

Funded by the Horizon 2020 programme of the European Union

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Ekonomia Bultzatzeko, Merkataritzako, Ostalaritzako eta Turismoko Zinegotzigoa Concejalía de Impulso Económico, Comercio, Hostelería y Turismo

## donostia sustapena fomento sanse bastián

DESARROLLO ECONÓMICO DE SAN SEBASTIÁN DONOSTIAKO GARAPEN EKONOMIKOA SAN SEBASTIAN ECONOMIC DEVELOPMENT

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# H°TMAPS

www.hotmaps-project.eu

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IKER MARTINEZ FOMENTO SAN SEBASTIAN 14TH NOVEMBER

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## Developing a heating plan Challenges & solutions thanks to Hotmaps

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IKER MARTINEZ – FOMENTO SAN SEBASTIAN 14TH NOVEMBER



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# **Introduction - Donostia San Sebastian**

Small or medium City (200.000 inh.) 20km from the border with France.



## European Capital of Culture 2016



## High standared of living:

gastronomy, culture, sports, high-cost lifestyles... in a special natural and architectural environment.







# **Introduction - Fomento San Sebastian**





#### **Smart City Plan - Integration**



#### **Outline of the Process**

Two main goals:

-A main strategic line with shared objectives. Integrated planning.

-Coherence (consistency) and Coordination in the Public Action

#### **Participatory approach**

- Municpal departments
- 200 people form companies, universities, R&D centers, insitutions took part defining the SmartCity Plan



#### **Smart City Plan – Areas of Intervention**



European Project: San Sebastián, Bristol, Florence



Systems Thinking for Comprehensive City Efficient Energy Planning





#### www.smartsteep.eu

Involvement of Municipal Departments But also 187 people from 96 different companies, universities, R&D centers, other government bodies, ... and citizens



### SMART CITY CLUSTER

San Sebastián



SWARTCHTGLUSTE



#### **Bioclimatic Buildings**



#### iSare Smart Micro-grid



Systems Thinking for Comprehensive City Efficient Energy Planning 2013-2015

# REPLICATE

#### **REPLICATE (LIGHTHOUSE)**

2016-2020 - Budget: 29 Mill€ Nearly zero or low energy districts Integrated infrastructures Sustainable urban mobility

#### Smartkalea Donostia-San Sebastián



**SmartKalea:** Pilot project of smart implementations with a collaborative public-private model (with residents, local business, local technological companies, Municipal Departments) This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement № 691735



#### **EIP - SCC** Market Place of the European Innovation Partnership on **Smart Cities and Communities** *POLICY & REGULATIONS / INTEGRATED PLANNING*

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Location: South-Western Europe

Size: 60.89 km<sup>2</sup>

Population municipality (inhabitants): 186.667

Metropolitan area (inhabitants): 436.500

Oceanic climate (Köppen Cfb) with warm summers and cool winters

Average temperatures range from 8.9 °C in January to 21.5 °C in August



Figure 1: Heat demand density map of San Sebastian



- The main objective is to analyse possible future scenarios of heating system in San Sebastian based on the use of District Heating networks on a 2050 horizon and in line with the Smart strategy and the Climate Change Plan.
- Hotmaps project is the first step for San Sebastian to start working in a Heating Strategy Plan, which is in line with other actions in the Municipality and very close to retrofitting strategy to reduce carbon emissions.



- Describe and map the current situation of heating in the municipality and the building stock energy demand
- Identify locations in the municipality interesting for district heating
- Identify scenarios for heating and cooling with a very high share of renewable energy
- Compare high RES scenarios with different levels of district heating / individual heating in terms of costs, CO2 emissions and RES share
- Identify different scenarios with retrofitting interventions and new DH systems with related cost and carbon emission reduction
- Show heat generation costs for different individual vs. different DH supply options from new installations (€/MWh)
- Define next steps for the development towards low CO2 heating and cooling in the municipality



- Heating and cooling have not been a topic of interest in the region so far mainly due to the soft climatic conditions.
- A strategic plan for heating and cooling in the region does not exist at the moment.
- Demand for cooling is not remarkable in households, in offices and commerce during summer it is.
- A first public DH is in operation since 2018 using biomass for heating and DHW of around 1500 dwellings.
- There are two more DH networks in the city, one of them has been renovated including biomass boilers and new household connections.



As first step we focus on stakeholders from the Municipality:

- Fomento de San Sebastian (FSS): as Economy Development Agency with strong focus on renewable energies, energy efficiency, and smart city planning. A Smart City plan and an Action Plan 2016-2020 for San Sebastian had been carried out led by FSS. Link also to other related projects like CELSIUS and CityFied
- Environmental department: in charge of the Agenda21, SEAP, Climate Strategy, etc. They coordinate and prepare the environmental strategy, energy efficiency regulation, and energy observatory of the city.
- Urban development department: urban planners of the city.



Fomento San Sebastian is committed to sustainable city development, there are several local plans and projects to improve the quality of life of the city in a general sense.

- Opportunity 1: San Sebastian does not perform heat planning so far; thus, the work done within the Hotmaps project could be the first step to activate this kind of planning and strategy development in the city.
- Opportunity 2: San Sebastian is working actively in plans related to Climate Change, Smart Cities, Energy Efficiency, Urban Sustainable Mobility, etc. There is a political commitment towards a sustainable city, and social awareness is increasing, so it could be a good moment to develop a heating plan.
- Barrier 1: Heating and cooling have not been a topic of interest in the region and the result of this project could be out of the city priorities.
- Barrier 2: it seems to be difficult to develop or integrate DH systems in existing compact dwellings in San Sebastian.
- Barrier 3: Gas utility pressure against the development of DH based on biomass. Already overcome in Txomin-Enea.

# **Heat Demand: building stock**

Building stock study: bottom up approach. The building stock database exists in the form of a GIS shape file containing polygons of 14.312 buildings in the municipality. Various attributes of the buildings are linked to the building shapes (building footprint, number of floors, building height, type of plot, construction year, number of inhabitants).



# **Heat Demand: building stock**

## **Distribution of gross floor area (GFA):**

- Multifamily houses (building category 5) show to be the main part of the building stock with 73% of total GFA in the city (residential and service sector).
- The age of the buildings is nearly distributed between the different construction periods. However, there exists a remarkable number of buildings built before 1969.
- Offices are the most relevant type of service buildings in the city, public and private offices together account for 24% of GFA in the service sector.
- Education and the health sector have also remarkable shares of GFA in the service sector with 20% and 18%, respectively.



In a second step statistical energy demand values per gross floor area (GFA) for space heating and hot water generation have been joined with the resulting building dataset.

		number of buildings [-]	gross floor area [m²]	useful energy demand [GWh/yr]	
				space heating	hot water
1	single family houses	1,960	130,189	8	2
5	multi family houses	8,028	6,509,010	253	103
8	public offices	62	161,886	16	0
9	private offices	249	386,542	31	1
10	wholesale & retail	62	175,582	14	0
11	hotels & restaurants	113	190,292	18	1
12	health	77	416,003	38	11
13	education	146	453,563	41	2
14	other non residential	192	511,407	44	2
Residential		9,988	6,639,198	260	105
Non-residential		901	2,295,276	202	18
Total		10,889	8,934,474	462	124

Total Energy demand: 586 GWh/yr

The totals for the residential as well as non-residential sectors match very well with estimations of useful energy demand in the city based on the consumption of gas, oil and electricity for heating and hot water generation



- Calculation and set up difference scenarios for the city
- Stakeholders meeting to analyse the scenarios and prioritize the main strategic line for heating systems
- Heating Strategy Document formulation and validation





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