



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

**ANNEX XII  
(1 May 2017 – 30 April 2020)**

**CALL FOR PROPOSALS  
PROGRAMME PERIOD 2017 – 2020 (ANNEX XII)**

## List of abbreviations

CHP	Combined Heat and Power
CV	Curriculum Vitae
DHC TPC	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
TCP	Technology Collaboration Programme
USD	United States of America Dollars

## **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, the 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 centralised 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 'annexes', and since 2011 also carries out task-shared research. More information about current Annex XI 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.

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## Call for Proposals for Annex XII

The IEA DHC Executive Committee (ExCo) through its Operating Agent hereby launches a **Call for Project Proposals**. This twelfth three-year period (Annex XII) will be run from 1 May 2017 to 30 April 2020.

Proposals may range in duration from approximately 3 months up to a maximum of 30 months, terminating not later than 30 April 2020.

Proposals should be based on one or more of the priority themes as set out below. (Proposals on innovative new issues outside these areas will be considered only at the discretion of the Operating Agent).

Proposals should have clear relevance to district energy<sup>1</sup> practice and provide a clear contribution to a more sustainable energy system. Proponents should avoid duplication of existing research for example within other IEA TCPs.

Proponents should clearly state and explain how and why their research tackles a well-defined need, who will use the results of their research, and to what benefit. Target groups should be clearly specified.

Proposals can cover project types from studies, applied research, to experimental investigations and demonstration projects.

### **Theme 1: System optimisation and asset management**

Background: District heating and cooling systems are complex. The combination of heat sources, the distribution system and customer connections always has to be adapted to local conditions. This theme calls for initiatives that increase natural resource efficiency, efficacy, reliability and cost effectiveness of district heating and cooling systems. The investigated approaches should be applicable to a variety of district energy situations and should address questions currently discussed in the industry or by policy makers. Research should focus on innovative methods, materials and practices such as case studies and demonstration projects in:

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<sup>1</sup> District energy has the same meaning as district heating and cooling and may include combined heat and power generation.

- 1.1. Thermal storage integration<sup>2</sup> – balance between different heating and cooling sources and demand profiles; simulation models; integration of alternative materials and technologies; different time scales
- 1.2. Optimal temperature regimes & transformation strategies – transition from old higher temperature district heating systems to new lower temperature systems; implementation of lower temperature<sup>3</sup> systems where possible; transformation towards operation parameters that support the incorporation of alternative energy sources in general; heat supply and demand transition strategies
- 1.3. Asset management - how to reduce cost without reducing lifetime of assets; design, investment, maintenance and retrofitting strategies for district energy systems to reduce tension between managing costs and balancing / optimising systems
- 1.4. Enhanced control strategies<sup>4</sup> – e.g. using predictive control to optimise systems; strategies for supply, distribution, storage and demand control
- 1.5. Surplus electricity for district heating and cooling - optimisation of the energy system, its planning, design and operation.

## **Theme 2: Cooling & sub-station Technologies**

Background: With cooling demand increasing worldwide, a major question for many communities is how to start implementing district cooling. 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 and air conditioning.

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<sup>2</sup> Proposers should be aware of the IEA Technology Collaboration Programme on Energy Storage (ECES TCP). For more information on this programme please visit <http://www.energy-storage.org>.

<sup>3</sup> Lower temperatures refers to lower forward and return temperatures as well as the resulting lower average temperatures.

<sup>4</sup> Proposers should be aware of the IEA Technology Collaboration Programme on Demand-Side Management (DSM TCP). For more information on this programme visit: <http://www.ieadsm.org>.

Proposals should show how the transition from local to district cooling can be economic and reduce primary energy consumption.

A further issue for district energy companies is optimisation of customer sub-stations. These connection units need to become more efficient, cost-effective and flexible concerning flow rates and temperatures.

Sectors of interest include:

- 2.1. From air conditioning to district cooling – analysis of the benefits and challenges of advanced district cooling systems over distributed air conditioning solutions; optimisation of existing technologies and systems (e.g. controls); demonstration of innovative district cooling solutions
- 2.2. Sub-station optimisation and design – increasing cost-competitiveness of district energy connection by optimal design; best practices for effective deployment and installation; effective fault correction measures and strategies.

### **Theme 3: Policy support & market development**

Background: A major challenge for the deployment of district heating and cooling networks can be the local political and market framework. Laws and regulations as well as market prices influence the economic viability of the technology as a whole and can lead to the preference of less integrated technologies. The following three challenges have been identified that currently need special attention of researchers:

- 3.1. Business models – concepts and best case examples for integrating multiple heat sources, dealing with varying price signals; financing, investment and operation strategies for system growth in an economically viable way
- 3.2. Comprehensive technology assessment – development and application of analytical methods that compare technology combinations as used in district heating applications with business as usual (approaches might address: exergy analysis, life cycle assessment, social impact assessment and/or full cost accounting)
- 3.3. Policy roadmaps and market development - showing viable ways towards an efficient, integrated and cost-effective thermal energy system.

## Proposal format

Proposals should contain the following information and should not exceed **12 pages** (Arial 11pt, line spacing 1.3, 2 cm borders) excluding CVs.

1.	Title of project
2.	Priority theme and sub-theme
3.	<p>Proposal summary (1000 words maximum)</p> <p>Include a clear statement of the research area stating the target audience(s) and the specific issue(s) that will be addressed. Define the end product(s) / deliverable(s) of the research.</p>
4.	Lead organisation; project manager, address, country, telephone number, email
5.	Partner organisations; project participants, addresses, countries, telephone numbers, emails
6.	<p>Objectives / goals</p> <ul style="list-style-type: none"> <li>• What is the principal objective of the project?</li> <li>• How will this research address the needs of the priority theme?</li> <li>• How will the research assist the growth of the District Heating &amp; Cooling Sector? To demonstrate the value to a specific target group (e.g. industry, communities and policy makers) a letter of support would be an asset.</li> <li>• How will the research and its benefits advance sustainable energy systems and be transferable to other countries, particularly those countries who are members of IEA DHC?</li> <li>• In what timeframe will these results occur: short term (&lt; 5 years), medium term (5 to 15 years), long term (&gt;15 years).</li> </ul>
7.	<p>Project plan</p> <ul style="list-style-type: none"> <li>• Describe fully the content of your proposal and the methodology for your research.</li> <li>• Provide a Gant Chart showing the overall project schedule together with major milestones for project review and interim deliverables.</li> <li>• Identify the use of any confidential or proprietary material, equipment, etc.</li> <li>• State the deliverables and products of the project.</li> </ul>

8.	<p><b>Previous research in this area</b></p> <ul style="list-style-type: none"> <li>• What is the current global level of knowledge in this area?</li> <li>• Is this research unique or does it call upon previous work either by the proponent or by others?</li> <li>• If it does call upon previous research, please specify in detail how the intended work follows on from what has already been done.</li> <li>• What linkages or communication exists between this research and other areas of research (other IEA TCPs, universities etc.)?</li> </ul>
9.	<p><b>Budget</b></p> <ul style="list-style-type: none"> <li>• Provide a detailed budgetary breakdown according to the proposed project plan (section 7 of this table) in terms of hours worked, sub-contracts, promotion, travel &amp; accommodation.</li> <li>• Identify and quantify any in-kind contributions from participants (see Appendix A).</li> <li>• Additional cash funding will be regarded favourably. (A letter of intent or similar is required.)</li> </ul>
10.	<p><b>Communication plan</b></p> <ul style="list-style-type: none"> <li>• Describe how you intend to communicate and disseminate your research results.</li> <li>• Outline how your budget supports this plan.</li> <li>• Include details of any related promotional opportunities for the project e.g. webinars, websites, conferences, social media etc.</li> </ul>
11.	<p><b>Project team</b></p> <ul style="list-style-type: none"> <li>• Identify the organisational structure, experience, roles and responsibilities within the project team.</li> <li>• Include CVs of personnel who will be working on this project. These individuals will be specified within the project contract and any changes will require approval of the Operating Agent.</li> </ul>
12.	<p><b>Conflict of interest</b></p> <ul style="list-style-type: none"> <li>• Please declare any conflict of interest.</li> </ul>

## Selection process

Proposals will be assessed according to the following ranking process.

Area	Issue	Score	
		Maximum per issue	Maximum per Area
<b>Technical</b>	Are the expected research results new and significant?	15	40
	Is a high level of technical competence evident in the proposal? Is the methodology appropriate?	10	
	How well does the research contribute to a more sustainable energy system?	10	
	How well does the research plan address the sub-theme specified in section 2 of the proposal?	5	
<b>Management</b>	Is the research team qualified?	10	20
	Is there a sound management structure and is the project plan and budget realistic?	10	
<b>Target group</b>	How well does the proposal demonstrate value to the target group(s)?	10	20
	How relevant will the research results be to IEA DHC member countries?	10	
<b>Information dissemination</b>	How effective is the communication plan? Does it include interim dissemination so that the target audience remains aware of the project?	10	15
	Is there information sharing between the researchers and the final users?	5	
<b>Additional Funding</b>	Has additional funding (including in-kind contributions) been secured and proved by a letter of intent or similar and submitted with the project proposal?	5	5

## Format requirements

- All reports should be sent in in “Microsoft Word” and “pdf” format.
- All presentations should be sent in in “Microsoft PowerPoint” 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.

## Deliverables

Project managers are required to prepare at least the following deliverables:

### During the project

- Status reports (including budget expenditure and a one page status report overview)  
- twice a year one month before the DHC TCP ExCo meetings, usually in April and October. The status reports should summarise the progress of the research in relation to the proposal and include an explanation of any deviations from the original proposal.
- A ‘status presentation’ - updated twice a year and submitted along with each status report. This should comprise a quick overview of project progress and any interim results. It should be aimed at the intended target audience(s) and decision makers.
- Two progress meetings per year involving the assigned group of technical experts designated by the Operating Agent. Over the duration of the project at least one of these meetings, and preferably two should be face-to-face.  
These meetings should be minuted and the minutes should be sent to the Operating Agent no later than two weeks after the meeting took place.

## At the end of the project

- A final public technical report including supporting drawings, models, pictures etc. describing the work completed in the project.
- A summary report of up to 2 pages for decision makers which presents the results in an easily understandable way.
- A technical 2-page summary for publication in international DHC magazines
- An oral presentation of the results at a major conference or meeting relevant to the project target audience and as agreed with the Operating Agent. This presentation should be recorded on video and a copy provided to the Operating Agent for publication.

## Publication and property rights

The 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 final report: title...”).

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

## Submission conditions

- Communication between the project team and IEA DHC shall be through the Operating Agent ([iea-dhc@agfw.de](mailto:iea-dhc@agfw.de)) mainly via email.
- The language of all proposals, reports and any communication with the Operating Agent shall be English.
- Project teams should comprise at least two countries. More than four countries are not recommended.
- The Lead Organisation should be from a member country of IEA DHC.
- Organisations from non-member countries are only permitted to participate as subcontractors.
- Proposals will be judged based on their merit and are expected to be within the range of \$100,000 to \$200,000 (USD). The total budget for this Call is approximately \$700.000 (USD).
- Proposals should be submitted in “pdf” format.
- 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.

## 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 **February 15<sup>th</sup> 2017 6pm Central European Time.**

Successful applicants will be notified by the Operating Agent by End of May, 2017.