

Terms of Reference

Consultancy Support for Capacity Building in DHAT and Training Program Development

1. Background

To draw on Denmark's technologies and experience in energy efficiency, the National Energy Conservation Center (NECC) and the Danish Energy Agency (DEA) signed the Implementation Agreement of Sino-Danish Pilot Project on District Heating and Energy Efficiency Improvements in China in 2017. One of the goals was to develop a Chinese tool for screening of possible heat projects including related technologies and methods during 2018.

The Danish Energy Agency has developed a heat screening tool which can compare different sources and combination of sources against each other. The tool is called the District Heating Assessment Tool (DHAT) and builds on central principles from Denmark's good experiences on heat planning. The tool is intended to be used as a screening tool for all of China with policy-oriented suggestions for efficient heating and for this purpose capacity building is needed for relevant stakeholders.

This assignment is aimed at developing a capacity building program for the DHAT. The capacity building program will ensure additional capacity to advise on sustainable district heating solutions with the DHAT within NECC in alignment with output 1 of the Project Programme for 2017-2020. Furthermore, the capacity building within NECC will strengthen the ability to cooperate with local level authorities and district heating companies and the capacity building can be utilized to strengthen the adaptation of the DHAT in local level district heating engagement, in alignment with output 2 of the Project Programme for 2017-2020.

This assignment aims at developing a self-contained two day course in the DHAT and run a pilot-course followed by an evaluation at NECC. The course can afterwards be repeated based on demand at a fixed rate for stakeholders at NECC of as part of the local engagement. DEA has assigned the training work in China to Copenhagen Centre on Energy Efficiency in August 2019.

2. Objectives

The objective of the assignment is to support the capacity building in the DHAT and modelling approaches to district heating planning in China. The project will participate in establishing a core group of users of the DHAT and modelling approaches in NECC and selected regions in China.

A self-contained two-day training program in the DHAT and modelling approaches is to be developed and conducted. The program will be designed to be replicable, and be especially relevant to Chinese stakeholders in national and regional governments.

3. Scope of Work

The project is divided in three phases:

- 1) Development of training program and content. The expectation is a self-contained two-day course which will provide the needed knowledge to do district heating assessments using the DHAT in a Chinese context. DEA will provide inputs and feedback as needed during this phase. A preliminary schedule and content for the course is seen in Table 1 (to confirmed and further developed by the consultant).
- 2) Pilot course and evaluation. When the full training program and content has been developed a pilot-course will be carried out followed by an evaluation of both topics and content of the individual sessions in the DHAT course. The course program will be updated as needed following the evaluation. DEA will assist in the planning of the pilot-course and in finding participants.
- 3) Course conduction. The course is to be conducted based on requests from China. In the beginning the target area can be NECC and other stakeholders in Beijing, but if the course is successful the target area is to be expanded to other areas of interest in China. This should include areas with DEA engagement in DH projects.

The project will in the first phase be focused on the development of the training program and content and no missions are expected in this phase. In the second phase one mission to NECC to conduct the pilot course is planned. Following this, evaluation and improvement of the course and content is to be carried out. In phase three, the course can be conducted numerous times with a pre-defined cost for each session. The course is at this point a self-contained two-day program which can be repeated as needed.

The task of the consultant is to develop the final training program as well as the content needed for the course. The consultant will conduct the pilot-course and the post-evaluation and adjust the course program and content according to the feedback from the participants. Following this, the consultant should be able to deliver the course as a two-day program with fixed rates for hours and traveling when relevant for the collaboration with NECC and local stakeholders. The consultant must be available for follow-up questions from the participants by phone and email in order to ensure a successful utilization of the tool following the course. A preliminary schedule for the two days is seen in Table 1.

Table 1: Preliminary schedule and content for the two-day DHAT course

| | Day 1 | Day 2 |
|---------------|---|--|
| 9.00 – 9.40 | Introduction heat planning DHAT-tool | Economic parameter's and DH-network |
| 9.40 – 10.20 | Finding Areas suitable for DH | Storage and use of storage together with technologies |
| 10.20 – 10.40 | Tee/Coffee break | Tee/Coffee break |
| 10.40 – 11.20 | Heat loss, tap water, heat demand and running hours | Available heat sources in local area |
| 11.20 – 12.00 | Technology catalogue for individual and district heating | Creating scenarios |
| 12.00 – 13.00 | Lunch | Lunch |
| 13.00 – 13.40 | Technology, fuel, heat and emission prices | Storage and solar based system |

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|---------------|---------------------------------------|--|
| 13.40 – 14.20 | Creating temperature and solar curves | Reporting possibilities |
| 14.20 – 14.40 | Tee/Coffee break | Tee/Coffee break |
| 14.40 – 15.30 | Socio economic costs and benefits | Decision making according to Scenarios |
| 15.30 – 16.00 | Summary End of day 1 | Evaluation End of day 2 |

4. Deliverables

- Development of training program and content
- Pilot course and evaluation of the program and content
- Two-day self-contained course program and content available for sessions by request

5. Budget

It is estimated that development of training program and content (phase 1) together with conduct of the pilot course and evaluation of the program and content (phase 2) will require a total of 15 national senior consultant man-days in China under the supervision from C2E2 senior advisor.

The cost of 15 man-days for the national consultant at 8,500 DKK per day amounts to 127,500 DKK.

Travel expenses for first mission are expected to be covered under DEA relating to travel for the consultant on the mission. Accommodations will be covered separately during travels, to the same standards that DEA employees adhere to.

| Expense category | Units | Cost per unit (DKK/unit) | TOTAL (DKK) |
|------------------------------------|-------|--------------------------|-------------|
| Per diem (Danish government rates) | 2 | 509 DKK/day | 1,018 |

Furthermore multiple courses can be conducted within one mission decreasing the cost for flights but increasing the per diem accordingly.

6. Qualifications and Skills

The appointed consultants should have:

- PhD. degree (desirable)
- Based in China (preferred in Beijing), able to travel to other Chinese cities (desirable)
- Solid knowledge about district heating planning and preferably DHAT
- In-depth understanding of Chinese energy planning, able to explain materials in an appropriate manner
- Experience of working in district heating and/or energy planning in China

- Fluent in English and Maderian

7. Working Arrangement

The consultant will be retained on a contract with the C2E2 and payments based on deliverable output. They would be required to be available for the timely delivery of milestones throughout the project.

The consultant will work under the supervision of Dr. Zhuolun Chen in C2E2 and will agree on face-to-face workdays in China or conference calls as per the progress of work.

8. Language

All outputs should be prepared and submitted in the English and/or Chinese language, as required, to the Copenhagen Centre for Energy Efficiency.

9. Time for completion

Four months with possible extension on demand of DEA.

10. Confidentiality and ownership of results

The contracted consultant is obliged to maintain confidentiality regarding the activities they carry out. The presentations and training materials generated, and all products related to the object of the present contract will be the exclusive property of C2E2. Any publication or dissemination that the consultant requires to do on joint works, may only be executed after authorization of such by C2E2 and the UNDERSECRETARIAT OF RENEWABLE ENERGY AND ENERGY EFFICIENCY.