sweet swiss energy research for the energy transition

DeCarbCH

WPX – Integrated District Heating and Cooling (iDHC) for the Future – Design, Planning and Implementation

UNIGE-EE, EMPA, ETHZ, HSLU-IGE, HSLU-TES, HSLU-TEVT, OST-IES, OST-SPF, ZHAW-INE, ZHAW-ZOW (DeCarbCH core partners)

Introduction

Starting point
- Climate urgency, delay in transforming energy system
- Risk of using well-proven technologies for heating
- Failure to account for cooling needs

iDHC
- Excess heat: Transport outside city or Store it
- Features:
  - Reversible heat pump systems and thermal grids
  - Operating at optimised temperature levels
  - Both fully centralised systems and partially decentralised systems
- Newly constructed grids

Tasks

Task X.1 iDHC design and control
- Optimized DHC design, considering system stability (e.g., solar regen.) & flexibility (e.g., STES)
- Optimized DHC operation, considering system stability (advanced control) & flexibility (sector coupl.)

Task X.2 Systems modelling and assessment
- Simulation and optimization (weekly, monthly and annual timescales)
- Comparative analysis of electricity (exergy), CO_2 emissions (real time) and costs

Task X.3 Value proposition, business models and legal implications
- Value proposition, business models: Barriers, drivers, policy mixes: Actor analysis, business models
- Legal implications: Right to space cooling? Construction, operational rules, data, const. & op. of TES

Task X.4 Case studies
- Rheintal, Frauenfeld, Eniwa, potentially EBL (real-life conditions)

Task X.5 Pathways of iDHC evolution, (sub-)grid synergies
- Cooling demand estimate, local circumstances; probabilistic approach; decomposition in sub-grids
- Advantages and drawbacks → Guidelines

Deliverables

DX.1.1 iDHC design and control rules

DX.2.1 iDHC Systems modelling and simulation tools

DX.3.1 iDHC Business models for overcoming barriers and leveraging drivers

DX.3.2 Legal implications of iDHC

DX.4.1 Case study applications of iDHC system modelling tools

DX.5.1 Guidelines for iDHC planners and for city planners

Partners

	UNIGE-EE	EMPA	ETHZ	HSLU-IGE	HSLU-TES	HSLU-TEVT	OST-IES	OST-SPF	ZHAW-INE	ZHAW-ZOW
T X.1		X		X		X	X	X		
T X.2	X	X		X		X	X	X	X	
T X.3								X	X	X
T X.4	X	X		X		X	X	X	X	X
T X.5	X	X	X	X	X	X	X	X	X	X

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