Stakeholder coordination for district cooling development

District Energy in Cities
A Global Initiative to Unlock the Potential of Energy Efficiency and Renewable Energy

Jointly prepared by: UN Environment & The Carbon Trust

Stakeholder coordination training workshop, Thane
• Include Hotmaps framework for stakeholder groups
• Include Carbon trust
• Stakeholder composition: based on Devine-Wright

• (go thematically or go by group?)
“In launching this report we want to draw the attention of the world’s decision makers, mayors and leaders at the community level to the importance of district energy systems.”

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>ASSESS</strong> existing energy and climate policy objectives, strategies and targets, and identify catalysts</td>
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<td>2.</td>
<td><strong>STRENGTHEN</strong> or develop the institutional multi-stakeholder coordination framework</td>
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<td>3.</td>
<td><strong>INTEGRATE</strong> district energy into national and/or local energy strategy and planning</td>
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<td>4.</td>
<td><strong>MAP</strong> local energy demand and evaluate local energy resources</td>
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<td>5.</td>
<td><strong>DETERMINE</strong> relevant policy design considerations</td>
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<td>6.</td>
<td><strong>CARRY OUT</strong> project pre-feasibility and viability</td>
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<td>7.</td>
<td><strong>DEVELOP</strong> business plan</td>
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<td>8.</td>
<td><strong>ANALYSE</strong> procurement options</td>
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<td>9.</td>
<td><strong>FACILITATE</strong> finance</td>
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<td>10.</td>
<td><strong>SET</strong> measurable, reportable and verifiable project indicators</td>
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District cooling is not just about air-conditioning!

District cooling is an opportunity to integrate city-systems in a smart way, lowering costs and making cities more green, clean, resilient and livable.

But it needs municipal leadership to realise projects and unlock diverse benefits

This is why city-led coordination is so crucial to delivering a city’s district cooling ambitions.

Thane Rapid Assessment Report for District Cooling - Analysis of structures for stakeholder coordination in Thane

Online Virtual Platform (upcoming) - Online knowledge centre of training material, tools, methodologies and best practice case studies

Available from: http://districtenergyinitiative.org
• Establishing a **stakeholder-coordination framework or structure** is key deliverable for all pilot cities in the Initiative (as per 10-step methodology)

• Global best practice can be **adapted** to Thane
  - Champion cities
  - Consultancies & Initiative partners
  - Similar national/local programmes & lessons

• Structures from other city units could be replicated (e.g. Smart City Cell) and other stakeholder groups

• **Replicable guidance** can be promoted to other Indian cities
  - Methodology and Terms of Reference
  - Training material
  - Thane support to regional trainings
How Thane can show leadership

- Thane could promote, enable and accelerate district cooling projects locally by establishing and leading a District Cooling Cell and a local DC Stakeholder Group of city departments, developers, utilities, trade body associations etc. to ensure the coordinated development of district cooling across the city.

- UN Environment has prepared a recommended draft ToR for a District Cooling Cell and a local DC Stakeholder Group

- Having well-respected advocates represented in such a DC Stakeholder Group could help to raise the profile of district cooling activity in Thane and build stakeholder support for this infrastructure.

- Coordination by the District Cooling Cell could include:
  - Oversight of the development of a pipeline of district cooling projects across the city and development of a long-term strategy for the connection of clusters
  - Developing and implementing planning policies to secure the connection of new development to district cooling systems and ensure new buildings are futureproofed for connection
  - Coordinating the timing of the laying of utilities and roadworks in order to save costs and minimize disruption.
  - Developing financing mechanisms and business models to support district cooling (e.g. project aggregation)
  - Receive appropriate training, dissemination of advice and information
Thane’s District Cooling Cell

- State and MMR governments and agencies
- Coordination support to individual projects
- Local DC Stakeholder Group
- National replication

City-level coordination of district cooling
- Strategy
- Mapping
- Planning
- Policy & Advocacy

Coordination support to individual projects
- Approvals/Permitting
- Network routing
- Stakeholder engagement
1. Define scope - could start as District Cooling and then widen to longer-term energy developments
2. Define a Terms of Reference with clear roles and responsibilities
3. Identify lead persons/department and dedicate resource
4. Ensure clear accountability and transparency in decision-making
5. Avoid complex accountancy and governance levels
6. Regular meetings and reporting
7. Support replication to other Indian cities
SETTING UP A DC STAKEHOLDER GROUP

1. Map stakeholder responsibilities in DC
2. Define membership of a stakeholder coordination structure in Thane
3. Regular meetings and reporting
4. Potential members:
   - TMC departments: public works, planning, electrical, finance, legal, water, sanitation, pollution, Thane Smart City Development Corporation Ltd. (TSCDCL)
   - Mumbai Metropolitan Regional Development Authority (MMRDA)
   - Maharashtra Energy Development Agency (MEDA)
   - Energy Efficiency Services Limited (EESL)
   - ICLEI SAS
   - Mahanagar Gas
   - Maharashtra State Electricity Distribution Company Limited (MSEDCL)
   - Maharashtra Chamber of Housing Industry (MCHI), Thane Unit
   - Indian Institute of Architects, Thane and Mumbai Centre
   - Major real estate developers in Thane (e.g. Hiranandani)
   - Thane Small Scale Industries Association (TSSIA)
   - Thane Belapur Industries Associations
   - ISHRAE
COORDINATION AT THE CITY-LEVEL
At the **city-level** strong coordination of stakeholders can deliver:

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>Incorporation of DCS into diverse, existing city strategies, targets and plans that integrate city systems</th>
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<tbody>
<tr>
<td>MAPPING</td>
<td>Improved data and knowledge sharing for district cooling and energy mapping</td>
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<td>Early project identification</td>
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<td>PLANNING</td>
<td>Development of a long-term city plan for DCS</td>
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<td>Coordination from state-level to city-level planning for DCS</td>
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<td>POLICY</td>
<td>Multi-stakeholder input to policy development</td>
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<td>Advocacy for policy change</td>
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Cities can drive DCS development towards city **objectives** by incorporating DCS into existing **strategies and targets** using DCS to **integrate** multiple sectors and city systems.

- The Initiative is developing a specific training module on incorporating DCS into strategies to be available on the Virtual Platform.

Coordinate city-departments and external stakeholders to consider DCS benefits to:

- Smart City and electricity efficiency/resilience
- GHG emissions and renewables
- Waste management
- Water stress
- Air pollution
- Urban resilience & emergency planning
- Energy Access
STAKEHOLDER COORDINATION TO SUPPORT STRATEGY DEVELOPMENT

URBAN RESILIENCE

• Use trigeneration to provide dedicated disaster relief buildings that continue to provide power and cooling during disasters, blackouts and heatwaves
• Keep hospitals and vital infrastructure powered and cooled during blackouts with trigeneration and thermal storage
• Evaluate role of DC, particularly with thermal storage, free cooling (lakes, rivers, underground reservoirs etc.) or underground heat rejection, in lowering Urban Heat Island Effect (e.g. Shenzhen, Paris)
• Emergency water wells combined with heat exchange
STAKEHOLDER COORDINATION TO SUPPORT STRATEGY DEVELOPMENT

WATER & SANITATION

- Reduce potable water use for cooling by making available Treated Sewage Effluent (TSE) for district cooling
- Use freshwater extraction pipes from rivers/reservoirs/lakes/aquifers as a cooling source or to remove excess heat (e.g. Toronto)
- Geothermal wells provide emergency water supplies (e.g. Paris, Milan)
- Running district cooling pipes through urban sewage system (e.g. Paris) or in multi-utility tunnels alongside water, sewage, power and fibre-optic.
- Biogas from wastewater treatment used in trigeneration
- Excess heat from sewage can be used for heating/hot water demand
GHGs & LOW-CARBON DEVELOPMENT

- Provide data and support to assessments on the impact of cooling, heating and hot water by sector on CO$_2$ emissions and refrigerant emissions
- Incorporate district cooling into strategies, targets and plans for CO$_2$ reductions
- Incorporate district cooling into refrigerant phase-out plans
- Coordinate the monitoring, reporting and verification of GHG emissions and reductions through district cooling
ELECTRICITY AND GAS PLANNING

• Analyse impact of cooling on electricity grid and % of power demand
• DCS can provide low-carbon, reliable power to critical infrastructure or high power loads (e.g. municipal EV charging points, hospitals, data centres, disaster shelters)
• DCS can lower capacity constraints and increase the resilience of the power grid
• Direct selling of low-cost renewable power to DCS (open-access)
  ▪ improve commercial viability
  ▪ ensure renewable power is used in the highest efficiency application
  ▪ exert municipality influence on the DCS (e.g. reduced DC rates for municipal buildings in return for low-cost power etc.)
• DCS can deliver on electricity objectives in a city’s Area-based development under the Smart City Mission
• DCS can unlock higher renewables shares linked to Solar City Master Plan
• How gas expansion in Thane can unlock trigeneration projects
WASTE MANAGEMENT

- Role of waste incinerators to sell excess heat to district cooling systems (through absorption chillers) and power (through electric chillers)
- Waste incinerators provide steam or hot water to industry applications
- Coordinating transmission pipeline of waste heat from incinerators to DCS system
- Biogas production for use in trigeneration
STAKEHOLDER COORDINATION TO SUPPORT STRATEGY DEVELOPMENT

AIR POLLUTION

• Determine if diesel gensets or local coal plants contribute to local air pollution and identify DCS and trigeneration role in reducing their use.

SMART CITY PLAN

• Align district cooling to key themes and sub-goals under Smart City Plan and its role in meeting Smart City objectives on: smart metering and monitoring of water; infrastructure for IT/ITeS and education, increase share of renewable energy; reuse of wastewater; decentralised wastewater treatment etc.

• Assess the incorporation of DC under Thane’s Area-Based Development proposal and the area-design or linking of nearby DC projects (e.g. private wiring of trigeneration power to the smart city area)
Identify potential DC projects, heat/cool sources and expansion and interconnection opportunities. Identify priority and opportunity zones for DC. Engage stakeholders and raise public awareness.

- The Initiative is developing a GIS energy map with Thane and a specific training module on energy mapping

- Map existing and upcoming energy demand and supply
- Identify potential DC projects and expansion and interconnection opportunities.
- Plan connections of waste heat and renewable sources
- Identify priority and opportunity zones for DC.
- Engage stakeholders and raise public awareness.
- Identify sector integration opportunities
Collection and update of data in an energy map requires diverse stakeholder input.

**e.g. existing and upcoming building developments**
- Real estate developers
- Building owners
- Department of Planning

**e.g. benchmarks for cooling and power demand**
- Building owners, developers, architects
- DISCOMs
- AHSRAE/ISHRAE

**e.g. waste heat sources & renewables**
- Industry groups
- Incinerators, power plants
for example...industry

- Identifying waste heat from local industry for connection to absorption chillers in DCS
- Identifying industrial users of cooling (manufacturers, data centres etc.)
- Identifying industrial users of steam/hot water to trigeneration (e.g. textiles, food-processing, paper etc.)
- Identifying industrial users of power to trigeneration via private wiring
Cities can unlock long-term investments in DCS through coherent long-term plans for district cooling and the integration of energy into urban and infrastructure planning.

The Initiative is developing a 20-year District Cooling Plan with Thane and training material to integrate DCS into urban and infrastructure planning.

**SHORT-TERM**
- Initial individual networks develop in highest potential sites

**MEDIUM-TERM**
- Initial networks expand connecting new customers

**LONG-TERM**
- Networks interconnect & connect large waste heat and renewable sources
"You often have land-use folks saying let’s put the buildings here, and transport planners saying how do we get people moving around – and then almost as an afterthought, folks say, well, how do we provide energy to the neighbourhood?

In Vancouver, we pioneered the integration of these various issues into our community building and urban planning."

Sadhu Johnston, City of Vancouver
Coordinate city-departments and external stakeholders to incorporate DCS within:

- Electricity and gas plans
- Sanitation and water plans
- Waste management plans
- Smart City Plan
- Planning policies and urban zoning
- Transport
- State-level plans
The Mayor will work with the relevant energy companies, Ofgem the regulator, national Government, the boroughs, developers, business representatives and others to promote strategic investment in electricity and gas infrastructure where and when it is required to accommodate the anticipated levels of growth in London.

“The Mayor will work with the relevant energy companies, Ofgem the regulator, national Government, the boroughs, developers, business representatives and others to promote strategic investment in electricity and gas infrastructure where and when it is required to accommodate the anticipated levels of growth in London.

The forecasting of requirements should take into account the opportunities and impacts of decentralised energy and demand management measures.”

The London Plan, 2016
for example...linking buildings, power and transport

Transport, electrical and planning dept, DISCOM and EESL can coordinate through the District Cooling Cell to use DCS to meet joint objectives:

• e.g. co-locating EV charging points to current/planned cooling demand
• e.g. investing in trigeneration rather than electricity network expansion in constrained areas of network
• e.g. laying DCS network at the same time road surface
for example...updating planning rules and zoning

Coordinate inputs and consultation of real estate developers, building owners, planning dept. and EESL to:

- e.g. secure concession zones for district cooling systems
- e.g. require new buildings to assess connection to DCS or development of new DCS
- e.g. update municipal zoning and FSI requirements to encourage dense, mixed-use developments suitable for DCS
- e.g. planning incentives for buildings developing/connecting to DCS
CASE STUDY: LONDON

- Catalysing network development
  - Large building developers must develop district heating if connection unavailable
  - Large new waste heat sources must accommodate connection to district energy
  - London required its 32 boroughs to carry out energy master planning

- Encouraging connections
  - Large building developers must connect to local district heat networks if available

- Coordination
  - London established a dedicated city unit that coordinates long-term development of district energy in the city
Cities can incentivize and remove barriers and risks to DCS development through streamlined approvals and permitting procedures, local policy development and advocacy for state or national-level policy changes.

The Initiative will work with Thane to design new policies and provide training material on urban, state and national policies for DCS.

**Analysis of local policy options**
- Fiscal incentives
- FSI bonus
- District cooling ready buildings
- Connection policies
- Concession contracts
- ‘Open-access’

**Advocate for state/national policy**
- VAT/GST incentives
- Power tariffs for thermal storage
- Trigeneration grid connection
- Standards
- Building codes

**Thane’s District Cooling Cell**

**Streamlining**
- Clear permitting procedures
- Fast approval process
for example...local building policies

- Align DC with rollout of Energy Conservation Building Code (ECBC) in Maharashtra (joint workshops, demonstration projects, incentives)
- Adapt DCR to include FSI bonuses for buildings that develop or connect to DC networks
- Adapt DCR to require ‘DC ready’ buildings in particular priority zones
- Incorporate DC into rehabilitation plans for urban neighbourhoods including retrofitting of cooling systems
- Require new large-scale developments to include DC
COORDINATION AT THE PROJECT-LEVEL
WHY IS STAKEHOLDER COORDINATION IMPORTANT FOR DC?

At the **project-level** a District Cooling Cell could **lower overall costs**, significantly **lower risks** and create a **more attractive project** to investors.

Design challenges:

- Early incorporation of DCS into area design
- Meeting developer timeline
- Network routing with other utilities

Permits and approvals from multiple departments and stakeholders

- Planning: Energy center and network route
- Utility connections
- Rights-of-way on public and private lands
- Approvals (e.g. road diversion, excavation, access to land)
STAKEHOLDER COORDINATION FOR DEVELOPMENT OF DCS POLICY

• District Cooling Cell and DC Stakeholder Group members (DISCOM, water, gas utility, sanitation dept. etc.) have knowledge of:
  • Existing pipe network under Thane’s streets
  • Planned public works or road relaying

• District Cooling Cell can help projects lower costs by:
  • Identify underground obstacles (e.g. water main) during design and construction
  • Co-locate DC pipes with other infrastructure
  • Undertake maintenance works on other utilities or road relaying in parallel to DC network construction

for example...network routing with other utilities
Thane Municipal Corporation and the DC Cell can lead stakeholder engagement at the city-level to support projects alongside engagement by individual project proponents.

**Stakeholder engagement: Why do we care?**

- It protects organisational reputation
- It de-risks projects and makes positive investment decisions more likely
- Creates projects that will actually happen, products that people buy, ideas that people accept
Two possible stakeholder engagement scenarios

**Gone wrong**
- Lack of information - misunderstandings
- Bad decisions taken on bad information
- Nasty surprises at decision points
- Unnecessary extra time and cost
- Negative impact on credibility
- Project goes nowhere

**Gone well**
- Good governance
- Appropriate resourcing and input
- Predictable decision-making process
- Robust decisions taken on good information
- Strengths and weaknesses are understood
Stakeholder engagement: What it is – and what it’s not

<table>
<thead>
<tr>
<th>What stakeholder engagement is</th>
<th>What stakeholder engagement is not</th>
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<tbody>
<tr>
<td>Genuine two-way process</td>
<td>One way communication</td>
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<tr>
<td>Meaningful dialogue where views are respected and taken seriously</td>
<td>Process where views are managed and people driven in one direction</td>
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<tr>
<td>A collaborative exercise to reach a solution that works</td>
<td>Pitching or selling a pre-determined solution or project</td>
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<td>Focused on outcomes – e.g. a project that everyone buys into, general happiness</td>
<td>Focused on outputs – interviews have been held therefore stakeholders have had their say</td>
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<tr>
<td>Structured and systematic engagement</td>
<td>Conversations with the people you know or think you need to talk to</td>
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<tr>
<td>Change</td>
<td>Behaviour change</td>
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Varying the engagement throughout the project development process

- **Pre-feasibility**
  - Introduce stakeholders to the project, collect technical and financial information to inform project feasibility

- **Feasibility and business case**
  - Understand stakeholder commercial appetite, quantify project risk, outline relationship terms

- **Commercialisation**
  - **Negotiate** contracts and secure commitment to connect, manage expectations during construction

- **Construction**

- **Operation**
  - Keep stakeholders satisfied
1. Identification
Stakeholder groups, organisations and individuals are identified. The stakeholder list is refined as the project progresses.

2. Mapping
Stakeholders are mapped and profiled to understand the nature of their interests, goals and motivations.

3. Prioritisation
Stakeholders are prioritised and visualised on an Influence-Interest Grid.

4. Planning
Appropriate communication channels and resourcing are allocated to stakeholders according to their level of priority. Tailored key messages are developed.

5. Engagement
Emphasis is put on ensuring that all stakeholders understand the purpose of the engagement, as well as the background and strategic vision for the project.
<table>
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<tr>
<th>Role</th>
<th>Description</th>
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<tr>
<td>Promotion</td>
<td>Party with the motivation to establish a successful district energy network and which takes responsibility for driving delivery.</td>
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<td>Customer</td>
<td>A heat/cool customer will contract with a Supplier who will provide their heat/cool in exchange for a promise to pay. The Customer may be a commercial entity, a domestic tenant or homeowner.</td>
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<tr>
<td>Governance</td>
<td>The Governance role includes setting objectives, prescribing policies and rules of conduct and overseeing performance.</td>
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<td>Funding</td>
<td>The Funder arranges finance and enters into agreements with the funding recipient. This role often ceases once finance has been repaid.</td>
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<td>Asset Ownership</td>
<td>The Asset Owner owns the physical assets of the network. Ownership could be split between different classes of assets.</td>
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<tr>
<td>Land Ownership</td>
<td>The role of the land owner, in this context, is to grant leases and easements for the siting of network assets and provide rights of access for the installation, operation and maintenance of plant and equipment.</td>
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<tr>
<td>Landlordship</td>
<td>The Landlord, in this context, owns the buildings in which network assets and heat customers are located.</td>
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<tr>
<td>Development of property</td>
<td>The parties responsible for constructing or maintaining the buildings which will receive heat from the heat network. This encompasses developers of new properties and owners of existing properties.</td>
</tr>
<tr>
<td>Installation and Operation</td>
<td>The installer designs and installs the heat network (typically primary, not secondary network). An Operator is responsible for the operation and maintenance of the heat network in such a manner as to ensure that heat of suitable quality and quantity can be delivered to Customers.</td>
</tr>
<tr>
<td>Sale of Heat</td>
<td>The sale of heat as a service is a logically distinct role from the physical delivery of heat to customers, as can be seen in the nationally regulated UK electricity and gas markets.</td>
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As well as a District Cooling Cell in Thane, individual projects should establish small coordination groups. Structures such as existing or new project boards and working groups should be used to progress the project efficiently and obtain approvals.

**Key considerations:**

- Should have basic **Terms of Reference** to give the necessary clarity and accountability to those inside and outside the group.
- **Governance reporting and progress reviews** should be commensurate to the work being done and stage of project development.
- Review of **barriers and performance** should dovetail with existing governance structures.
- Processes should be agreed for how performance and progress is reviewed against known **risks** in the project risk register.

**Key activities:**

- Set out and communicate widely the **project vision**, focusing on the interaction between different priorities.
- Gather necessary **information** to develop the project.
- Review **business models** and **sign-off** the study **outputs**.
Stakeholder engagement makes projects more likely to happen

**Barnsley: what was achieved?**

1. Helped **avoid crisis** associated with the opposition of the Better Barnsley development team and delivery partners

2. Engagement with prospective customer **Barnsley College** developed their interest in acting as an **investment partner** of Barnsley Council

3. Engagement with prospective customer **Digital Media Centre** revealed their ownership of stranded biomass assets and interest in providing generation capacity to the scheme

- Supporting the development of a portfolio of district energy projects across 11 local authority areas in the Leeds City Region with a combined capital value of >£90m.

- Regional coordination through the Leeds City Region District Energy Programme – led by the combined authority

**Key Outcomes**

1. Used stakeholder intelligence to shape direction of project
2. De-risked the project through a greater understanding of stakeholder perspectives
3. Improved the viability of the investment opportunity to make the project more likely to happen
Velenje, Slovenia has an energy agency, KSSENA, to facilitate the implementation of its energy concept, including modern district energy.

- Dedicated team manages coordination on energy in the city
- Manages development of energy plans and strategy
- Supports energy management (audits, accounting, benchmarking, feasibility studies)
- Project support (financing, cooperation with energy companies, tender evaluation)
Use district heating in all new buildings and major renovations within the concession area for district heating.

Municipal master plan, which closely links energy, urban development and transport.

Develop district heating along light-rail minimizes disruption.

Established group of companies and agencies named the **Digging Club**
- district heating network owner
- water and sewage departments
- waste management company
- local electricity distribution operator
Benjamin Hickman
Technical Expert
District Energy in Cities Initiative
benjamin.hickman@un.org