Accelerating the use of strategic heating and cooling planning in cities and regions

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www.actionheat.eu

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Who we are

The **Act!onHeat consortium** brings together leading European experts in strategic H&C planning and policy analysis, various coalitions working to increase the speed of the transition, and specialists in capacity building and investment support.

Fraunhofer ISI

TU WIEN TECHNISCHE UNIVERSITÄT WIEN

ICLEI Local Governments for Sustainability EUROPE

ethink ENERGY RESEARCH

centre for sustainable energy

creara ENERGY EXPERTS

eclareon

Who we are

Spin off of TU Wien/Energy Economics Group

Strategic H&C planning since more than 15 years

Relevant experiences related to the session today:

- Performance of the Comprehensive Assessment for AT 2015, 2020 (together with TU Wien)
- Assistance of local, regional and national level authorities in H&C planning via EU financed projects like progRESsHEAT, Hotmaps, PATH2LC, Act!onHeat
- Development of H&C strategies / plans for local authorities / utilities; mainly in DE and AT (e.g. Frankfurt, Osnabrück, Innsbruck)

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Who can benefit from Act!onHeat?

- **Local and regional authorities**
- **Utilities**
- Consultancies and energy companies
- **Energy agencies**
- Researchers and academia
- Policy makers
- H&C industry and industry associations
- Local government networks

4th and last call is currently open

Support Facility

Successful applicants will be **clustered into groups depending on the topic of focus**, that can vary from the development of a heat inventory to the assessment of DH potential, estimation of RES potential, etc.

The support package will consist of:

- ✓ Interactive webinars / online workshops
- ✓ Guidance documents for the different topics
- ✓ **Individual support activities when considered**

THERMOS tool

Allows users to identify and assess performance of:

- Optimal solutions for the expansion of a DHC network
- Local heat demand and network paths to match a known energy source
- Optimal network solutions to match available energy sources and demand

www.thermos-project.eu

Hotmaps tool

Allows users to:

- Identify the location of H&C demand, supply, renewable energy potential and waste heat potential
- Estimate the potential for district heating and compare to the costs of individual heating
- Develop scenarios for decarbonisation pathways of H&C

www.hotmaps.eu

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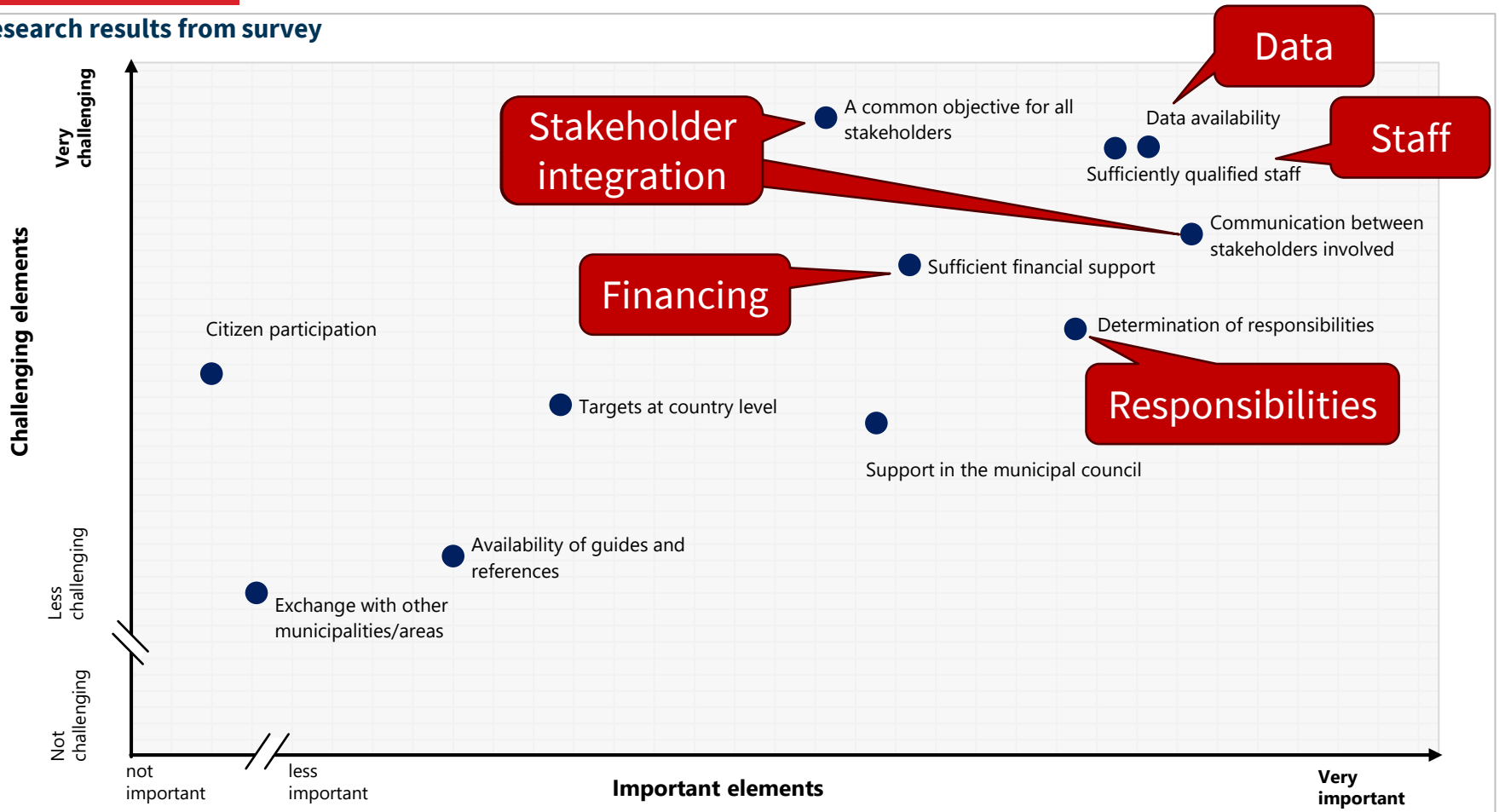
Research contribution

- In the initial phase, Act!onHeat conducted **research** to develop support adequately, but also to get evidence on successful H&C plans.
- The research design included an EU-wide **meta-study**, a **survey** with around 350 respondents and 15 **expert interviews**.
- The results are summarised in a report available **online.**

www.actionheat.eu/resources/strategic-hc-planning-success-factors

Research results from survey



*Graph shows distribution and weighted mean of responses (**n=349**)*

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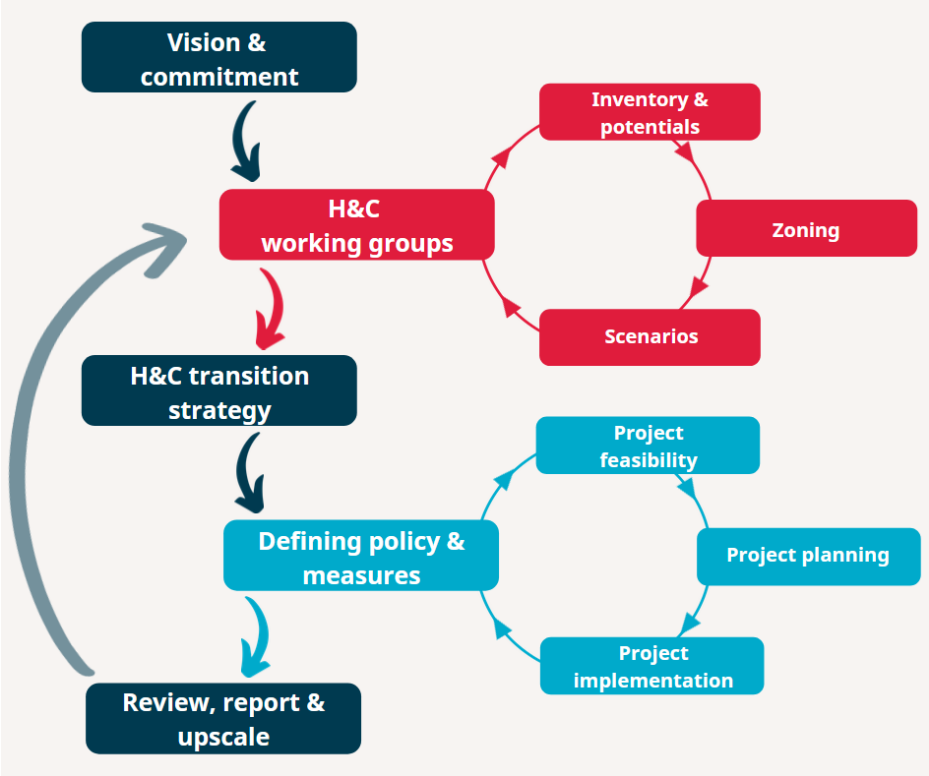
H&C Workflow

This workflow is addressed to energy agencies, consultants and local authorities to guide them with questions that help to structure the strategic heating and cooling planning.

Important: H&C planning is an ongoing task; it does not end with the H&C plan!



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Support Facility Case Studies

LEA HESSEN
LANDES ENERGIE AGENTUR

- Energy agency in Hessen (Germany)
- Heat planning became mandatory end of last year
- First point of contact for the municipalities on heat planning

3 comprehensive workshops attended by numerous Hessian municipalities. Experts from the Act!onHeat consortium gave keynote speeches.

Targeted *training webinars* for members of LEA Hessen. The topics are:

- "Data for municipal heating and cooling planning“
- "Developing a data inventory for heat planning“
- "Using the hotmaps database and toolbox for strategic heating and cooling planning“

Provide advice for a quick advisory service for district heating. Thus a *best-practice slide deck for RES in district heating networks* has been developed for LEA.

Support Facility Case Studies

Macedonian Academy of Sciences and Arts

- Research Center for Energy and Sustainable Development (RCESD)
- Objective to set up a data inventory to assist Macedonian municipalities in their H&C strategy

Participated in targeted *training webinars* as part of Act!onHeat. The topics were:

- "Data for municipal heating and cooling planning“
- "Developing a data inventory for heat planning“
- "Using the hotmaps database and toolbox for strategic heating and cooling planning"

Experts of Act!onHeat assist **RCESD** in the collection of data to *set up the Hotmaps toolbox for Macedonia* to be used by Macedonian municipalities in the development of their H&C strategy.

Act!onHeat hosted a workshop to Macedonian municipal authorities to show in detail *how the toolbox works*

Ongoing Support Facility Case Studies

Flanders State of the Art

- Flemish Energy and Climate Agency (VEKA)
- Support local bodies in developing their heating and cooling plans

Experts of Act!onHeat assist **VEKA** in the understanding of how local heating/ cooling plans can comply with the rules for municipalities above 45 000 inhabitants as set out in the EED 2023

Act!onHeat assisted in the preparation of a workshop with municipalities in Flanders falling under Article 25 (6)

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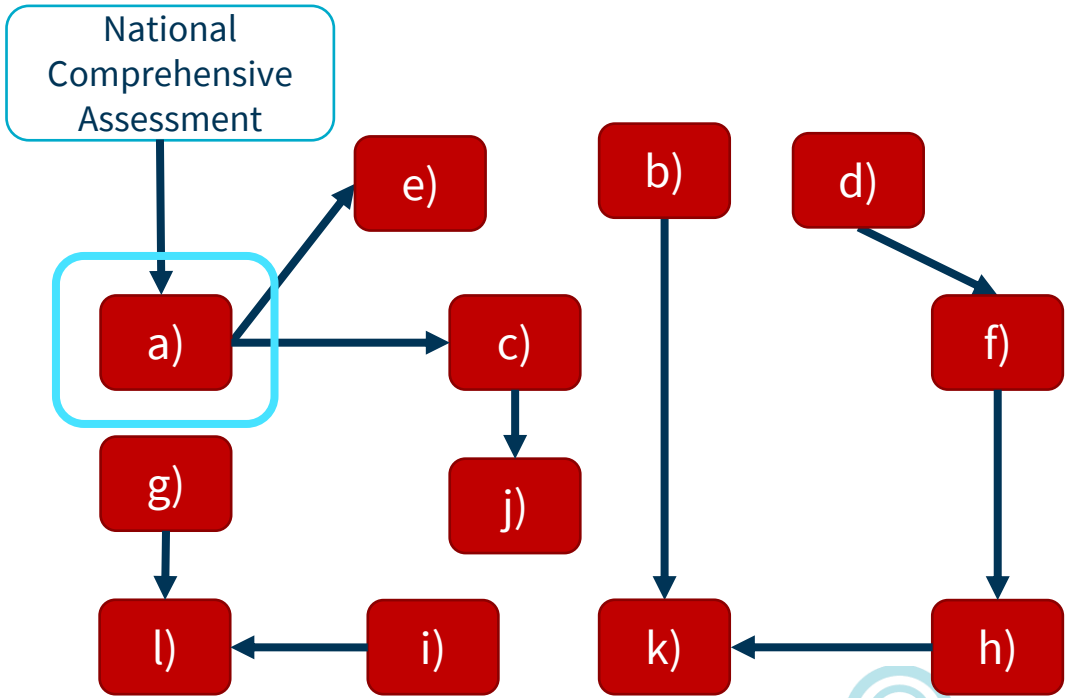
What was done so far

- For each of the requirements, **develop** …
  - a **checklist** for compliance
  - a list of **keywords** for a search within the heat plan documents
- **Analyse** selected **existing plans** in how far they comply
- **Discuss** …
  - **outcomes** and a potential approach for implementation between Act!onHeat and VEKA
  - checklist and basic setting of local heat planning between VEKA and municipalities

Local heating and cooling (H&C) plans Requirements and Interconnections

	Description
a)	provide estimate and mapping of the potential
b)	be compliant with Energy Efficiency first principle
c)	strategy for the use of the identified potentials
d)	involve all relevant stakeholders and the general public
e)	take into account relevant existing infrastructure
f)	consider the common needs of local communities and multiple local or regional administrative units or regions
g)	assess the role of energy communities and other consumer-led initiatives
h)	include analysis of H&C in local building stock
i)	assess financing
j).1	include a trajectory to achieve the goals
j).2	include the monitoring of the progress
k)	replace inefficient H&C appliances in public buildings
l)	assess potential synergies with the plans of neighboring authorities

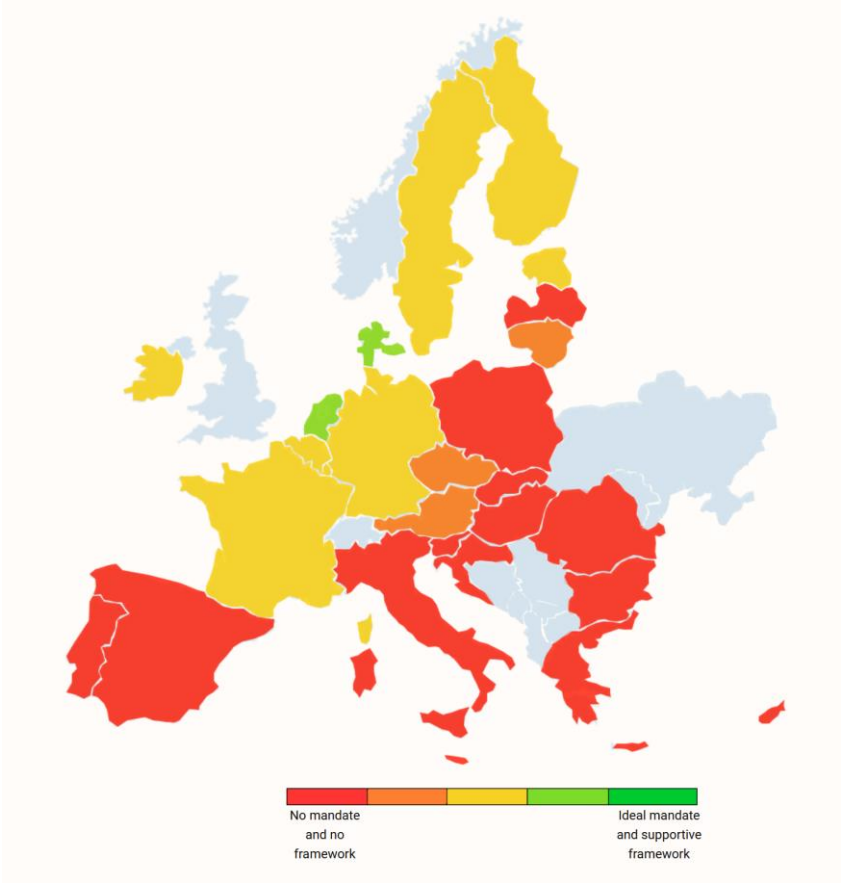


Local heating and cooling (H&C) plans

Directive Breakdown		Key Words Collection for checking the relevant passages in the H/C plan documents	Checklist for compliance
Potential for increasing energy efficiency	estimate	Renovation, efficiency, renovation scenario, demand forecast, maps, building archetype, building renovation status, maps	# Building renovation scenarios are presented # A description of the method and the assumptions of the renovation scenarios is provided # Heat zoning (current state of demand) based on building renovation/demand/building type is presented # A map with savings over the territory is provided
	mapping		
Potential for low-temperature district heating readiness (readiness of buildings)	estimate	Low temperature district heating (LTDH) (readiness), renovation level, low temperature supply systems, radiators	# The temperature level of the existing heat supply systems in the buildings are mentioned / analysed # Buildings potentially supplied by LTDH are identified # Zones potentially suitable for low-temperature district heating are identified
	mapping		
Potential for high efficiency cogeneration	estimate	High efficiency cogeneration, CHP, highly efficient	# High-efficiency cogeneration is mentioned in the plan # Existing (cogeneration) plants are presented on a map # Relevant parameters for cogeneration plants to be highly efficient is presented # Presented potentials of cogeneration plants distinguish between highly efficient and not highly efficient
	mapping		
Potential for waste heat recovery	estimate	Waste water treatment, waste heat, industrial waste heat, data centers	# Locations of waste heat sources are identified # Estimates of the temperature level and the available waste heat are presented
	mapping		
Potential for Renewable Energy	estimate	Shallow geothermal, deep geothermal, Solar PV, Solar thermal, Biomass	# The available potential of renewable energy for heat and cold supply is presented (in terms of energy and/or power) # The potential is shown on a map (maybe not covering all potentials)
	mapping		
Potential for cooling	estimate	cooling demand, commercial buildings	# An estimation of the energy demand for cooling of buildings is presented # A map showing the (theoretical) energy demand for cooling in the territory is presented (# The increasing cooling demand due to climate change is addressed)
	mapping		

Analysis of existing plans

- Selected countries with different framework conditions:
  - ES
  - BE
  - NL
  - DE
- Desk research on existing plan documents
- Application of search for keywords in the documents and evaluation of compliance according to checklist



Source: EU Tracker – Local heating and cooling plans, Energy Cities

Results from the analysis and discussions

- Existence of plans:
  - In Spain difficult to find specific heat plans, energy or sustainability plans exist, containing H&C at different level of detail
  - For BE, NL and DE municipalities heat plans were found / publicly available

- Compliance of plans with the newly defined requirements
  - **Not any of the analysed plans fully complies**, even if compliance is granted in case that keywords are mentioned / topic somehow considered
  - **A relevant number of requirements were found included**; mostly related to what can be understood as heat planning according to the Danish model
  - **What is often missing**:
    - a) Potential for low-temperature district heating readiness (neither estimate nor mapping)
    - b) Compliance with the energy efficiency first principle
    - g) Assessment of the roles of energy communities and consumer-led initiatives
    - j) Monitoring of the implementation of measures and policies
    - l) Synergies with the plans of neighbouring municipalities
  - Some criteria easy to meet, others more difficult → e.g. EE1st principle
  - **One criteria not clear how this should be interpreted** → f) consider the common needs of local communities and multiple local or regional administrative units or regions

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Operationalisation for energy supply, energy system integration, H&C planning

- "**only invest in supply side infrastructure** (generation/transmission/distribution/storage of electricity/heat/gas) **and behind-the-meter supply technologies** (e.g. heat pump in buildings) **whenever demand side resources** (end-use efficiency, demand response, distributed resources) **are not available or more expensive**" (DE ENER 2021, p. 13)
- **Integrated district heating / cooling planning**: use a cost-benefit-analysis to find most cost-effective heat supply options evaluated against reducing heat demand through energy efficiency in buildings and processes (DG ENER 2021, p. 13)

DG ENER, 2021. Analysis to support the implementation of the energy efficiency first principle in decision-making: final report. Publications Office, LU.

What can be seen in currently existing municipal heat plans

- Consideration of **efficiency and supply options**:
  - **Supply side infrastructure** at local level considered, focus on district heating network and generation; storage often missing; electricity distribution system usually not covered in the calculations;
  - Ways of considering **carbon neutral gas** vary widely from not considering at all as there is a clear goal to leave it out, to detailed description and consideration of price and availability of scenarios
  - **Behind the meter supply technologies** usually well represented; still can range from consideration of basic options (HP and biomass) calculated with some variations of prices in the most represented building archetype, to a comprehensive assessment of options, price scenarios,
  - **Demand side resources**: heat savings via renovation of existing buildings is the mostly considered option; this can range from presentation of one scenario to a comprehensive analysis of saving options and related costs; demand response, local storage, on-site PV usually not considered
- **Cost benefit analysis** (CBA):
  - **Often no CBA for savings vs. supply**, i.e. no comparison of scenarios with different saving levels and supply structure levels
  - CBA often **focusing on comparison of supply options** for heat
  - **Societal and Health aspects usually not quantified**, sometimes discussed; however, we saw examples where a quantification happened
  - **Economic and carbon neutrality** of course **usually quantified**;
- Other aspects
  - **Supply security** is an important aspect, **often discussed in the context of carbon neutral gas**
  - **Energy poverty usually not mentioned** in current plans

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Conclusions on EE1st in local H&C planning

- Cost-Benefit-Analysis:
  - Thorough CBA at local level is not easy to implement due to related calculation efforts and data needs;
  - **At least require a CBA of heat savings through renovation vs. carbon neutral heat supply**
  - the better the **definition of methods** to be used **and default data provided** (e.g. gas price scenarios, factors for non-energy benefits, emission factors), the better will be the CBA

- Non-energy aspects:
  - **Consideration** of societal and health effects, energy poverty and security of supply are **important** to be considered **in the discussion**;
  - this can (also) be done qualitatively and in the discussion process, **arguments can be prepared at national/regional level**;
  - **at local level** mainly important to **identify low-income households** and relation to existing stock

Conclusions on Art. 25 (6) implementation

- Requirements and compliance:
  - **All aspects** integrated in the requirements in Art. 25 (6) **make sense in integrated / strategic heat planning**;
  - A **strict interpretation** of each requirement **might lead to many plans not compliant**;
  - In a first round of developed plans compliance could potentially be met when majority of requirements are integrated at least somehow; in the next round of plans with higher level of detail
  - **Guidance** of how compliance can be achieved and is interpreted **is needed**

- It makes sense to **provide assistance from the regional (/national) level**:
  - Provision of **guidelines** for the implementation / interpretation of the requirements
  - **Draft text to be included** in the heat plans
  - **Framework agreements** for heat planning
  - Involvement of the regional energy agency

Summary and overall conclusions for national level

- Municipalities …
  - (want to) take action
  - Have very limited resources (financial, staff)
  - Lack knowledge about heat planning
  - **Need guidance, legislative structure** and **financing**

- Financing is crucial for planning and implementation
  - Municipalities need forces for heat planning; **financing of planning activities** (staff + external consulting) potentially difficult only with resources from the municipality
  - **Financing of measures** set out in the plans not possible to come from local level; often financing programmes difficult to overlook → **one-stop-shops**, information at regional level

Summary and overall conclusions for national level

- (High quality) **plans need a** corresponding **legislative structure**
  - Plans are mainly developed according to legislation
  - Specific H/C plans are often only developed in case there is an obligation
  - **Important elements: Data, CBA, zoning**

- **Data** is crucial for planning
  - A clear **legislation on data provision from data holders** to authorities and planners
  - E.g. authorising ordinance on data transfer with exact rules and definition (e.g. which data holders, which level of aggregation, which data)
  - Also **need for definition of data protection in the context of strategic H/C planning in the legislation**

- **Implementation of identified transformation** needs a legislative structure:
  - **Especially zoning** is only possible with a respective framework; this should be discussed and defined at national / regional level; overall options and structure to come from national level

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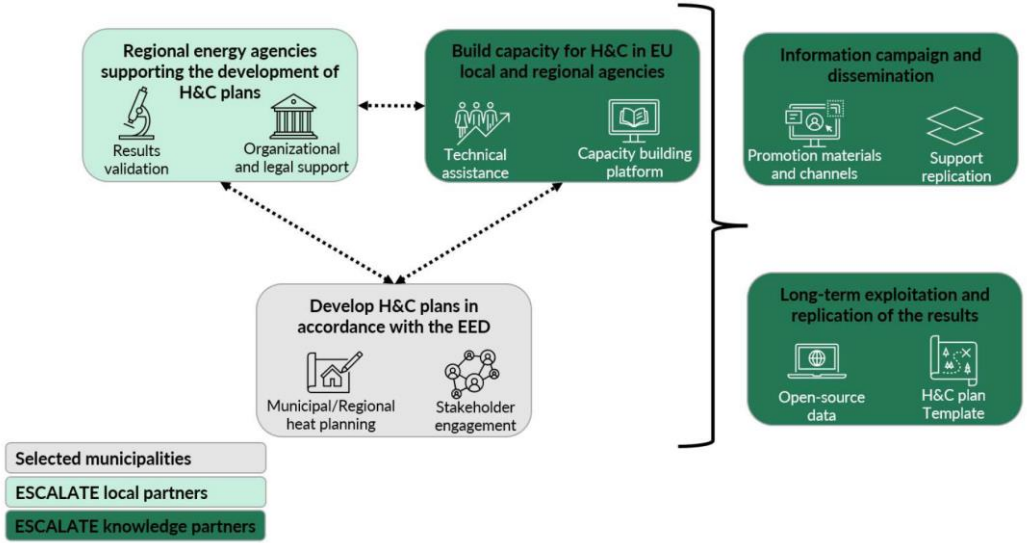
New LIFE project ESCALATE

ESCALATE local heating and cooling transition plans: Regional multipliers of capacity building and technical support to empower local administrations

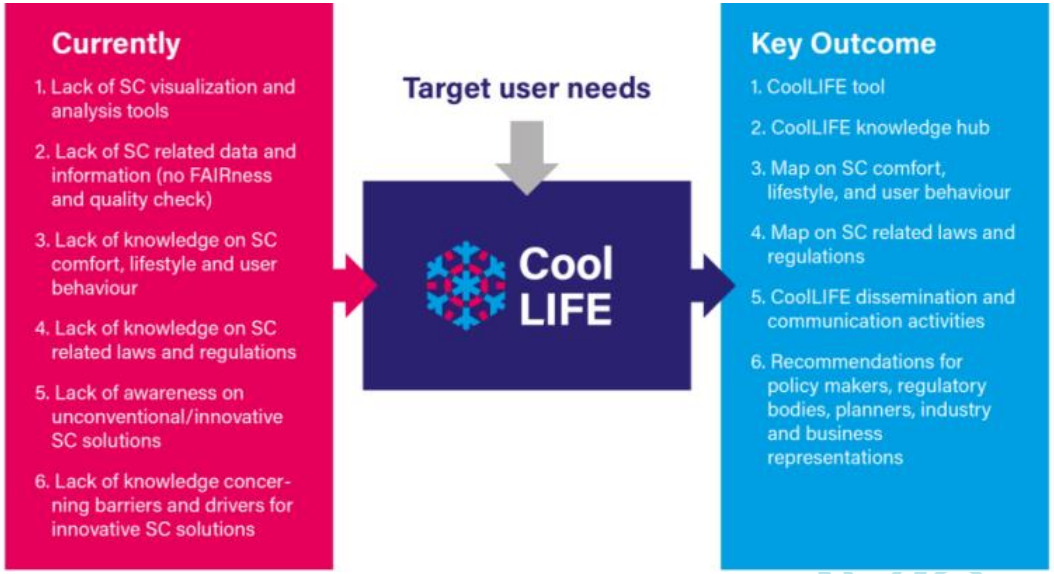
- LIFE project, just entered the GA preparation phase
- Directly focusing on LRAs and the implementation of Art. 25(6)
- Involved:
  - 8 local energy agencies
  - 5 knowledge partners
  - 1 communication partner
  - 10 countries



Ongoing LIFE project CoolLIFE

Open Source Tools to Face the Increase in Buildings' Space Cooling Demand

- LIFE project, ongoing since 11/2022
- Development of a tool, knowledge hub, recommendations, dissemination
- Tool will be usable for the national comprehensive assessments Art. 26



Cool LIFE

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Ongoing HORIZON project SAPHEA

Developing a single access point for the market uptake of geothermal energy use in multivalent heating and cooling networks across Europe

- Horizon Europe project, ongoing since 10/2022
- Objectives:
  - Establishing a **digital access point** for decision making support and consultancy on geothermal energy use in heating and cooling networks
  - **Adapting and upgrading existing datasets and tools** for early stage investment decisions and strategic planning of energy suppliers, communities and municipalities
  - **Fostering supportive market frameworks** to facilitate future investments into "geoHC networks"
  - Reducing social gaps and barriers **to bring "geoHC networks" closer to regional stakeholders** across Europe
  - **Empowering future investors and operators** of "geoHC networks"

SAPHEA
INTEGRATING GEOTHERMAL HEATING AND COOLING NETWORKS IN EUROPE

Funded by the European Union

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Thank you very much for the interest!

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