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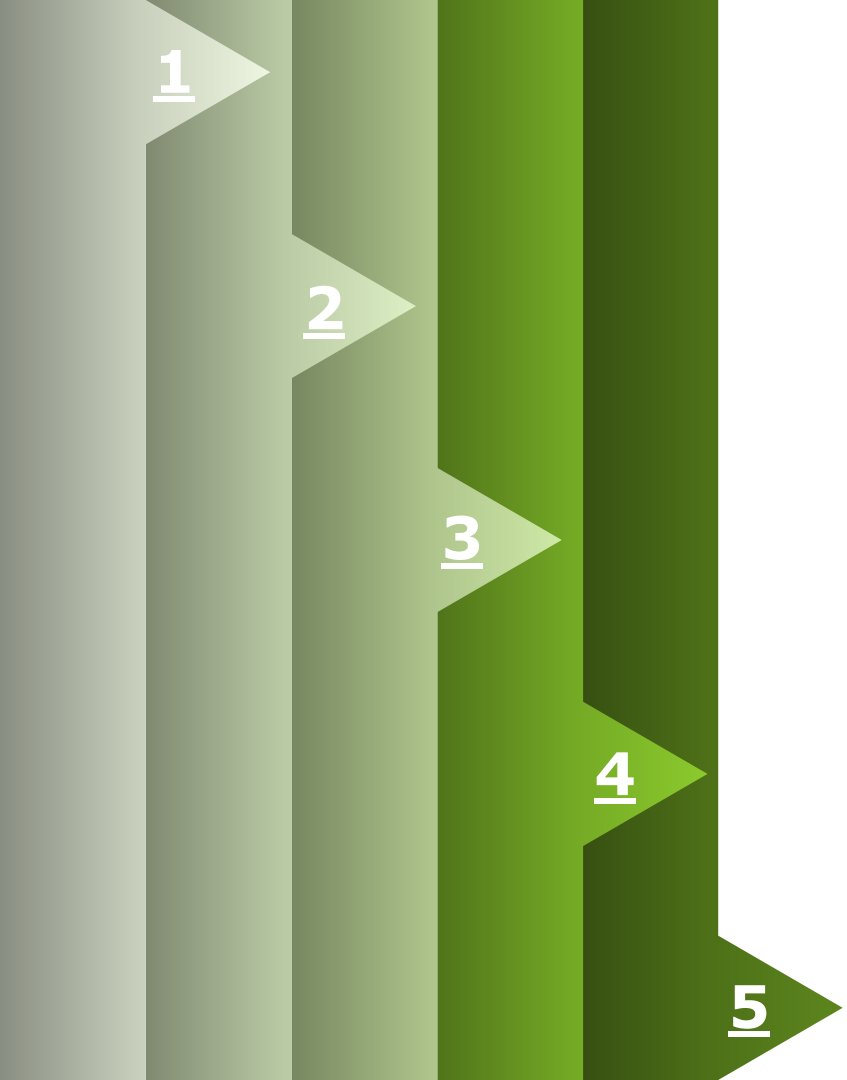
Local Governments for Sustainability
EUROPE

Strategic Heating and Cooling Support Package



Modules

1) Strategic municipal heat planning in times of the energy crisis
2) Energy community driven H&C projects
3) Partnership models and finance of new and refurbished H&C infrastructure
4) Procurement of H&C plants and solutions
5) H&C resilience through blue and green infrastructure

1) Strategic municipal heat planning in times of the energy crisis

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Strategic municipal heat planning in times of the energy crisis

Agenda

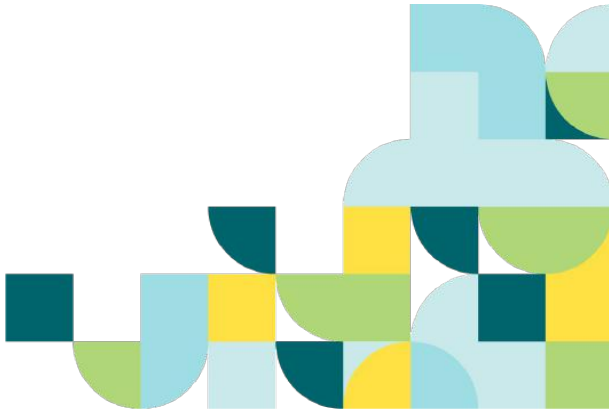
Time	Topic	Speaker
10:00-10:15	Welcome and introduction to the topic	Veljko Vorkapic, Nicola Iezza (ICLEI Europe)
10:15-10:35	Case study: Redesign of the district heating system in Warsaw to save energy and climate	Leszek Drogosz (Deputy Director of Infrastructure Department, City of Warsaw)
10:35-10:50	Facilitated discussion between peer cities	
10:50-11:00	Tools and guidelines	Veljko Vorkapic (ICLEI Europe)

Strategic H&C Support Package

- The aim: to help cities to deliver on overarching climate mitigation and adaptation targets by means of a more efficient and renewable thermal systems
- Funded by European Climate Foundation
- Complementary to guidelines and modules developed in other relevant EU projects

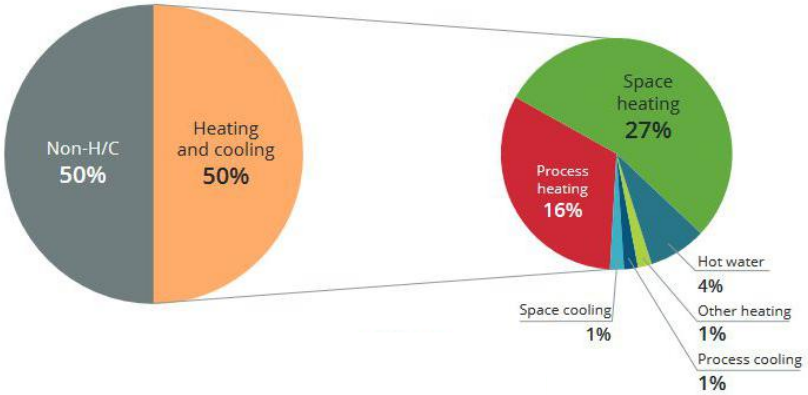
Strategic H&C Support Package

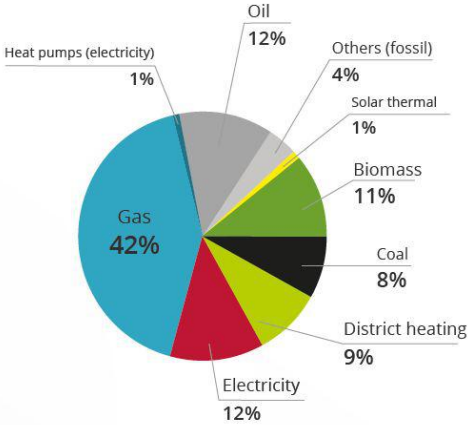
- Dealing with five specific topics:
  1. Strategic municipal heat planning in times of the energy crisis
  2. Energy community driven H&C projects
  3. Partnership models and finance of new and refurbished H&C infrastructure
  4. Procurement of H&C plants and solutions
  5. H&C resilience through blue and green infrastructure
- Format
  - Introduction on the topic by ICLEI
  - Case study presented by a peer city
  - Discussion among peer cities
  - Outline of practical tools



Relevance of H&C

- EU consumes half of its energy for H&C





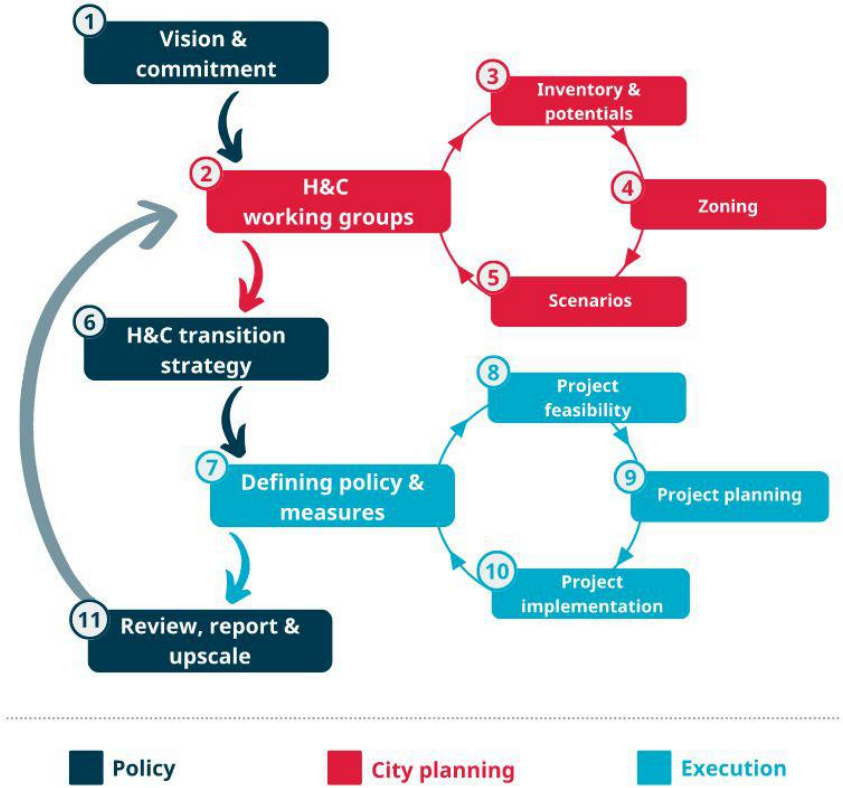
Heat Roadmap Europe (2018)

- Rapid and significant change is needed to achieve climate neutrality by 2050
- Strategic H&C planning - an effective tool

Strategic H&C planning

- Sustainable H&C - reducing the energy demand, whilst shifting the energy supply for the remaining demand away from fossil fuels to carbon neutral sources, provided through the use of RES, waste heat and energy efficiency measures

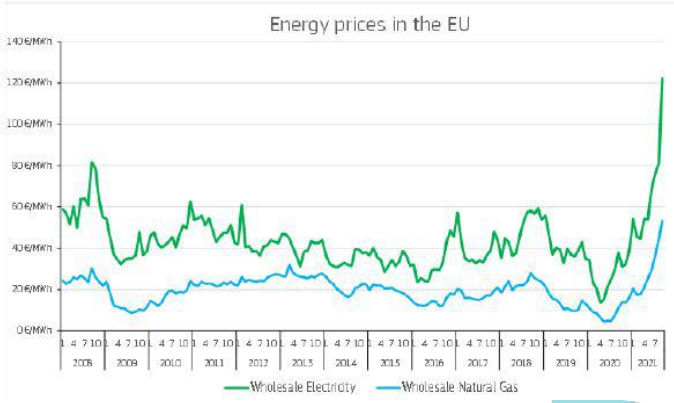
Strategic H&C planning



Act!onHeat (2022)

Energy crisis and energy poverty

- Causes of **energy prices rise**:
  - Rise in global energy demand after the Covid-19 pandemic
  - Delayed infrastructure maintenance
  - Russia's invasion of Ukraine
  - Unfavourable weather conditions to produce renewable energy (hydro, wind)
  - Increased carbon price
- Impacts:
  - Major repercussions on industry and SMEs
  - Energy-intensive industries (e.g. fertiliser sector)
  - The energy poor and low and lower-middle-income households
- Risks of undermining confidence and support in the energy transition
- Provides an incentive to switch to cheaper RE, more EE and performing buildings



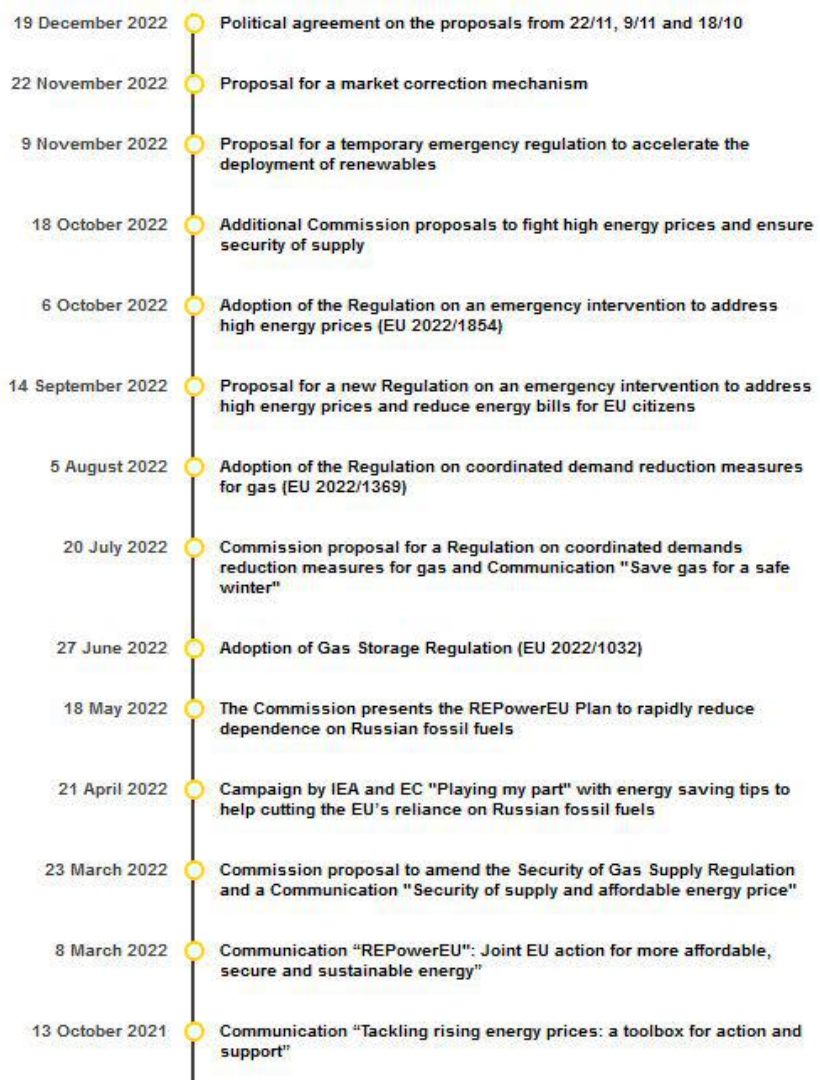
EC (2021)

Energy crisis and energy poverty

- **Energy poverty** - situation in which individuals or households are not able to adequately heat, cool, or provide other required energy services in their homes
- Results from low household income, high energy costs and energy inefficient homes
- Serious implications for the health and quality of life of affected citizens
- 36 million people in the EU were unable to keep their homes adequately warm (2020)

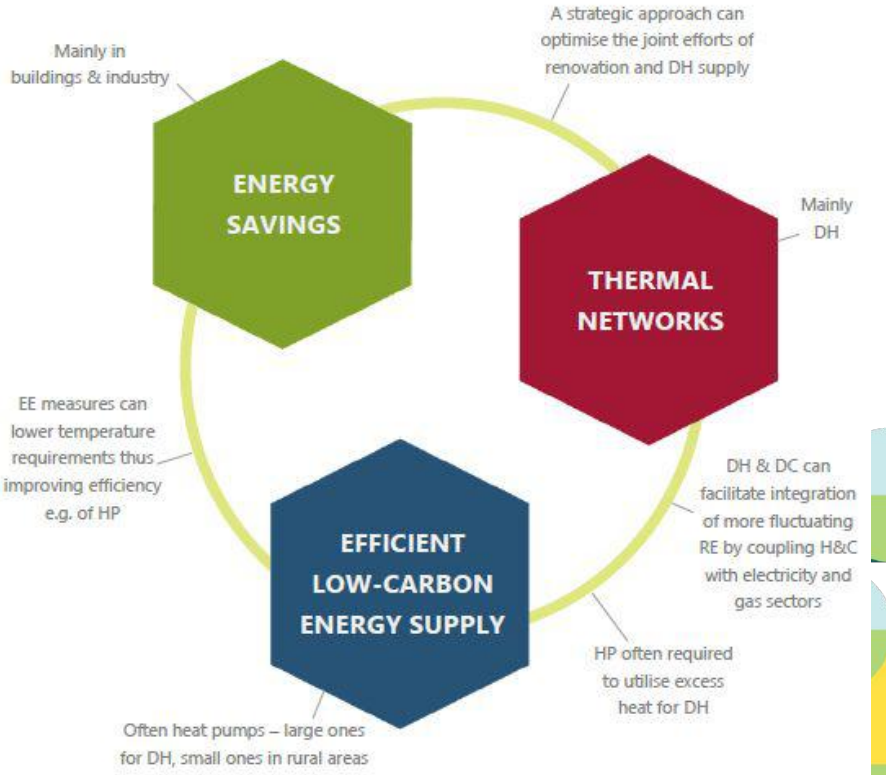
EU response

- The “toolbox” - help MS to support consumers and industry
  - Immediate measures
  - Medium-term measures
- REPowerEU - reduce dependence on Russian fossil fuels
  - Energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy
- Security of supply and affordable energy prices
  - Minimum gas storage obligations; a 15% gas demand reduction target
- Emergency market intervention
  - Reduction of electricity demand, revenue cap on electricity, solidarity contribution from FF companies
- October package
  - New tools to address high energy prices and ensure security of supply the coming winter
- Accelerating renewables permitting
  - To accelerate the deployment of RES
- Market Correction Mechanism
  - Instrument to automatically intervene on the gas markets in case of extreme gas price hikes



H&C measures

- H&C planning requires combined efforts of EE measures, an efficient low-carbon H&C supply with increased electrification and a significant deployment of more district H&C
- Demand reductions vs. decarbonised energy supply to be optimised
- The holistic approach - considering jointly electricity, heating, cooling and transport



HRE (2018)

H&C measures

- Systems
  - District heating networks with cascading temperature levels
  - District heat network with PVT and seasonal storage
  - Sewage water heat exchanger
  - Mini district heat network on effluent with individual heat pump
  - High temperature district heat network with solar collectors and storage
  - Biomass in district heat network
  - District heat network on industrial waste heat
  - Mid temperature district heat network on residual waste heat
  - Power-to-Heat in a district heat network
  - Heat pump on sea and surface water
  - Low temperature district heat network with heat pumps on mine water
  - Biogas and heat from waste water treatment
  - Waste incineration with combined heat power
  - Usage of cooling and heat from drink water infrastructures
  - District cooling
- Generation
  - Heat pump
  - Air-source heat pump
  - Ground-source heat pump
  - Hybrid heat pump
  - Biogas
  - Biomass
  - Geothermal energy
  - Solar collectors
  - Asphalt/road solar collectors
- Storage
  - Heat hub
  - Borehole thermal energy storage (BTES)
  - Aquifer thermal energy storage (ATES)
  - High temperature seasonal thermal energy storage in underground closed systems
  - High temperature storage in the ground
  - Seasonal storage for zero-energy-buildings (emporium concept)
  - Smart district heat network with PCM
- SMART
  - Advanced control for smart heat grid

VITO (2018)

Engie

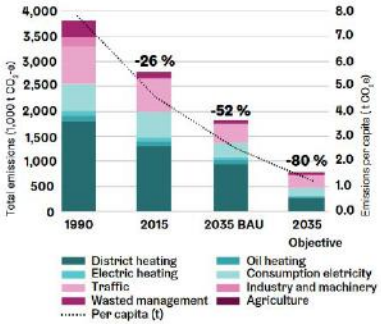
Role of local government

- Regional and local authorities:
  - Implement sustainable H&C
  - Identify the key financial and social challenges facing households in energy poverty
  - Develop measures tailored to their local context
  - Design and implement green transition which is fair, inclusive and sustainable
- Recast EED
  - Aims to greatly increase EE by focusing on sectors with high energy-savings potential (H&C, industry and energy services) and expecting the public sector to lead by example
  - Suggests that *"Member States shall encourage regional and local authorities to prepare local heating and cooling plans at least in municipalities having a total population higher than 50.000 inhabitants"*
- In most countries strategic H&C planning is still in its infancy
  - Institutionally anchored in Denmark over a longer period of time
  - The introduction of mandatory H&C plans is recent in Baden Württemberg (Germany), the Netherlands and Scotland

Role of local government

- Cities leading the way
- Covenant of Mayors and 100 Climate-neutral and Smart Cities Mission – key initiatives and partnerships for action

Cities leading the way
Helsinki, Finland - Carbon Neutral City by 2035



BAU – Business as Usual Scenario

- Heat consumption +7%
- Geothermal heating ↗↗, district heating ↗, oil heating ↘, electric heating ↘
- Hanasaari B (coal plant) will be closed down 2024

Carbon Neutrality Scenario

- Heat consumption -19%
- Geothermal heating ↗↗↗, end to oil heating,
- 70 % of district heating will be emission-free and Helen will be climate-neutral by 2050.
- Recovering waste-heat
- Increase the locally produced renewable heating in buildings (solar storage)

Cities leading the way
Mannheim, Germany - Carbon Neutral City by 2030

Climate Action Plan 2030.

- The largest hard coal-fired power plant in Germany supplies more than 60% of the inhabitants with district heating. Replace **the heat supply till 2030 by river heat, geothermal and biomass.**
- Energy efficiency in buildings
- To supply all municipal buildings with 40 MW peak solar energy for a climate-neutral administration by 2027

Role of local government

- Cities Energy Saving Sprint - Joint initiative of the EC and CoM to support cities in reducing their energy consumption

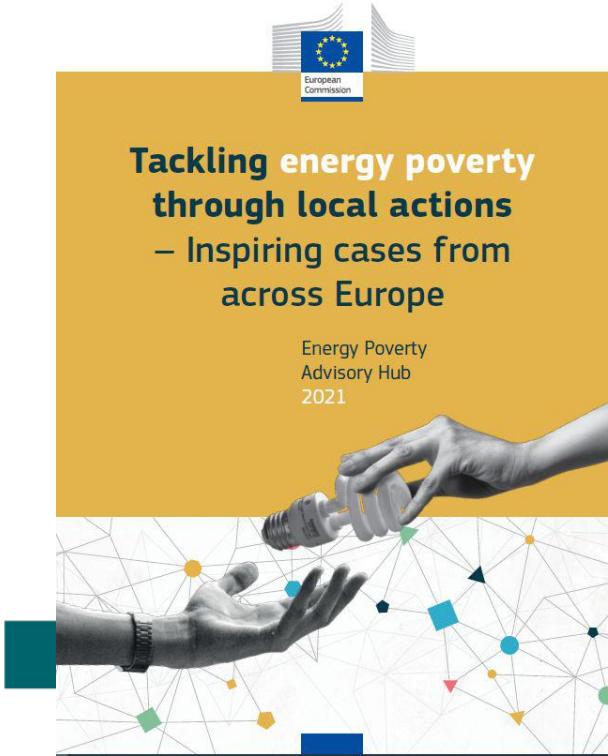
City	Heating	Lighting	Campaign/Communication
Freiburg (DE)	• Switched off hot water in City hall. • Municipal buildings temperature reduced by 1°C. • Water temperature in indoor pools reduced by 1°C.	• Switched off of outdoor lighting of public buildings. • Switched off outdoor lighting of public landmarks.	Energy Savings at work (Uni of Freiburg): - Switch off the monitor during breaks - No standby for electronic devices - Switch off unnecessary light (when is bright enough) - Boiling coffee and pour it in thermoses (no stewing on hot plates) - Fridges- temperature set at 8°C - Uncover radiators.
Lille (FR)	• Already for 14 years indoor temperature of municipal buildings has been set at 19°C. • Museum heating set at 18°C. Exemptions for sensitive cultural heritage. • Gym temperatures set at 14°C. • Sports facilities set at 16°C. • Pool temperature set at 26°C, room temperature set at 24°C. • Baby swimming cancelled because it needs temperature of 30°C. • Ban of portable heaters.	• Switch off lighting outside public buildings.	

Tools & Guidelines

- **POWERPOOR** project (https://powerpoor.eu/index.php/toolkit)
- **POWER TARGET** - data-driven approach aiming at supporting local and regional authorities to identify citizens suffering from energy poverty
- **POWER ACT** - to facilitate citizens behaviour change and support them in implementing EE measures
- **POWER FUND** - provide citizens with information on funding opportunities for projects that can help alleviate energy poverty (energy communities and crowdfunding)
- **Energy Poverty Guidebook** for energy planning

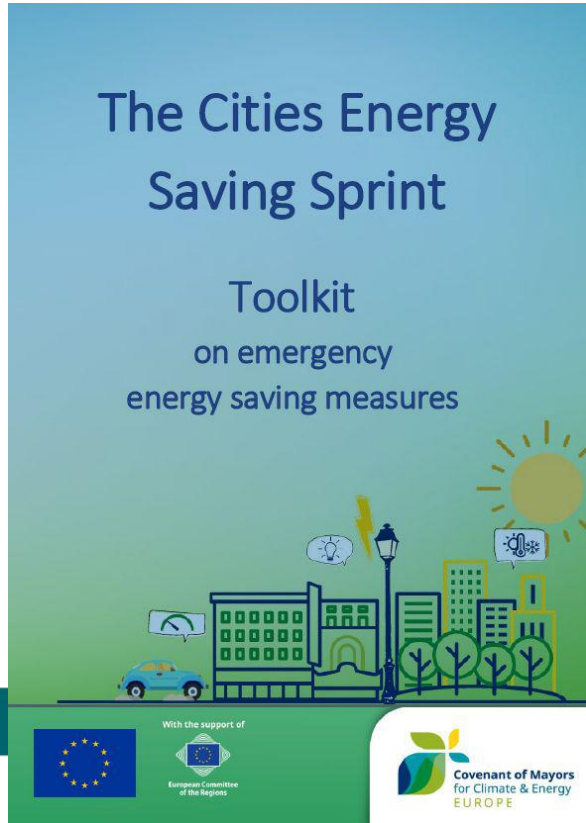
Tools & Guidelines

- **The Energy Poverty Advisory Hub (EPAH)**
- https://energy-poverty.ec.europa.eu/index_en
- Provides direct technical assistance, online courses and trainings
- The EPAH ATLAS – more than 200 case studies
  - https://atlas.energypoverty.eu/atlas/map



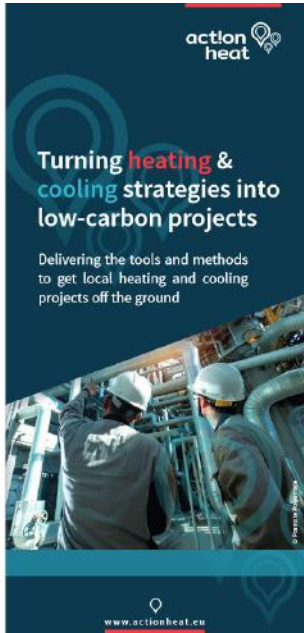
Tools & Guidelines

- **Cities Energy Saving Sprint**:
- https://eu-mayors.ec.europa.eu/en/cities-energy-saving-sprint
- Cities Energy Saving Toolkit
- Repository of the energy saving measures



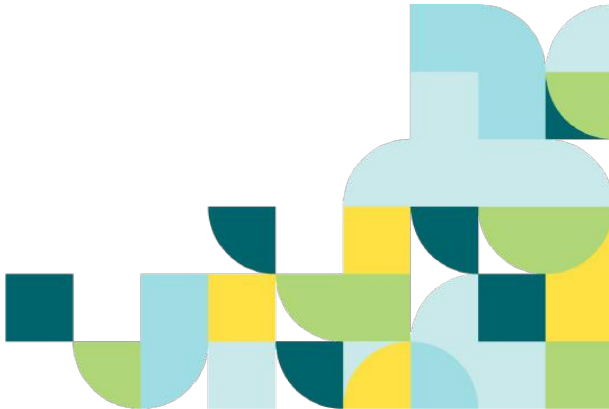
Tools & Guidelines

- **Act!onheat project** - https://actionheat.eu/
- Online webinars
- The Support Facility:
  - H&C transition strategy development
  - Project Feasibility
- Every 6 months



Tools & Gudelines

The Pan-European Thermal Atlas (Peta)	Data on H&C supply and demand for the EU	https://heatroadmap.eu/peta4/
Hotmaps	GIS-based online software that supports authorities and energy planners to set up a strategic H&C plan	https://www.hotmaps-project.eu/
THERMOS	Free, web-based energy planning software that provides accurate heat and cold network options analysis	https://www.thermos-project.eu/home/



Thank you!

Contact: veljko.vorkapic@iclei.org
nicola.iezza@ilei.org

Redesign of the district heating system in Warsaw

Leszek Drogosz
Deputy Director
Infrastructure Department
City of Warsaw

Warsaw in numbers

517 km²
administrative area

1.8 million
inhabitants
38 milllion - Poland

3.3 million
inhabitants within agglomeration

105 000
UA refugee in Warsaw
1,8 milion - Poland

220 000
students
18% of students in Poland

40%
green space

€ 4.6 billion
budget expenditures for 2022

2.5%
unemployment rate
2.9% - Poland

Warsaw energy dilemmas for today and tomorrow

How to create energy balance for current and future times?

What to do with increase of electric energy consumption in transportation and heating areas?

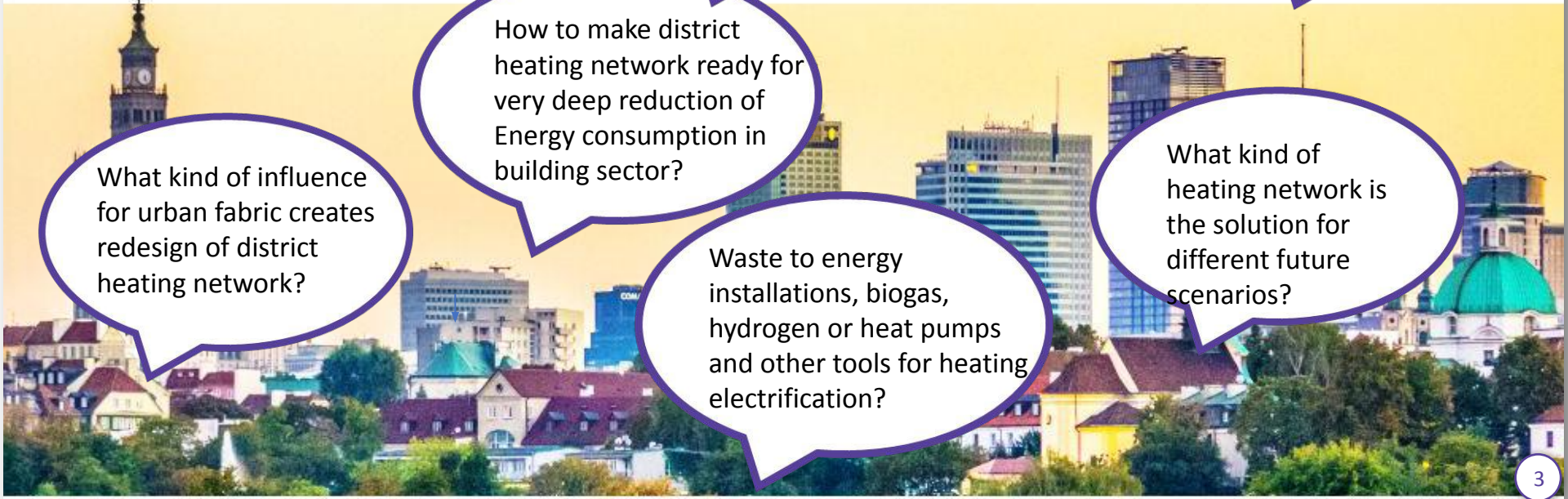
What lessons from today are the most important for a future?

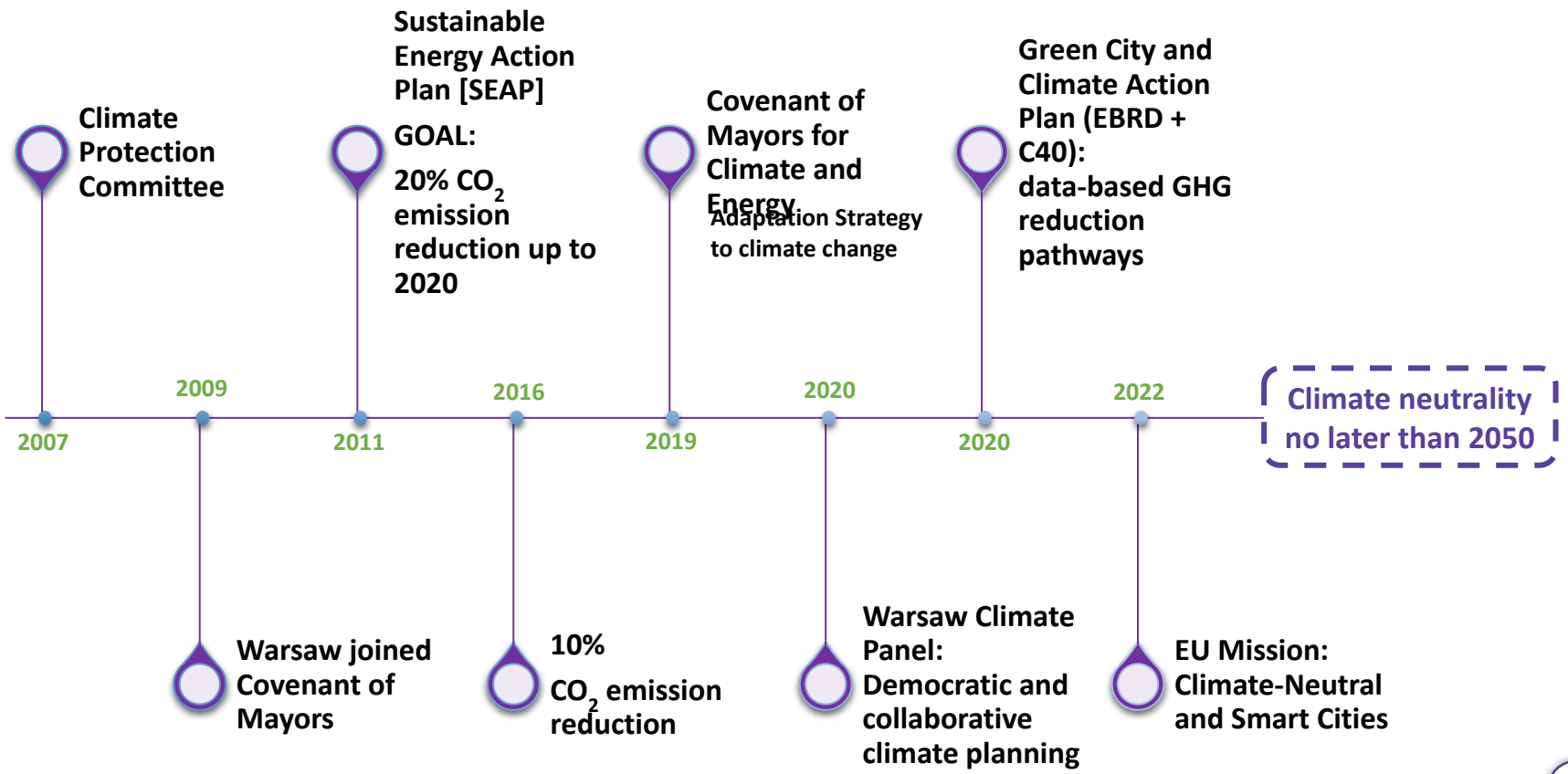
How to make district heating network ready for very deep reduction of Energy consumption in building sector?

What kind of influence for urban fabric creates redesign of district heating network?

Waste to energy installations, biogas, hydrogen or heat pumps and other tools for heating electrification?

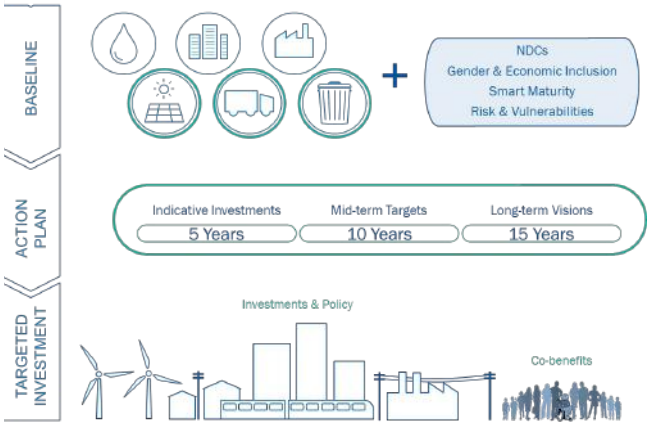
What kind of heating network is the solution for different future scenarios?




Climate Protection Committee
2007
Warsaw joined Covenant of Mayors
2009
Sustainable Energy Action Plan [SEAP]
GOAL:
20% CO_2 emission reduction up to 2020
2011
10% CO_2 emission reduction
2016
Covenant of Mayors for Climate and Energy
Adaptation Strategy to climate change
2019
Warsaw Climate Panel: Democratic and collaborative climate planning
2020
Green City and Climate Action Plan (EBRD + C40): data-based GHG reduction pathways
2020
EU Mission: Climate-Neutral and Smart Cities
2022
Climate neutrality no later than 2050

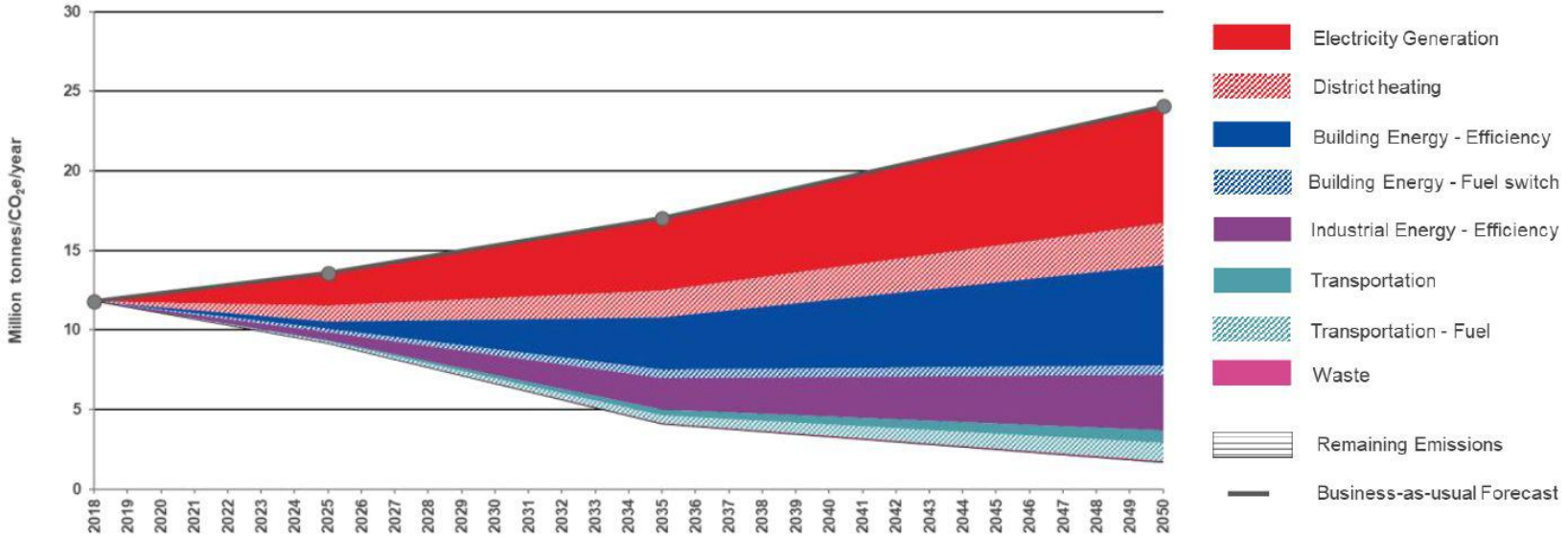
What we have?

Sector	Theme	Strategy goals	GCCAP actions
Energy	District heat decarbonisation	Switch all power plants serving the network away from coal to using mostly gas (and some biomass & RDF) by 2035 Switch from gas-oriented system to renewables by 2050	ID E2, E6, Ok1
	Grid decarbonisation	National electricity grid achieving 0 coal in the energy mix by 2050, replaced by an increase in renewables	ID E1, E2, E3, E6
		Procuring all municipal electricity from a 100% renewable energy tariff from 2023	ID E1, E2, E3, E4, E5
		Maintain 60% of electricity demand met by district heating, meanwhile decarbonising the network	ID E2, E6, B1, B3
	Distributed renewables (PV)	Install solar PV systems on 15% of residential buildings and 20% of commercial buildings by 2035, having achieved 100% of city-owned buildings by 2030. By 2050, reach 60% of residential buildings and 80% of commercial.	ID E1, E2, E3, B1, B2, B3, T3
Buildings	New buildings - construction standards	Nearly net zero new builds from 2022	ID E3, B1, B2
	Existing buildings - retrofits	20% of all residential and commercial buildings with whole house (window, roof, wall insulation) retrofit by 2035, increasing to 40% of buildings by 2050	ID B2, B3
	Space and water heating - fuel switch	Gas and coal powered heating replaced with heat pumps by 2035	ID E3, B1, B2, B3
Industrial buildings	Industrial buildings efficiency improvement	Work with the private sector to increase efficiency of these buildings 60% by 2035	ID B1, B2, B3
Transport	Mode shift	50% more trips by cycling by 2050	ID R1, R5, T1, T3, IT1
	Mode shift	35% less trips taken by passenger autos by 2050	ID R1, R5, T1, T2, T3,T4, T5, T6, IT1
	Mode shift	Increase the proportion of total citywide trips by public transport from 42% to 53% by 2050	ID R1, R5, T1, T2, T3, T5, T6, IT1
	Passenger vehicle - fuel switch	24% of passenger cars to be EV or hyrdrogen by 2035 and 64% by 2050.	ID E2, E4, T4, IT2,
	Transit vehicle – fuel switch	100% of buses in the city to be electric powered by 2050	ID T2



Emissions Pathways - GCAP

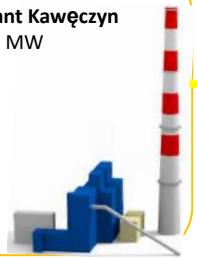
CO_2 emissions



Heating system in Warsaw

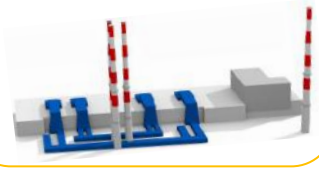
What we have?

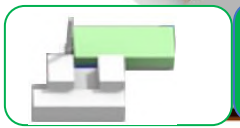
Heating plant Kawęczyn
Power: 465 MW



Peak sources

Heating plant Wola
Power: 349 MW





Municipal Solid Waste Incineration Plant
Power: 9 MW

Combined heat and power plant Żerań
Power: 1 736 MW

Combined heat and power plant (cogeneration)

Combined heat and power plant Siekierki
Power: 2 068 MW

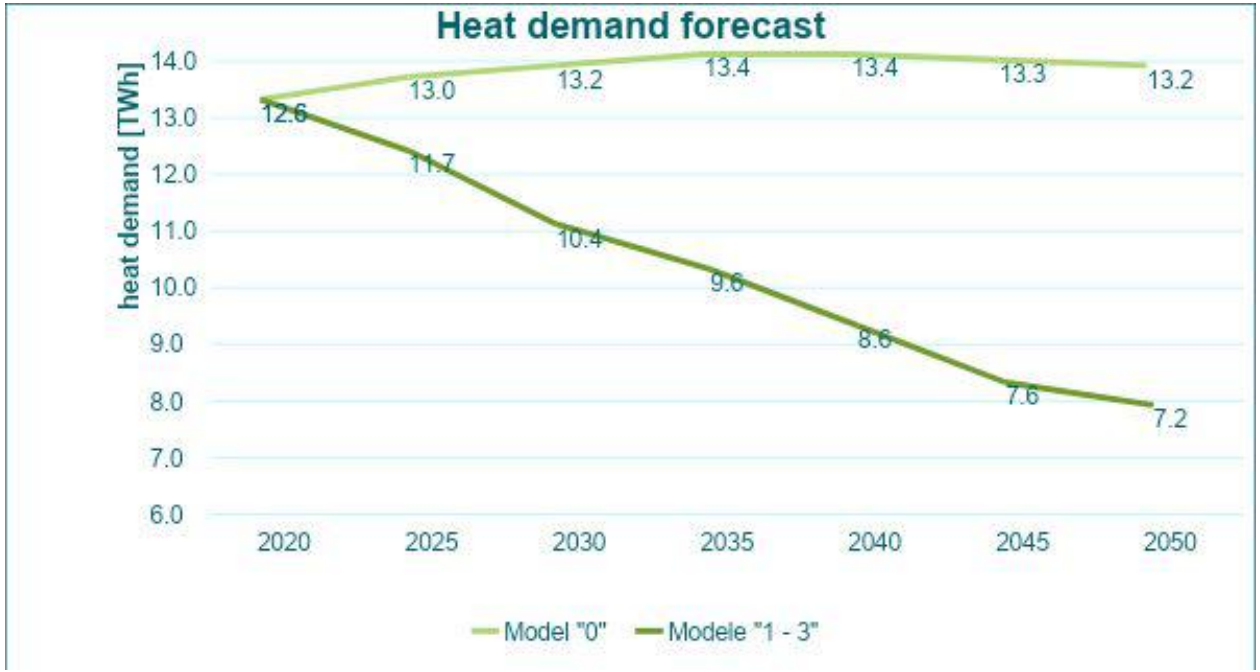
district heating length: 1.841 km

district heating power consumption 10.159 GWh

cover 80% of the city's demand for heat

	electricity	heat	gas	total cost of energy
	cost [million €/year]	cost [million €/year]	cost [million €/year]	[million €/year]
2017	59,9	24,00	5,30	89,2
2018	60,6	25,50	5,40	91,5
2019	61,6	27,30	5,50	94,4
2020	69,7	28,70	5,60	104,0
2021	82,1	36,90	7,30	126,3
2022*	131,9	40,70	11,00	183,6

MODEL 0 business as usual	**MODEL 1** RES development + 70% offshore wind farms
MODEL 2 RES development + 35% offshore wind farms	**MODEL 3** fast energy transformation heat pumps elimination of fossil fuels electrification of 90% of the city's heat needs



- city development
- electrification of district heating
- passivation of buildings

MODEL "0"	2020	2025	2030	2035	2040	2045	2050
Share of heat from heat pumps - (electrified heating) [%], including:	**0,8**	**5,1**	**8,6**	**13,2**	**18,1**	**23,7**	**29,9**
share of energy from commercial power industry [%]	0,8	5,1	8,6	13,2	18,1	23,7	29,9
share of heat from conventional sources (non-electrified heating) [%], including:	**99,2**	**94,9**	**91,4**	**86,8**	**81,9**	**76,3**	**70,1**
share of heat from local and individual sources from fossil fuels [%]	27,0	28,5	27,0	25,3	23,8	22,4	21,2
share of non-renewable sources energy network heat [%]	68,8	63,1	61,1	58,3	54,8	50,7	48,9
share of network heat from renewable sources [%]	3,4	3,3	3,3	3,2	3,2	3,2	0,0

MODEL "3"	2020	2025	2030	2035	2040	2045	2050
share of heat from heat pumps (electrified heating) [%], including:	**0,8**	**20**	**40**	**50**	**65**	**80**	**90**
share of PV sources [%]	-	2,1	9,4	13,6	17,3	20,9	22,5
share of µEW [%]	-	0,0	0,1	0,3	0,7	1,2	1,8
share of EWL [%]	-	0,6	2,0	4,3	8,3	13,8	18,0
share of EB [%]	-	0,1	0,6	1,3	2,5	3,8	4,5
share of circular economy [%]	-	2,0	1,4	2,6	3,4	4,2	4,5
share EWM [%]	-	0,0	2,3	10,7	21,7	31,5	36,0
share of energy from the commercial power industry [%]	-	17,0	24,2	17,3	11,0	4,5	2,7
share of heat from conventional sources (non-electrified heating) [%], including:	**99,2**	**80**	**60**	**50**	**35**	**20**	**10**
share of heat from local and individual sources from fossil fuels [%]	27,0	24,6	19,0	16,7	12,2	7,4	3,9
share of non-renewable sources energy network heat [%]	68,8	51,7	36,8	28,8	17,8	7,0	6,1
share of network heat from renewable sources [%]	3,4	3,7	4,1	4,5	5,0	5,7	0,0

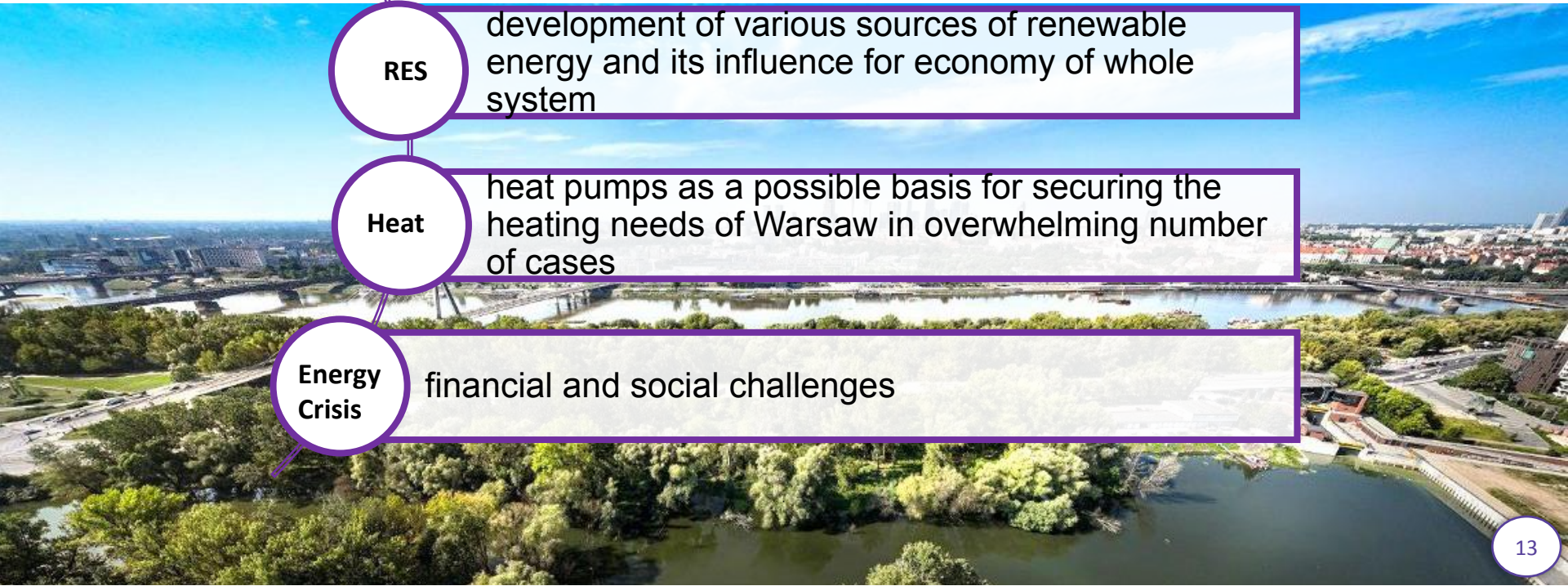
What we need?

Buildings — passive technologies in construction and modernization of buildings

RES — development of various sources of renewable energy and its influence for economy of whole system

Heat — heat pumps as a possible basis for securing the heating needs of Warsaw in overwhelming number of cases

Energy Crisis — financial and social challenges



Challenges

Reduction — What if reduction of heat demand will reach the level of e.g. 75%?

Replacement — Will electric technologies in heating like induction boilers be ready to replace traditional solutions?

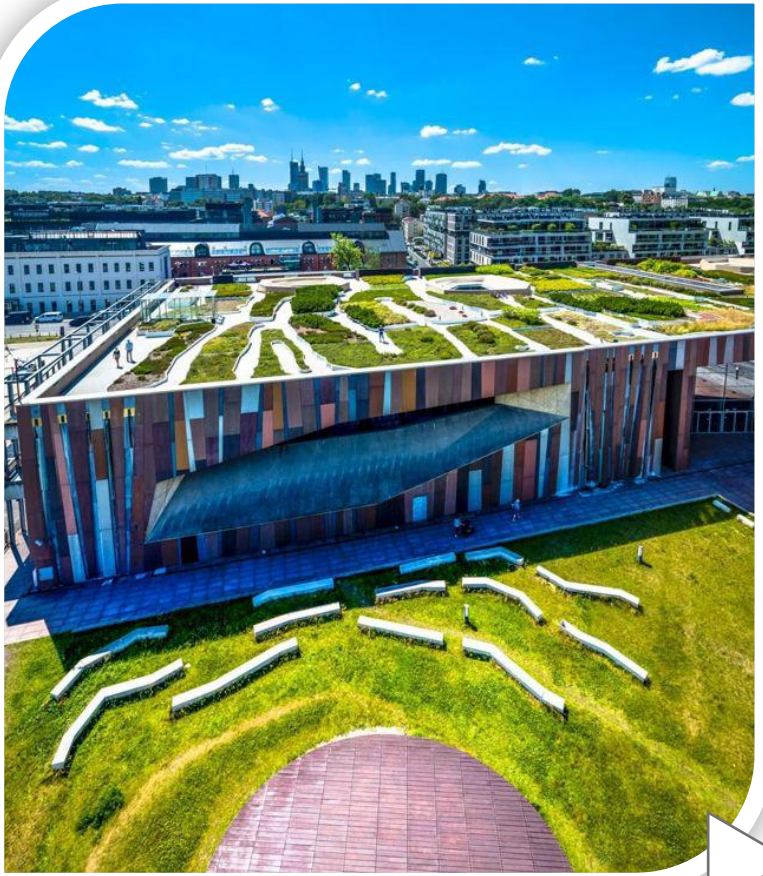
Change — How to solve the problem with scale of necessary changes taking into account whole technical, economical and urban vision?

Target — How to prepare all target groups for change?

Balance — How to secure balance between economy, climate and energy security?

Thank you!

fall in love with Warsaw



2) Energy community driven H&C projects

ICLEI
Local Governments for Sustainability
EUROPE

Strategic Heating and Cooling Support Package

Energy community-driven H&C

Agenda

Time	Topic	Speaker
10:00-10:15	Introduction to the topic of thermal energy communities	Arthur Hinsch (ICLEI Europe)
10:15-10:35	Case study: District heating cooperatives in Denmark	Birger Lauersen (Danish District Heating Association)
10:35-10:50	Facilitated discussion between peer cities	
10:50-11:00	Further guidance	Arthur Hinsch (ICLEI Europe)

Strategic H&C Support Package

- The aim: to help cities to deliver on overarching climate mitigation and adaptation targets by means of a more efficient and renewable thermal systems
- Funded by European Climate Foundation
- Complementary to guidelines and modules developed in other relevant EU projects

Strategic H&C Support Package

- Dealing with five specific topics:
  1. Strategic municipal heat planning in times of the energy crisis
  2. Energy community driven H&C projects
  3. Partnership models and finance of new and refurbished H&C infrastructure
  4. Procurement of H&C plants and solutions
  5. H&C resilience through blue and green infrastructure
- Format
  - Introduction on the topic by ICLEI
  - Case study presented by a peer city
  - Discussion among peer cities
  - Outline of practical tools

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Local Governments for Sustainability
EUROPE

Introduction to (Thermal) Energy Communities

Arthur Hinsch,
Climate & Energy Officer,
ICLEI Europe

What are energy communities?

Adapted from Marco Gütle, BBEn 2021

What can municipalities do?

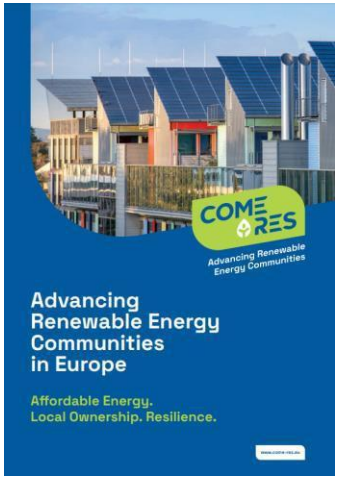
Many things! E.g:

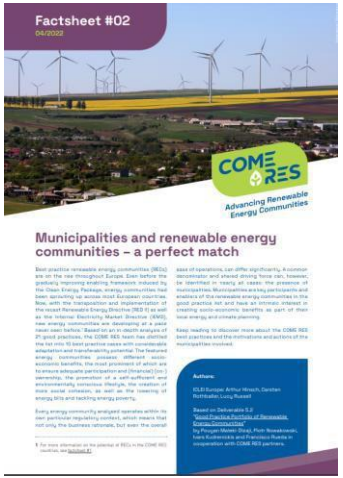
- They can make **public space** available
- They can **raise awareness** and **share municipal staff and resources** e.g. join the board of the community
- They can **set concrete targets** for the promotion of energy communities and make them a firm part of their climate & energy plans
- They can save costs and can **protect vulnerable households**
- They can **bring together different stakeholders** and promote innovation through **co-creation** and **citizen engagement**
- They can improve the **flexibility and resilience** of local grids
- They can **become part** of energy communities themselves
- They can **profit financially** from engaging with RECs get and access to renewable energy sources

Key Peculiarities of TECs and Questions

- Currently large reliance on renewable electricity for renewable heating and rise of electricity and oil prices potential for more DHS
- Sustainable heat transitions requires many individual decisions (were no connection mandate exists).
- Need for critical mass.
- TECs are forming, how can they be made more inclusive?
- Renewable energy cooperativenes and/or professional and financinal support for larger projects?
- What is the role of the municipality? Collective benefit?
- Question of scale (if we don‘t do it, who will?)

Further Guidance





Energy Cooperative Kappel

Lohtaja Cooperative

ThermoBello

POWERPOOR Toolkit

Rural Energy Communities Advisory Hub

Energy Communities Repository

ConnectHeat project

- **Coordinator:** Riccardo Battisti, riccardo.battisti@ambienteitalia.it
- **LinkedIn page:** https://www.linkedin.com/showcase/connectheat/ (already active)
- **Website:** https://connectheat.ambienteitalia.it/ (under construction, available at the end of March)

Thank you!

Contact:

veljko.vorkapic@iclei.org
nicola.iezza@ilei.org

ICLEI - Energy community driven H&C projects

Energy communities and municipalities in Danish district heating

Birger Lauersen, Manager International Affairs

Danish District Heating Association

DANISH DISTRICT HEATING ASSOCIATION

A bit of background

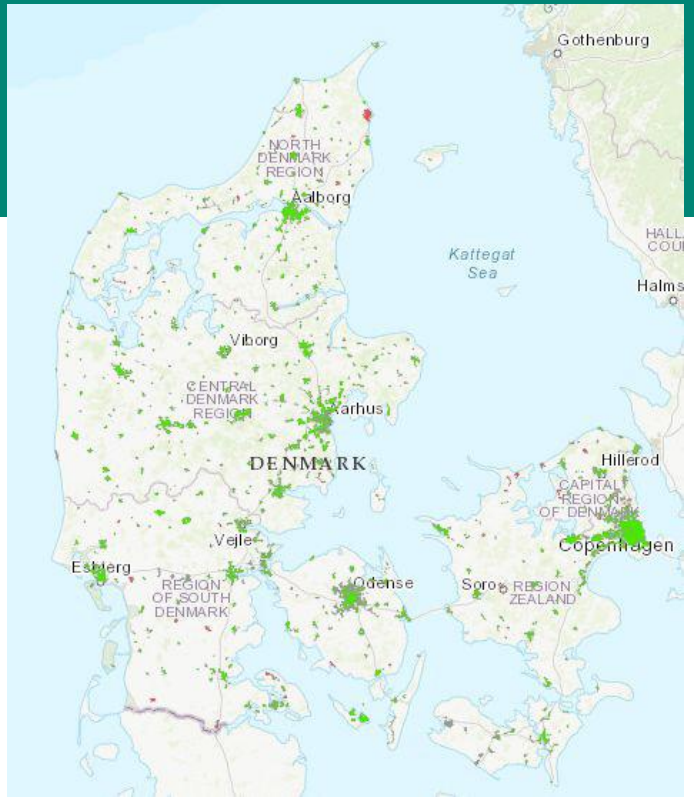
1. Strong cooperative movement in Denmark
   - Agricultural sector since 1866, electricity since early 1891, DH since mid 1900'
2. No domestic coal, oil, gas or hydro
   - Coastal country - all fuels imported through cities
   - Power plants in city harbours - heat market nearby
3. Energy crisis in 1970'ties hit hard
   - Energy and heat planning
   - District heating regulation – monopolistic non-profit sector

Result

- Widespread district heating (+400 systems)
- Approx. 330 cooperatives & 40 municipally owned DH-utilities
- Non-profit sector – attractive prices

Three ways of citizen involvement:

1. Heat planning (political control)
2. Municipal utilities (political control)
3. Cooperative utilities (co-ownership)



Energy Efficiency Directive , 2012/27/EU) art. 2, (42):

- Efficient DHC, EED
- Non-efficient DHC

DANISH DISTRICT HEATING ASSOCIATION

Strong supply line..

- District heating concept well-known (2/3 of population as users)
- Cooperatives/”economically active association” is a concept well-known (DH, electricity, water, cable, agriculture, banking/finance, insurance, supermarkets…)
- Strong supply line
  - Municipalities
  - Regulation
  - Engineering consultancies
  - Component supply industry
  - Contractors
  - Operators
  - Staff
  - And so on….

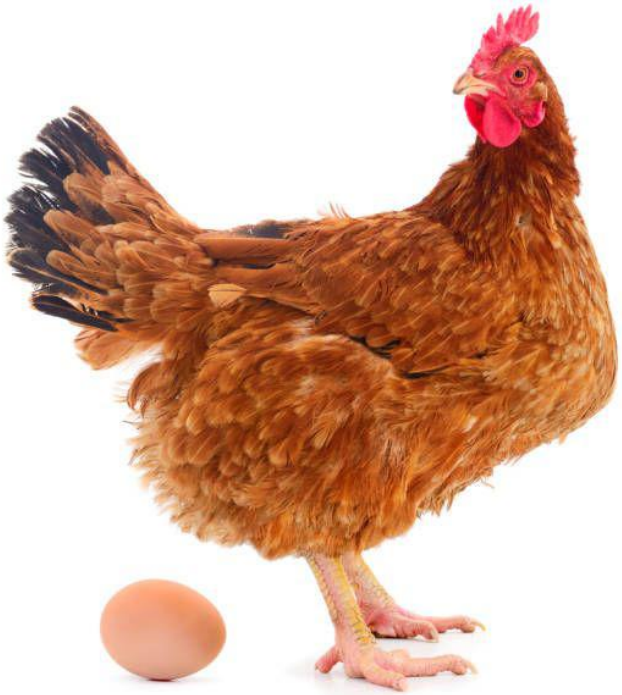
..and huge demand!

- 15-20 % households on fossils wants out!
- It’s either DH or HP’s
- Many want DH!

DANISH DISTRICT HEATING ASSOCIATION

The conumdrum

- For customers to connect to DH, there has to be a DH network
- To develop a DH network, you need customers (“a critical mass”)
- A patient approach may deal with this over time
- But what if you’re in a hurry?



DANISH DISTRICT HEATING ASSOCIATION

Municipal role in Danish heating sector (very condensed!)

Before 2019: Planning with intent

Zoning based on lowest socio-economic cost (not consumer cost!

- Zones suitable for ”collective supply”
  - Heat density (urban & suburban areas)
  - Availability of heat source or gas
  - District heating or natural gas
  - Request construction by utility
  - Permitting (grid and production)
  - Optionally impose obligation to connect/remain connected
  - Issue loan-guarantee (grid and production)

- Zones for individual solutions (countryside)

After 2019: ~~Planning with intent~~ Analyzing feasibility

Zoning based on lowest socio-economic cost/~~not~~ consumer cost/technical feasibility/sustainability……~~!~~

- Zones suitable for ”collective supply (DH)”
  - Heat density (urban & suburban areas)
  - Availability of heat source ~~or gas~~
  - District heating ~~or natural gas~~
  - ~~Request construction by utility~~
  - Permitting/Easing of permitting (grid and production)
  - ~~Optionally impose compulsory connection/remain connected~~
  - Issue loan-guarantee (grid and production)
  - No support for individual heat pumps (for one year)

Consumer protection through national legislation!

DANISH DISTRICT HEATING ASSOCIATION

DH communities meet municipalities

Existing district heating utilities

Grid expansions and/or production expansion/transition

- Submission of project for evaluation and permitting
- Possible request for loan-guarantee
- Municipal sustainability policies (difference municipal/cooperative utilities)

New district heating utilities

New green-field DH projects

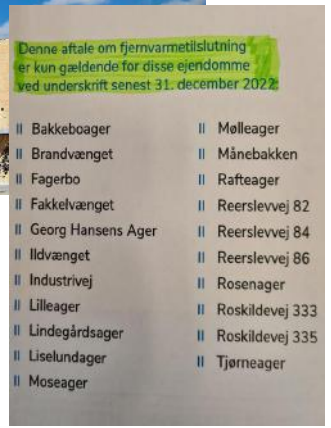
- Towns, villages and residential areas without DH attracted by ease, low cost, sustainability and legitimacy of DH
- May be outside or distant from existing DH areas or unattractive for existing utilities
- Now 50-100 new cooperatives in all stages of developments from rough idea to project submitted for evaluation
- May get some support for maturing idea and developing project
- Eventually submission project, permitting and perhaps guarantee

DANISH DISTRICT HEATING ASSOCIATION

Either end of the scale

Føns Nærvarme er et andelsselskab med 53 forbrugere, som er tilsluttet en varmecentral med to varmepumper og et flisfyret kedelanlæg.

- Cooperative DH utility
- Small village
- 53 connected households
- No employees
- Operations outsourced



- Cooperative DH utility
- Suburb western Copenhagen
- 15k consuming households
- 22 employees
- Operations in-house

DANISH DISTRICT HEATING ASSOCIATION

DANISH DISTRICT HEATING ASSOCIATION

Birger Lauersen
Manager International Affairs

bl@danskfjernvarme.dk

www.danskfjernvarme.dk

3) Partnership models and finance of new and refurbished H&C infrastructure

Local Governments for Sustainability EUROPE

Strategic Heating and Cooling Support Package

Partnership Models and finance of new and refurbished H&C infrastructures

Agenda

Time	Topic	Speaker
10:00-10:20	Thermal energy finance - linking H&C Strategies to financial decision-making	
	• Climate Disclosure in cities	Nicola Iezza (ICLEI Europe)
	• The Energy Savings Insurance (ESI) model	Livia Miethke Morais (BASE)
10:20-10:30	Partnership in action – the case of Sonderborg Project Zero	Allan Pilgaard-Jensen (Deputy Director, ProjectZero)
10:30-10:50	Facilitated discussion	Veljko Vorkapic (ICLEI Europe)
10:50-11:00	Driving innovation via investments – existing project pipelines	Nicola Iezza (ICLEI Europe)

Strategic H&C Support Package

AIM: to help cities to deliver on overarching climate mitigation and adaptation targets by means of a more efficient and renewable thermal systems

SUPPORT: Funded by European Climate Foundation

STRUCTURE: Five modules - complementary to guidelines and modules developed in other relevant EU projects

Thermal energy finance - linking H&C Strategies to financial decision-making

- Going from planning into action requires a blend of technical expertiese, financial decision-making and partnership with private sector

- H&C Strategies should be documents aiming at maximising the utility across activities in H&C at the local level

In this module:

- What are the steps to link H&C Strategies to finance and decision-making?
- How to successfully establish local partnerships for the common good?
- What opportunities for financing?

What are the steps to link H&C Strategies to finance and decision-making?

STEP 1
Establish a clear Vision and Commitment

STEP 2
Disclose climate-related risks and prioritize interventions

STEP 3
Divest from polluting sources; De-risk investments; Repurpose local budget

STEP 4
Develop project opportunities & partnerships with local actors

Climate-related Financial Disclosure

STEP 2 Disclose climate-related risks and prioritize interventions

ICLEI Local Governments for Sustainability EUROPE

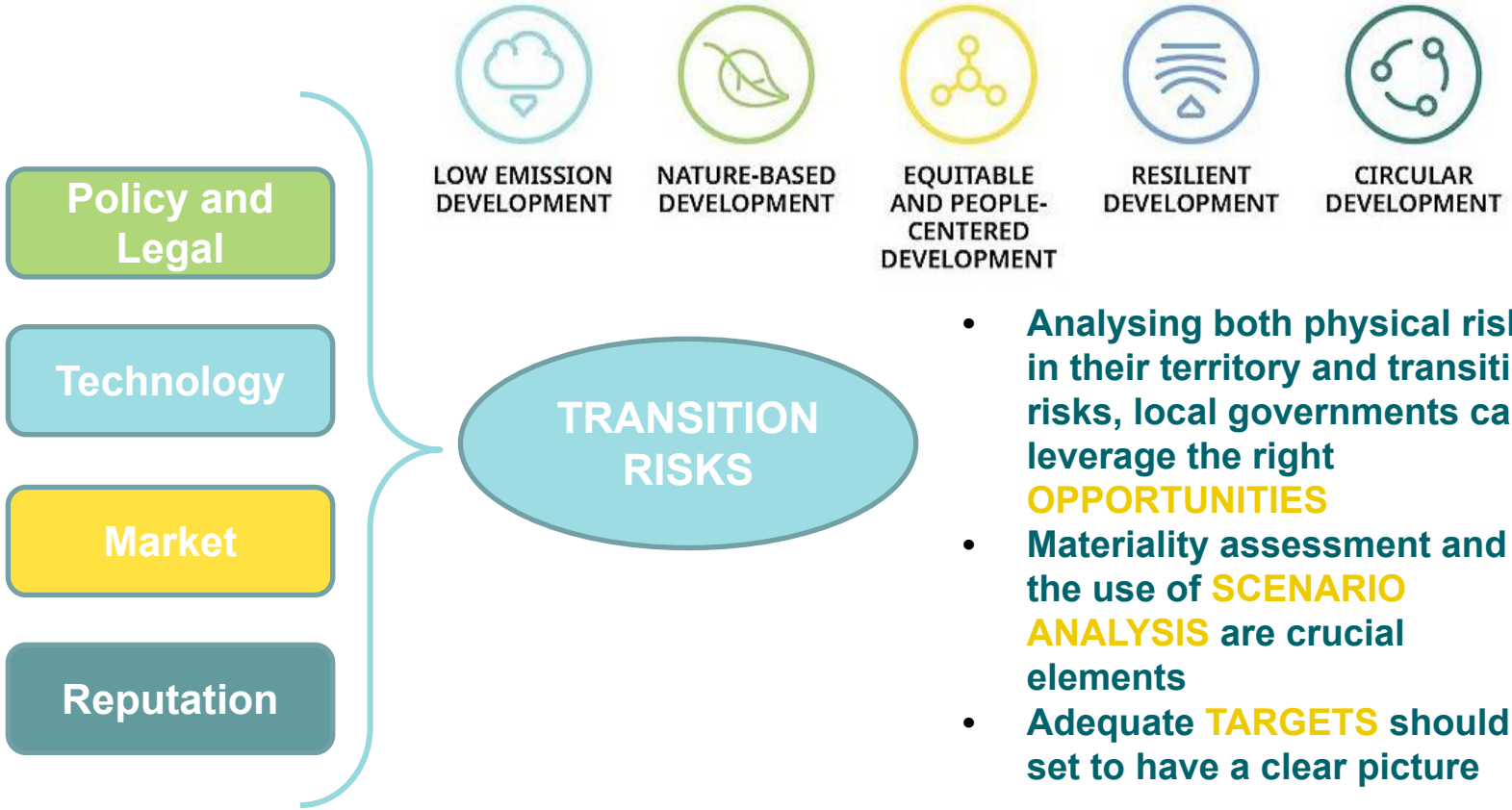
➔ Linked to local budgeting decision

WHAT: to help build consideration of the effects of climate change into routine business and financial decisions

WHY: more informed and more efficient allocation of capital; demonstrate responsibility and foresight

HOW: taking into consideration physical and transition risks and linking them to budgetary decisions and metrics

Transition risks towards Climate Resilient Development



- **Analysing both physical risks in their territory and transition risks, local governments can leverage the right OPPORTUNITIES**
- **Materiality assessment and the use of SCENARIO ANALYSIS are crucial elements**
- **Adequate TARGETS should be set to have a clear picture**

From framework to implementation - ICLEI TAP

Mission

Enabling access to finance to scale up local climate action

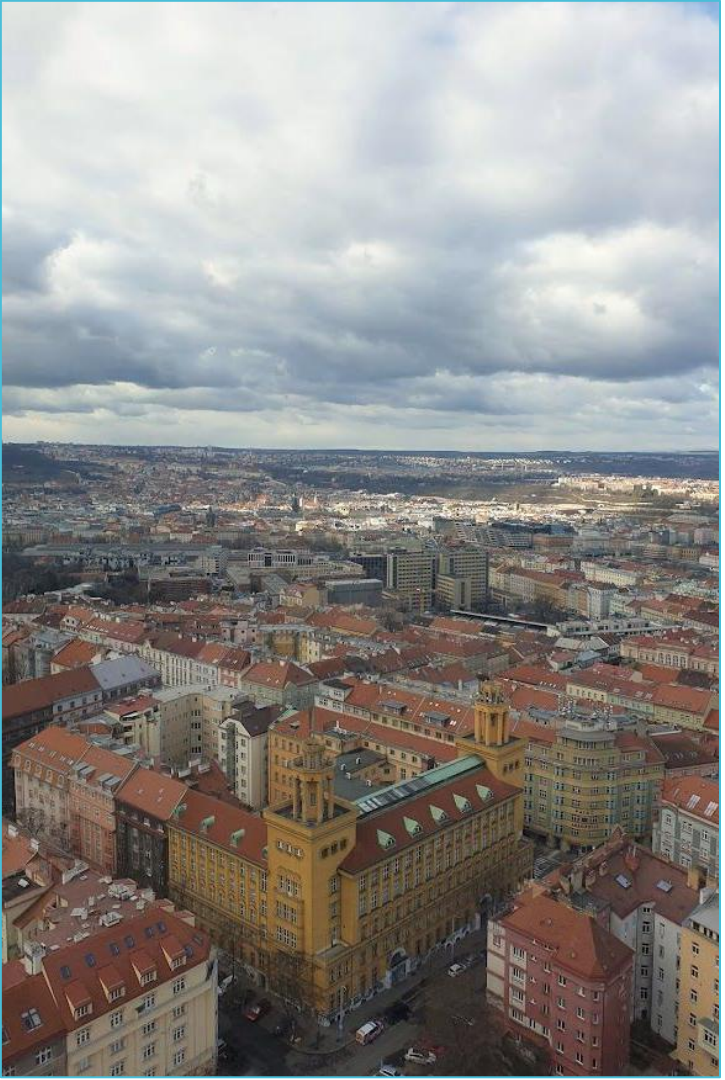
Accelerating net zero emission and climate-resilient development

Supporting national ambitions through transformative local infrastructure projects

Activities

- **Project Pipeline,** subnational demand-driven
- **Project Preparation Facility (PPF)** with tailored services to guide project development to achieve maturity and be finance-ready
- **Advocacy Instrument** presenting the demand and diversity of subnational projects seeking finance

tap-potential.org



EUCF
European City Facility

The EUCF is a **European initiative** to support **municipalities/local** authorities, their groupings, as well as local public entities aggregating municipalities/local authorities across Europe to develop **investment concepts** to accelerate investments **in sustainable energy**.

Co-funded by the European Union

What is the EUCF, which opportunities?

- **Financial & direct support for investment concepts (209)**
- **Lump sums of 60.000 EUR per investment concept**
- **Build capacity of municipal staff**
- **Facilitate access to private & public finance**
- **Encourage replication in small and medium sized cities**

SIGN UP FOR THE CALL ALERT

WORKING WITH

€60.000

GRANTS

EUCF

European City Facility

Co-funded by the European Union

ICLEI
Local Governments for Sustainability
EUROPE

THANK YOU FOR YOUR ATTENTION!

Veljko Vorkapic, Senior Officer, ICLEI Europe
veljko.vorkapic@iclei.org

Nicola Iezza
Officer, ICLEI Europe
nicola.iezza@iclei.org

ESI Europe 2.0

Driving Investments in Energy Efficiency through Energy Savings Insurance in Europe 2.0

ICLEI Europe

Module 3 – Partnership Models and finance of new and refurbished H&C infrastructures

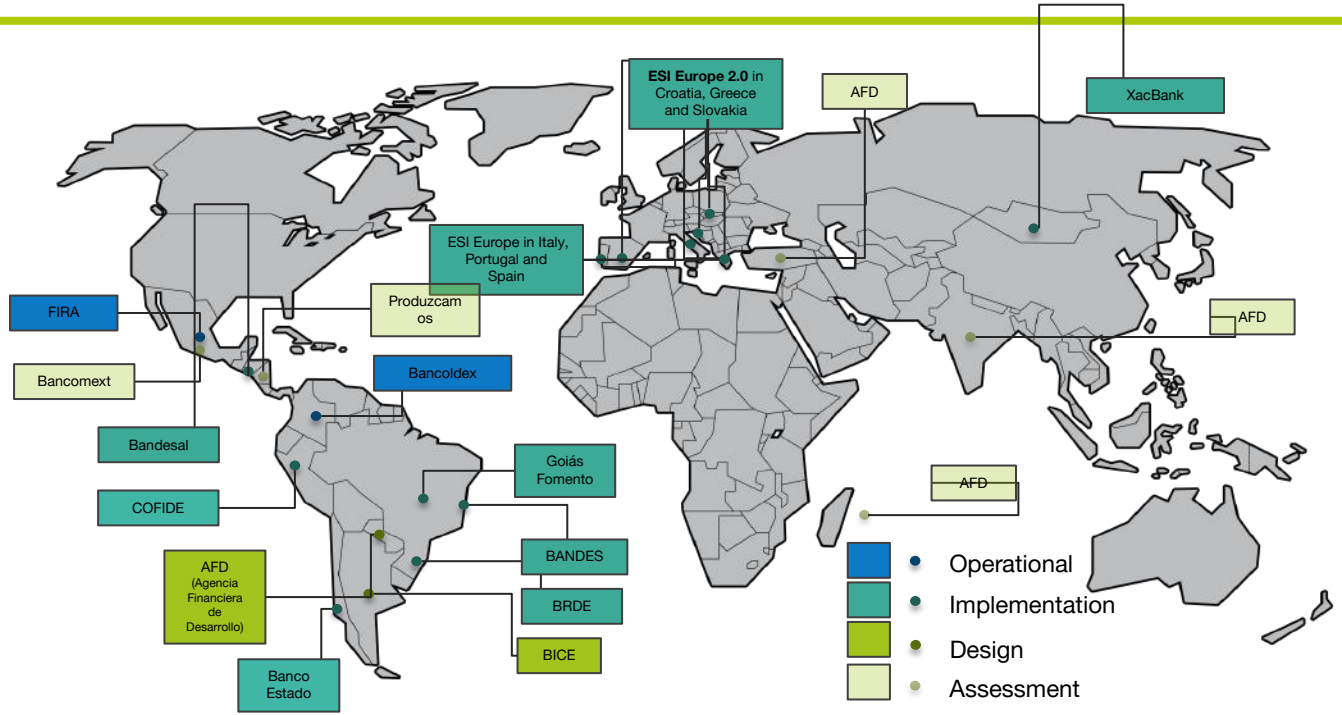
28 March 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033691

The ESI model around the world

The ESI model was recognised by the Global Innovation Lab for Climate Finance as one of the most promising instruments to mobilise private sector investments in energy efficiency.

ESI also features in the G20 Energy Efficiency Investment Toolkit by the UNEP FI and in the Swiss Sustainable Finance compendium of instruments for Financing the Low-Carbon Economy.

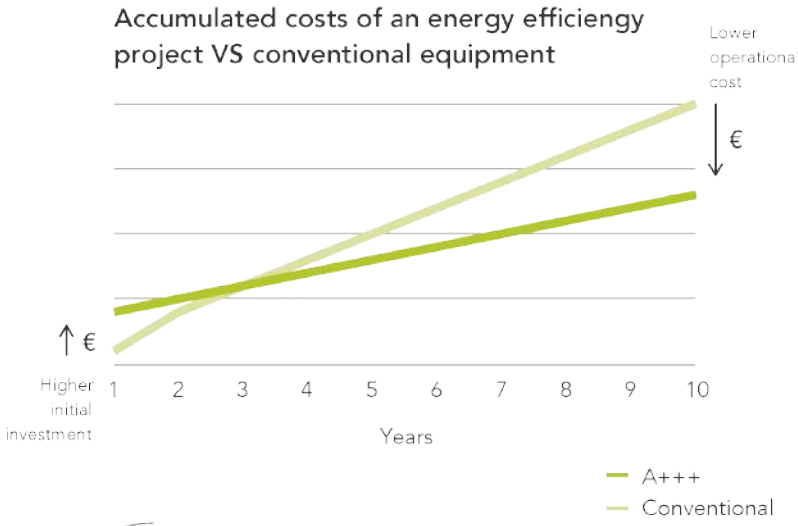


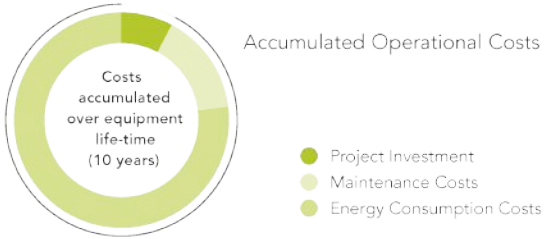
Rationale of the ESI model

Investments in energy efficient systems…

…have benefits:
- Reduced operational costs
- Higher productivity and competitiveness
- Improved environmental impact

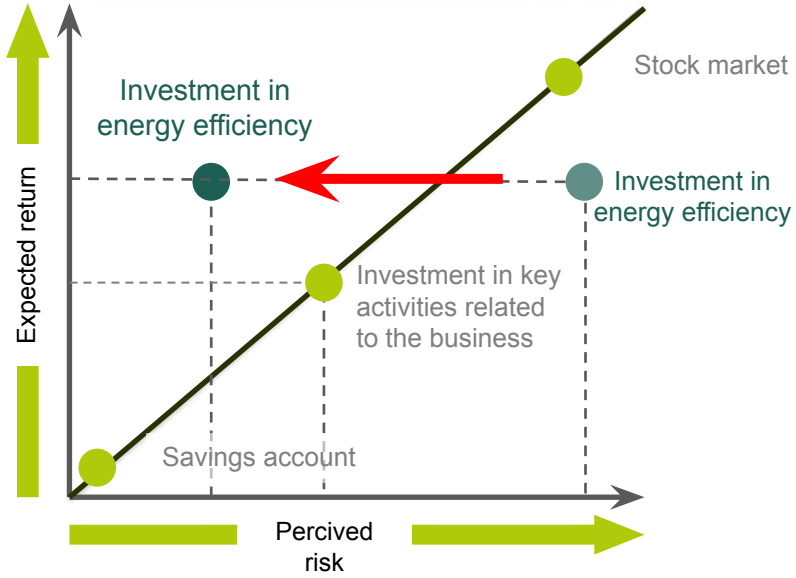
…but face barriers:
- Higher upfront costs
- Lack of trust (among actors, in future energy savings)
- Competing investments opportunities





The ESI model

Risk/Return tradeoff investment opportunities for enterprises



The challenge for energy efficient technologies, is that SMEs tend to perceive these investments as relatively high risk, and as a result, the level of expected return is not commensurate with the level of perceived risk

The ESI model reduced the risk perception of energy efficiency investments, making those more attractive, mobilising demand for such solutions.

The ESI model

The **ESI model** is the combination of financial and non-financial elements designed to work together to reduced the perceived risk and build trust in future energy savings and mobilise private investments in Energy Efficiency.

GoSafe with ESI is the brand created to bring the ESI model to market by the ESI Europe project (currently available in Italy, Portugal and Spain).

The ESI model elements

1. Standardised contract

An agreement between technology provider and customer with guaranteed energy savings clause.

2. Energy Savings Insurance

Coverage of the guaranteed energy saving provided by an insurance for up to 5 years (surety bond).

3. Technical Validation

The project and the guaranteed savings are validated by a third-party validation entity that also act as an arbiter in case of disagreement.

4. Green Financing

Facilitated access to green credit lines with competitive conditions by financial institutions to EE customers.

Online Platform

A functional interface developed to facilitate the workflow and information access of the different key actors of the energy efficiency project.

The main characteristics are:

✔ SECURE

It is accessed on a login and password, secured area

✔ PROJECT PROCESS & REPORTING

It registers information and actions of the project: proposal validation, contract activation, installation validation and monitoring reports

✔ TAILORED ACCESS

Accessed by TPs, Clients, Validation Entity, Insurance companies and Financial Institutions

✔ DEVELOPED IN BLOCKCHAIN

Increased transparency, trust, traceability and reliability of information

www.esi-europe.org

www.gosafe-esi.com

Livia Miethke Morais

Senior Sustainable Energy Finance Specialist

livia.miethke@energy-base.org

The ESI Europe 2.0 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033691

Programme coordinator:

National coordinator in Croatia, Greece and Slovakia:

Partnership model
– to secure a CO2 neutral energy system by 2029

ProjectZero
SONDERBORG

ICLEI Heating & Cooling webinar, 28 March 2023

Sonderborg target: CO2 neutral energy system by 2029

A local solution to a global problem

Sonderborg focuses on **energy efficiency** first as this has the potential to **reduce total costs** of decarbonization by almost **50%.**

Sonderborg has already **reduced CO_2 emissions by 50%** since start of ProjectZero in **2007.**

With ProjectZero, Sonderborg has a clear approach to **decarbonize Sonderborgs energy system by 2029** in an intelligent and cost-effective way.

A local solution to a global problem

Energy efficiency:
Priority #1

The greenest energy is the energy we don't use

Sector integration:
Priority #2

Reuse the energy already used once

Renewable energy:
Priority #3

Use renewable energy

Organizing local stakeholders is essential

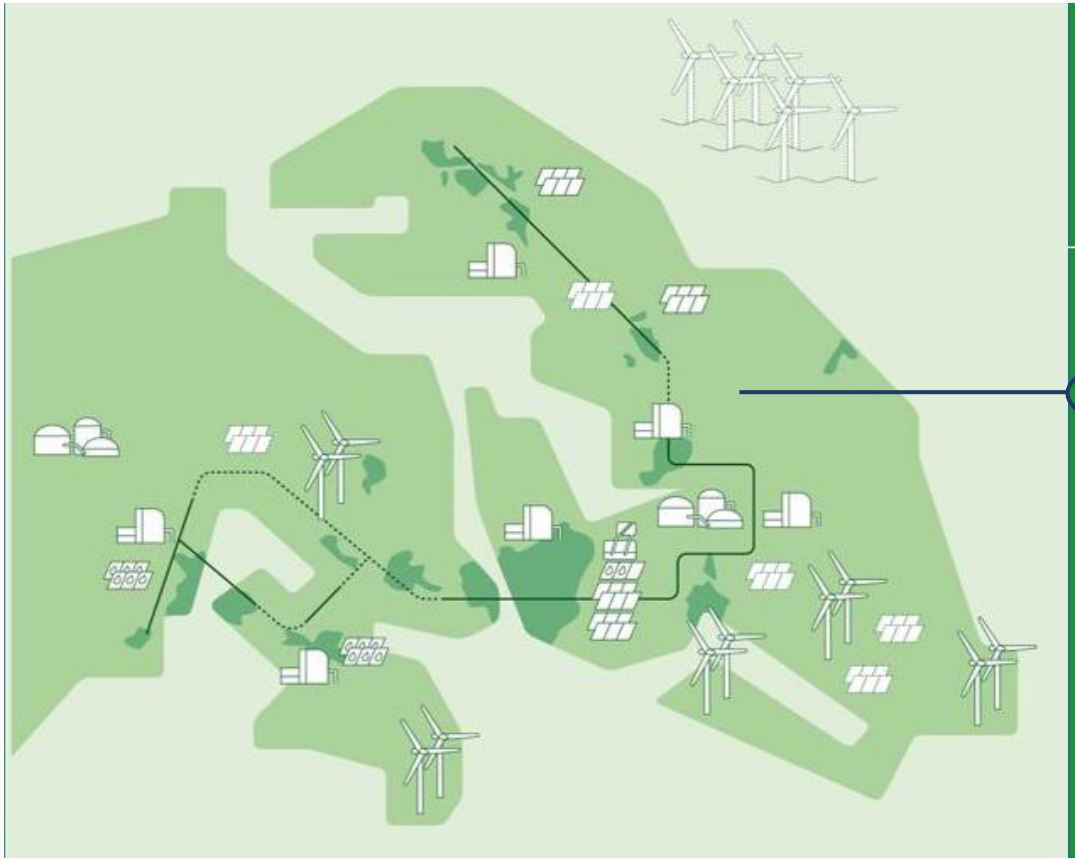
Local energy system

Relevance for each and every stakeholder to ensure engagement

Local stakeholders

- City of Sonderborg
- Citizens
- Utilities
- Large and small industries
- Universities and schools
- Building owners
- Housing associations
- Banks

Three district heating companies work together



Local stakeholders

- City of Sonderborg
- Citizens
- Utilities
- Large and small industries
- Universities and schools
- Building owners
- Housing associations
- Banks

Masterplan organization

More than 75 people are part of the organization

18	0
Owner – occupied housing	

For each ‘hotspot’:

Owner **Project manager** **Working group** **Experts**

Project Management Office

The office **mobilizes and motivates** the master plan organization.

Continuous adaptation to framework conditions **is key.**

The engagement by the stakeholders is driven by a **common goal** and ”what is in it for me”

Partnership recommendations

The ProjectZero SØNDERBORG model

1. Local engagement behind a bold aspiration
2. Develop an intelligent and cost-effective masterplan
3. Organizing local action
4. Drive performance management
5. Don’t wait, the solutions are ready

ProjectZero
SØNDERBORG

4) Procurement of H&C plants and solutions

ICLEI
Local Governments for Sustainability

Strategic Heating and Cooling Support Package

Introduction to sustainable public procurement of H&C plants and solutions

Agenda

Time	Topic	Speaker
10:00-10:15	Introduction to the sustainable procurement of H&C plants and solutions	Grace Sly (ICLEI Europe)
10:15-10:30	Helsinki Energy Challenge	Laura Uuttu-Deschryvere (Head of International Affairs, City of Helsinki)
10:30-10:50	Facilitated discussion	Veljko Vorkapic (ICLEI Europe)
10:50-11:00	Tools and guidance	Grace Sly (ICLEI Europe)

Strategic H&C Support Package

- The aim: to help cities to deliver on overarching climate mitigation and adaptation targets by means of a more efficient and renewable thermal systems
- Funded by European Climate Foundation
- Five modules - complementary to guidelines and modules developed in other relevant EU projects

Why public procurement matters

14%	Percentage of annual GDP that public procurement represents in the EU.
2 trillion euros	Annual value of public procurement in the EU.

Public procurement is a powerful market force for stimulating growth, promoting resource and energy efficiency, supporting innovation, social inclusion and achieving strategic objectives of a city.

Sustainable public procurement

Impacts of sustainable procurement
Taken from ICLEI (2016): Procura+ Manuel, 3rd edition

SPP regulatory and policy frameworks

International

The EU is bound by the WTO's Government Procurement Agreement (GPA) and bilateral trade agreements.

EU

Public procurement in the EU is regulated by the 2014 public procurement directives. SPP has been endorsed in a number of EU policies and strategies (i.e., Circular Economy Action Plan).

National

Most EU Member States have published SPP National Action Plans outlining various actions and support measures for sustainable public procurement.

Benefits of SPP

Through SPP, public authorities can…

- ✔ **meet environmental and sustainable policy goals**.
- ✔ **improve financial efficiency** through life cycle costing and procuring value for money.
- ✔ **reduce risk** by ensuring compliance with environmental and social legislation.
- ✔ **accelerate market transformations** and innovation by creating demand for sustainable products and services.

SPP before launching a tender...

Pre-procurement

Define real needs.

Consult public authorities who have undertaken similar procurements.

Engage with potential suppliers.

Choosing a procurement procedure

<u>Examples (as referenced in the 2014 directives):</u>

Open procedure

Innovation partnership

Competitive dialogue

Negotiation procedure with negotiation

Design contest

SPP within the procurement process

Subject matter	Defining the **'subject matter'** of a contract permits inclusion of non market-distorting sustainability considerations. *All specifications and award criteria must relate to the subject matter*.
Exclusion and selection criteria	Contracting authorities can both **exclude** an operator who has violated a legal obligation, and consider **selected** experiences or competences when assessing a bidder's ability to perform the contract.
Technical specifications	**Technical specifications** can be based on sustainability standards, labels and the EU and national criteria (e.g., EU GPP criteria, fair trade or ecolabels).
Award criteria	Procurers may **award** points to recognise sustainability performance beyond the minimum requirements set in the specifications.
Contract performance clauses	**Contract performance clauses** can specify that goods are to be supplied or services/works performed in a sustainable way.

SPP before launching a tender:
H&C solutions examples

Pre-procurement

South Dublin's construction of a novel DHC system began with a *market consultation* to identify companies with proper capabilities. *Knowledge exchanges* with Danish and other HeatNet partners assisted with technical and organisational issues.

Choosing a procurement procedure

The South Dublin County Council chose a *competitive dialogue* procedure to procure the DHC system. This is composed of

1. An initial pre-qualitative questionnaire that narrowed down bidders.
2. A second stage where qualified bidders presented an outline solution.
3. Based on these submission, bidders were asked to submit their final solution and costs for evaluation.

SPP within the procurement process:
H&C solutions examples

Subject matter

In 2008, the procurement authority of Northern Bavaria in Germany sought "a heating system through the construction and operation of a biomass heating plant". By defining the **subject matter** of the contract in sustainable terms, the authority was able to prove that their criteria had a direct connection with tendered subject when challenged.

Selection criteria

During the construction of a passive swiming pool, the Municipality of Sulejów, Poland included **selection criteria** that required bidders to demonstrate a previous execution of at least one building with a geothermal pump.

SPP within the procurement process:
H&C solutions examples

Technical specifications

In 2013, the municipality of Toholampi, Finland sought to procure a CHP plant. Functional and performance-based **technical specification** were introduced alongside a negotiated procedure in order to stimulate market innovation.

Award criteria

When public authority responsible for social housing in Torino, Italy procured innovative solutions for energy saving building technologies, the contract was **weighed and awarded** based on:
Energy efficiency (70 points in total), Sustainability (10 points), Installation and maintenance, (50 points in total) and Economic criteria (30 points).

Contract performance

The resulting contract included **provisions** for early termination should any environmental terms or conditions be breached.

ICLEI
Local Governments for Sustainability

Strategic Heating and Cooling Support Package

Introduction to sustainable public procurement of H&C plants and solutions

Tools and guidance

Regulatory guidance

- Directive 2014/24/EU and Directive 2014/25/EU on public procurement.
- EU GPP Criteria [voluntary]
  - Electricity (2012)
  - Office Building Design, Construction and Management (2016, under revision)
- Labels (e.g.) [voluntary]
  - EU Ecolabel, Blue Angel, Nordic Swan
  - Fairtrade International, TCO certified, World Fair Trade Organization
- European Commission guidance
  - 'Buying social' (2021) guide to SRPP.
  - 'Innovation procurement guidance' (2021)
  - 'Making public procurement work in and for Europe' (2017) presents the EC's public procurement strategy.

Procura+ European Sustainable Procurement Network

Initiated and coordinated by ICLEI, **Procura+** is a network of European public authorities and regions that connect, exchange and act on sustainable and innovation procurement.

Connect.	Exchange.	Act.
We are a network of European public authorities that connect, exchange and act on sustainable and innovation procurement.	Our combined knowledge and experience allows us to provide advice, support and publicity to any public authority that wants to implement sustainable and innovation procurement.	The Procura+ Network joins forces to champion sustainable and innovation procurement at the European level.

Sustainable Procurement Platform

ICLEI
Local Governments for Sustainability

The **Sustainable Procurement Platform** is managed by ICLEI. It provides up-to-date news, case studies, events, guidance and more on sustainable procurement from across the world.

Other guidance

The **Buying Green! Handbook** is the European Commission's main guidance document to help public authorities buy goods and services with a lower environmental impact.

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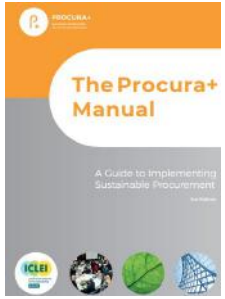
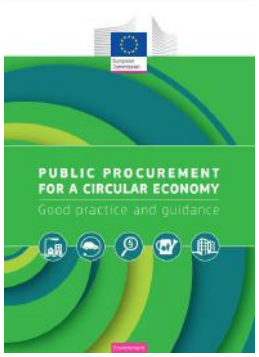


The **Procura+ Manual** provides clear, easy-to-understand guidance for any European public authority on how to implement sustainable procurement.



The European Commission's **Public Procurement for a Circular Economy** brochure contains a range of good practice cases as well as guidance on integrating circular economy principles into procurement.

Thank you!

Contact: grace.sly@iclei.org

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www.procuraplus.org

Sustainable & Circular Procurement:
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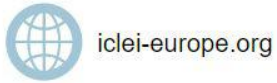
Innovation Procurement:
www.innovation-procurement.org

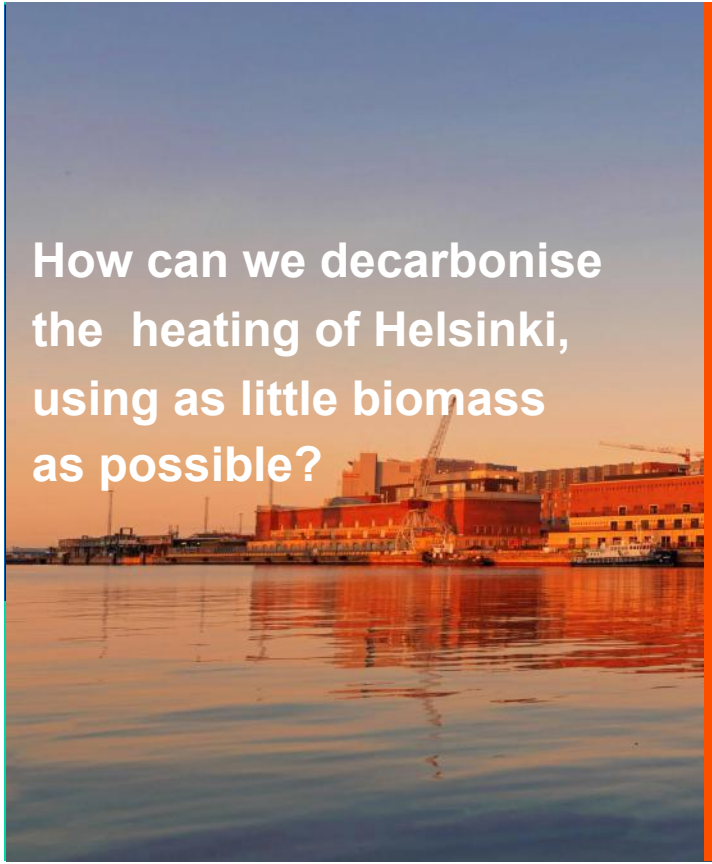


Helsinki Energy Challenge

25 April 2023

Laura Uuttu-Deschryvere
Head of International Affairs
City of Helsinki

Helsinki



How can we decarbonise the heating of Helsinki, using as little biomass as possible?

Some key background facts at the launch of the Helsinki Energy Challenge:

- Helsinki: Carbon neutral by 2035 *(now the goal set to 2030)*
- Finland: Use of coal banned as of 2029
- Fact: 53% of heat in Helsinki produced with coal
- Biomass not an option as a replacement to coal

Helsinki Energy Challenge - an international challenge competition that invited innovators from around the world to propose game-changing solutions that can transform Helsinki's heating

A year-long competition with two phases:
(1) Open application phase – (2) Co-creation phase

Main prize: 1 MEUR

Solutions for Helsinki but to be shared with other cities around the world.

27 Feb–30 Sept 2020	Application phase
April–September	Helsinki Energy Challenge webinars and other events
By 14 September	All clarifying questions and answers are published on the Challenge website
30 Sept 16:00 EET	Deadline for the Challenge applications
6 November	Finalist teams invited to the co-creation phase
11 November	Orientation webinar for the finalist teams
9–11 December	Boot camp in Helsinki
22 January 2021	Deadline for the finalist teams to submit their final competition entries
February 2021	Winner(s) selected by the international jury
March 2021	Awards ceremony, Helsinki

Helsinki

An innovative public procurement

- A challenge/ innovation competition – but, at the same time, **a public procurement process**
- The competition was organized as **a design contest** as specified in the Finnish Act on Public Procurement. Procurement notice published in the European Tenders Electronic Daily (TED) portal.
- **The challenge question** played an essential role for the success of the competition.
- We threw the innovators a significant challenge to solve, without knowing at all what the outcome would be.

Helsinki

1 Phase – Open application phase and selection of the Teams

- A public competition open to everyone globally –startups, larger companies, research institutions, universities, consortiums and individual experts. Only requirement: a team with minimum 2 members
- Competition entries master plans for decarbonising the heating of Helsinki. The proposed plan could include one or more solutions - new & old technologies, non-technological innovations, and a mix of these.
- The evaluation criteria in a key role in terms of the success of the competition. Evaluation criteria in the 1st Phase:
  - The team: (1) The team's expertise relevant to the solution that the team proposes; (2) The diversity of relevant expertise represented within the team; (3) The team's experience in the energy sector
  - The proposed solution evaluated against seven criteria: Climate impact - Cost impact - Impact on natural resources - Implementation schedule - Implementation feasibility - Reliability and security of supply - Capacity
- 10 best applications selected to the Co-creation phase by the City of Helsinki - with the help of several independent industry experts.
  - *Evaluation challenging - equal treatment, evaluation and comparison using published criteria*

Helsinki

All received applications:

252
Teams/ proposals

1528
Innovators and solution providers

From
35
countries

Finalist teams:

10
Teams

41/ 104
Organisations/ persons

From
12
countries

Helsinki

2 Phase – Co-creation phase and winner selection

- The aim of the Helsinki Energy Challenge co-creation phase was to support the finalist teams to further develop and finalize their proposed solutions to fit into the context of Helsinki.
- Each finalist team had a different solution and therefore different needs -¨the aim was to tailor the information and mentoring to the needs of each finalist team.
- The co-creation phase consisted of the individual teamwork, orientation webinar, 3-day boot camp and resulted in more elaborate solutions, which were thought out in detail and in close contact with the context of Helsinki
- Challenge for the organizer: Equal treatment of the teams - All information available to each team, - Keeping the teams' confidential information
- The winners selected by independent jury
    - Final competition entries evaluated anonymously - only the solutions evaluated (the team not evaluated)
    - The prize: 1 million euros
    - But, for many participants, the reason for participating was not the prize money.

Helsinki

More information:

energychallenge.hel.fi

Helsinki

5) H&C resilience through blue and green infrastructure

Heating and Cooling Strategy Support Package

Module 5

H&C resilience through blue and green infrastructure

Luca Arbau
Officer, Urban Resilience and Climate Adaptation
ICLEI Europe

OBJECTIVES

1. To explore how climate adaptation action can make **H&C systems more resilient**
2. To explore the role of **green and blue infrastructure** in building resilience to heatwaves and heat stress
3. To learn more on the climate adaptation actions taken in **Barcelona** at the **metropolitan scale**
4. To learn more about **available tools** for resilience and climate adaptation
5. To discuss best practices and **share experiences** on the resilience of H&C systems

AGENDA

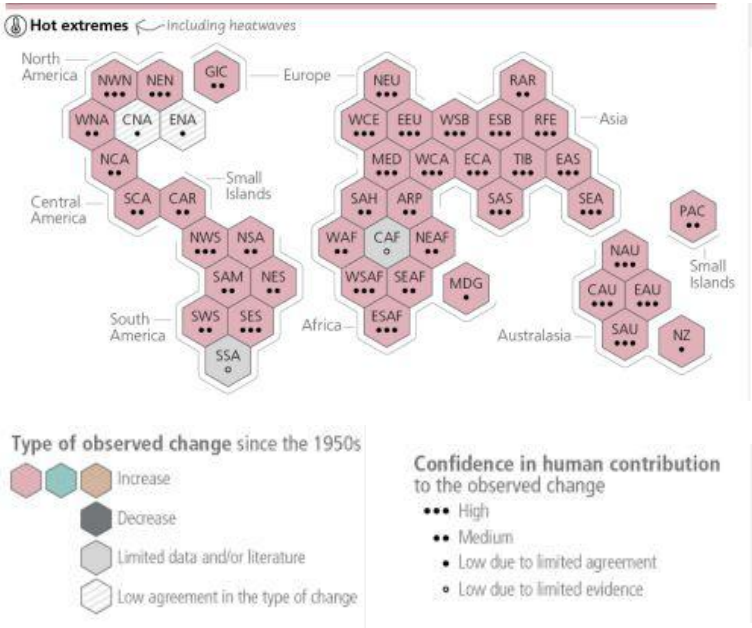
Time	Topic	Speaker
10:00 - 10:05	Welcome and introduction to the session	Luca Arbau *ICLEI Europe*
10:05 - 10:15	Adapting to the new extremes: rethinking H&C systems	Luca Arbau *ICLEI Europe*
10:15 - 10:30	Green and blue infrastructure to tackle the heat island effect	Margarita Espinós Torredemer *Metropolitan Area of Barcelona (AMB)*
10:30 - 10:50	Facilitated discussion	Veljko Vorkapic *ICLEI Europe*
10:50 - 11:00	Resilience and adaptation: tools and guidance	Luca Arbau *ICLEI Europe*

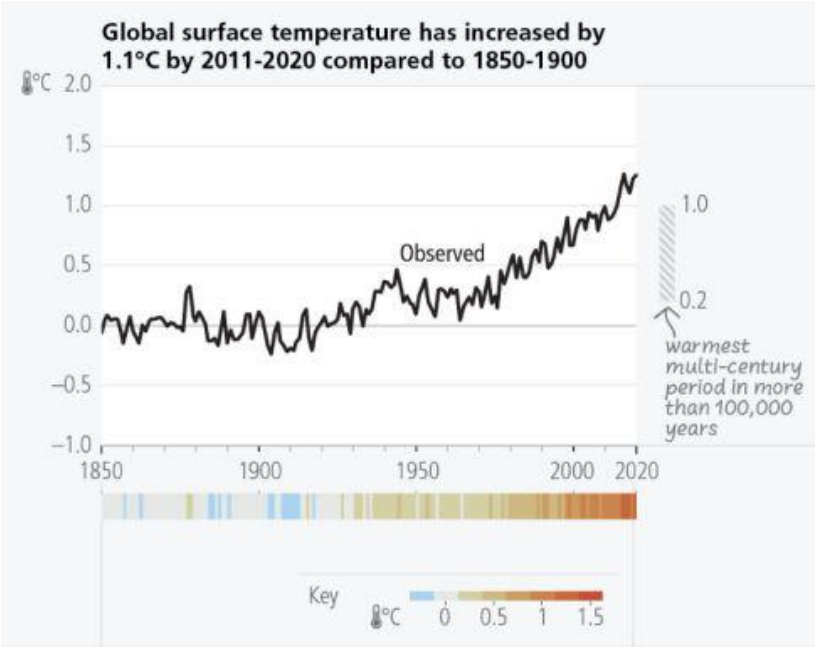
Adapting to the new extremes:
rethinking H&C systems

Luca Arbau
Officer, Urban Resilience and Climate Adaptation
ICLEI Europe

Heat stress and cities

- The global surface temperature has increased by around 1.1°C since 1850–1900





Source: IPCC (2023), "Synthesis report of the IPCC 6th assessment report (AR6) - longer report"

Heat stress and cities

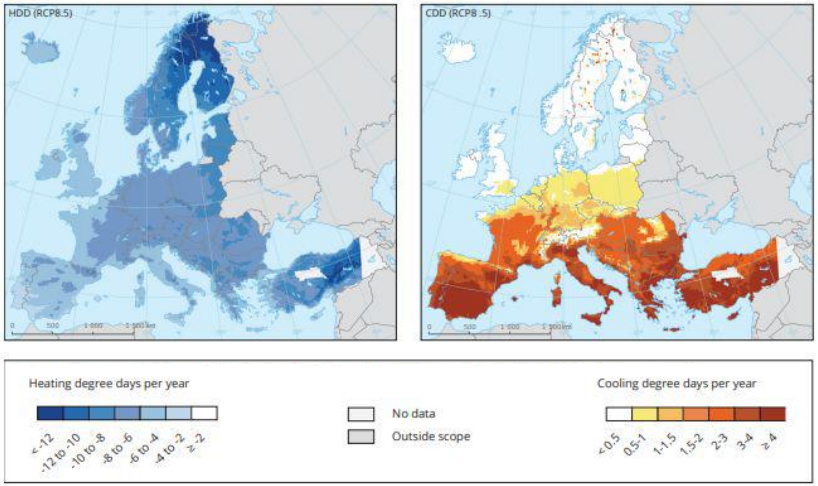
- **Hotter days**, **higher night-time temperatures** and an increasing number of **humid heatwaves** are increasingly affecting health and well-being across Europe
- The duration of extreme humid heat conditions is **projected to increase** substantially across Europe, with the largest increase in southern Europe
- According to Copernicus, the summer 2022 **was the hottest** ever
- 2022 heatwave caused **20,000 deaths** in Western Europe (deadliest climate event of the year)

A firefighter tackles a blaze in a wheat field in the province of Zamora, Spain, in July 2022

Credits: Isabel Infantes/Reuters

A changing climate: H&C effects

- The need for heating is winter is decreasing, while the need **for cooling in summer** increases
- Heating and cooling request not only depends on average temperatures but also on a variety of **socio-economic and technological factors**
- **Adaptation needs** can arise from the combination of cooling needs (particularly in southern Europe) with changes in socio-economic characteristics



Projected linear trend in heating (HDD) and cooling degree days (CDD) over the period 1981-2100 under high emission scenario

Source: EEA (2019), „Adaptation challenges and opportunities for the European energy system"

Air conditioning and „maladaptation“

- Urban resilience will depend more and more on the **stability of electricity networks** during heatwaves, but also on **water availability**

- An extensive use of air conditioning can lead to **maladaptation**, including:
  - *unsustainable energy demand*
  - *heat generated by equipment (thus heat island effect)*
  - *CO2 emissions*
  - *excessive water consumption for thermal power generation*
  - *psychological dependence*
  - *…*

Credits: Sergei A. on Unsplash

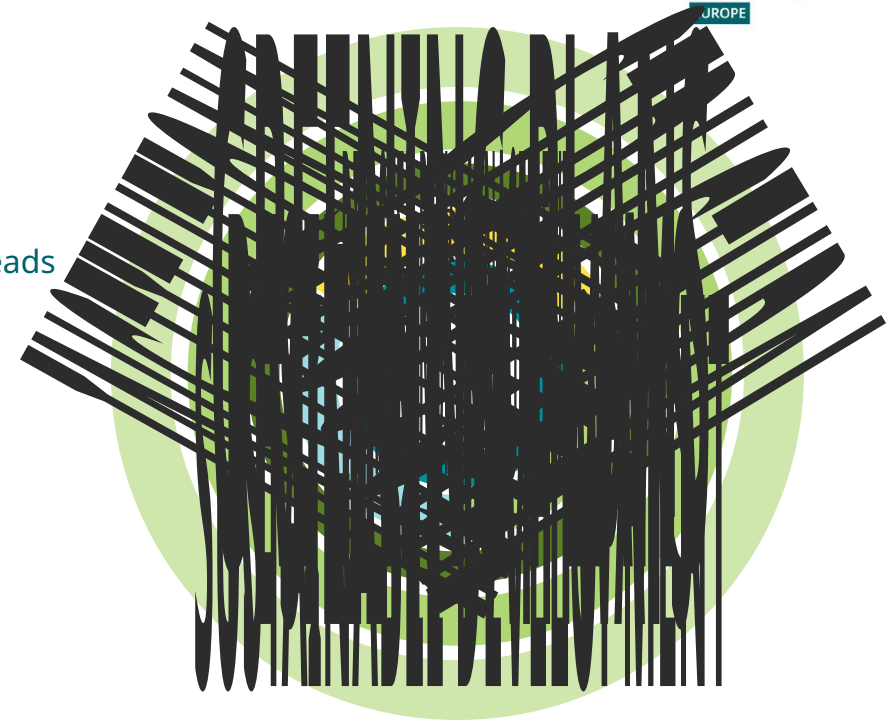
Towards a resilient cooling system

- Experience from European cities – such as Athens, Barcelona, Malmö, … - shows that it is needed to tackle urban heat at different levels:
  - Planning/policy
  - Communications/outreach
  - Investments in built environment and NBS

„Nature-based solutions made easy“
Credits: NetworkNature

Resilience to heat stress: planning

- Integrated planning should take into consideration **structural, social and institutional** characters
- Establishing partnership and **exchange with peers** leads to improved knowledge
- EU guidelines and initiatives (i.e. The Green Deal, the Adaptation Strategy, the EU Missions, etc) provide a framework for alignment and replication
- **Good practice**: the city of Athens appointed **a Chief Heat Officer** to deal with heat planning and management



Credits: Elena Petsani, ICLEI Europe

Resilience to heat stress: communication

- **Categorising heatwaves** to raise awareness
- **Governments, employers and individuals** should know how to act in the event of a heatwave
- Involve **vulnerable communities** to increase social resilience: leave no one behind
- **Good practice**: in Bologna, volunteers and non-governmental organisations assist vulnerable individuals during heatwaves via a **payment-free call centre** that looks after people at risk and accompanies them to cooling centres or hospitals, if needed

Credits: bigissues.com

Resilience to heat stress: NBS

- Bringing nature into cities helps keeping **temperatures down**
- Parks and green corridors are **climate shelters** accessible to all
- Possibility to integrate nature in **vacant plots, streets, brownfields, rooftops, mobility network** …
- Co-benefits:
  - Air quality
  - Recreation use
  - Absorption of CO2 emission
  - Awareness raising
  - Increased biodiversity
  - …

Top: One of Athens' „pocket parks". Credits: news.gtp.gr
Bottom: NetworkNature project

Resources

D. L. Chandler (2022) *3Q: Why Europe is so vulnerable to heat waves.* MIT news

Copernicus (2022) *A wrap-up of Europe's summer 2022 heatwave*

Copernicus (2022) *Summer 2022 Europe's hottest on record*

C. Crownhart (2022) *The legacy of Europe's heat waves will be more air conditioning. That's a problem.* MIT Technology review

European Environment Agency (2023) *Heat and cold — extreme heat*

European Environment Agency (2022) *Economic losses and fatalities from weather- and climate-related events in Europe*

European Environment Agency (2022) *Towards 'just resilience': leaving no one behind when adapting to climate change*

P. Hockenos (2022) *A very European answer to air conditioning.* CNN

IFRC (2022) *IFRC warns that the growing heatwave in Europe could have tragic consequences*

International Energy Agency (2018) *The future of cooling. Opportunities for energy-efficient air conditioning*

IPCC (2023) *AR6 Synthesis Report: Climate Change 2023*

P. Kotsoni (2021) *The pocket parks of Athens*. Punto Grecia

V. Latinos (2022) *Adaptation to climate change: Local & regional government perspective.* Open Access Government

S. Laville (2022) *Over 20,000 died in western Europe's summer heatwaves, figures show.* The Guardian

C. Nunley (2022) *European countries face an air conditioning Catch-22 after its red hot, record-breaking summer.* CNBC

S. Quefelec (2022) *Cooling buildings sustainably in Europe: exploring the links between climate change mitigation and adaptation, and their social impacts.* European Environment Agency

D. Rizzi (2023) *Recommendations for Biodiversity- positive Design with Nature-based Solutions (NBS)* ICLEI Europe for NetworkNature

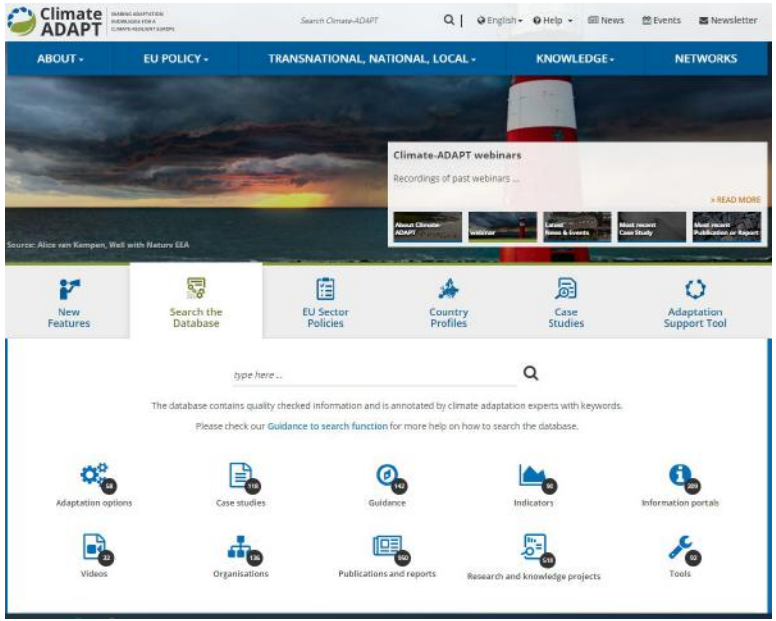
R. Roca Vallejo (2023) *Nature-based-solutions Made Easy.* ICLEI Europe for Network-Nature

UNEP (2022) *As heatwaves blanket Europe, cities turn to nature for solutions*

Climate-ADAPT: the one-stop shop

Climate-ADAPT **supports Europe in adapting to climate change** helping users to access and share data and information on:

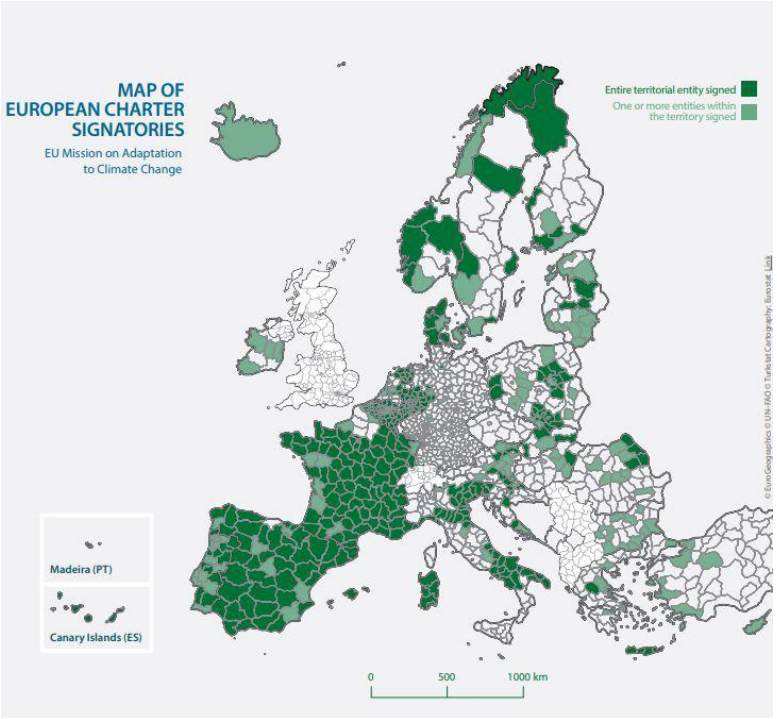
- Expected climate change in Europe
- Current and future vulnerability of regions and sectors
- EU, national and transnational adaptation strategies and actions
- Adaptation **case studies** and potential **adaptation options**
- **Tools** that support adaptation planning



www.climate-adapt.eea.europa.eu

EU framework: the Mission on Adaptation

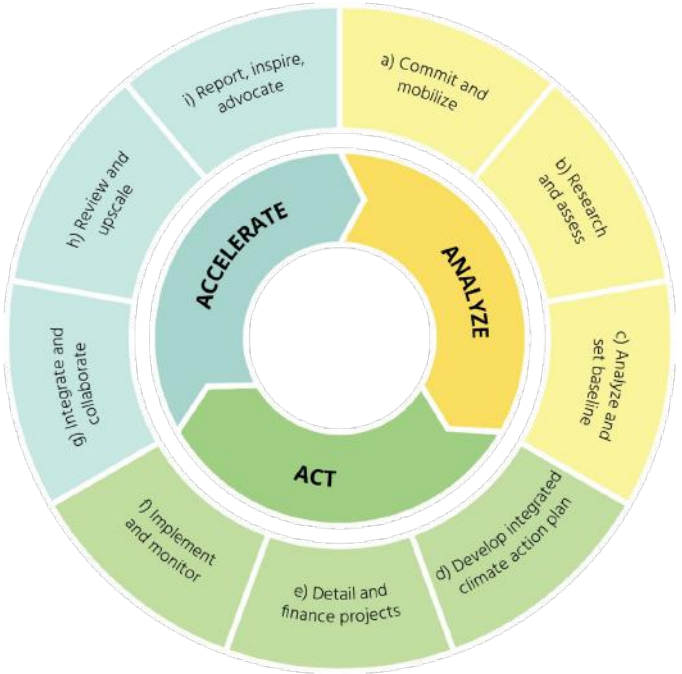
- The Mission on Adaptation supports EU regions, cities and local authorities in their efforts to build **resilience against the impacts of climate change**
- By 2030 at least 150 European regions and communities will have implemented **climate resilience pathways**
- Open **funding opportunities** under HorizonEU to take climate adaptation action
- One **platform** (on Climate-ADAPT) for all
- A **Community of Practice** to share experiences and discuss resilience



Map of signatories of the Mission Adaptation Charter

Resilience planning: an ICLEI methodology

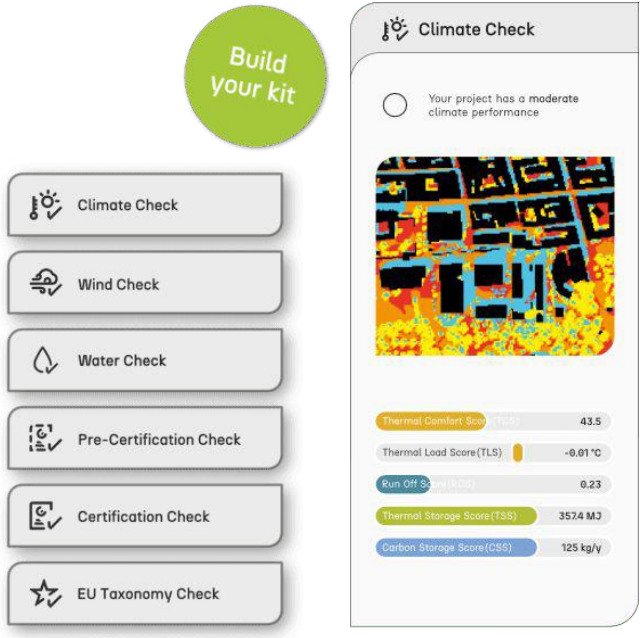
- Supports local governments, cities and communities to **understand shocks and stresses** which may impede secure, sustainable development and to **develop strategies to build resilience to these challenges**
- Is offered as a **systematic way for cities and communities to plan and act**. It is a 9-step process in 3 phases, *Analyze, Act and Accelerate,* each unfolding into three steps
- Outlines how **to assess urban risks and vulnerabilities** (Analyze) and how **to develop and implement options to build resilience** to these risks to ensure a city can achieve its sustainable development goals (Act)
- Shows how **to scale up this activity** and to link with national and international networks, campaigns and initiatives (Accelerate)



ICLEI Urban Resilience Planning Circle

Software for cooling planning: greenpass

- Greenpass is a ClimateTech company enabling liveable cities all over the world
- The environmental impact kit consists of state-of-the-art and scientifically profound checks
- The climate check enables the evaluation and optimization of climate-fit real estate and open spaces and provides:
    - quantitative impact assessment using climate KPIs
    - thematic maps & diagrams
    - scenario performance comparisons
    - guidance on resilience & optimization measures
    - comprehensive & easy comprehensible report



GREENPASS environmental impact kit

CONTACTS

ICLEI EUROPE

The ICLEI European Secretariat is based in Freiburg (Germany) with offices in Brussels (Belgium) and Berlin (Germany).

Luca Arbau
Officer, Urban Resilience and Climate Adaptation

luca.arbau@iclei.org

iclei-europe.org

ICLEI_Europe

@ICLEI_Europe

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Sustainability Protocol

Environmental criteria for AMB and IMPSOL projects and works

Public Space Services

AMB

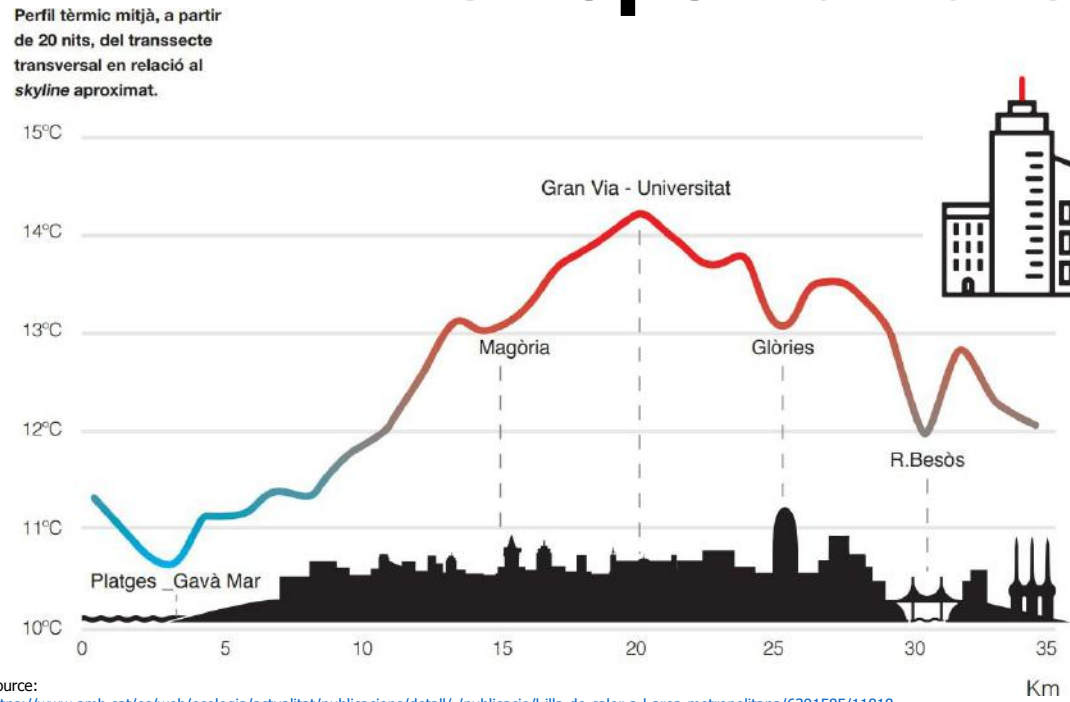
AMB

Barcelona metropolitan area

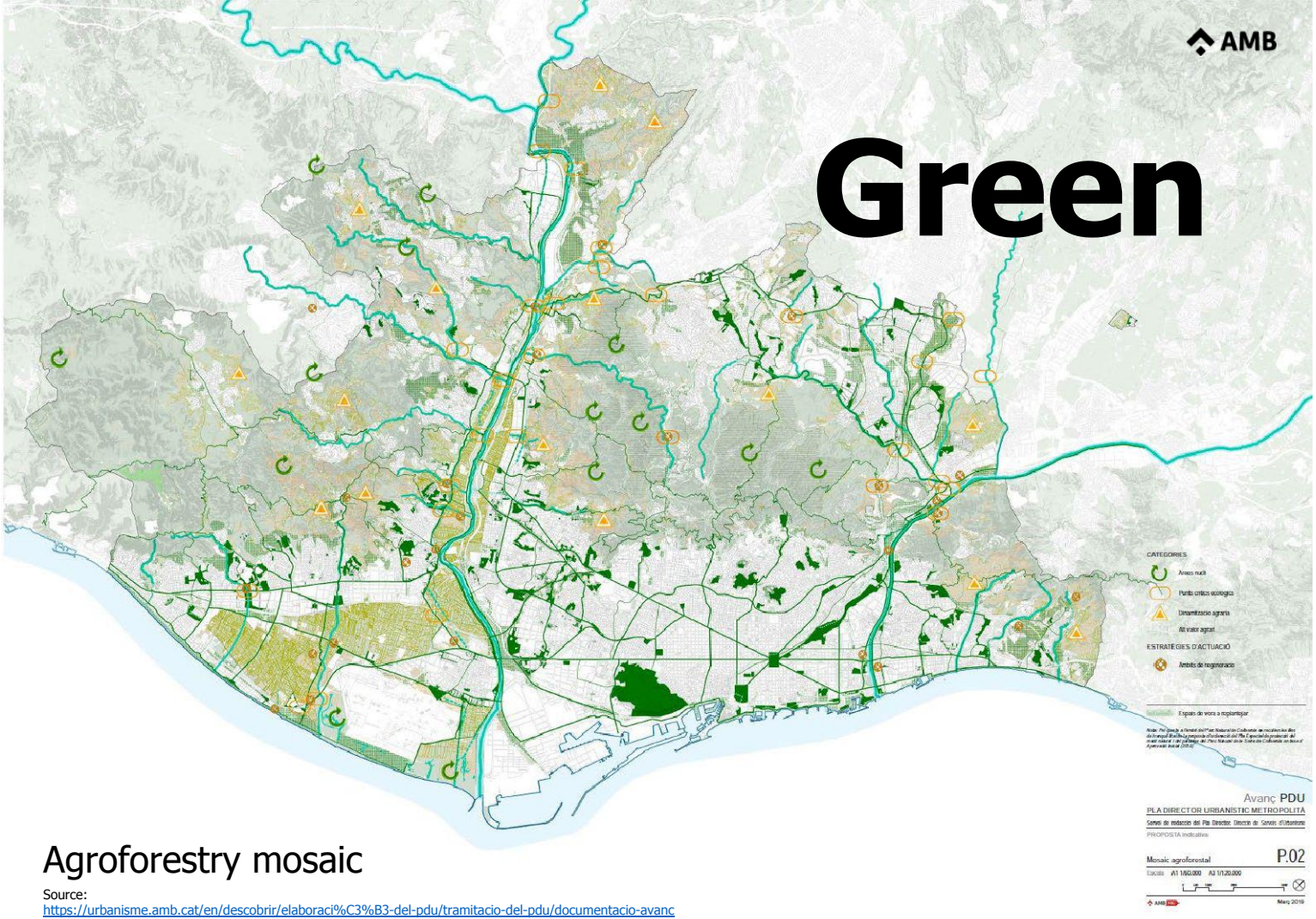
52%
of open spaces

900 km
contact between urban and open spaces

Heat island effect in Barcelona metropolitan area



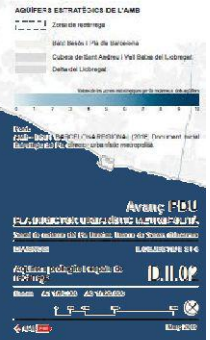
Source:
https://www.amb.cat/es/web/ecologia/actualitat/publicacions/detall/-/publicacio/l-illa-de-calor-a-l-area-metropolitana/6391585/11818



Agroforestry mosaic

Source:
https://urbanisme.amb.cat/en/descobrir/elaboraci%C3%B3-del-pdu/tramitacio-del-pdu/documentacio-avanc

Blue

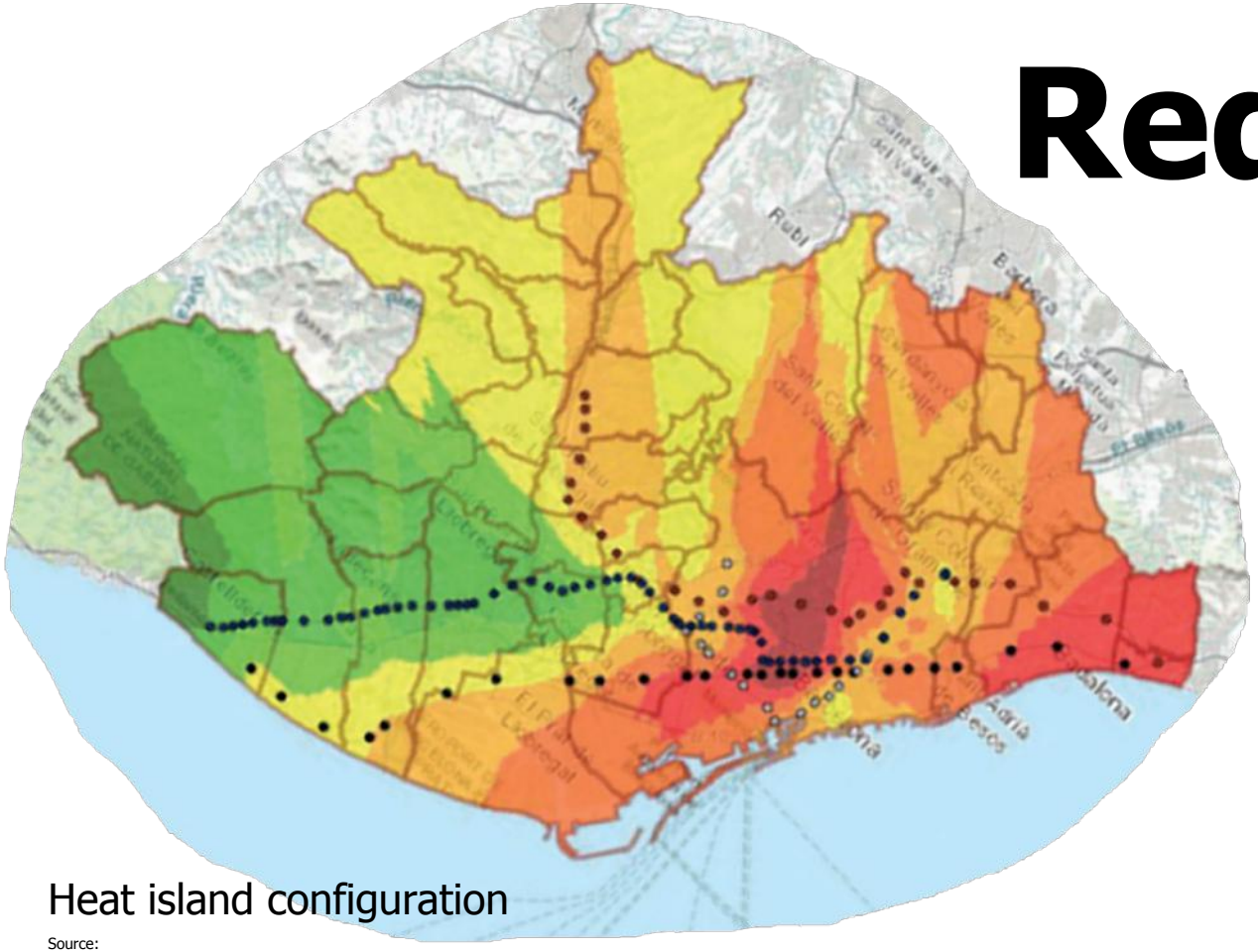


Protected aquifers and recharge zones

Source:
https://urbanisme.amb.cat/en/descobrir/elaboraci%C3%B3-del-pdu/tramitacio-del-pdu/documentacio-avanc

AMB

Red

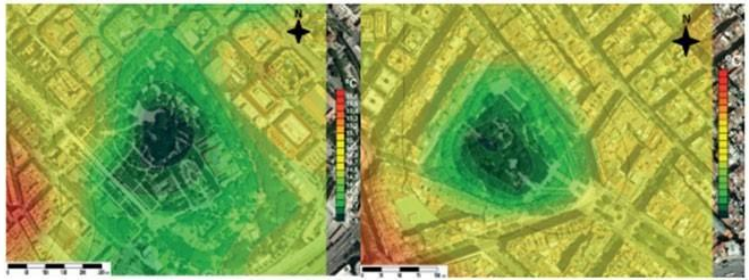


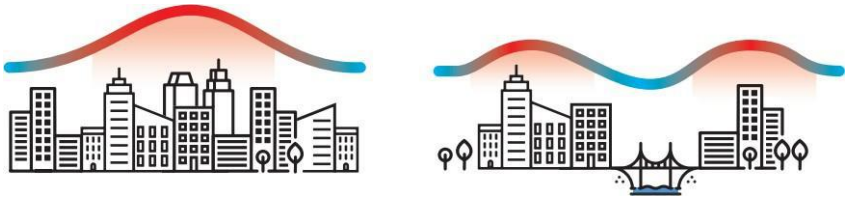
Heat island configuration

Source:
https://urbanisme.amb.cat/en/descobrir/elaboraci%C3%B3-del-pdu/tramitacio-del-pdu/documentacio-avanc

Thermal maps

Figura: Mapes d'isotermes del parc de la Ciutadella (esquerra) i del Turó Park (dreta), i les seves proximitats.





Source:
https://www.amb.cat/es/web/ecologia/actualitat/publicacions/detall/-/publicacio/l-illa-de-calor-a-l-area-metropolitana/6391585/11818

Heat island effect reduction

Project: Joan de Batlle street in Sant Feliu de Llobregat (2021)

Impermeable surface exposed to the sun 46%
(requirement for streets: maximum 70%)
Measured on june 21st, 13h

Strategies to reduce heat retention in projects:

- Shadow
- Permeable pavements
- Green

Other strategies that could be included:

- Water surfaces
- Light coloured materials (according to SRI)

Surface avoiding heat retention

Reference data

16.1 Table of values for the 2020 horizon.

Project type	Impermeable pavement surface exposed to sun
Streets	70%
Squares	45%
Parks	25%

Reference data

17.1 Table of values for the 2020 horizon.

Roof surface	Surface of façades with greatest sun exposure
40%	40%

Source: AMB sustainability protocol


Shadow


Permeable
pavements


Green

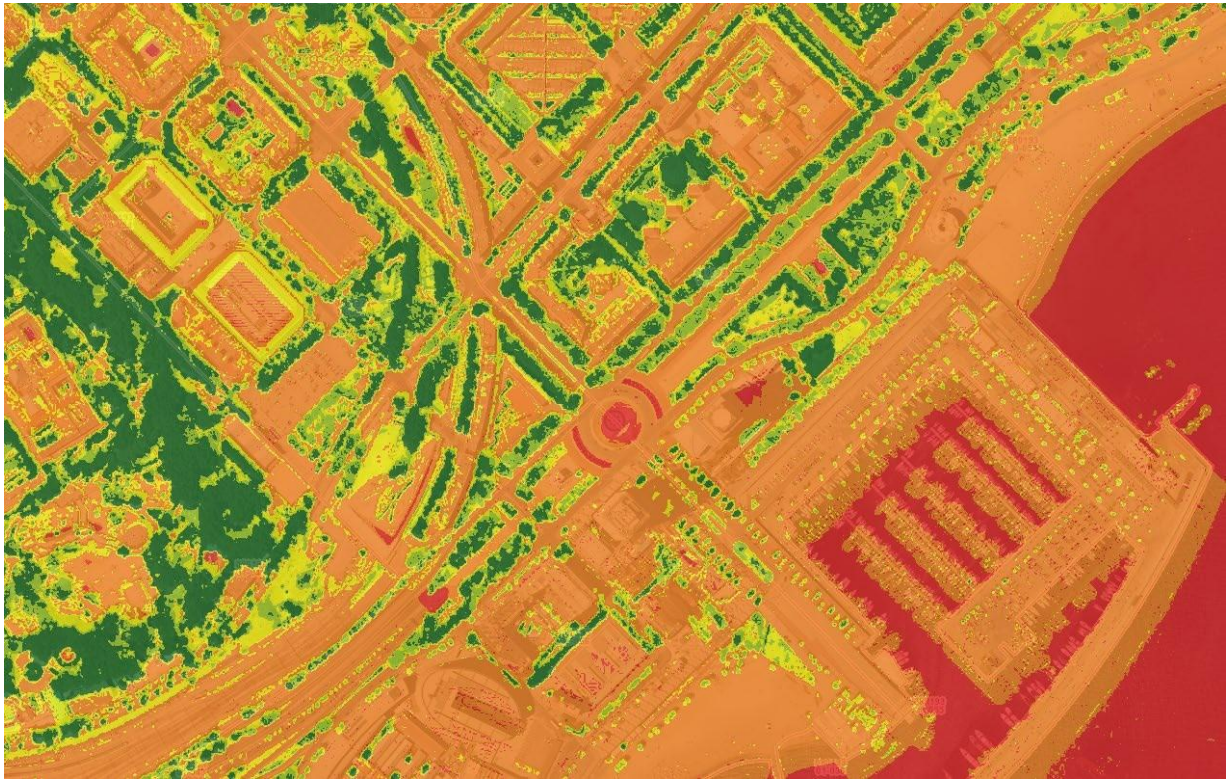

AMB
Vegetation benefits

AMB

Vegetation benefits

- CO_2 storage
- Pollution filtering
- **Urban temperature regulation**
- Runoff control
- Social and health benefits
- Biodiversity increase

NDVI



Source:
http://www.icc.cat/vissir3/index.html?HohKY1Ems

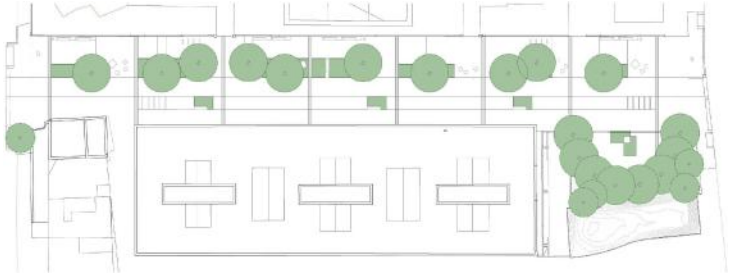
LiDAR

Source:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/index.html

Minimum green surface

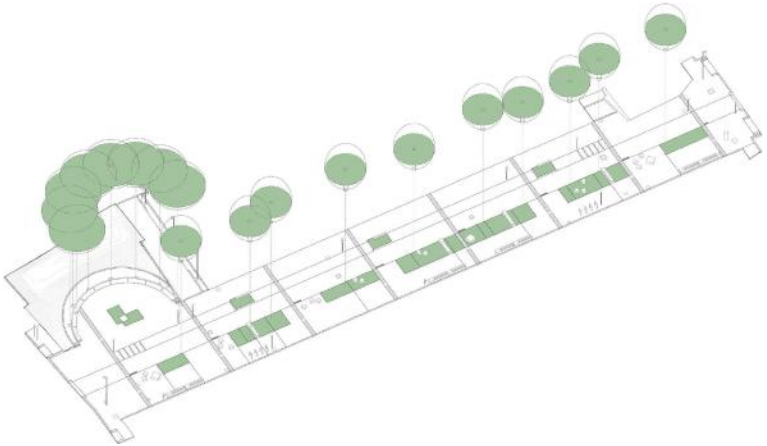
Green coverage 25%

(requirement for streets: minimum 25%)



Sum of vegetation layers 29%

(requirement for streets: minimum 25%)



Project: Joan de Batlle street in Sant Feliu de Llobregat (2021)

Minimum green surface

Reference data

13.1 Table of values for the 2020 horizon.

Project type	Total sum of vegetation layers	Green coverage
Buildings	20%	-
Streets	25%	25%
Squares	65%	50%
Parks	100%	70%

Source: AMB sustainability protocol


AMB
Mercè Rodoreda library, SJD

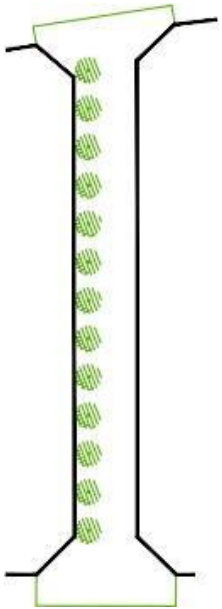
Sant Vicenç dels Horts

Kindergarten

Sum of vegetation layers 211 m^2 - 31 %

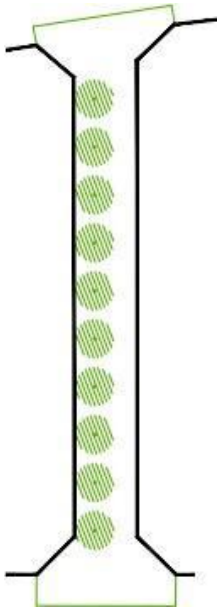
Parcel surface
677 m^2


AMB
Can Rigal park,
LHL



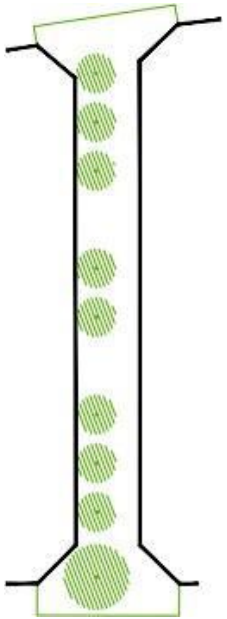
10 m street
2 m R tree
6 m frame

15,2 % coverage



10 m street **3 m R** tree
7,5 m frame

26,3 % coverage



10 m street **3 m R** tree **7,5 m** frame
5 m R punctual

28,4 % coverage

Trees. Estimated growth radius

Arbrat per viari i espais verds

Espai lliure: és la distància entre l'eix de plantació de l'arbre i el primer obstàcle (façana, balcó etc).
Radi: és el radi a utilitzar per calcular la cobertura arbòria

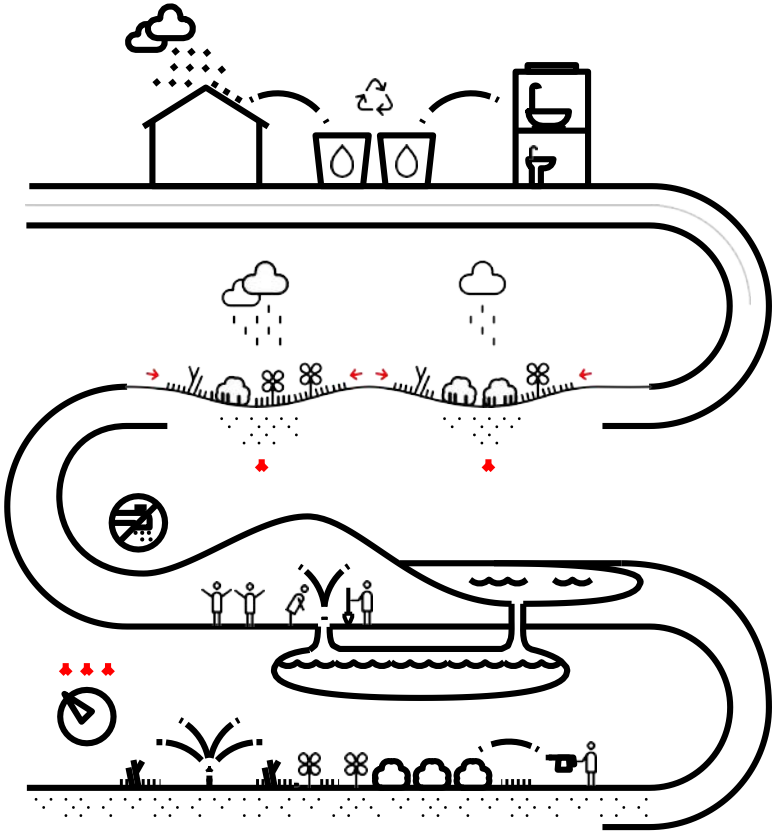
Espai lliure 2 - 2,5 m

Plantacions en Viari

Espècie:	Fulla:	Forma:	Alçada:	Marc:	Radi:	Resistència:
Acca sellowiana	Persistent	Esfèrica	4-6	4-6	1,8	Mig tolerant
Arbust format com a arbre, produeix fruits carnosos, planta rústica i resistent.						
Arbutus unedo	Persistent	Ovalada	4-6	4-6	2	Tolerant
Arbust autòcton produït com a arbre, pot créixer tort, sensible a la pol·lució. Produeix fruits carnosos que embruten, interessant per la fauna. És sensible a Xylosandrus .						
Callistemon viminalis	Persistent	Esfèrica	4-6	4-6	1,8	Mig tolerant
Arbust amb una floració espectacular. Format com a arbre, té tendència a tombar-se, són convenients un bon aspratge i seguiment.						
Catalpa bignonioides 'Nana'	Caduc	El·líptica	4-8	4-6	2	Mig sensible
Varietat molt compacta i petita, sense flors. És convenient mantenir el reg.						
Citrus aurantium	Persistent	Esfèrica	4-6	4-6	1,8	Mig tolerant
Arbret de floració molt olorosa, tolera el sol i l'ombra però no el vent. Fa espines i fruits . Té tendència a patir plagues que generen molèsties i embruten.						
Elaeagnus angustifolia 'Caspica'	Caduc	El·líptica	4-8	4-6	2	Tolerant
Arbre interessant amb poques referencies de plantació a l'àrea metropolitana de Barcelona. No té espines.						

Source: Tree database. Espai Públic, AMB (2023)


Limit water consumption of the irrigated area
Vegetation challenges
Use of alternative water resources



Rainwater

Mandatory to recuperate it in buildings with garden when both:

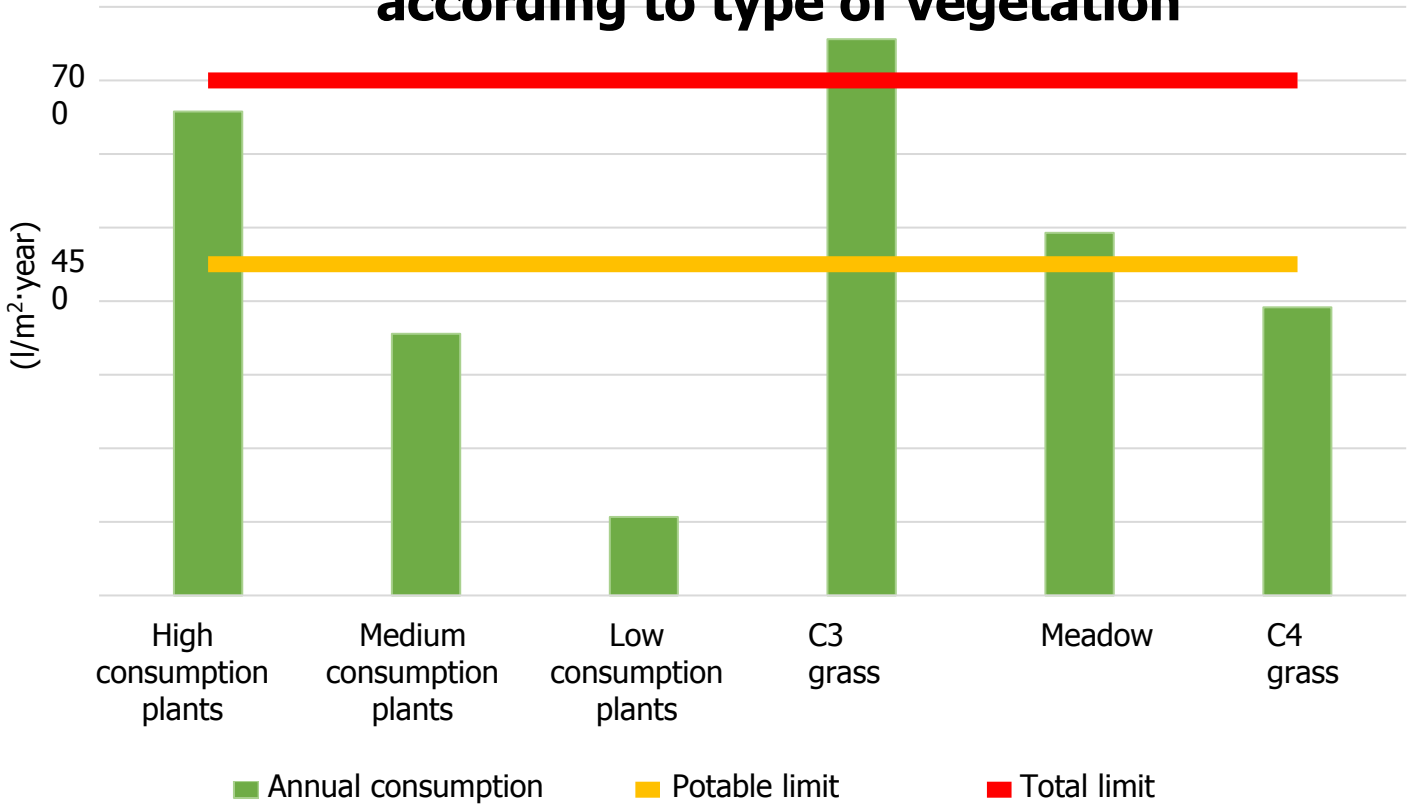
- Roof rainwater catchment area > 500 m^2
- Irrigated garden area > 200 m^2

Potable, regenerated and groundwater

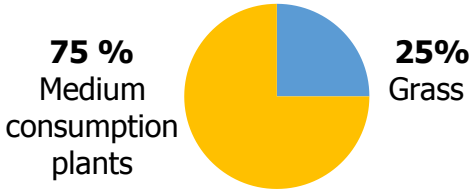
Consumption limits:

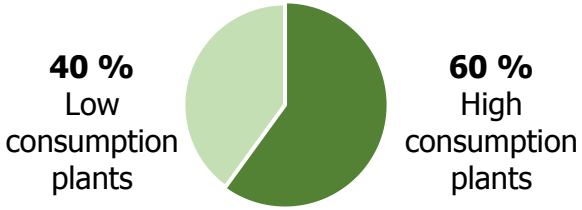
- Potable water consumption < 450 $l/m^2 \cdot year$
- Total water consumption < 700 $l/m^2 \cdot year$

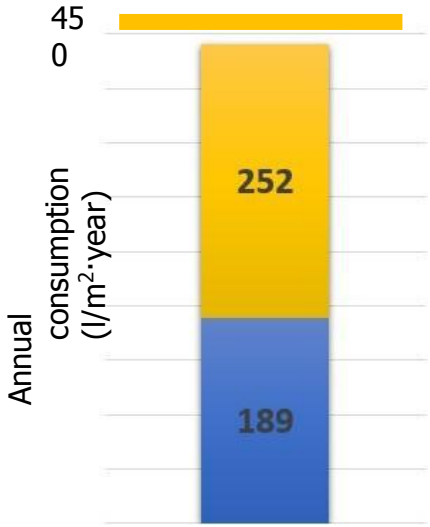
Water consumption according to type of vegetation

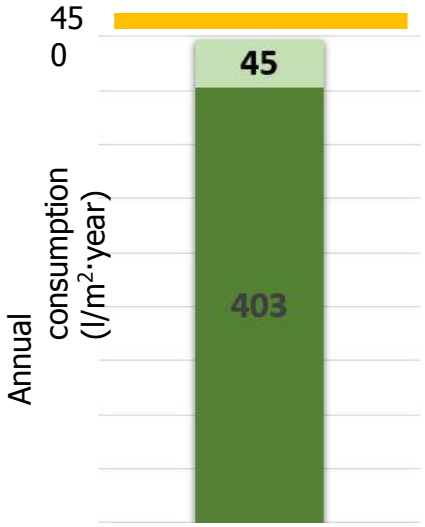


Possible combinations

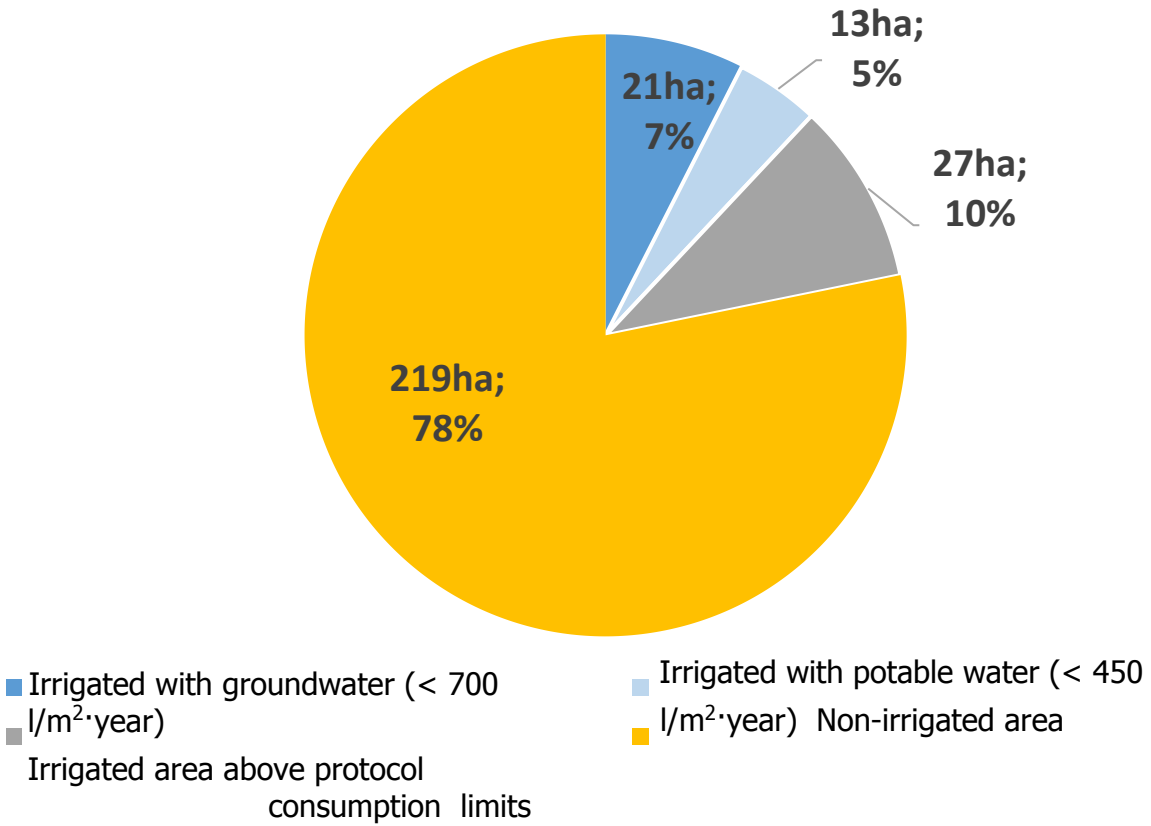








AMB parks surface distribution according to irrigation sources, 280 ha



Santa Coloma de Gramenet, 2019

Salzereda F1 promenade

Potable water irrigation 445 l/m² in 2020

Protocol limit
450 l/m² in 2020-2024

Santa Coloma de Gramenet, 1999

Can Zam park

Groundwater irrigation 604 l/m² in 2019

Protocol limit
700 l/m² in 2020-2024

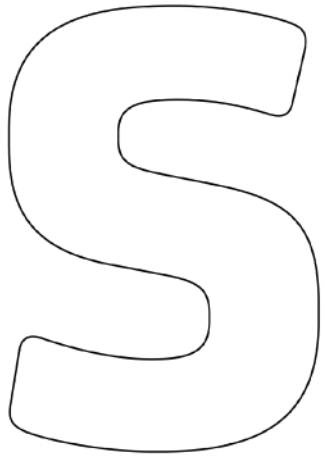
Sustainability protocol

Quick guide

Environmental criteria

for AMB and IMPSOL

projects and works



v. 1.2 / 2021

AMB

AMB

6

areas

1

criteri

9

- Transversal analysis and follow-up
- Energy
- Materials
- Wate
- Comfort and health
- Site sustainability

1 Anàlisi d'alternatives i optimització del programa

Objectiu

Valorar la idoneïtat de la proposta de programa inicial i analitzar possibles alternatives, amb la finalitat de reduir al màxim la petjada ecològica.

Tipus de projecte

- Parcs
- Carrers i places
- Edificis d'equipaments
- Edificis d'habitatges

Criteris relacionats que cal tenir en compte

— **3** Manteniment i explotació eficients
— **4** Minimització de la demanda i del consum energètics
— **5** Generació d'energia renovable per a autoconsum
— **7** Minimització de la petjada de CO_2
— **18** Facilitats per als vehicles unipersonals sostenibles

Requisits

1.1 Anàlisi d'alternatives d'emplaçament

Anàlisi comparativa d'emplaçaments alternatius que justifiqui la selecció de la millor opció en relació amb els aspectes següents:

a. Existència d'edificacions o espais per rehabilitar alternatius a la nova construcció, on es pugui implantar el projecte.

   Per a la rehabilitació d'edificis, s'ha de fer una auditoria energètica.

b. Mobilitat generada: accés amb sistemes de mobilitat més sostenible com el transport públic o els vehicles de mobilitat personal (VMP), i accés per a vianants.

c. Preexistències rellevants.

1.2 Optimització del programa funcional

Anàlisi del programa funcional i optimització del projecte valorant els aspectes següents:

a. Identificació de sinergies amb altres edificis o instal·lacions municipals existents.

b. En edificis: anàlisi dels usos interiors i optimització de la seva distribució.

Implantació

Cal completar la pestanya "criteri 1" de l'eina *AMB Sostenibilitat* per justificar el requisit.

1.1 Anàlisi d'alternatives d'emplaçament

En la selecció de la parcel·la, l'ajuntament ha de tenir en compte els aspectes següents:

a. S'ha d'intentar reduir la superfície d'obra nova per construir, aprofitant espais ja existents que puguin acollir la totalitat o part del programa que s'ha d'implantar.

- Simplicitat de les comunicacions.
- Sinergies entre les instal·lacions.

– Conclusions: programa funcional optimitzat (justificació en cas que no es pugui reduir).

Documents per lliurar

Eines complementàries

– Fitxa resultat de l'eina *AMB Sostenibilitat* (criteri 1).

AN9 Aspectes ambientals

AN22 Aspectes ambientals

Documentació (tècnica) justificativa

– Estudi d'optimització del programa funcional del projecte, incloent-hi un informe justificatiu i plànols comparatius entre els dos programes on s'indiquin les millores d'un respecte a l'altre.

MD 4.1 Descripció general

MD 1.1.2 Antecedents, àmbit d'actuació i situació prèvia

– Anàlisi d'alternatives d'emplaçament, incloent-hi un informe justificatiu i plànols de situació que justifiquin la decisió.

MD 4.1 Descripció general

MD 1.1.2 Antecedents, àmbit d'actuació i situació prèvia

Documentació de referència

– SITES, Section 2: Pre-design assessment + Planning.

– Direcció de Serveis de l'Espai Públic (2018). *Metodologia. Treball en equip en la redacció de projectes.*

– LEED BD+NC V.4, Credit Integrative Process & Credit Site Assessment.

– Climate Consultant i tutorials: http://www.energy-design-tools.aud.ucla.edu/.

This **Quick Guide** sets out the main points of the **Sustainability Protocol**, although to apply the criteria and requirements, the full version of the Protocol should be consulted, which contains the **associated tables**, the **implementation procedure** and **references** to standards, tools and technical guidelines.

Cross-cutting follow-up and analysis

1 Analysis of alternatives and programme optimisation

Objective
Assess the suitability of the initial programme proposal and analyse possible alternatives in order to minimise the ecological footprint.

Project type	Requirements
	1.1 Analysis of alternative sites. 1.2 Optimisation of the functional programme.

2 Integrated environmental follow-up

Objective
Help to ensure that decisions affecting the project's environmental sustainability are taken into account from the outset and throughout the drafting and construction process, in all areas and in coordination with the city council.

Project type	Requirements
	2.1 Integrated environmental follow-up of the project with the council.

3 Efficient maintenance and operation

Objective
Ensure the durability and proper maintenance of the project and its installations during its service life, starting from the drafting of the project and taking into account the end user.

Project type	Requirements
	3.1 Verification of spaces, auxiliary equipment and accessibility for maintenance. 3.2 Completion of a maintenance analysis. 3.3 Definition of a waste management strategy during the use phase. 3.4 Incorporation of energy and water consumption monitoring systems. 3.5 Facilities buildings: building energy management systems (BMS).
	3.6 Verification of spaces, auxiliary equipment and accessibility for maintenance. 3.7 Completion of a maintenance analysis. 3.8 Incorporation of energy and water consumption monitoring systems. 3.9 Publication and submission of the user's handbook.

Energy

4 Energy demand and consumption minimisation

Objective
Optimise energy demand through passive design strategies, while also reducing primary energy consumption through good installations design and the use of high-efficiency systems.

Project type	Requirements
	4.1 Optimisation of passive design. 4.2 Maximum values of overall energy demand and total primary energy consumption (PEC). 4.3 Energy rating A.

Reference data

4.2 Table of values for the 2020 horizon.

Building's energy load according to its main use	Global demand (kWh/m²year)	Zone C2 Total PEC (kWh/m²year)	Zone D2 Total PEC (kWh/m²year)
High very high*	20	110	90
Average*		95	85
Low*	15	35	40

Project type	Requirements
	4.4 Outdoor lighting energy consumption estimate. 4.5 Minimum energy efficiency values for outdoor lighting installations.

Reference data

4.5 Table of values for the 2020 horizon.

Energy Efficiency Index (EEI)
> 2.0*

(*) See conditions in the Sustainability Protocol.

5 Renewable energy generation for self-consumption

Objective
Promote the installation of on-site energy generation systems that use renewable sources.

Project type	Requirements
	5.1 Minimum renewable electric power capacity to be installed. 5.2 Calculation of total coverage from renewables.

Reference data

5.1 Table of values for the 2020 horizon.

Project type	Minimum generation	Additional percentage required by the CTE
Streets (*)	15 kWp / 2 kWp	
Parks and squares (*)	15 kWp / 2 kWp	
Facilities buildings (*)		5% - 20%
Housing units (*)		5% - 20%

(*) (**) See conditions in the Sustainability Protocol.

Water

6 Minimisation of potable water consumption

Objective
Limit consumption of mains drinking water through highly efficient installations, while prioritising the use of alternative water resources (when available) where this is possible.

Project type	Requirements
	6.1 In buildings: maximum water flow rates for sanitary fixtures. 6.2 In buildings: grey water recovery systems. 6.3 In buildings with gardens: rainwater harvesting systems. 6.4 Limitation of water consumption in green spaces: irrigation installations. 6.5 Control of water consumed for water games.

Reference data

6.1 Table of values for the 2020 horizon.

Project type	Bathroom* (l/min)	Kitchen (l/min)	Shower (l/min)	Toilet (l)	Urinal ** (l)
Facilities buildings	1.5	5	5	3/4.5	1.2
Housing units	3	6	5	3/4.5	-

(*) See conditions in the Sustainability Protocol.

6.2 In facilities buildings: 400 m³ or more of grey water. In housing: 40 housing units upwards.
6.3 Mandatory if there is 500 m² or more of catchment area and 200 m² or more of watered garden.
6.4 Table of values for the 2020 horizon.

Drinking water consumption (l/m²year)	Total consumption (l/m²year)
480	700

Materials

7 Minimisation of carbon footprint

Objective
Implement strategies to limit CO_2 emissions from buildings and public spaces throughout their life cycle. Measure and assess the embodied carbon footprint of materials in their manufacturing and construction phases.

Project type	Requirements
	7.1 Preliminary definition of materials and construction systems. 7.2 Maximum values for embodied carbon footprint of materials.

Reference data

7.1 Table of values for the 2020 horizon.

Project type	Carbon footprint (kgCO₂e/m²) depending on type of intervention: New building/ Redevelopment*	Renovation*
Housing units*	611	324
Administrative facilities	640	339
Sports facilities	701	372
Other facilities*	681	361
Streets**	163	33
Squares**	209	42
Parks**	67	13

(*)(**) See conditions in the Sustainability Protocol.

8 Use of materials with ecolabels I and III

Objective
Ensure that a significant proportion of the materials used in the construction process meet the highest sustainability standards.

Project type	Requirements
	8.1 Minimum percentage of materials with ecolabels type I and III.

Reference data

8.1 Table of values for the 2020 horizon.

Facilities buildings and housing	Streets, squares and parks
20%	10%

Thank you!

Download the protocol

More information
espaipublic@amb.cat **www.amb.cat**

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