IEA DHC|CHP

iea Energy Technology Network

IEA Technology Collaboration Programme on
District Heating and Cooling
including Combined Heat and Power

Call period: 10 December 2018 – 18 January 2019

Fulfilment period: 1 February 2019 – 31 May 2019

CALL FOR PROPOSALS

SUSTAINABLE DISTRICT COOLING GUIDELINES

List of abbreviations

CHP	Combined Heat and Power
CV	Curriculum Vitae
DHC TCP	Denomination for IEA DHC within the IEA
ExCo	Executive Committee of IEA DHC
IEA	International Energy Agency
IEA DHC	International Energy Agency Technology Collaboration Programme on District Heating and Cooling including Combined Heat and Power
OA	Operating Agent
TCP	Technology Collaboration Programme
USD	United States of America Dollars

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Programme Background

The International Energy Agency

The International Energy Agency (IEA) was established in 1974 in order to strengthen international co-operation on energy technologies. It works to ensure reliable, affordable and clean energy for its member countries and beyond. As an element of its international energy technology co-operation, participating countries undertake co-operative actions in energy research, development and demonstration. These are known as Technology Collaboration Programmes (TCPs).

The Technology Collaboration Programme for District Heating and Cooling

The 'IEA Technology Collaboration Programme for District Heating and Cooling including Combined Heat and Power' (IEA DHC) was established in 1983. It is the only international research and development programme for this technology that has global reach.

Specifically, IEA DHC deals with the design, performance and operation of non-individual heating and cooling generation, distribution systems and consumer installations. It is dedicated to helping district heating and cooling and combined heat and power become powerful tools for energy conservation and the reduction of environmental impacts of supplying heating and cooling.

IEA DHC has proceeded since 1983 by means of three-year cost-shared research periods called: 'annexes', and since 2011 also carries out task-shared research. More information about current Annex XII projects and previous annexes can be found on the IEA DHC web site http://www.iea-dhc.org

For the purpose of this document, the term "Operating Agent" shall refer to the management of the IEA Technology Collaboration Programme on District Heating & Cooling (IEA DHC) as represented by its Operating Agent.

Call for
Sustainable District Cooling Guidelines

The IEA DHC Executive Committee (ExCo) through its Operating Agent hereby launches a **Call for Project Proposals.** The project needs to be **finished by May 31st 2019**. The first final draft of the guideline should be made available **by May 3rd 2019**.

Proponents should clearly state and explain how and why their research tackles the well-defined need in this proposal.

Call background

With cooling demand increasing worldwide, a major question for many communities are whether and how to start implementing district cooling solutions. This transition from local air conditioning units to more centralised district cooling can help to reduce peak electricity demand and increase the efficiency of cooling services, while also taking advantage of coupling opportunities in the broader energy system.

The intent of the Sustainable District Cooling Guidelines is to provide an overview of the various elements, technologies, management tools and operational considerations already existing in order to provide insight and guidance on the value and achievement of sustainable district cooling solutions. Examples of real-world district cooling solutions, best practice, innovative solutions and “outside the box” thinking would be appreciated in the development of the guidelines.

Proposals should show how the transition from local (i.e. packaged unit or individual building) cooling technology to district cooling can be both economically favourable and reduce primary energy consumption and its related green-house gas emissions.

The sustainable district cooling guidelines should cover the following aspects:

- System Design:
    - Equipment types/choices and energy performance,
        - A small “encyclopaedia” would be useful – what is typical in district cooling systems, what are some of the generation options for efficient district cooling production, examples of advanced technology, etc.
        - Consideration for interfacing with existing building cooling systems, and key building system characteristics needed to ensure effective connection and optimal primary energy performance
    - Extent of and/or need for automation / smart control in the system (monitoring capacity, fault detection, etc.).
    - Refrigerant choice in chillers.
    - Transmission / distribution losses
    - Auxiliary power demands.
- System performance and evaluation:
    - Information / qualification / methodological quantification of system benefits: how to know when the system benefits outweigh the potential “loss” in efficiency (in terms of cold generation).
    - Clear “thresholds” of what good performance/design should look like.
- Checklist:
    - Provide a comprehensive checklist of things to consider when building a sustainable district cooling system,
        - The checklist shall provide the reader with a means to make sure no vital aspect of sustainable cooling design is overlooked. It should provide a means to consider: “Did you think about this?”
- Quick reference Roadmap:
    - A quick reference roadmap should be included that maps out the steps necessary to implement a sustainable district cooling system.

- Questions to consider:
  - Have clean power options been factored in? Please choose an assessment method that considers what changes cooling demand brings to power demand, and what generators cover this demand in practice. Simply considering power green because it is labelled as green will not be sufficient.
  - Refrigerant choice
  - Transmission/distribution losses: beyond technology choice, what measures can operators take to avoid / reduce these losses and are there best practice examples (e.g. digital monitoring) that can be useful in system design and operations?
  - Efficiency of other system components (e.g. pumping).
  - Seasonality – can it be used at the right times / for enough time – and what will be potential storage needs?
  - Is “waste” cold captured in the systems?
  - Have “free” or natural cooling options been considered?
  - Have you considered how district cooling integrates with existing cooling systems?
  - Have you provided a short guideline on how to reduce cooling demand in general and cooling demand during peak load times of the power grid?
  - Have you shown an exemplary cost comparison of a sustainable district cooling system and a decentralized cooling system and how the economy of district cooling systems can be assessed?

Proposal format

Proposals should contain the following information and should not exceed **2 pages** (Arial 11pt, line spacing 1.3, 2 cm borders. Short CVs (max. 2 pages each) of the research staff doing the work should be added to the proposal.

1.	Title of project
2.	Proposal summary in your words (300 words maximum) Briefly describe your vision of the sustainable district cooling guidelines.
3.	Lead organisation; country, description (one sentence), contact, email
4.	Partner organisation; country, description (one sentence), contact, email
5.	Project plan • State the deliverables and products of the project. • What about these outcomes is new? • How relevant are these outcomes to the international DHC community?
6.	Budget • State the total of your required budget in USD. The budget should indicate the prices for the key work packages.

Evaluation criteria

The proposals will be evaluated based on the following criteria:

1. Fulfilment of the demands
2. Qualification of staff doing the work
3. Overall quality

Format requirements

- All reports should be sent in in “Microsoft Word” and “pdf” format.
- Reports and presentations (including e.g. requirements for graphics) should be prepared as specified by the Operating Agent; templates will be provided. Alternative delivery formats can be suggested to the Operating Agent if they are considered an improvement over the provided templates. They can be used if the Operating Agent provides written agreement.

Deliverables

- Draft final report: Sustainable District Cooling Guidelines (Final Draft).
- Final report after incorporating review comments:
  Sustainable District Cooling Guidelines (Final version).

Publication and property rights

The IEA DHC Operating Agent and the project team will each have a non-exclusive copyright of all project results. Preliminary project results can be published under a creative commons license after the written agreement of the Operating Agent. All results of IEA DHC projects will be public after final delivery and approval. The project team has the right to conduct further projects based on preliminary and final results from projects. This requires proper scientific reference to the research funded by IEA DHC (e.g. “IEA DHC report: title…”). …”).

All project reports will be available to the public on the IEA DHC website (www.iea-dhc.org) and eventually in selected scientific libraries.

Submission conditions

- Communication between the project team and IEA DHC shall be through the IEA DHC Operating Agent (iea-dhc@agfw.de) mainly via email.
- The language of all proposals, reports and any communication with the IEA DHC Operating Agent shall be English.
- Project teams should comprise researchers from at least two IEA DHC member countries.
- All partners have to be from a member country of IEA DHC. The current member countries are: Austria, Canada, China, Denmark, Finland, France, Germany, Korea, Norway, Sweden, United Kingdom and the United States of America.
- Proposals will be judged based on their merit and are expected to be within the range of $30,000 to $50,000 (USD).
- IEA DHC funding is considered international research funding and therefore the proponents are asked to invoice without VAT. Please investigate before applying whether you have to invoice with VAT or can invoice without VAT using the VAT number of the Operating Agent (DE 185180282).
- Proposals should be submitted in “pdf” format.
- The project proposals will be assessed by the Executive Committee of IEA DHC. Project managers will be informed of the assessors’ decision by the Operating Agent in writing. The assessors’ decision will be final and any further correspondence is at the discretion of the Operating Agent.
- The budget should be in USD and will be paid in USD. **The proponent is asked to consider the exchange rate risks if using different currencies internally.** Changes to the budget or the proposal due to exchange risks will not be accommodated after the proposal submission deadline.
- Project managers of IEA DHC projects will be solely responsible for the outcome in respect to IEA DHC. Project partners will be contracted as subcontractors of the project manager and do not have direct communication with IEA DHC. The project

manager is advised to use similar conditions for the subcontracts as are laid out in the project contract with IEA DHC. E.g. IEA DHC reserves the right to charge an administration fee for information received after a mutually agreed deadline. Consequently subcontractors should also be eligible to pay an administration fee for missing deadlines.

- The proposals should be no more than 2 pages + CVs (2 pages each).
- Please ensure that only CVs of the researchers actually doing the work are included. CVs of their heads of department or similar are not required. Changes in personnel doing the work will require the Contractor to send in a CV of the new researcher and a prior written agreement of the IEA DHC Operating Agent to allow inclusion.
- The draft final reports will be reviewed by experts assigned by IEA DHC.

Schedule

The proposal must be sent in PDF format by e-mail exclusively to the IEA DHC Operating Agent at:

IEA-DHC@agfw.de

The proposal must be received by **January 18th 2019 6pm** Central European Time.

Successful applicants will be notified by the Operating Agent by January 31st, 2019.

It is expected that the selected project will start on 1 February 2019 and conclude not later than **May 31st 2019.**

The first draft final version of the "Sustainable District Cooling Guidelines" must be finished by **May 3rd 2019**. The review results will be provided by May 20th 2019.