# IEA DHC Annex TS8: Experimental investigations of DHC systems

## Annex Presentation, 2024

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# IEA DHC Annex TS 8 - Experimental investigations of DHC systems

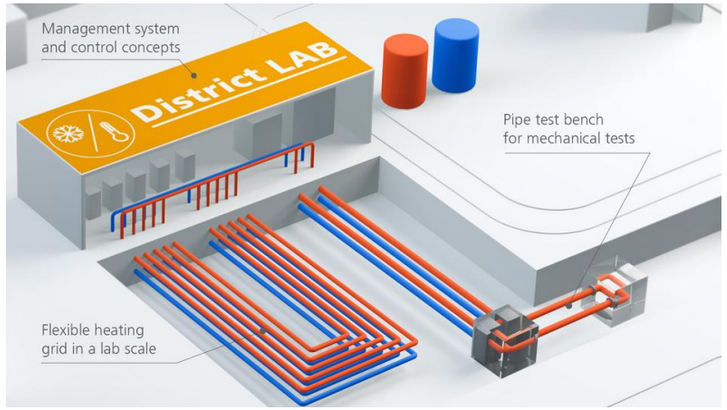
## Background and Motivation

- Successful transformation and expansion of DHC-networks
- Application of flexibilization, digitalization and sector coupling approaches
- New operating strategies for multivalent and volatile use of heat sources

**Laboratory and field experiments in conjunction with software-based and digitized applications (e.g., digital twins) can enhance and improve the performance of DHC systems**

- Comparison of simulation and experimental findings can help to improve simulation models
- Correct data leads to correct simulation results to facilitate successful expansion of DHC

**Minimizing data-related risks for fast and successful deployment of DHC networks**

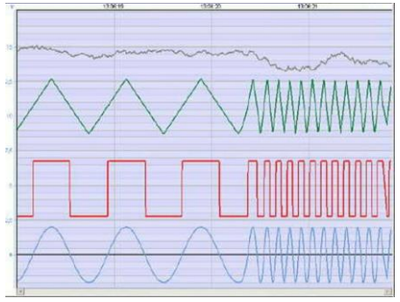


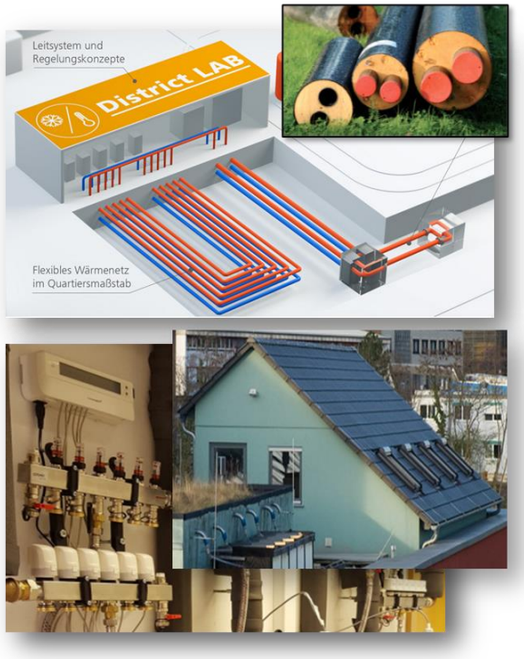

# IEA DHC Annex TS 8 - Experimental investigations of DHC systems

## Targets and main working items

**Advance and demonstrate experimental research for district heating expansion by identifying appropriate digital technologies, robust data bases, and linking experimental facilities.**

- Assessment and identification of **requirements for experimental und flexible investigations** for future DHC supply
- Collection and compilation of **design and control methods** by digital approaches
- Identification and consolidation of **available data bases** for software-based and experimental investigation
- Identification and collection of potentials for **linking of available experiential facilities**
- Creating an **overview of experimental setups**





# Experimental investigations of DHC systems
## Key messages

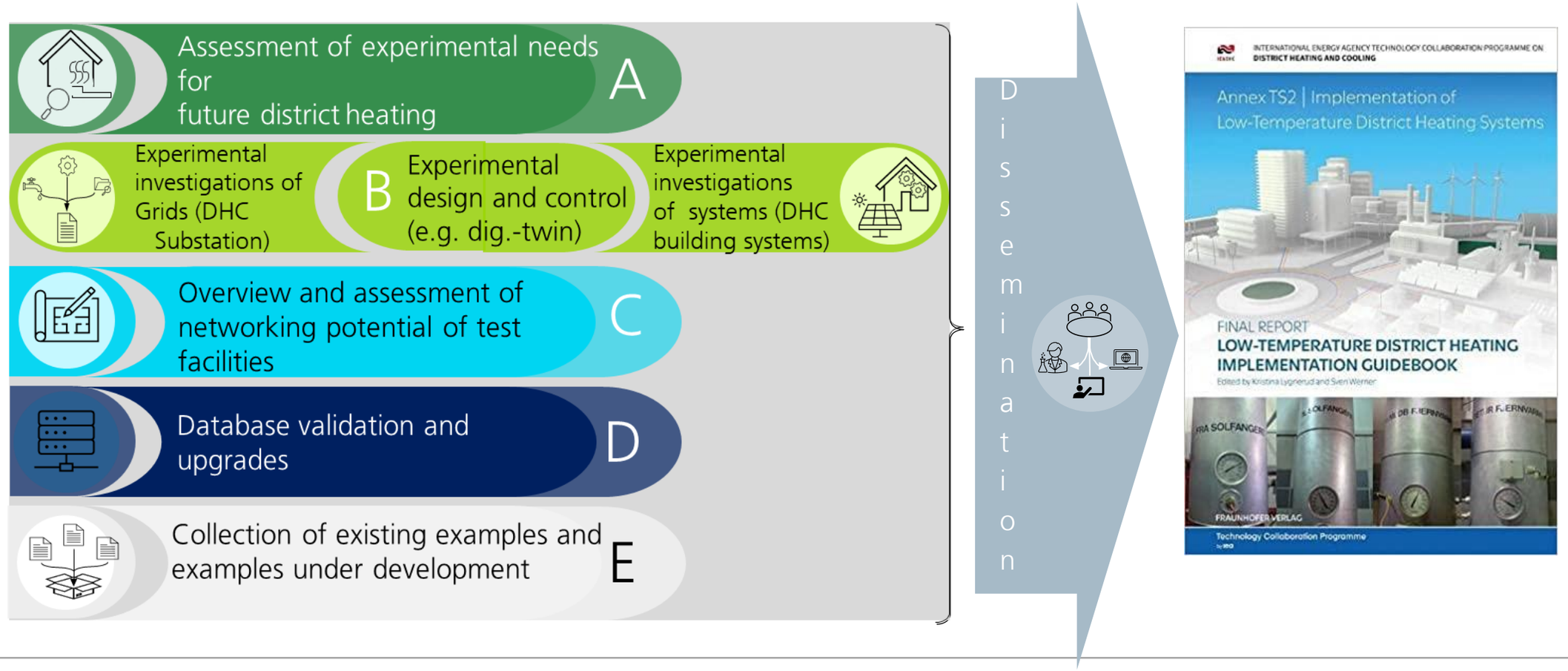
- Successful transformation and expansion of DHC networks requires flexibility, digitisation and sector coupling approaches to develop new operational strategies for multivalent and volatile use of heat sources

- Laboratory and field experiments combined with software-based and digitised applications (e.g. digital twins) can enhance and improve the performance of DHC systems

- The use of correct data for experimental and software-based investigations helps to minimise data-related risks for the rapid and successful deployment of DHC networks

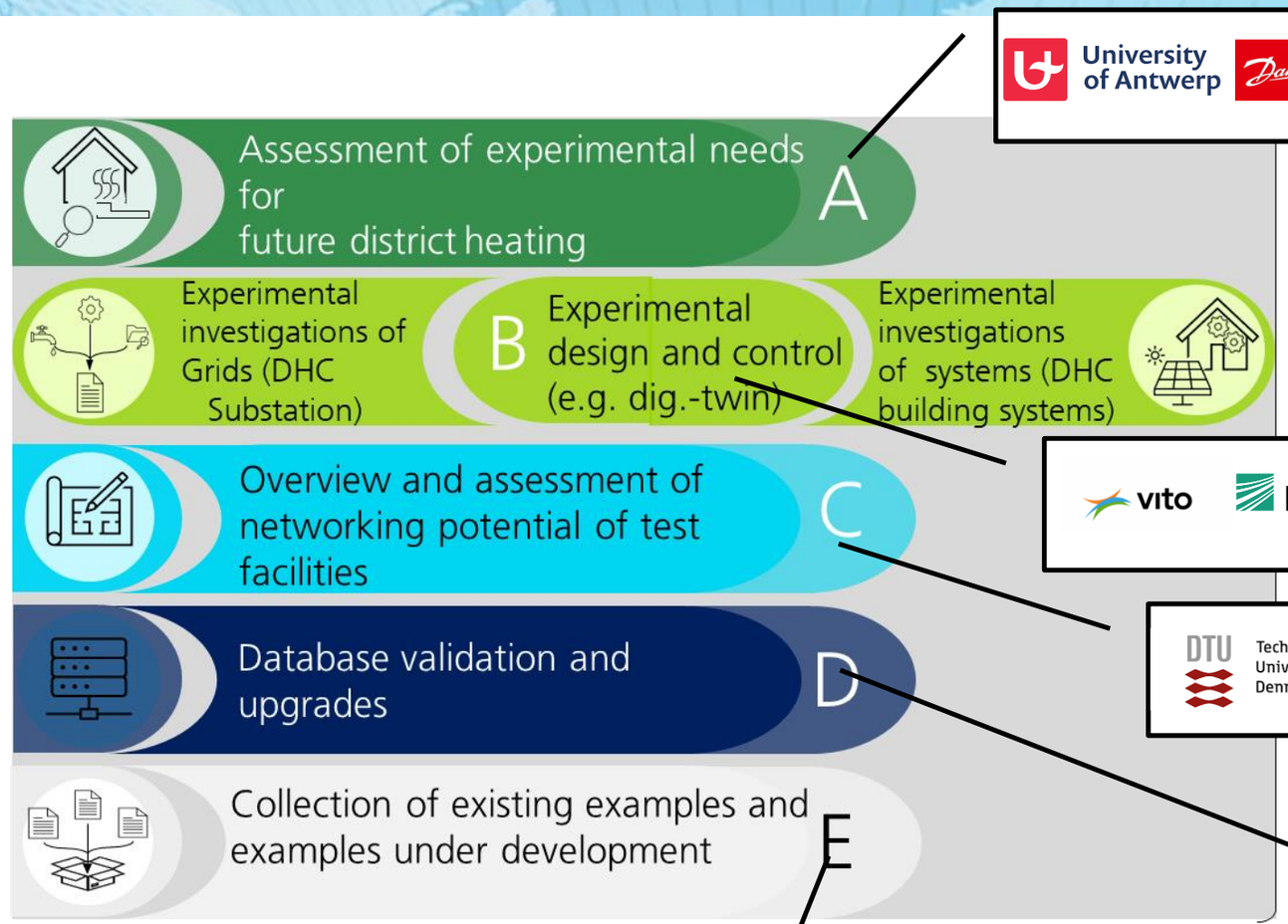
# IEA DHC Annex TS 8 - Experimental investigations of DHC systems

## Structure of the Annex



# IEA DHC Annex TS 8 - Experimental investigations of DHC systems

**Proposed subtask leaders**

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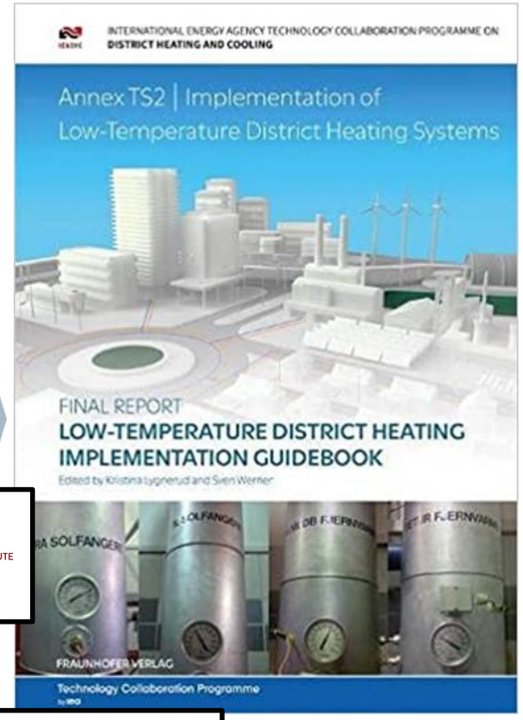
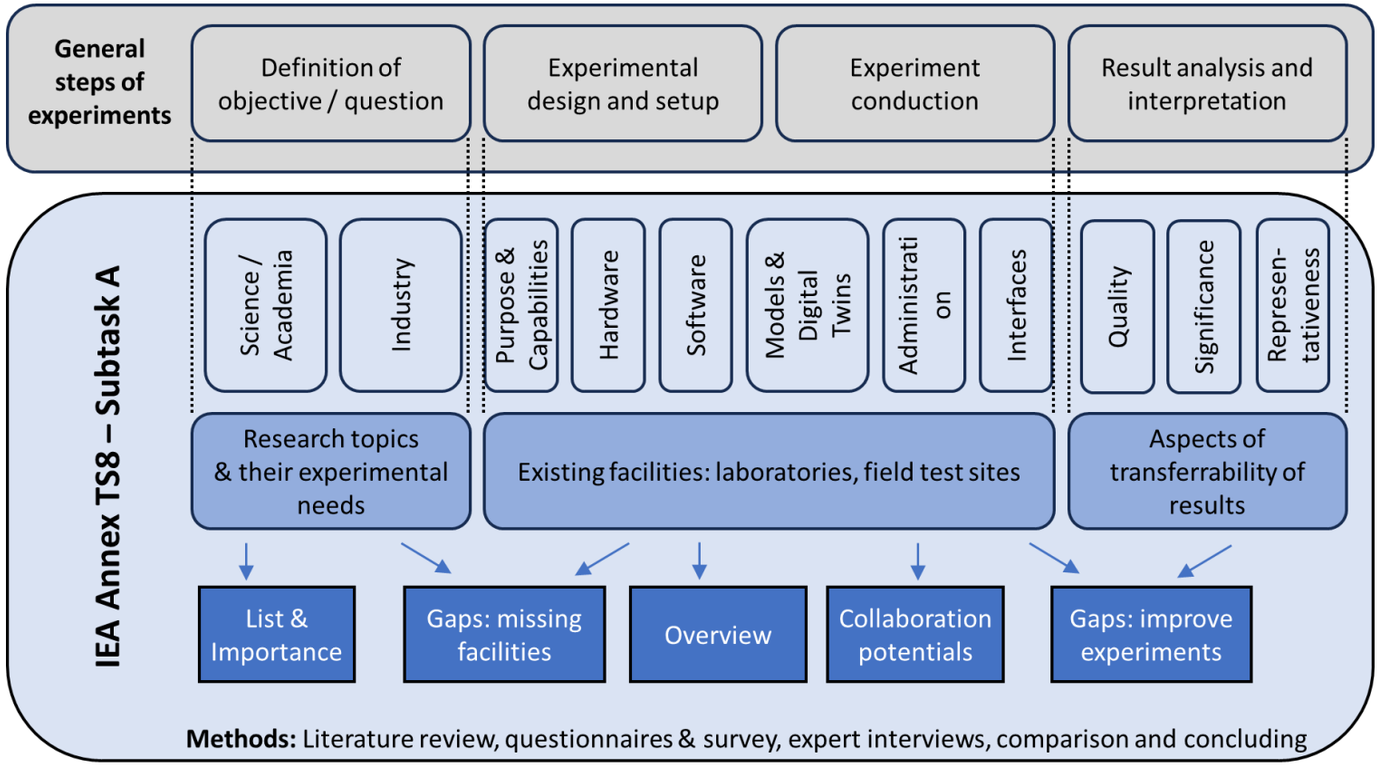


# Schedule

| Subtask Progress | Preparation Phase | | Working Phase | | | | | | Reporting |
|---|---|---|---|---|---|---|---|---|---|
| | 2023 | | 2024 | | 2025 | | 2026 | | 2027 |
| A: Assessment of experimental needs | | | | | | | | | |
| B: Experimental design and control | | | | | | | | | |
| C: Database validation and upgrades | | | | | | | | | |
| D: Networking potential of test facilities | | | | | | | | | |
| E: Overview and assessment of networking potential of test facilities | | | | | | | | | |
| D: Collection of existing examples and examples under development | | | | | | | | | |
| E: Dissemination | | | | | | | | | |
| Annex Meeting | • | • | • | • | • | • | • | • | • |

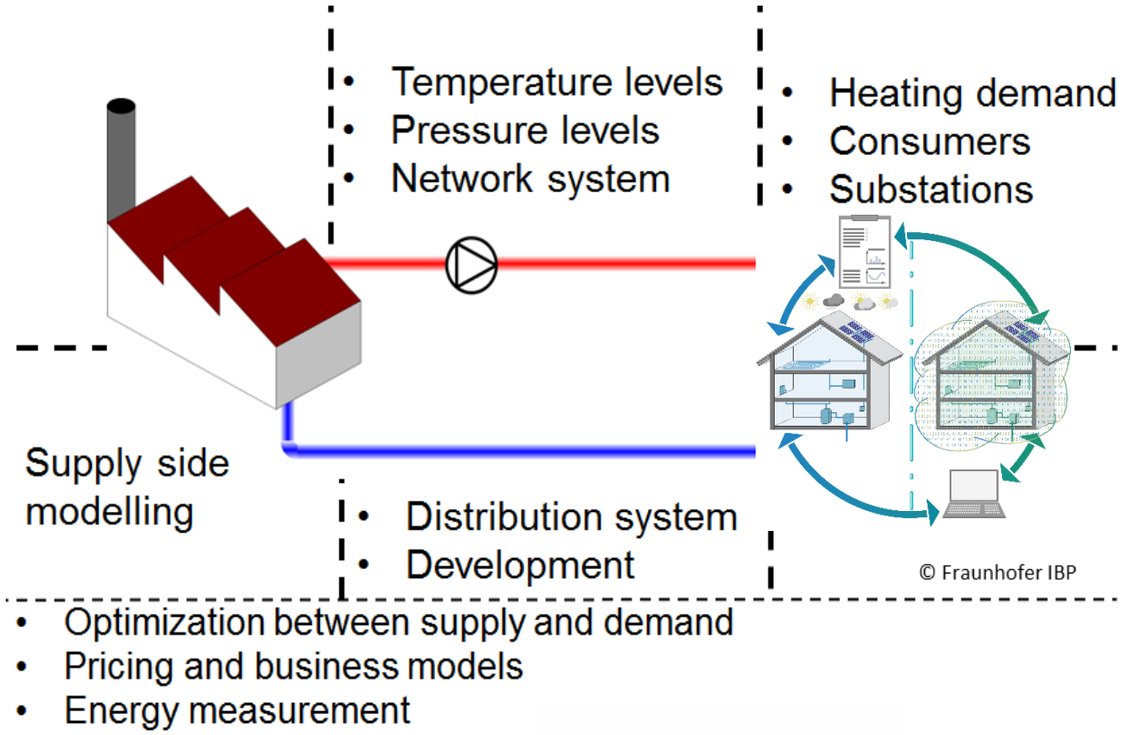
# Assessment of experimental needs to promote future district heating



# Experimental design and control (e.g. dig.-twin)

Design and control of experimental setups, subdivided to encompass a range of investigation options, including a grid-level approach and a system-level approach.

- Enhancing **efficient utilization of network temperatures** within buildings and intelligent control strategies
- Analysis of **heat consumption** and **feedback** to the district heating network
- Analysis of **monitoring data** for **fault detection** and diagnosis in district heating substations
- Enhancing **lifetime and performance of pipes** and fittings in the district heating networks
- Evaluate **control strategies** in district heating networks
- Evaluate required **parameters to monitor** for different objectives

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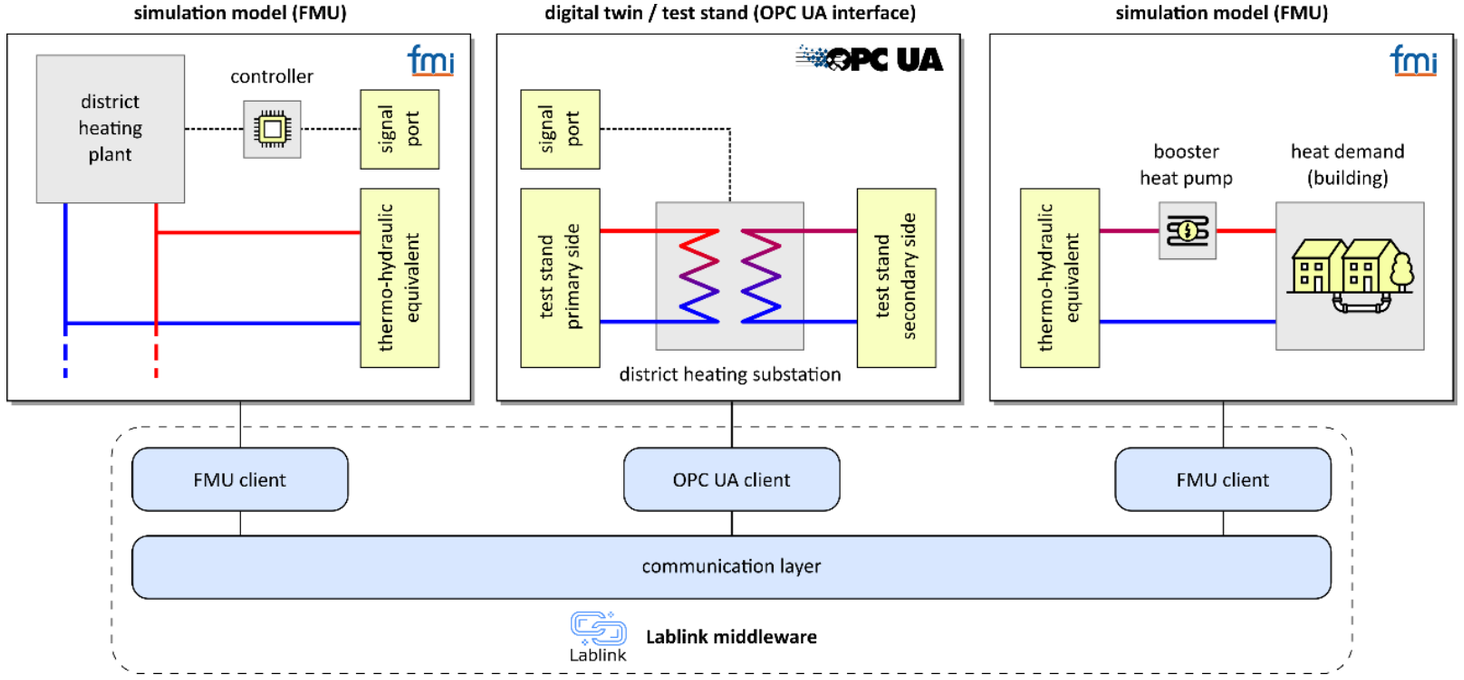
# Overview and assessment of networking potential of test facilities

Collection of approaches and examples of networking of test facilities against the background of district heating supply and sector coupling. The emphasis is on both component-by-component testing as well as system-level assessments considering laboratory and field experiments.

- Collection and assessment of **relevant use cases** that demonstrate the added value of linking test facilities
- Gather and share **best practices** for the technical aspects of connecting laboratory infrastructure and simulation setups
- **Initiate a collaborative network** comprising various stakeholders to pursue the topic beyond the scope of the Annex TS8, encompassing a broader thematic framework for future activities




Source: https://doi.org/10.1109/MSCPES55116.2022.9770173

# Database or dataset identification, validation, enhancement and interoperability

Identification, validation, enhancement, and interoperability of existing tagged databases or datasets. Various approaches will be compiled with the primary goal of minimizing data-related risks for rapid and successful deployment within DHC networks. An example of the use of incorrect datasets can be the lifetime prediction for pipes and joints in EN253 and EN 489.

- **Collection of data and validation approaches** that would need to be used for experimental investigations
- Collection of cases where **data from labs** has been used to compensate pour data quality from real world measurements
- **Compilation of possible data sources** and, if applicable, data sources from partners
- Assessment of **typical data challenges** for validation with regard to their possible advantages and disadvantages
- **Data Spaces/Data interoperability**

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# Collection of existing examples and examples under development

Collect approaches of system investigations that are part of DHC or building supply structures. The studies distinguish between building supply infrastructures, e.g. connected to a thermal network, and district heating systems.

- Identification and review of **existing examples and examples under development**
- Review of **available simulation and validation approaches** for the investigation of building and system dynamics.
- **Classification of the collected examples** (e.g.: grid-level, building level) in close cooperation with subtask A, B and D
- Description of the respective focus and **purpose of the investigation facility**
- **Creation of fact sheets** for the collection of existing examples and examples un-der development

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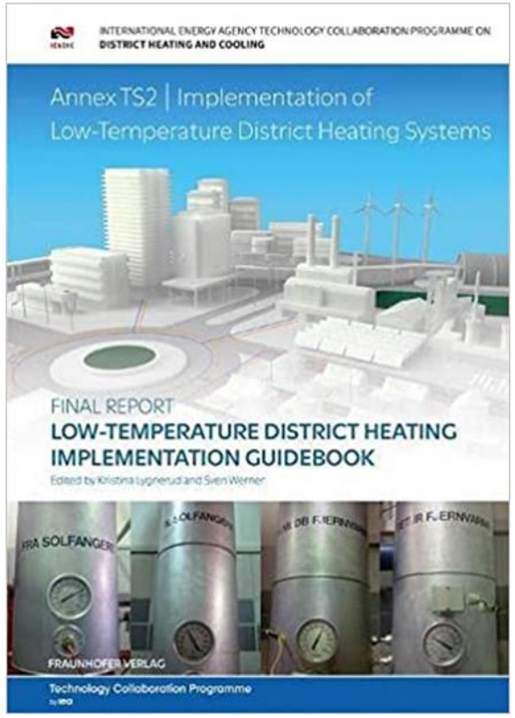
# Subtask F: Knowledge Transfer, Dissemination, Management

## Dissemination

Dissemination




The focus of this subtask is to collect and distribute information on on-going and finished work. This includes the set-up of an information platform and the organisation of semi-nars and workshops.

- Initiation of demonstration projects and development of new activity formats between research and business.
- Documentation of best practice examples.
- Information material, website and seminars/workshops.
- Harmonize vocabulary
- Guidebook.

# Contact us!

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