

POLICIES TO REDUCE ENERGY CONSUMPTION OF BUILDINGS AND THEIR THE CARBON FOOTPRINT IN DONOSTIA - SAN SEBASTIÁN



The Role of Municipalities in Promoting the Renovation Wave



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ENERGIA ERAGINKORTASUN ATALA
SECCIÓN DE EFICIENCIA ENERGÉTICA

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- 2. MUNICIPAL ORDINANCE OF ENERGY EFFICIENCY IN BUILDINGS**
- 3. NEXT CHALLENGE IN RESIDENTIAL BUILDINGS**
- 4. REFURBISHMENT OF MUNICIPAL BUILDINGS WITH ENERGY EFFICIENCY CRITERIA**

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188,191 INHABITANTS

Donostia / San Sebastián

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Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
US Dept of State Geographer

Google Earth

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**KLIMA
DONOSTIA**

5 of June of 2018

Climate Plan DSS 2050

17 of March of 2020

Climate Emergency Declaration

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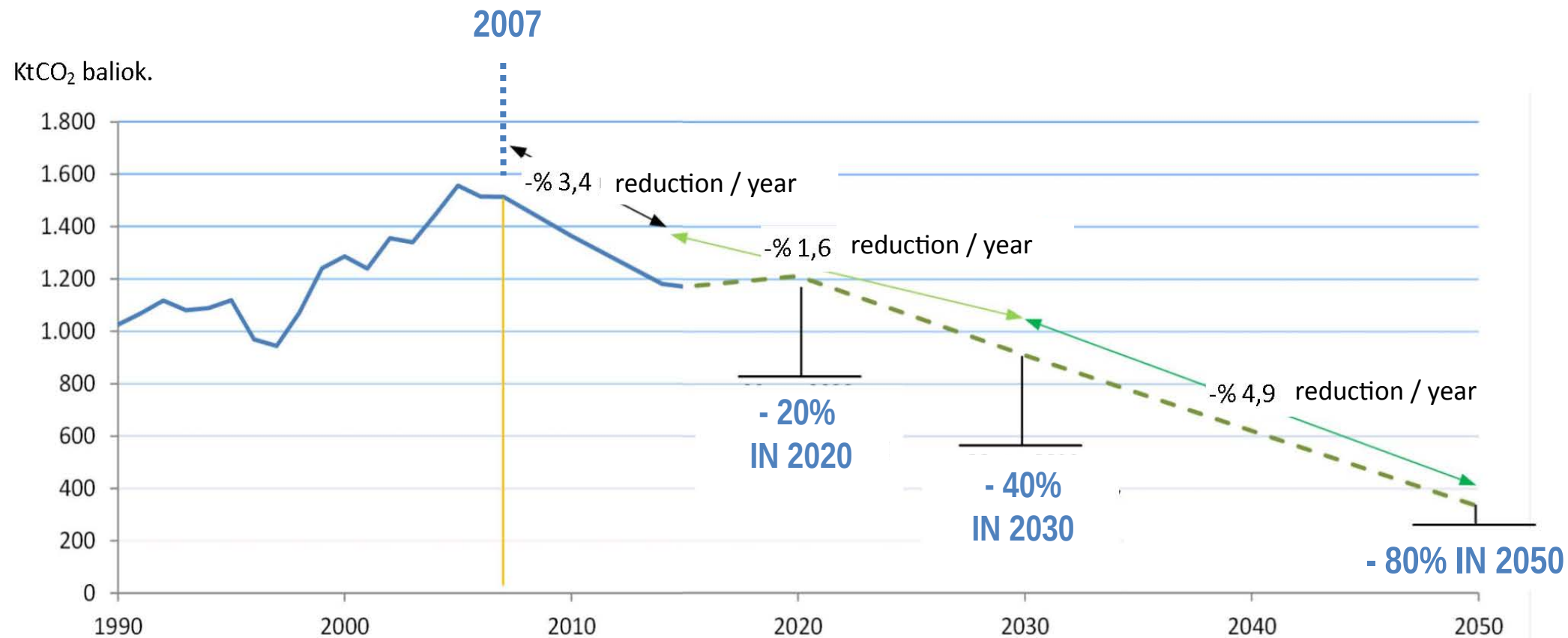
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1. CONTEXT_ CO₂ REDUCTION OBJECTIVES _ CLIMATE PLAN DSS 2050



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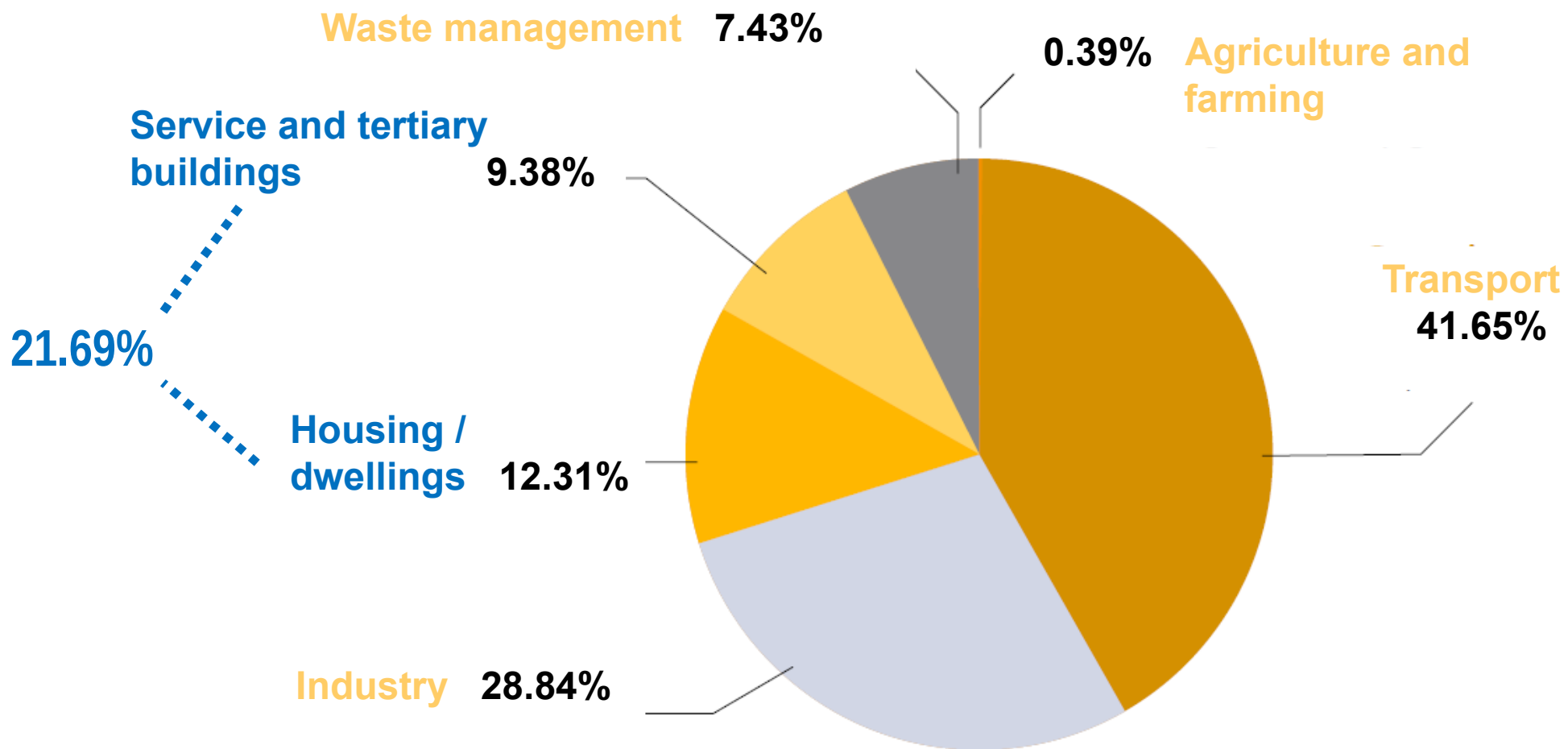
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1. CONTEXT_ CO₂ EMISSIONS BY SECTORS IN DONOSTIA / SAN SEBASTIÁN



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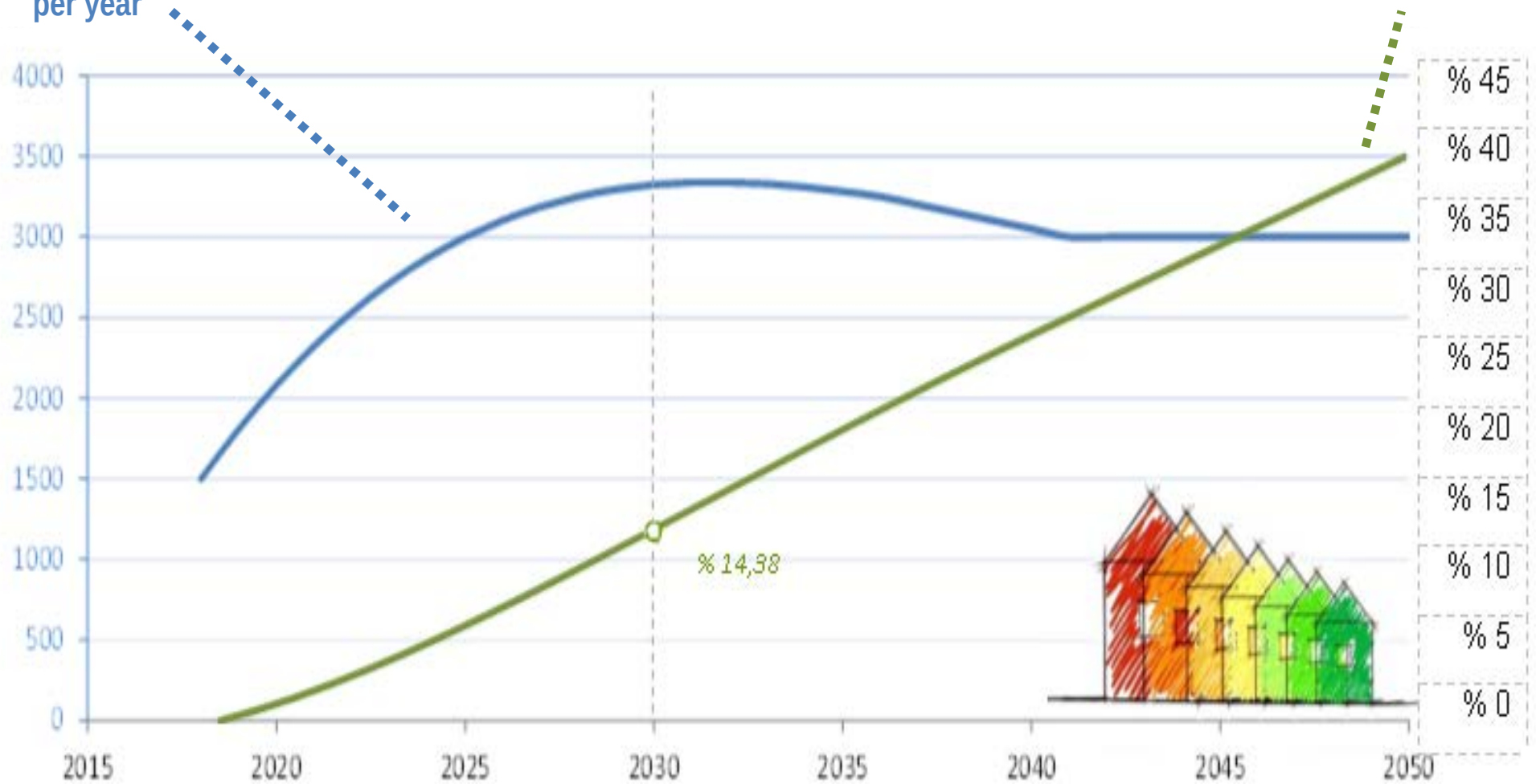
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1. CONTEXT_ REFURBISHMENT AND SAVING OBJETIVES IN RESIDENTIAL BUILDINGS _ CLIMATE PLAN DSS 2050

Dwellings refurbished
per year

Savings



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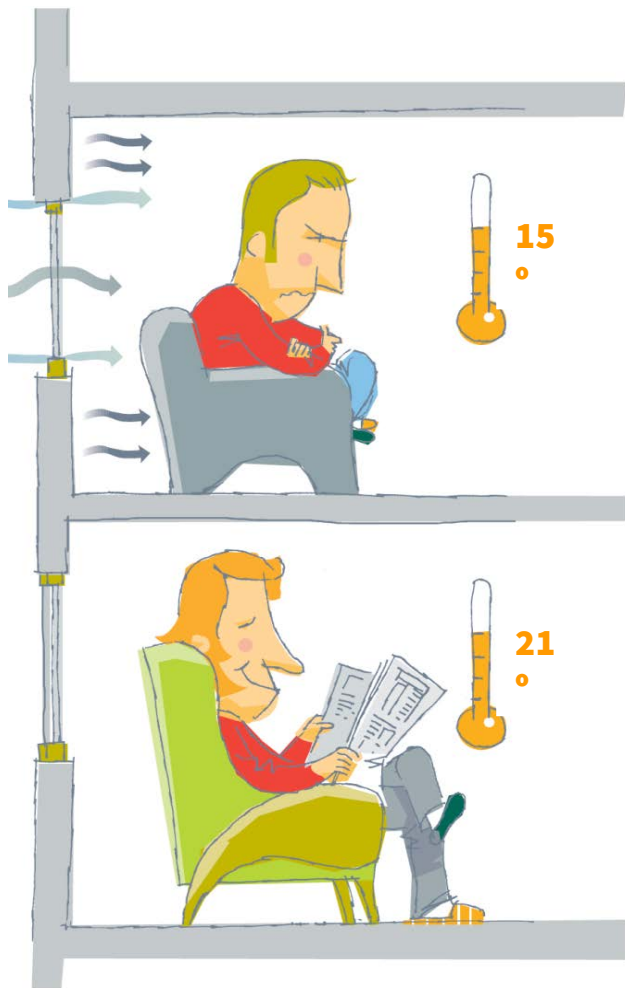
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1. CONTEXT_ WHY ENERGY REFURBISHMENT OF BUILDINGS?



1. DUE TO PROTECTION OF ENVIRONMENT AND CLIMATE CHANGE

2. DUE TO THE ECONOMY (TO AVOID ENERGY DEPENDENCY)

3. DUE TO THE HEALTHINESS AND COMFORT AT HOMES

4. DUE TO CONSOLIDATING AND IMPROVING CONSTRUCTED URBAN AREAS

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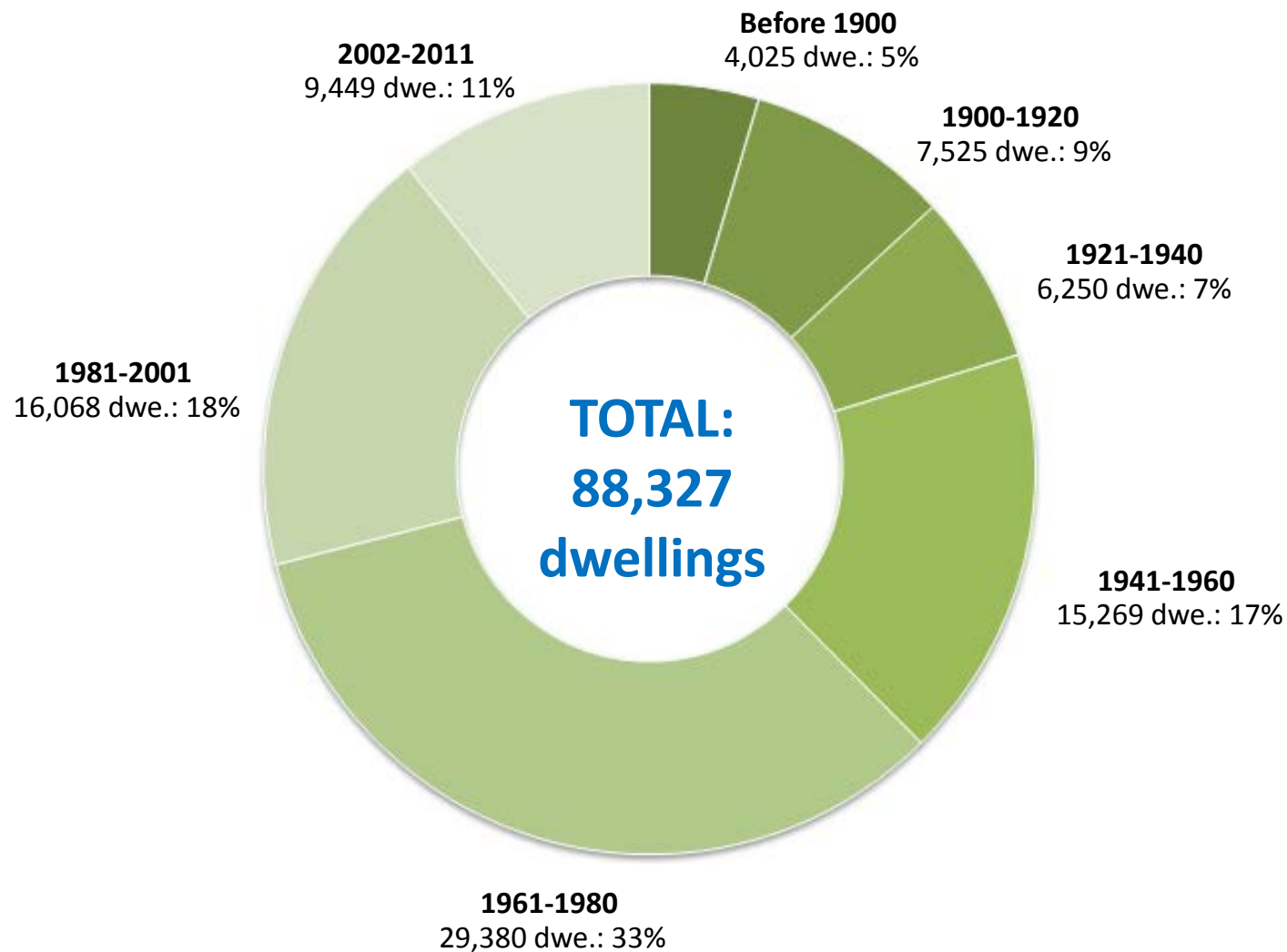
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1. CONTEXT_ DWELLINGS BY YEAR OF CONSTRUCTION IN DONOSTIA / SAN SEBASTIÁN



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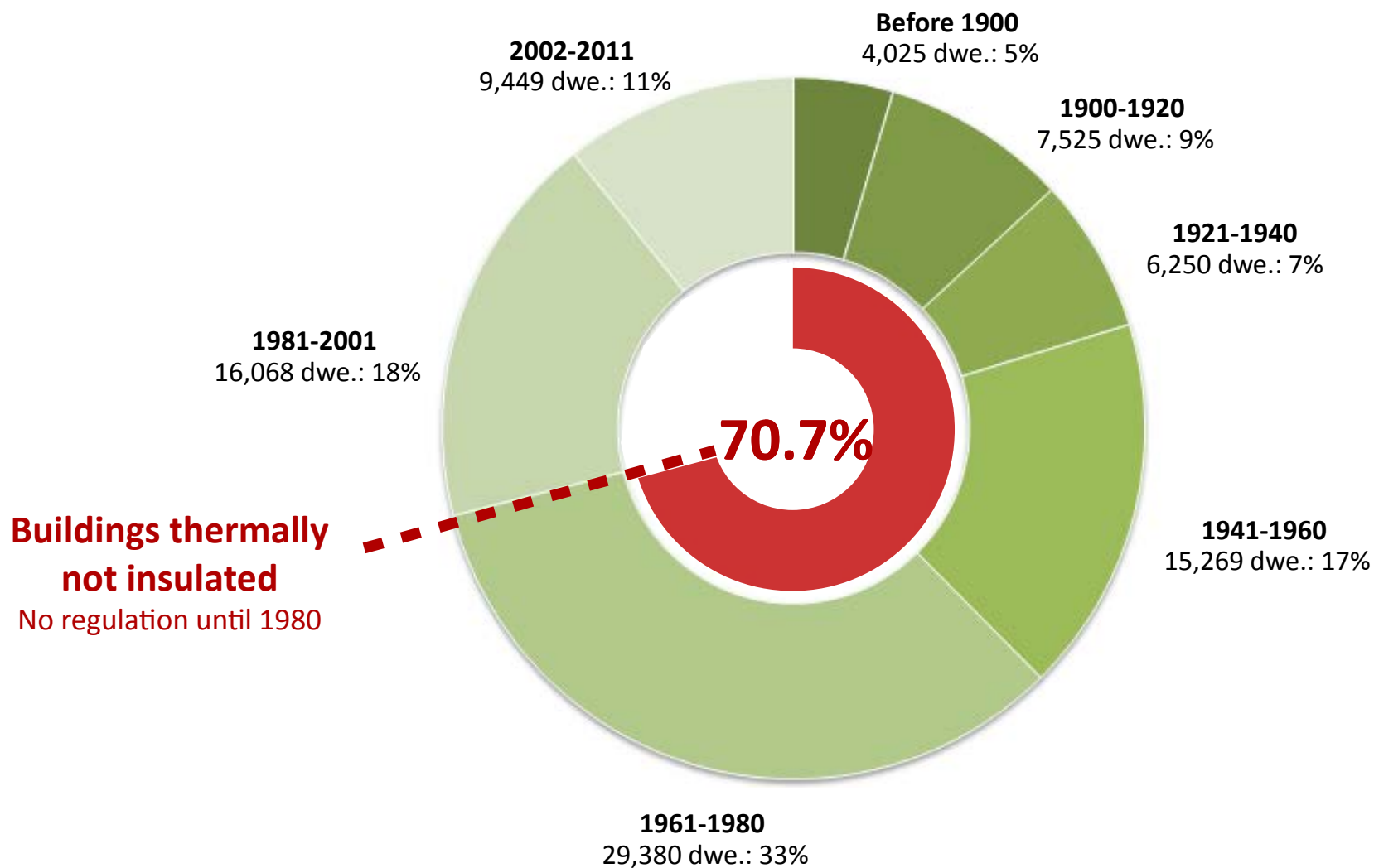
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2. MUNICIPAL ORDINANCE OF ENERGY EFFICIENCY IN BUILDINGS

APPROVED IN JUNE OF 2009

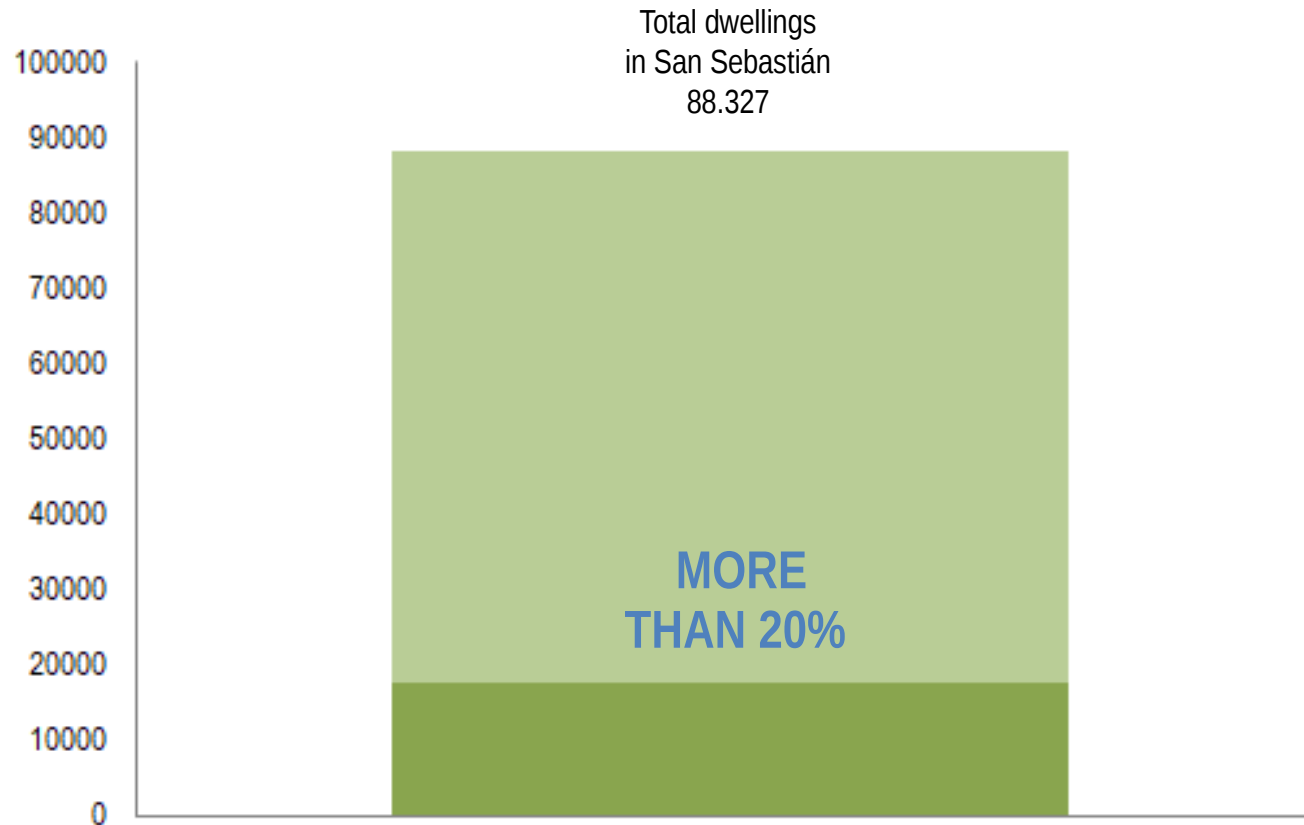
The Ordinance, in its Annex I.A — Passive Energy Strategies in Buildings —, obliges to energy refurbishment in these cases of total or partial interventions on the thermal envelope:

- Total or partial remodeling, refurbishments or changes of use will have to justify the compliance of this Ordinance in relation to the elements of the envelope that are changed. For example: refurbishments of roofs or terraces.
- In the total or partial refurbishment of the envelope of existing buildings built before 1980, the neighborhood associations that undertake the refurbishment of their façades should analyze the technical and economic viability of energy refurbishment. They are obliged to do it in a part of the total of the enclosures to be reformed: at least, the façade north or more unfavorable; or the minimum equivalent of 25% in isolated buildings and 50% in buildings between party walls.



2. MUNICIPAL ORDINANCE_ RESULTS_ DWELLINGS AFFECTED BY REFURBISHMENTS

*Period: 2009-06 / 12-2020



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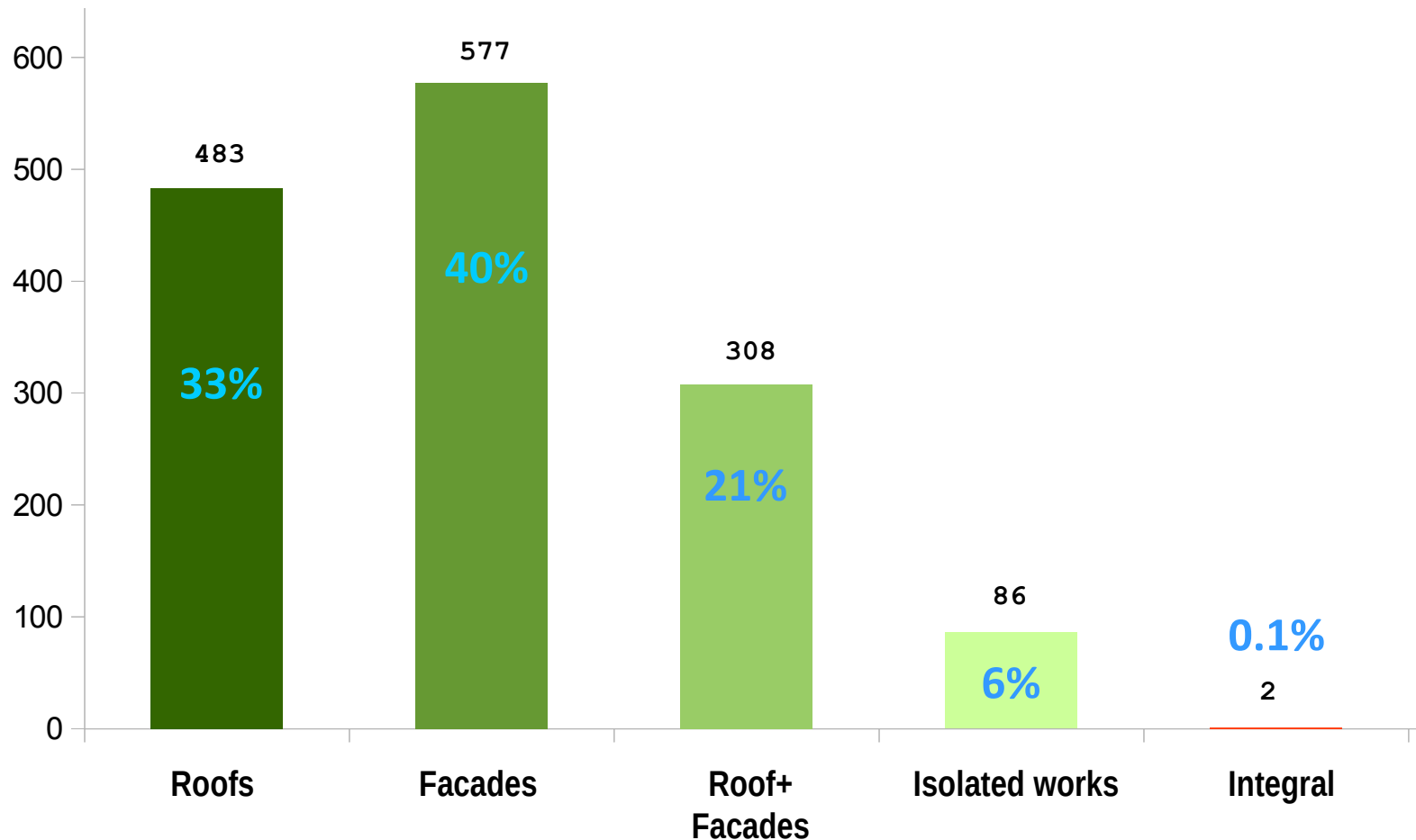
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2. MUNICIPAL ORDINANCE_ RESULTS_ TYPE OF REFURBISHMENT WORKS PROCESSED

*Period: 2009-06 / 12-2020

Total: 1456 works processed



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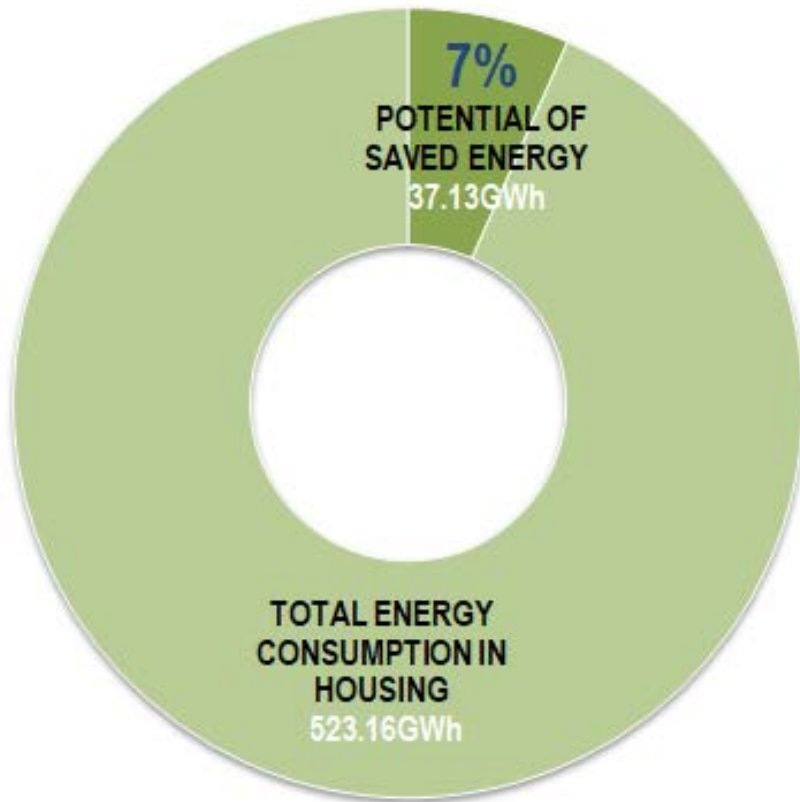
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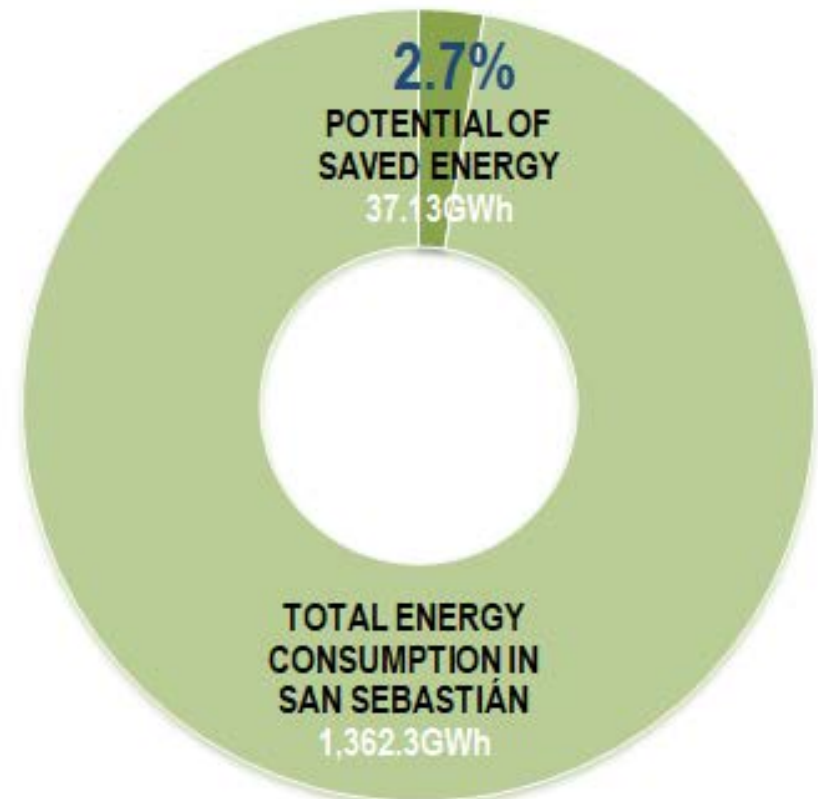
2. MUNICIPAL ORDINANCE_ RESULTS_ POTENTIAL ENERGY SAVINGS

*Period: 2009-06 / 12-2020

Energy savings compared to total consumption in homes



Energy savings compared to total consumption in the city



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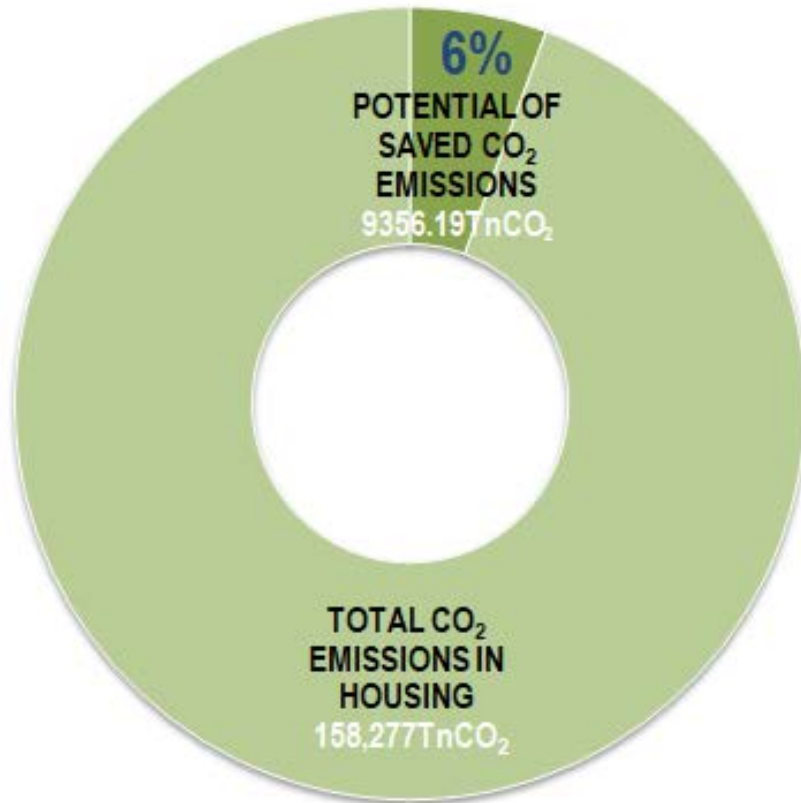
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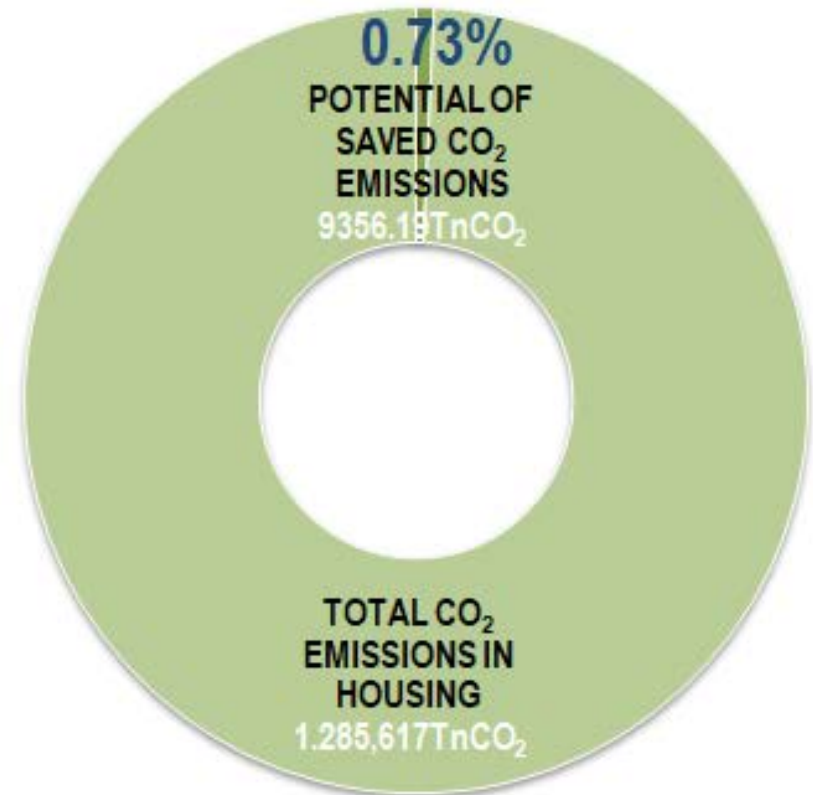
2. MUNICIPAL ORDINANCE_ RESULTS_ POTENTIAL SAVINGS OF CO₂ EMISSIONS

*Period: 2009-06 / 12-2020

CO₂ savings compared
to emissions in homes



CO₂ savings compared
to emissions in the city



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2. MUNICIPAL ORDINANCE_ RESULTS_ EXAMPLES



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2. MUNICIPAL ORDINANCE_ NEW DOCUMENT_ 2021

IN FORCE SINCE
2021-02-23



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2. MUNICIPAL ORDINANCE_ SOME GAPS IN THE STRATEGY BY REGULATION

1. **It only affects partially:** it does not promote integral refurbishments
2. **It does not promote new works:** it is a "passive" tool
3. It does not apply in historically **protected buildings**
4. **Citizens with limited economic resources,** perhaps, **are not able to apply it**



3. NEXT CHALLENGE IN RESIDENTIAL BUILDINGS: DISTRICT SCALE RETROFITTING



REPLICATE Project



donostia sustapena
fomento sansebastián



RENAISSANCE OF PLACES
WITH INNOVATIVE CITIZENSHIP
AND TECHNOLOGY

This project has received funding from
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Research and Innovation Programme
under Grant Agreement Nº 691735



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4. REFURBISHMENT OF MUNICIPAL BUILDINGS WITH ENERGY EFFICIENCY CRITERIA



Number of municipal buildings: **90**

27 of them have to be refurbished by **2030**, achieving at least a **B** in the building's energy rating (Law of sustainability in the Basque public administration, year 2020)

The Law, among other requirements, also states that at least **32%** of the energy consumed by the municipality must be generated with renewable energies by **2030**.



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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ WHAT ARE WE DOING?_ 3 APPROACHES

1.- Total refurbishment: Changing electrical, thermal installations and thermal envelope of the building.



2.- Partial refurbishment: Changing electrical and/or thermal installations.



3.- Production of renewable energy for self-consumption of the buildings.
Biomass, Solar (PV and thermal)



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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 1. TOTAL REFURBISHMENT

Example: MUNICIPAL CHILDREN'S SCHOOL



BEFORE



AFTER

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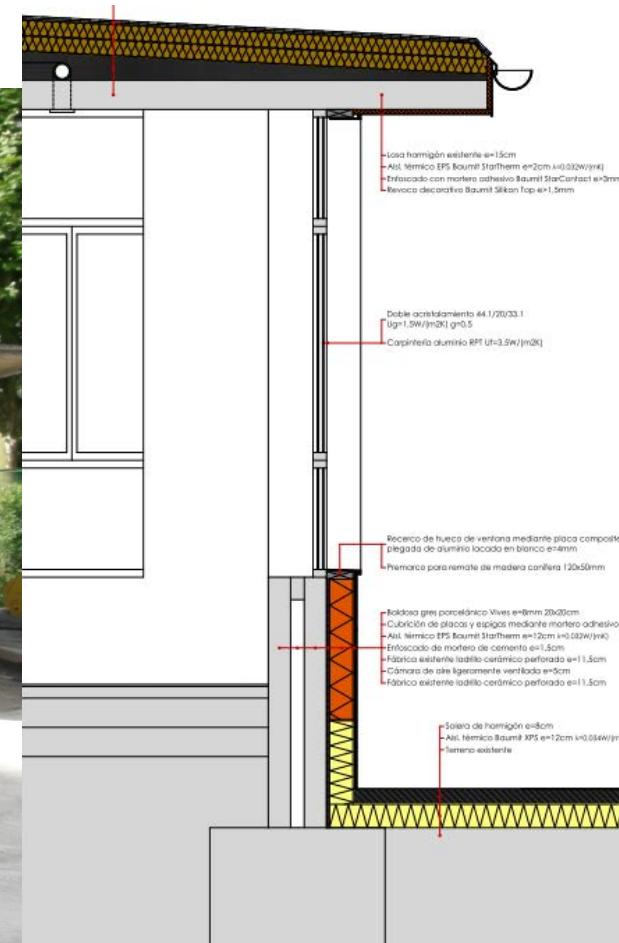


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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 1. TOTAL REFURBISHMENT

Example: MUNICIPAL CHILDREN'S SCHOOL



CONSTRUCTION WORK

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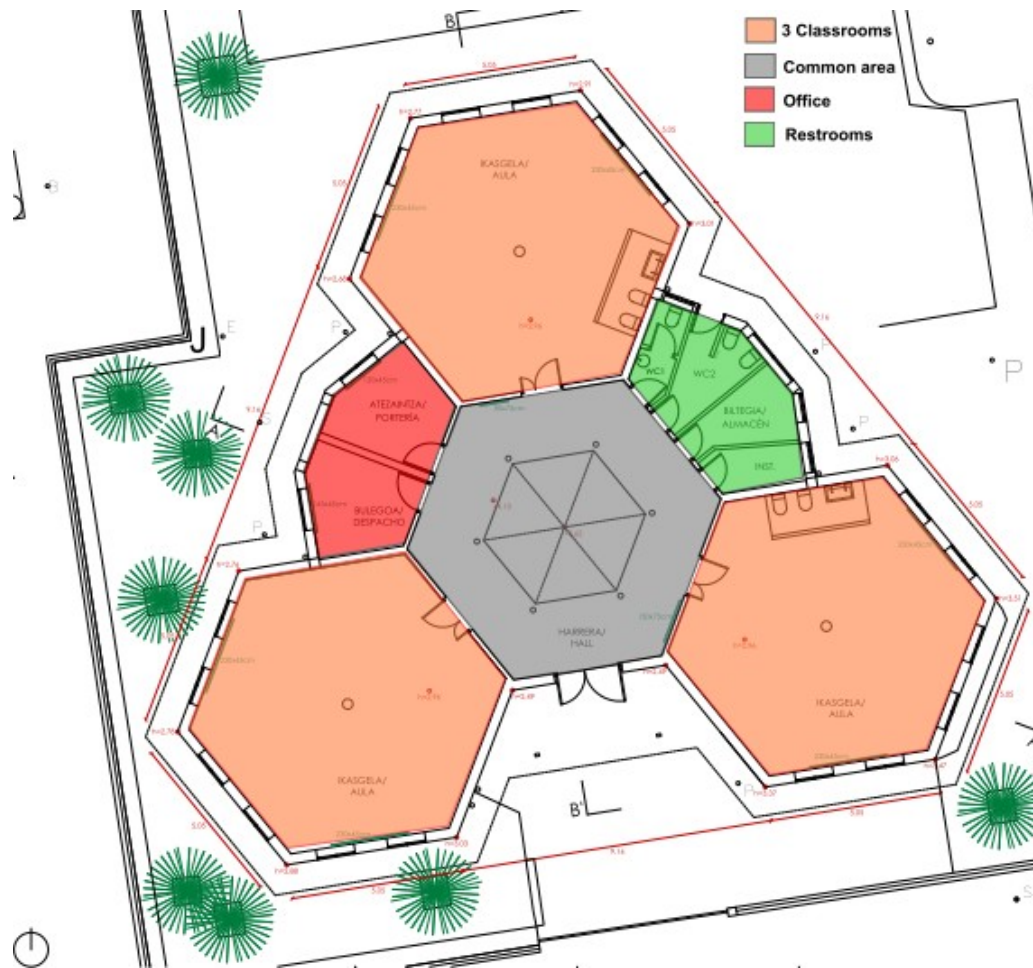


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Example: MUNICIPAL CHILDREN'S SCHOOL



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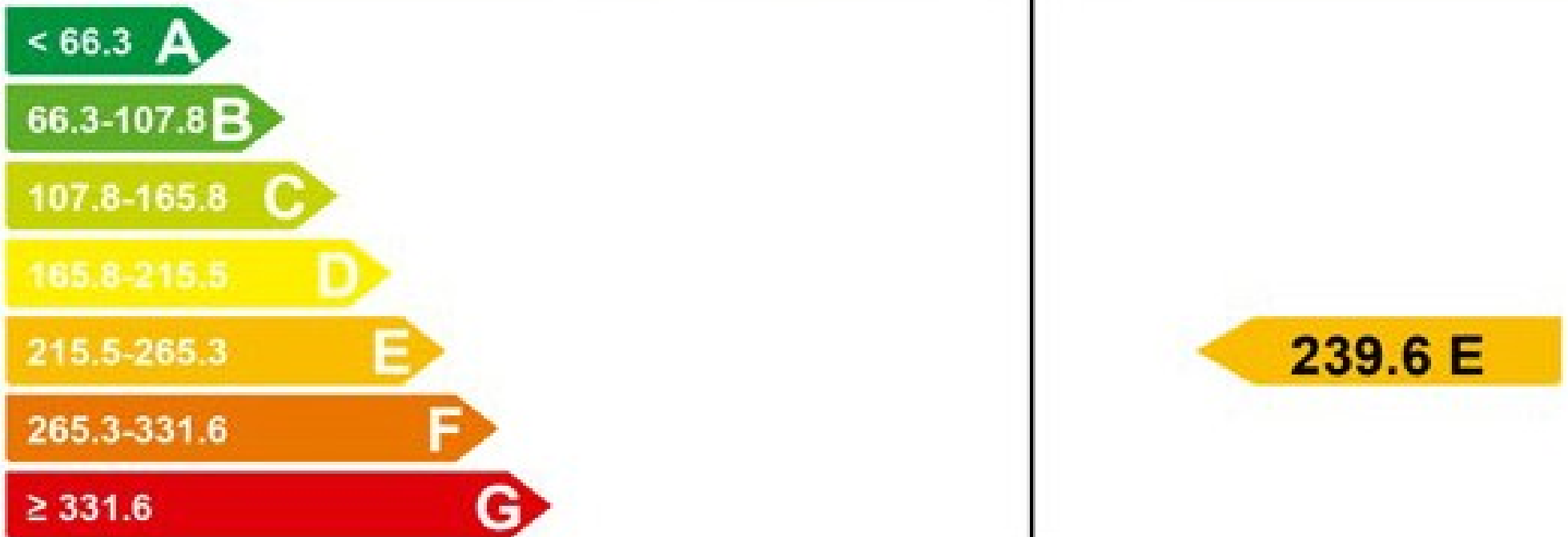
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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 1. TOTAL REFURBISHMENT

Example: MUNICIPAL CHILDREN'S SCHOOL

CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE [kWh/m² año]



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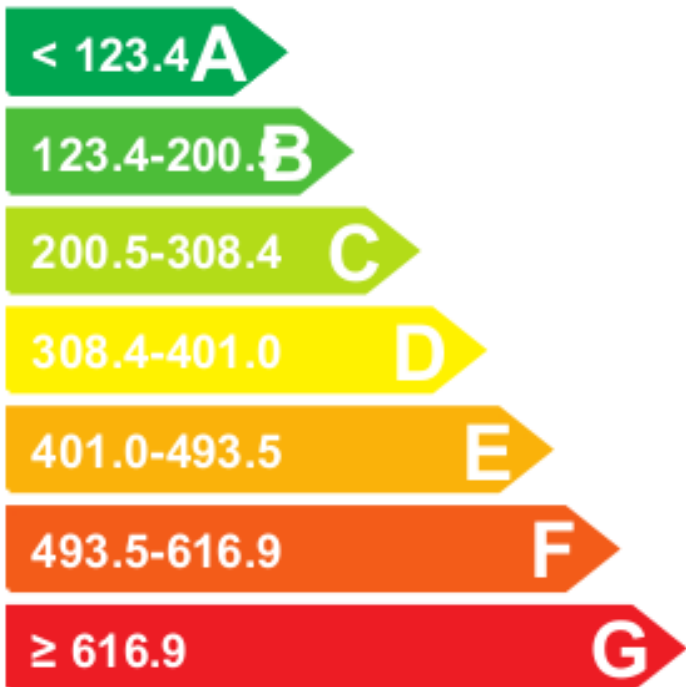
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Example: MUNICIPAL CHILDREN'S SCHOOL

CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE [kWh/m² año]



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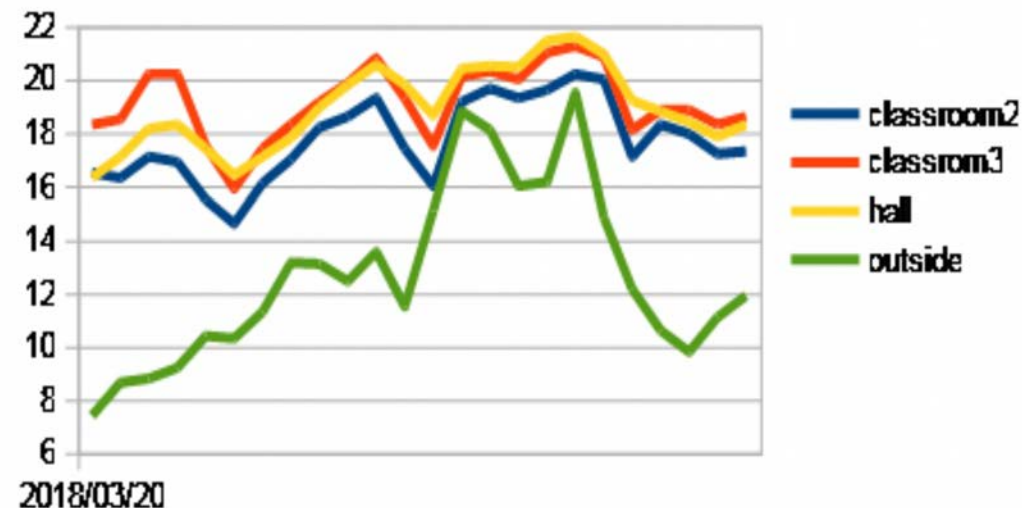
4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 1. TOTAL REFURBISHMENT

Example: MUNICIPAL CHILDREN'S SCHOOL

¿WHY DID WE SELECT THIS BUILDING?

- Problem with thermal discomfort
- Affected users (children)
- High energy consumption
- Replicability
- Example for society
- Short execution period

Temperature



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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 1. TOTAL REFURBISHMENT

Example: **MUNICIPAL CHILDREN'S SCHOOL**

* **ADDING INSULATION AND HEAT RECOVERY VENTILATION
CHANGES ENERGY RATING FROM AN **E** TO AN **A****



New double skylight

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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 2. PARTIAL REFURBISHMENT

POWER AND LIGHTING CONTROL IN SCHOOLS



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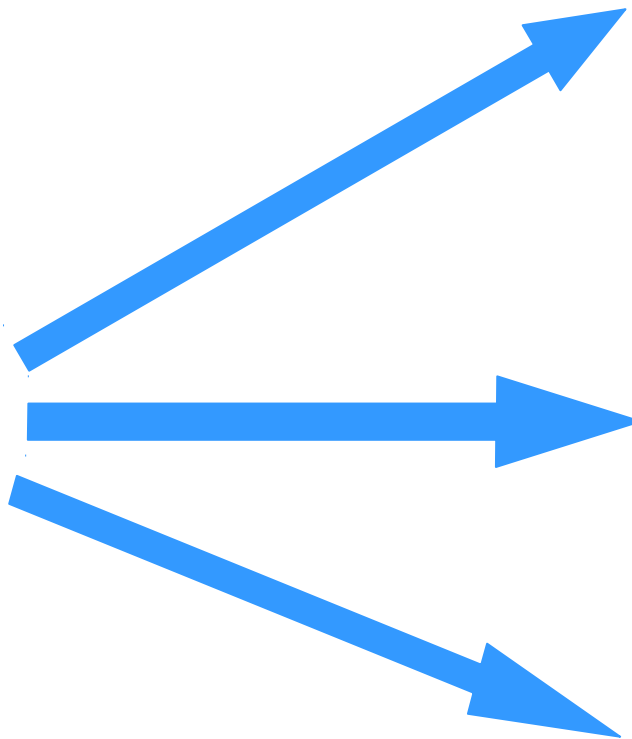


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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 2. PARTIAL REFURBISHMENT

REPLACEMENT OF BOILERS TO GAS AND BIOMASS



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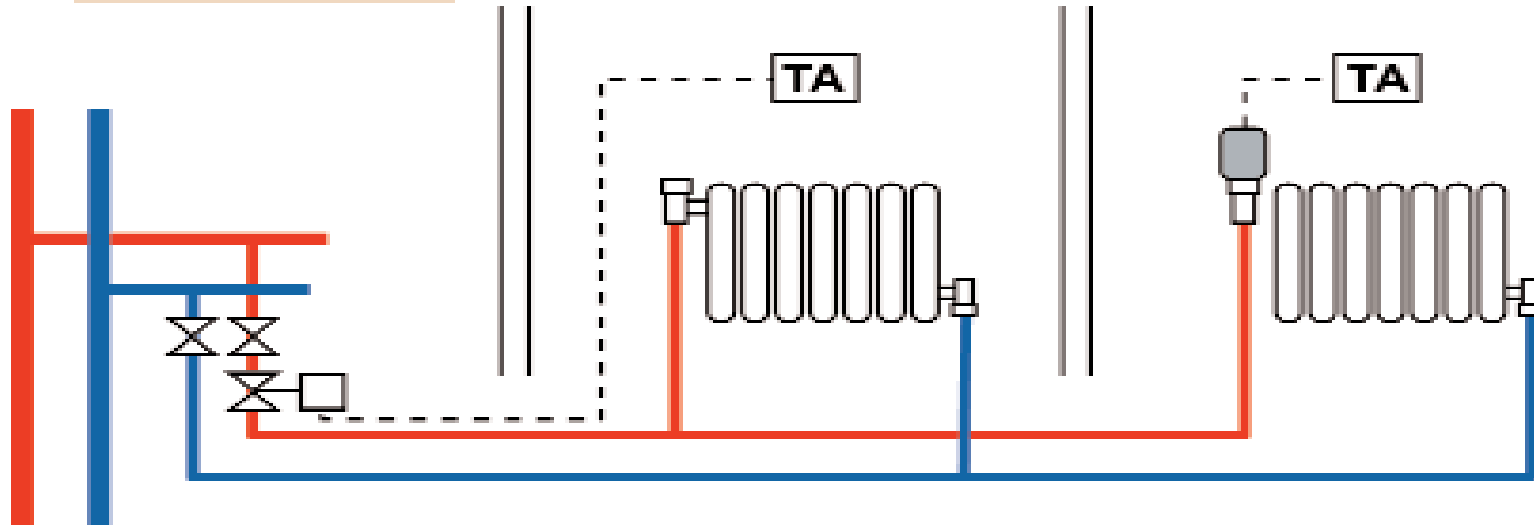
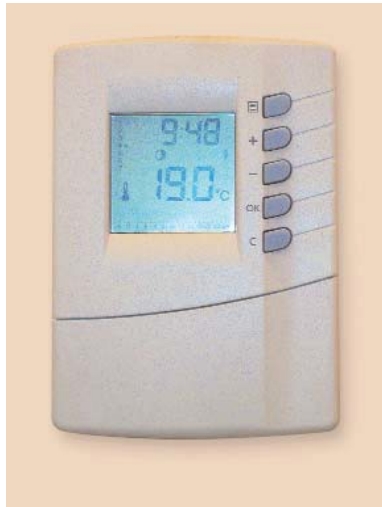


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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 2. PARTIAL REFURBISHMENT

DIGITAL REGULATOR INSTALTION FOR HEATING CONTROL



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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 2. PARTIAL REFURBISHMENT

CHANGE OF LIGHTS TO LED LAMPS



AVERAGE OF 35% OF SAVINGS IN ELECTRICITY

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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 3. RENEWAL ENERGY FOR SELF-CONSUMPTION

IMPLEMENTATION OF SOLAR PV ON ROOFTOPS



AVERAGE REDUCTION OF 30% IN ELECTRICITY CONSUMPTION

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4. REFURBISHMENT OF MUNICIPAL BUILDINGS_ 3. RENEWAL ENERGY FOR SELF-CONSUMPTION

IMPLEMENTATION OF SOLAR PV ON ROOFTOPS



- . **11 buildings** so far, have solar PV installations for self consumption and 5 facilities are in the tendering process for another **5 buildings**, totalling **802 kWp**
- . Another **28 buildings** have solar PV to sell to the grid, totalling **805,6 kWp**
- . **In total: 1,6 megawatt solar PV on 44 municipal buildings.**

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ありがとう
THANKS

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