

International Energy Agency Implementing Agreement on
District Heating and Cooling including Combined Heat and Power
Annexe XI

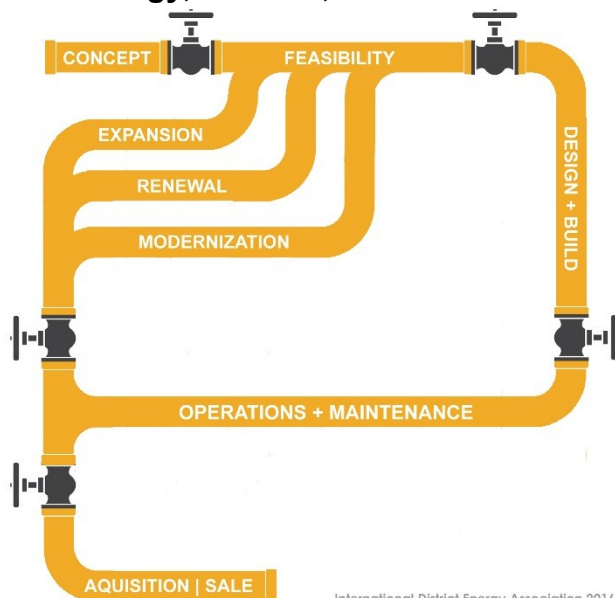
SUMMARY

District energy (DE) systems are recognized worldwide for advancing social, environmental, urban sustainability and economic development objectives, while providing economic value to the communities, cities, campuses and districts they serve. They make up the backbone of the efficient, reliable and resilient infrastructure that supports heating and cooling needs in many cities, communities, hospitals, airports and campuses. They play a critical role in supporting education, research, commerce, industry and a vibrant community life for local economies. Heating and cooling solutions deployed at a community or district scale, rather than by individual buildings, offer solutions to many challenges:

- Grappling with the round-the-clock demands and energy intensity levels of key sectors such as hospitals, research and education campuses, and data centers
- Supporting urban growth with a more resilient energy infrastructure
- De-carbonizing the energy infrastructure to meet climate action goals
- Creating an inviting environment of economic development and business enterprise
- Providing electric grid support, peak load management and enhanced efficiency through technologies such as thermal storage and combined heat and power (CHP).

By aggregating the heating and cooling loads of dozens or even hundreds of buildings DE systems are able to leverage scale to incorporate local resources, resulting in job development and retention while circulating economic benefits in the local economies.

Technology, Finance, Business Models and Governance



While technology solutions must be designed and constructed with best practices, even more essential to a system’s success is ensuring its economic viability through sustainable business models for service delivery to attract end-users and financing. The choice of business models and type of financing is determined by system objectives and projected lifecycle, which could be new system deployment, expansion of an existing system to meet growing load demands, or the renewal of assets that have reached the end of their useful lives.

The ownership and management models range from a pure public sector venture to a purely private sector approach. In between, a range of hybrid options involving varying blends of both private and public sector financing, design, operation, fuel supply, day-to-day management and decision-making are possible. The key differentiating factors are:

- **Control:** over project objectives
- **Risk:** the project is willing to carry to exercise control
- **Finance:** the project's return on capital relative to hurdle rates and costs of capital

Successful business model are characterized by the appropriate balance between risk and control, appropriate financing as well as ongoing governance of the objectives and overseeing the use of best practices.

Policy with a Purpose

Of particular value are policies aimed at reducing market uncertainties such as customer connection and uptake. Supportive local policies help to attract private capital and accelerate deployment. While often led by local policy, there is a need for alignment and for the

development of mutually reinforcing policies at all levels of government.



Key factors for Success

For a project to successfully

navigate through the different lifecycle stages, maintain momentum and enable all participants to work toward project objectives, attention must be paid to key factors for good decision-making. Five key factors have been identified as critical components of strategies for success:

1. **Risk:** identifying, allocating and managing risk
2. **Information:** gathering and disseminating information needed for decision-making
3. **Money:** managing funds to align with the system lifecycle stage needs
4. **People:** including appropriate people and experts as needed in decision-making
5. **Tools:** using available tools to improve decision-making

Success Stories, Best Practices and Lessons Learned

There is a significant body of work showcasing the accomplishments of DE systems and their success in meeting a range of objectives. This report is structured as a guide to help practitioners, policymakers, customers and communities explore success factors, approaches, best practices and strategies leading to the progression of projects from concept to delivery and sustain them through their productive long lifecycles. A few useful tools are also provided.



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