



*IEA Implementing Agreement on District Heating and Cooling, including the integration of Combined Heat and Power*

**STRATEGIC AREAS OF INTEREST ANNEX IX**

(May 2008 - May 2011)

**Call for Proposals**

**Programme Period 2008 – 2011 (Annex IX)**

## IEA DHC Areas of Interest themes for Annex IX

*All projects should:*

- demonstrate their relevance to the IEA-DHC participant countries;
- analyse what work already exists within the IEA-DHC portfolio and what other relevant research there is.

Area of Interest	Brief Work Statement for Prioritised Topics
<b>1. Policy Analysis for DHC</b>	
	<p>Given the greenhouse gas and primary energy saving potential of thermal networks, together with fuel flexibility that offers rapid integration of new low and zero carbon technologies, it is proposed to compare:</p> <ul style="list-style-type: none"> <li>- policy drivers in participant countries. Analysis should include the experience in participant countries and may include examples from elsewhere.</li> <li>- barriers to system implementation and expansion in participant countries.</li> </ul> <p>Important elements include:</p> <ul style="list-style-type: none"> <li>- assessment of the EU and national greenhouse gas trading schemes relative to their treatment of DHC and CHP and recommendations regarding their possible future evolution.</li> <li>- evaluation of existing and potential policy measures, including planning policy e.g. zoning, to encourage implementation of DHC and CHP in the context of liberalised electricity markets and greenhouse gas emission constraints.</li> </ul>
<b>2. Improving Pipe Networks</b>	
	<p>Improvements in cost effectiveness and quality of the distribution system remain one of the most effective ways to improve the economy of district energy systems. Important issues include:</p> <ul style="list-style-type: none"> <li>- Technical solutions for prolonging life of systems</li> <li>- Maintenance and renovation strategies</li> <li>- Increasing the quality of network construction, from design to supervision (eg improved jointing methods and quality control and inspection measures for pipe installations on site)</li> <li>- Methods for detecting existing pipelines.</li> </ul>



<p><b>3. Guidelines for Small Scale (up to 10 MW) District Energy Systems</b></p>	<p>A comparison of approaches for application at neighbourhood scale and for remote communities, to include:</p> <ul style="list-style-type: none"> <li>- Circumstances for likely success:             <ul style="list-style-type: none"> <li>o What minimum load demand?</li> <li>o What building sectors?</li> <li>o Availability of fuel</li> <li>o Demand density</li> </ul> </li> <li>- Planning district energy: how to put a scheme together             <ul style="list-style-type: none"> <li>o Who needs to be involved?</li> <li>o Organisational aspects</li> <li>o Financial models</li> </ul> </li> <li>- Technology and fuel scenarios             <ul style="list-style-type: none"> <li>o CHP</li> <li>o Biomass</li> <li>o Renewables other than biomass</li> </ul> </li> </ul>
<p><b>4. District Cooling Equipment at the Customer Side</b></p>	<p>The focus of this topic is mainly heat-based cooling technology based on the use of district heating. It should address in particular schemes with summer surplus heat eg CHP, renewables and locally available waste heat.</p> <p>The project should assess the possibility to combine and integrate district cooling (DC) equipment for two options:</p> <ul style="list-style-type: none"> <li>- Delivering DH to a plant serving a local chilled water network</li> <li>- Delivering DH to heat-based chillers in customer buildings.</li> </ul> <p>The project outcome should be an analysis, which includes the pros and cons with arguments derived from the analysis carried out and investigation of the relative carbon emissions of DC compared to individual systems. The project should assess the two possibilities mentioned above for both the residential and service sectors. It should also specify the main barriers to and drivers for absorption cooling technology, and how it would improve the cost effectiveness of DH.</p>



<p><b>5. Renewable Energy Sources for District Energy Systems</b></p>	<p>District energy (DE) networks offer key advantages for integrating some of the most notable present and future technologies for low carbon and renewable energy sources:</p> <ul style="list-style-type: none"> <li>- centralised treatment of renewables like solar and biomass is easier</li> <li>- central plant can be more readily operated and maintained and run at higher load factor</li> <li>- the flexibility of thermal networks means alternative fuels can easily be introduced.</li> </ul> <p>This project aims to collate information from all participating countries (and elsewhere if appropriate), illustrated with case studies where possible.</p> <p>Aspects of the study should include:</p> <ul style="list-style-type: none"> <li>- where the potential for each type of renewable technology exists</li> <li>- the practicality of integrating each fuel type in small and large DE networks</li> <li>- cost, primary energy and carbon dioxide impact for existing DE networks</li> <li>- cost, primary energy and carbon dioxide impact for new build networks</li> <li>- the progression of DE systems towards zero carbon.</li> </ul>
<p><b>6. District Energy in Future Buildings</b></p>	<p>It is technically possible for buildings to be constructed, through super-insulation, building-scale renewable power generation and other measures, such that they require very little or no energy input from outside the building. However, is this the most economically optimal way to achieve the goal of dramatically reducing fossil energy consumption for operating buildings? And, is this the optimal way for society as a whole to achieve acceptable indoor climate in buildings in all seasons of the year considering costs and consumption of earth resources? What should we do with the waste heat that will always be generated from production plants for the electricity we need in the society? Is it more cost-effective to achieve the goal of creating a sustainable world through delivery of waste heat and renewable energy from district energy plants to high-efficiency buildings?</p> <p>The IEA-District Heating and Cooling Implementing Agreement seeks life-cycle cost comparison of alternative means for reducing consumption of non-renewable resources to meet the energy requirements of buildings. The comparison should address a range of technology approaches, from very little input of energy from outside the building to district energy approaches that integrate community renewable energy and waste heat recovery resources with highly efficient buildings.</p>