mexico. Daily operation and coordination of DEPP is the responsibility of the DEA.

To oversee the overall DEPP implementation an Advisory Group will be established in Copenhagen with representation from MFA and the Danish Ministry of Energy, Utilities and Climate. DEA will act as Secretary to the Advisory Group. The Advisory Group will meet at regular intervals to discuss programme progress and solicit cross-programme countries experience and to discuss opportunities from learning across partnerships. DEA will, in its capacity as Secretary to the Advisory Group be responsible for i) submission to the Advisory Group of progress reports consolidated from the four countries and ii) management of funds allocated for activities above individual country-level including mid-term reviews.

DEA will together with the LTA on a daily basis coordinate and facilitate all activities in China. This includes for example responsibilities for: i) identifying the most appropriate TA for any requested assignment from a partner; ii) QA of any inputs provided by TA; iii) facilitation of study tours to Denmark, and iv) monitoring of progress against targets.

TA will be delivered by DEA, Energinet.dk or external international consultants.

Both development engagements in China have their own implementation structure.
The parties have agreed to the following management arrangement with the aim to ensure adequate dialogue and timely decisions in regard to this development engagement.

The implementation structure for CNREC will follow the existing structure:

The engagement will follow the CNREC implementation structure established as part of CIFF support. The CIFF project is guided by a Policy Committee, anchored in the Chinese energy administration. The Policy Committee is led by NEA (New and Renewable Energy Department) and includes high-level representatives from institutions involved in energy policy making in China (NDRC, Ministry of Finance, Ministry of Science and Technology); the Embassy of Denmark; and CIFF. The CNREC implementation structure also includes an Advisory Committee with key national and international experts. CNREC is responsible for project management, and a project team with participants from CNREC, NREL, GIZ and DEA implement the project with support from external experts.

The BRE programme is managed by a Management Group with the CNREC Director, Chief Expert and Chief Modeller from CNREC and Project Managers from each of the participating organizations (i.e., CNREC, NREL, GIZ, DEA). The group will meet 3-4 times a year to ensure optimal coordination and progress according to the timetable.

Further, the programme will be supported by the China Advisory Group, advising the Management Group; as well as a China Experts Group and International Experts Groups advising the Management Group with expertise in RE, power sector transformation, grid development and operation, and distribution generation both in China and internationally.

A halftime long-term adviser (LTA) will support CNREC on a daily basis. The LTA will: i) facilitate CNREC partners in the implementation of the DE; ii) provide high level advise and technical input to demands from CNREC related to RE for heating and energy efficiency, and iii) assist facilitation of the partnership between CNREC and DEA.

The implementation structure for NECC will be as follows:
A Steering Committee that include the following high level members: NDRC, NECC, DEA and Denmark's embassy in Beijing (EDK). The Steering Committee should provide strategic guidance and will meet once or twice per year to approve annual work plans, progress reports, and discuss and resolve issues related to program. Decisions are made by consensus.

A Management Group will be established and consist of the Director of International Cooperation and other relevant coordinators from NECC, the DEA country coordinator and the LTA. The group will be managing daily implementation of the development engagement. The management Group will meet on a needs basis, and will: i) develop annual and detailed biannual work plans for the DE, matching priorities in the partners work plans, ii) associated with the detailed biannual work plan, the Management Group will determine the need for technical assistance (TA) from DEA experts and from national and international experts through development of a TA provision plan; iii) endorse inputs based on TOR prepared at output level; iv) monitor day-to-day progress of DE implementation. v) monitor programme progress at output level, using the "traffic light" system; vi) ensure cross fertilisation between engagements.

The Management Group reports on programme development to the Steering Committee and acts as Secretary to the Steering Committee. Decisions are made by consensus.

A halftime long-term adviser (LTA) will support NECC on a daily basis and assist in facilitating the partnership between DEA and NECC, but for practical and coordination reasons, the LTA will be stationed in CNREC. The will provide high level advice and technical assistance for analysis and policy development including through sharing merits from Denmark with regards to planning, regulation, technical measures and technology solutions.

DEA foresee that the MEUC seconded Energy Counsellor at the RDE in Beijing participate in CNREC and NECC meetings, when relevant and in meetings with like-minded development partners and the private sector to keep abreast of development in the sector and feed this into the RDE/DEA high-level policy dialogue with Chinese authorities.

It is anticipated that the Energy Counsellor establishes a dialogue with Danish private sector partners in the sector to get input on barriers the private sector encounters in the sector and feed this into the DEs where relevant. In return the counsellor will keep the private sector informed of development in the sector that may be of commercial interest.

3.1. Results Monitoring Mechanisms

Bi-annual reports on performance management will be submitted to the Development Engagement partners and a full annual end-of-year report, which includes progress against indicators and a discussion of challenges that have been encountered or which may lie ahead.

Performance monitoring reported to the partners through the biannual progress report at output and development engagement level will be using a "traffic-light" system, where:

- "green" is on-track – implementation continues as scheduled;
- "yellow" is partly on-track which needs an explanation, including actions taken to get back on-track and closer monitoring of progress;
- "red" is off-track, which needs a detailed explanation with recommendations of changes to the implementation to get the engagement back on-track.

The initial results frame is established for each of the development engagements and appears in Annex B. During the inception phase, indicators and specific targets will be revisited, validated and potentially refined. These will be approved by the Development Engagement partners and informed to the Advisory Group in Copenhagen overseeing the entire DEPP in the four countries (Vietnam, Mexico, China and South Africa). An inception report will be produced three month after implementation start, including documentation of any changes in indicators and targets and include the first annual work plan.

The Danish MFA shall have the right to carry out any technical or financial mission that is considered necessary to monitor the implementation of the programme, which may include a mid-term review. After the termination of the programme support the Danish Government reserves the right to carry out evaluation in accordance with this article.

3.2. Outcome Level Budget

The overall budget for the DEPP is DKK 115 million, out of which DKK 27.08 million have been allocated to China including (technical) assistance from DEA.

The budget for each outcome of the two Development Engagements is set out in the following table. Note that the table only includes the funds contributed by Denmark.

Development Engagement Outcomes	**DE partner**	**17/18**	**18/19**	**19/20**	**Total**
Energy policy assistance and analyses provided to relevant policy makers (NEA, and NDRC)		5,706	5,706	5,706	17,117

showing clear pathways for setting more ambitious RE targets in the 14th FYP. DKK '000	CNREC				
Enabling environment that is more conducive for development of sustainable district heating systems including through utilisation of industrial excess heat, is established. DKK '000	NECC	1,368	1,368	1,368	4,105
Total Country Programme		7,074	7,074	7,074	21,223

4. THE PARTNERSHIP COUNTRY PROGRAM BUDGET

Because each Development Engagement will yield one major outcome, the programme budget is identical to the outcome budget tabulated above. Detailed output based budgets is annexed to this programme document. Detailed output budgets showing technical assistance inputs and costs are included in each development engagement document.

The total amount of hours from DEA allocated for the programme is 23520

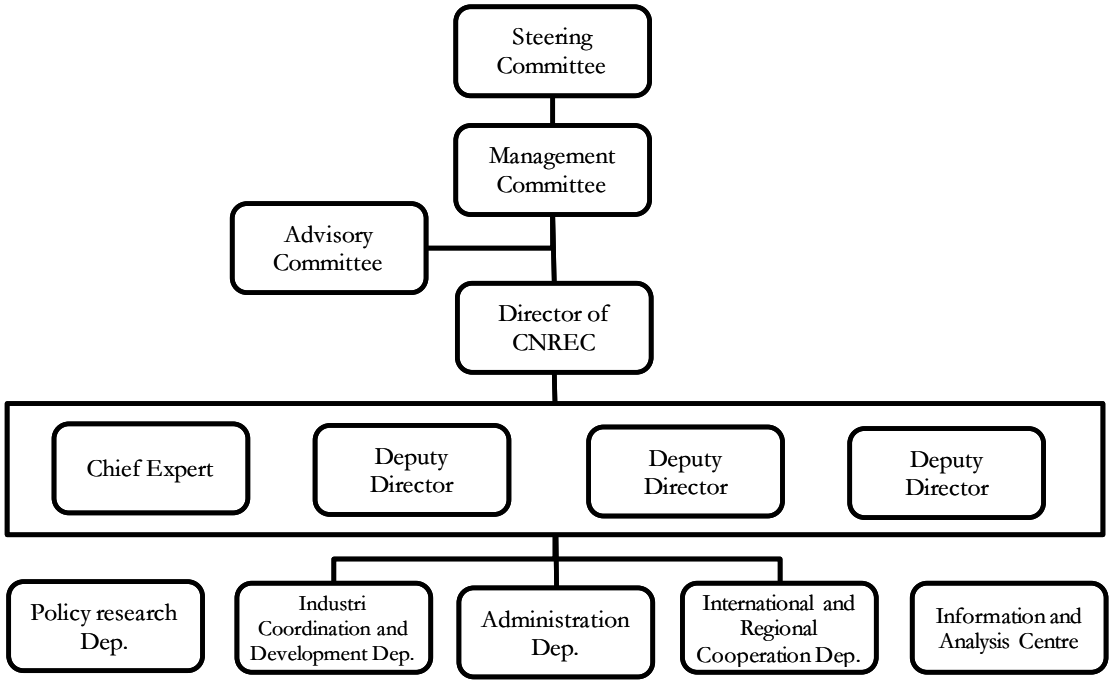
5. ANNEXES

Annex A: Partners - brief description

China National Renewable Energy Centre

China National Renewable Energy Centre (CNREC) is a research centre and think tank for policy research on renewable energy. CNREC is part of the Energy Research Institute under the National Development and Reform Commission and it provides the National Energy Administration with research results for energy planning and energy administration.

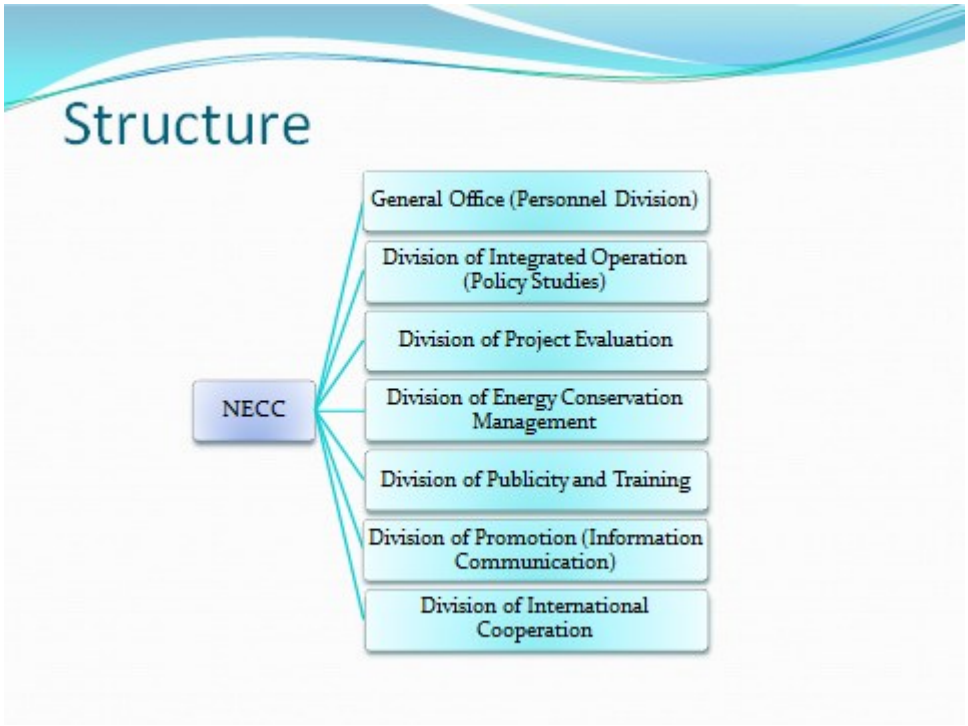
CNREC has 30 permanent staff one third seconded from the ERI (NDRC's research centre) and the remainder hired directly. The staff is organized within a three-level management structure including a Steering Committee, a Management Committee and the CNREC Management, and five departments for the implementation level. According to task assignments, CNREC comprises four departments, an information centre and an affiliated enterprise with the function of testing and technique research.



CNREC's suitability as a partner is essentially linked to the Centre's strategic position and ability to feed into policy development and planning, including power market reform, processes in China. Though there may not be a straight line from policy recommendations to implementation, early results support the change theory. Hence, CNREC has succeeded in generating support from top level political decision makers and is invited to provide input to the National Development and Reform Commission (NDRC) and the Chinese National Energy Administration (NEA) for the next Five-year-plan, the main instrument in the Chinese policy making process. In addition, CNREC's policy research has already informed polices at the local level by CNREC working with local authorities in relation to RE planning and implementation. This also shows that CNREC is capable of assisting the acceleration of deployment of RE sources on the ground.

When it comes to increase of RE deployment for the long term, 2030- and 2050-RE planning scenarios will in coming years become a new tool in the formal planning process in China. CNREC is already developing a new long term planning and policy instrument, China Renewable Energy Outlook (CREO), which identifies different pathways for China's expansion of RE through establishing a national framework for RE development up to 2030.

National Energy Conservation Centre



The NRDC instructed NECC to work with DEA on this project. NECC are responsible for EE in China, they provide policy advice on the issue directly to the NRDC. They regulate the most energy intensive industries in China, set targets for energy intensity and monitor progress towards those targets. They have a large presence at decentralised levels including provincial, municipal and over 1700 offices at county level. Their principal responsibilities are as follows.

- To undertake research tasks in relation to energy saving policies, regulations, planning and administrative regime;
- As commissioned by the relevant government authorities, to conduct energy conservation evaluation and study of fixed asset investment projects and put forward review opinions;
- To organize and carry out the promotion of energy conservation technologies, products and new mechanisms;
- To conduct energy conservation publicity, training, information communication and consulting service;
- As commissioned by the relevant government authorities, to carry out the administration of the energy efficiency labelling;
- To conduct international exchanges and cooperation in the field of energy conservation.

The current co-operation between DEA and NECC has been comparatively small scale with the point of entry being the international division of the NECC and activities centred around awareness-raising on potential opportunities in EE, the capabilities and technologies of Danish companies and information exchange.

NECC has broad influence on energy conservation in China because it is affiliated to NDRC, and contact with Division of Energy Conservation, Department of Resources Conservation & Environmental Protection directly. So NECC has priority to get national information and data, and also has the power to reflect their research result in the policy suggestions to policy makers.

Besides that, there are 45 provincial level ECC centers, 300 municipal level ECC centers and more than 1,700 county level ECC centers. This network makes NECC have a comprehensive understanding of the difference in the whole country, and organize specific trainings and workshops to different technical demanding from different regions.

Annex B: Results Framework

Country Programme	**Energy Partnership Programme Between China and Denmark**
Thematic Programme Objective	China is in transition to a low carbon economy through an increased share of RE and sustainable district heating
Impact Indicator	Tons of carbon dioxide equivalent (tCO_2 eq) reduced in China as a result of the programme

Development Engagement 1:

Outcome		Energy policy assistance and analyses is provided to relevant policy makers (NEA, and NDRC) showing clear pathways for setting more ambitious RE targets in the 14th FYP	
Outcome indicator		CNREC has delivered scenarios and sector specific analysis for the 14th FYP for energy.	
Baseline	Year	2016	13th FYP still in force
Target	Year	2020	Draft 14th FYP due 2020
Output 1		**Ambitious RE scenarios and sector specific analysis published in CREO** Ambitious RE long-term scenarios for China are generated and published in the CREO that includes identification of main barriers and effects on stakeholders of full RE penetration such as social, economic and environmental effects, and sector specific analysis of main barriers for RE deployment (e.g. RE for heating, offshore wind etc.)	
Output indicator		CNREC uses robust energy models that provide strong evidence base to inform policy making around an increased share of RE	
Baseline	Year	2017	Use of CNREC's model suite extended to analyse longer term scenarios including effects on stakeholders of full RE penetration in China Renewable Energy Outlook 2017.
Target	Year 1½	2018	Use of model suite extended to analyse longer term scenarios including social, economic and environmental effects in CREO 2018. CNREC analyses specific RE sectors in China and provide policy advice in CREO.
Target	Year 3	2020	CNREC's use of the model suites for long-term forecasts and definition of sector specific targets was included in draft 14th FYP
Output 2		**Thermal Power Flexibility** CNREC has presented to NEA and the power sector convincing evidence for a power system that can accept variable inputs without curtailment including suitable incentive systems for thermal plants to manage their output so as to accommodate variable RE inputs; technological and management solutions available to thermal plants to increase flexibility.	
Output indicator		CNREC has additional capacity in analyzing thermal power plants flexibility	
Baseline	Year	2017	Thermal power plants flexibility is not yet a fully developed field of research of CNREC
Target	Year 1½	2018	CREO 2018 describes incentive systems for thermal power plants to accommodate RE inputs
Target	Year 3	2020	CREO 2019 and 2020 describe technological and management solutions for thermal plants to accommodate RE inputs.
Output 3		**Grid Development Strategies** CNREC has established cooperation with grid companies and provides inputs	

		to their grid development strategies using the research methodology and tools developed in the BRE-programme.	
Output indicator		CNREC and grid companies have established cooperation on development of grid development strategies for RE integration	
Baseline	Year	2017	CNRECs research on grid development is insignificant
Target	Year 1½	2018	CNREC and grid companies publishes a joint research report on RE integration
Target	Year 3	2020	CNREC has established cooperation with grid companies on their grid development strategies
Output 4		**Wider anchoring of research results** CNRECs results, presented in the CREOs, are recognized domestically and internationally and CNREC is a recognized center of excellence for research on transition of Chinese power system.	
Output indicator		CREO is recognized as the key publication on RE development in China, nationally as well as internationally.	
Baseline	Year	2017	CNREC has presented CREO 2016 at the International Transition Dialogue in Suhzou in China and at the Berlin Energy Transition Dialogues.
Target	Year 1½	2018	CNREC has presented CREO 2017 and 2018 at high level national, international and multilateral fora and cooperates with multilateral organisations.
Target	Year 3	2020	CREO 2019 has been accepted as the authoritative source on insight with regards to the development of the energy system in China.

Development Engagement 2:

Outcome		Enabling environment that is more conducive for development of sustainable district heating systems including through utilisation of industrial excess heat, is established.	
Outcome indicator		NDRC has adopted recommendations provided by NECC for district heating planning including utilisation of excess heat from industries.	
Baseline	Year	2017	The potential for utilization of low temperature heating from industries is not being realised.
Target	Year	2020	NDRC has issued guidelines for district heating planning that includes utilization of industrial waste heat.
Output 1		**NECC has strengthened capacity in district heating planning** NECC has additional capacity to advise on sustainable district heating solutions including by means of an assessment tool, and has developed district heating guidelines/policy recommendations.	
Output indicator		Guidelines and planning tools for district heating planning produced and presented to NDRC.	
Baseline	Year	2017	District heating technical requirements exist only, and district heating guidelines and planning tools are absence.
Target	Year 1½	2018	District heating planning project identified, data and local barriers are analysed serving as input for development of an assessment tool [2]
Target	Year 3	2020	Guidelines and planning tools produced and disseminated to local and national stakeholders

[2] The Danish support is TA on planning methodologies and not financing of components

Output 2		**NECC has expanded its local level district heating engagement** NECC cooperates with local level authorities and district heating companies on utilization of excess heat for district heating and the guidelines and tools developed are widely disseminated to NECC local level facilities.	
Output indicator		Local authorities are trained and new district heating assessment model and the guidelines are adopted by relevant stakeholders	
Baseline	Year	2017	No local authorities and/or district heating companies working with NECC on district heating solutions
Target	Year 1½	2018	Recurrent dissemination of results and sensitizing local authorities to options for excess heat for district heating Local authorities
Target	Year 3	2020	At least 2 of local authorities and/or district heating companies has received training in the guidelines and planning, and is using the capacity obtained.
Output 3		**Analysis of stated policies** NECC has extended capacity to evaluate stated EE policies related to EE in district heating and this is reflected in guidelines and policy notes that are disseminated to the NDRC and local the ECC's.	
Output indicator		NECC publishes and disseminates guidelines and policy notes	
Baseline	Year	2017	Guidelines and policy notes in need of revision
Target	Year 1½	2018	Consultation by NECC of draft inputs is ongoing.
Target	Year 3	2020	In priority areas, NECC has a comprehensive suite of policy and guidance documents reflecting best practice.

Annex C: Budget at output level

Development Engagement 1:

Outputs	Contribution with Danish funds	Partner Contribution in-kind
1. Ambitious RE scenarios and sector specific analysis published in CREO, in DKK '000	**11,500**	
TA travel costs etc. in DKK '000	930	
Delegations to Denmark in DKK '000	90	
Other costs in DKK '000	300	
TA from DEA in hours	9,620	
TA from other international experts in hours	2,250	
TA from LTA in hours	2,100	
2. Thermal Power Flexibility, in DKK '000	**3,551**	
TA travel costs etc. in DKK '000	400	
Other costs in DKK '000	150	
TA from DEA in hours	4,500	
TA from other international experts in hours	750	
3. Grid Development Strategies, in DKK '000	**3,632**	
TA travel costs etc. in DKK '000	400	
Other costs DKK '000	150	
TA from DEA in hours	3,100	
TA from other international experts in hours	1,500	
4. Wider anchoring of research results, in DKK '000	**1,492**	
TA travel costs etc. in DKK '000	400	
Delegations to Denmark in DKK '000	90	
Other costs DKK '000	150	
TA from DEA in hours	2,100	
GRAND TOTAL, DKK '000	20,177	

Development Engagement 2:

Outputs	Contribution with Danish funds	Partner Contribution in-kind
1. NECC has strengthened capacity in district heating planning	**3,169**	
TA travel costs etc. in DKK '000	450	
Delegations to Denmark in DKK '000	180	Delegation members will cover travel cost, accommodati

		on and per diem.
Other costs in DKK '000	150	
TA from DEA in hours	2,400	
TA from other international experts in hours	1,200	
TA from local consultants in hours		When necessary
TA from LTA*) in hours	2,100	
2. NECC has expanded its local level district heating engagement	**468**	
TA travel costs etc. in DKK '000		
Delegations to Denmark in DKK '000		
Other costs in DKK '000	90	
TA from DEA in hours	900	
TA from local consultants in hours		When necessary
3. Analysis of stated policies	**468**	
Other costs DKK '000	90	
TA from DEA in hours	900	
GRAND TOTAL	**4,150**	

Annex E: Development Engagement Documents

Annex F: ToR for LTA

The Danish Energy Agency (DEA) will as part of the new Danish Energy Partnership Programme in China (July 2017- June 2020) add a long term advisor (LTA) to boost its activities with China National Renewable Energy Centre (CNREC) and the National Energy Conservation Centre (NECC). The LTA will support specific tasks defined in the cooperation with the two partner organisations. The resources (working hours) of the new LTA will be divided equally between tasks for CNREC and tasks for NECC. The LTA will be stationed at CNRECs office in Guohong.

为支持丹麦新的能源合作伙伴计划在中国的开展，丹麦能源署将向中国增派一位长期顾问，以加强丹麦能源署与中国国家可再生能源中心和国家节能中心的合作计划的实施，期限为2017年7月-2020年6月。该长期顾问将根据丹麦能源署与两家机构确定的具体工作计划提供支持。该长期顾问的工作时间将在国家可再生能源和国家节能中心之间平均分配。其办公地点设在国宏大厦的中国国家可再生能源中心。

CNREC

国家可再生能源中心

The LTA's main function in cooperation with CNREC will be to support implementation of the upcoming MoU between NEA and the Danish Ministry for Energy, Utilities and Climate (MEUC), where RE for heating is one of the main topics for cooperation. This will include supporting the work at CNREC as well as tasks that may arise after agreement between NEA and MEUC

为保证与国家可再生能源中心"可再生能源推动中国能源革命"合作项目的顺利实施，丹麦能源署在之前已承诺的资源上特增派一位长期顾问提供支持。

The focus for the LTA will be related to the development of China Renewable Energy Outlook (CREO). Besides contribution to the further development of the scenarios in the CREO, the LTA will work with the "Work Packages" Renewable Energy (RE) for Heating and Energy Efficiency where DEA is international lead. For both task the LTA will provide specific input to the deliveries in CREO and for case studies within these topic areas in the Jingjinji case. This could tentatively include activities with Zhangjiakou.

该长期顾问的工作重点包括中国可再生能源展望报告，参与中国可再生能源发展进一步情景分析，参与丹麦能源署牵头的可再生能源供暖和能源效率的工作计划的实施。在这两个项目中，该长期顾问将为中国可再生能源展望报告和京津冀地区可再生能源发展案例研究提供具体的建议，也可以包括中心在张家口开展的活动。

丹麦能源、公用事业和气候部与国家能源局将签署《关于加强中丹可再生能源伙伴关系的谅解备忘录》，并成立可再生能源联合工作组。丹方长期顾问将为工作组开展可再生能源供暖合作提供支持。

For the tasks in relation to CNREC, the LTA will refer to the management group in the Boosting RE programme. Tasks will furthermore be coordinated with DEA in Copenhagen.

丹方长期顾问将向"可再生能源推动中国能源革命"项目组管理层汇报工作，具体工作内容将与丹麦能源署进一步协调。

NECC

国家节能中心

A LTA will be an addition to the already committed resources to the cooperation with NECC in the ongoing programme.

为保证与国家节能中心正在开展的合作项目的顺利实施，丹麦能源署在之前已承诺的资源上特增派一位长期顾问提供支持。

The LTA will provide support to the upcoming pilot project(s) focused on utilization of excess heat from industries, district heating and energy efficiency. Specifically, the LTA will provide assistance on district heating planning methodologies and case studies of integration of excess heat from industries in the district heating system and specific case related studies of potential for increased energy efficiency in industries.

丹方长期顾问将为双方将要实施的工业余热利用供暖、区域供暖和提高能效示范项目提供技术支持，具体来说，丹方顾问将为区域供热规划方法、工业余热用于供暖案例研究和工业能效提高相关案例研究提供支持。

This could potentially include cooperation with Beijing District Heating Group and the Yanqing DRC.

工作内容还可能包括与北京市热力集团和延庆区发改委的合作。

Results from the case studies will provide the required basis information to develop policy recommendations related to excess heat from industries and measures for increased energy efficiency.

案例研究成果将为中方制定工业余热利用政策建议和提高能效措施提必要供依据。