

BUILDING AND SITE REGENERATION: POLICIES FOR ENERGY REFURBISHMENT OF BUILDINGS

DONOSTIA / SAN SEBASTIÁN



2nd EU-JAPAN CITIES EXCHANGE MEETING

DELEGATION OF THE EUROPEAN UNION TO JAPAN

International Urban Cooperation Programme (IUC)

Tokyo. 2018-04-23



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ENERGIA ERAGINKORTASUN ATALA
SECCIÓN DE EFICIENCIA ENERGÉTICA



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186,377 INHABITANTS

Donostia / San Sebastián

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

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40% OF ENERGY IN EUROPE IS CONSUMED IN BUILDINGS

In Donostia / San Sebastián buildings represent the **22%** of the CO₂ emissions

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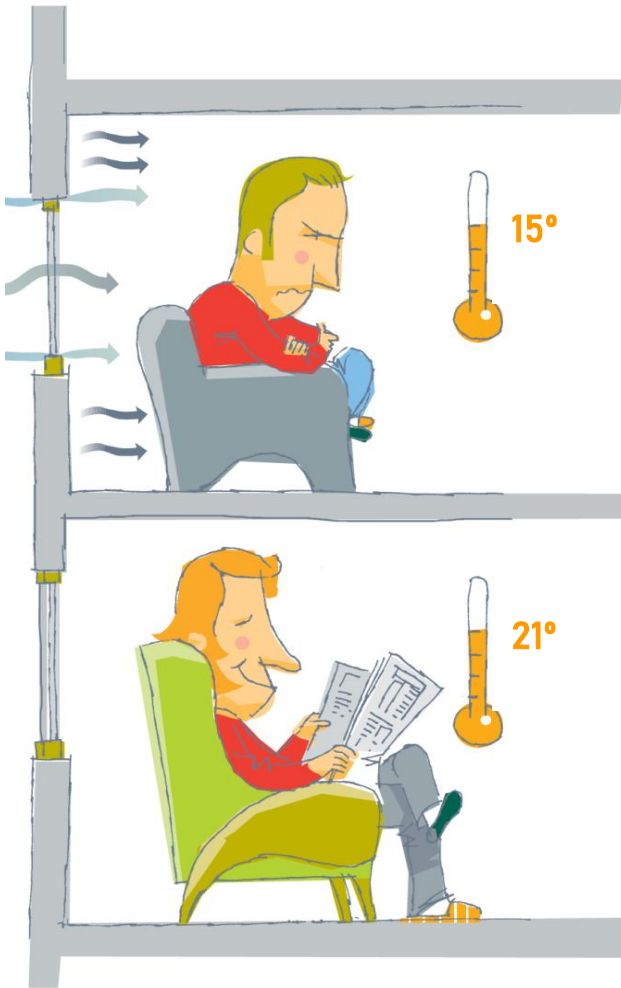
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WHY ENERGY REFURBISHMENT OF BUILDINGS?



1. DUE TO PROTECTION OF ENVIRONMENT AND CLIMATE CHANGE

2. DUE TO THE ECONOMY (ENERGY DEPENDENCY)

3. DUE TO THE HEALTHINESS AND COMFORT AT HOMES

4. DUE TO CONSOLIDATING AND IMPROVING CONSTRUCTED URBAN AREAS

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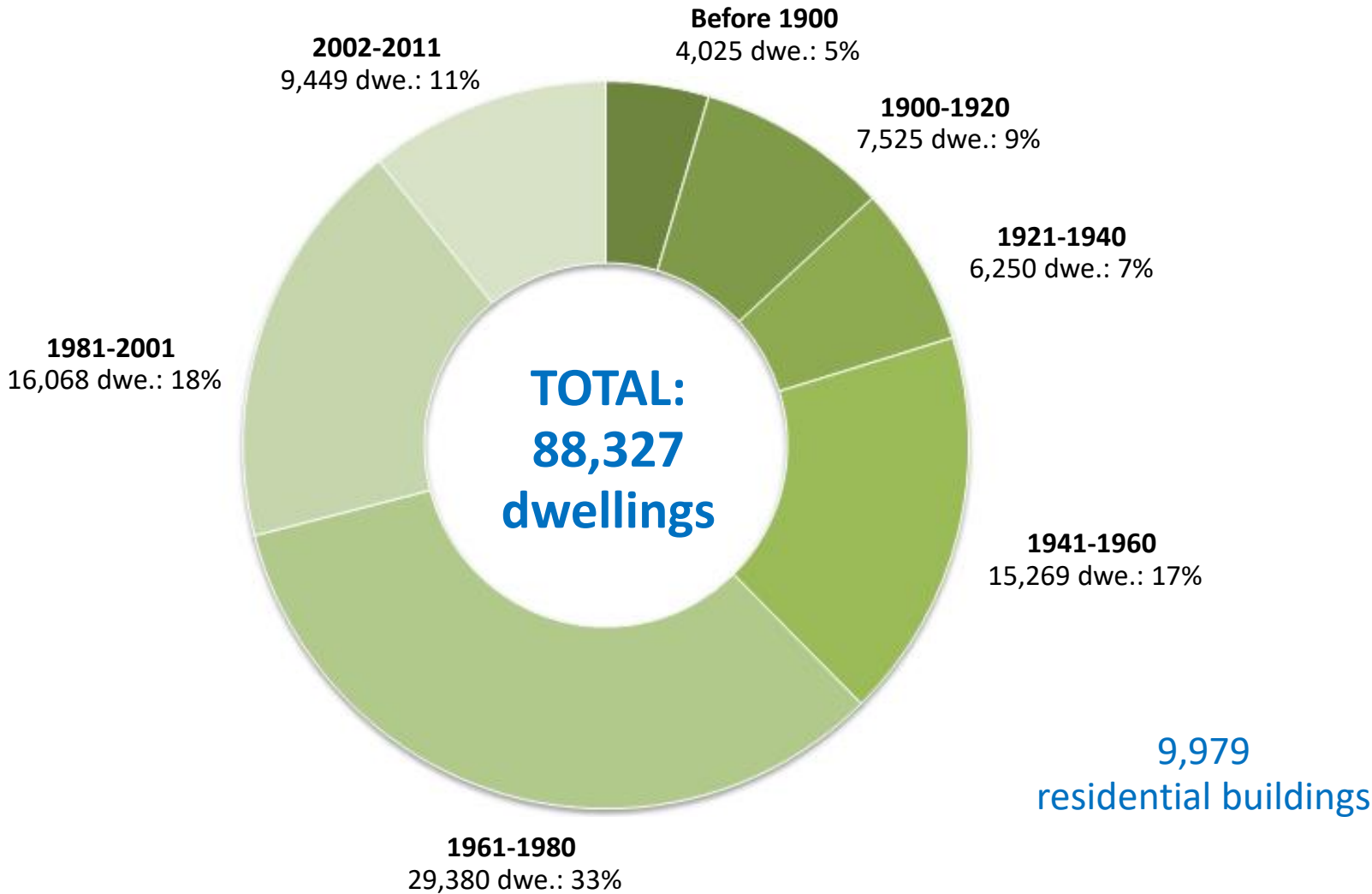
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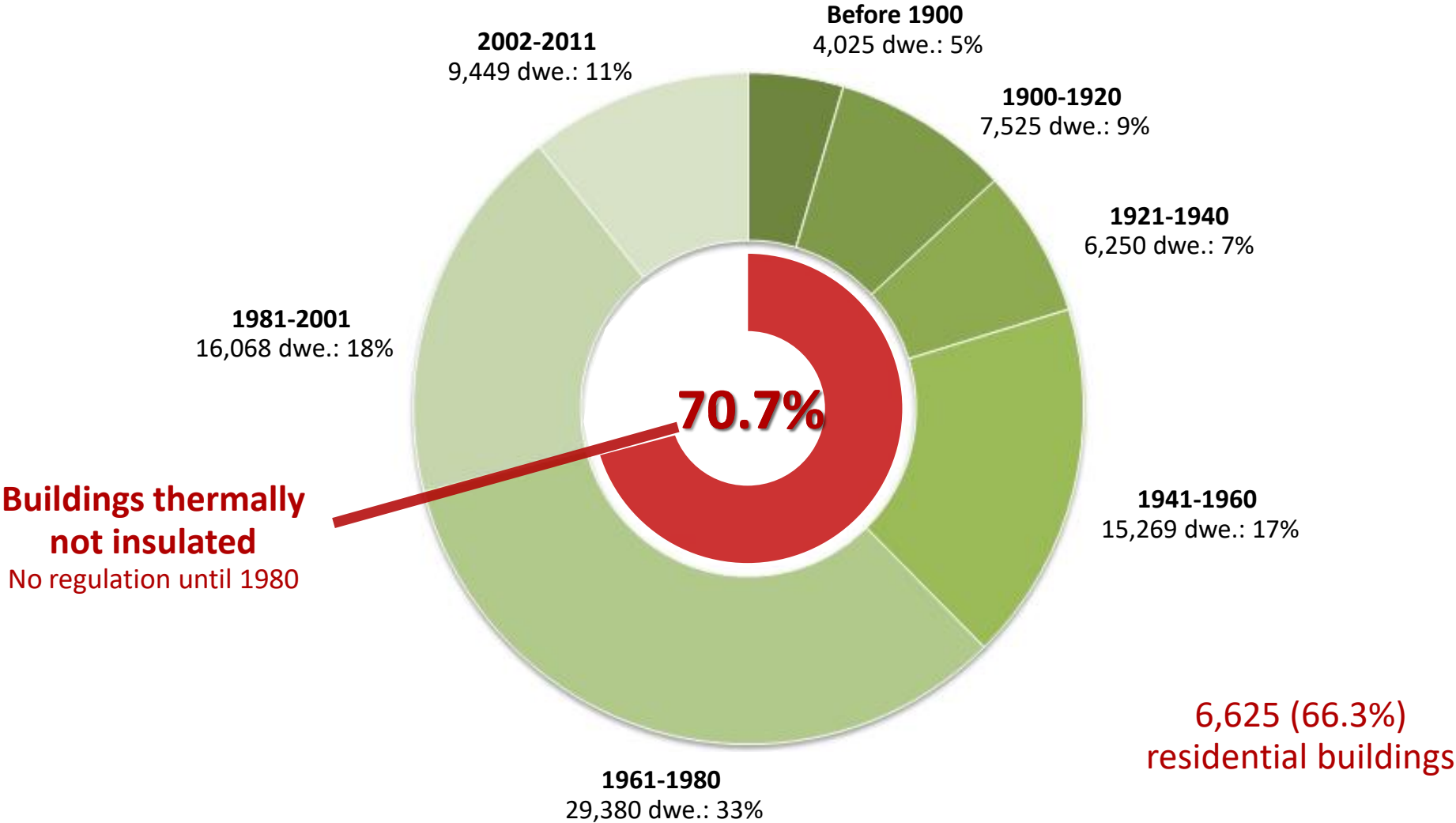
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DWELLINGS BY YEAR OF CONSTRUCTION IN DONOSTIA / SAN SEBASTIÁN



DWELLINGS BY YEAR OF CONSTRUCTION IN DONOSTIA / SAN SEBASTIÁN



ARCHITECTURALLY AND HISTORICALLY PROTECTED BUILDINGS

1,125 buildings



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ARCHITECTURALLY AND HISTORICALLY PROTECTED BUILDINGS



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MUNICIPAL ORDINANCE OF ENERGY EFFICIENCIA AND ENVIRONMENTAL QUALITY OF BUILDINGS

IN FORCE SINCE 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.

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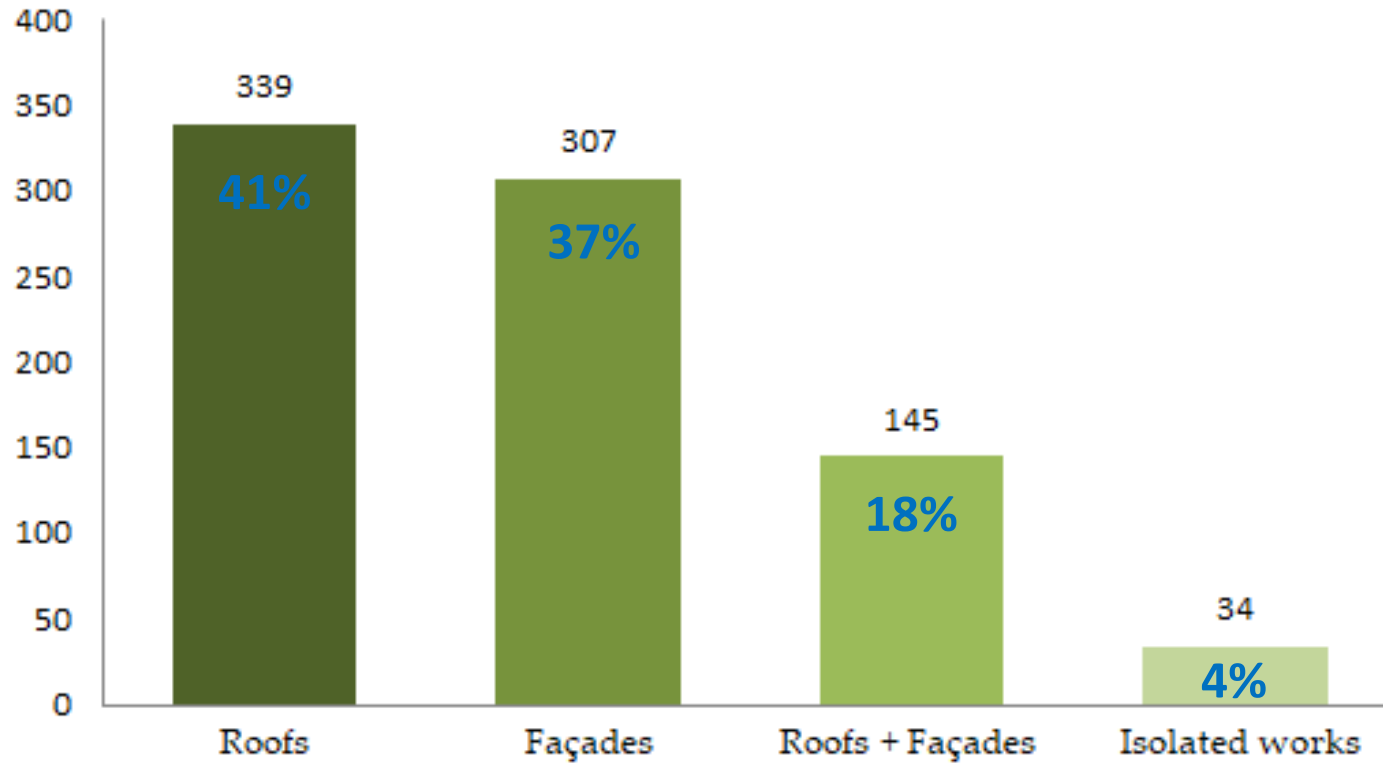
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TYPE OF THERMAL ENVELOPE REFURBISHED ENERGETICALLY UNDER THE ENERGY ORDINANCE

*Period: 2009/06/1 – 2016/12/31

Total: 825 works processed



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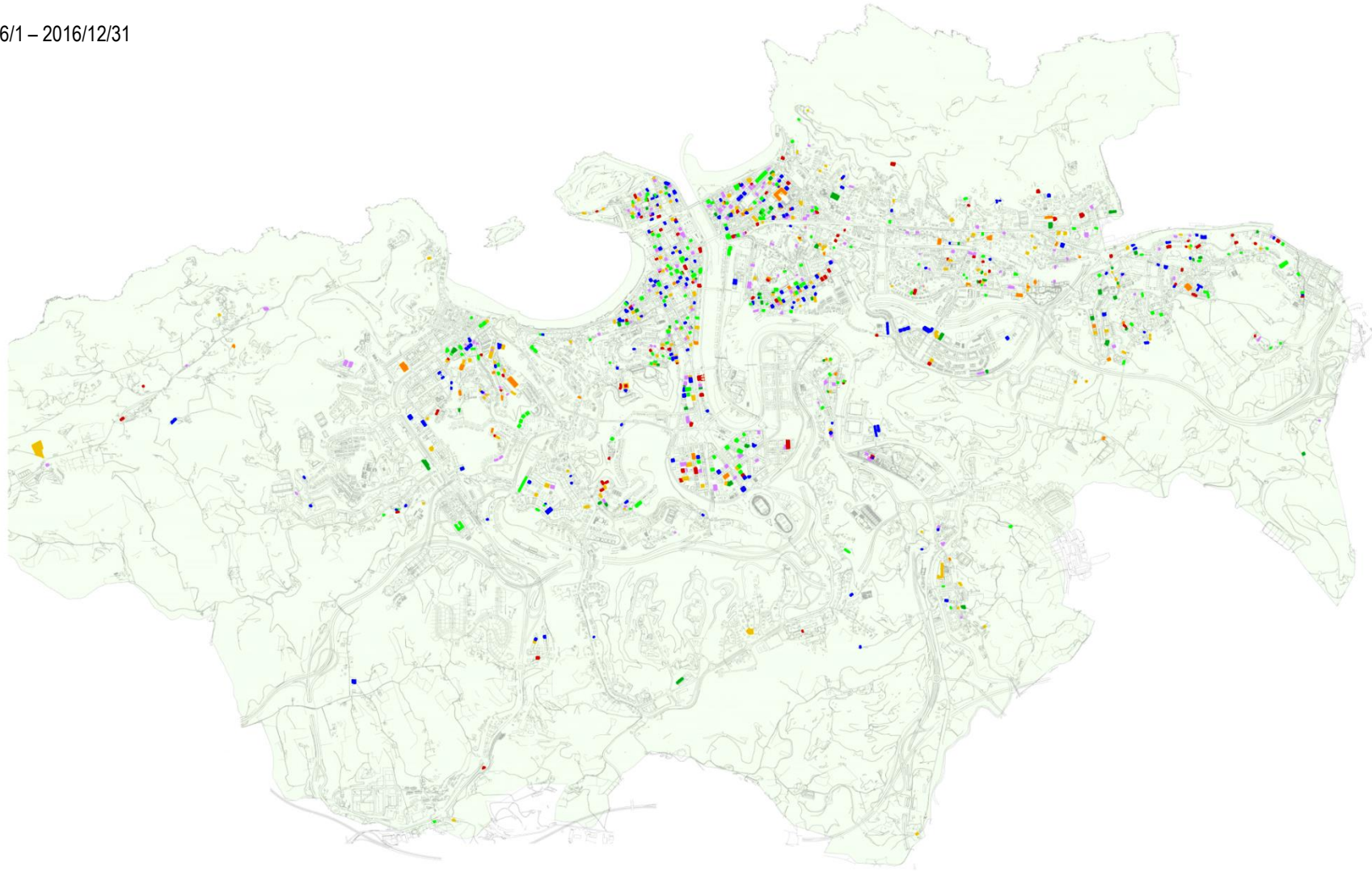


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TERRITORIAL DISTRIBUTION CLASSIFIED BY YEARS OF THE THERMAL ENVELOPE REFURBISHMENT WORKS

*Period: 2009/06/1 – 2016/12/31



2009: 1 work 2010: 46 works 2011: 57 works 2012: 112 works 2013: 164 works 2014: 155 works 2015: 150 works 2016: 140 works

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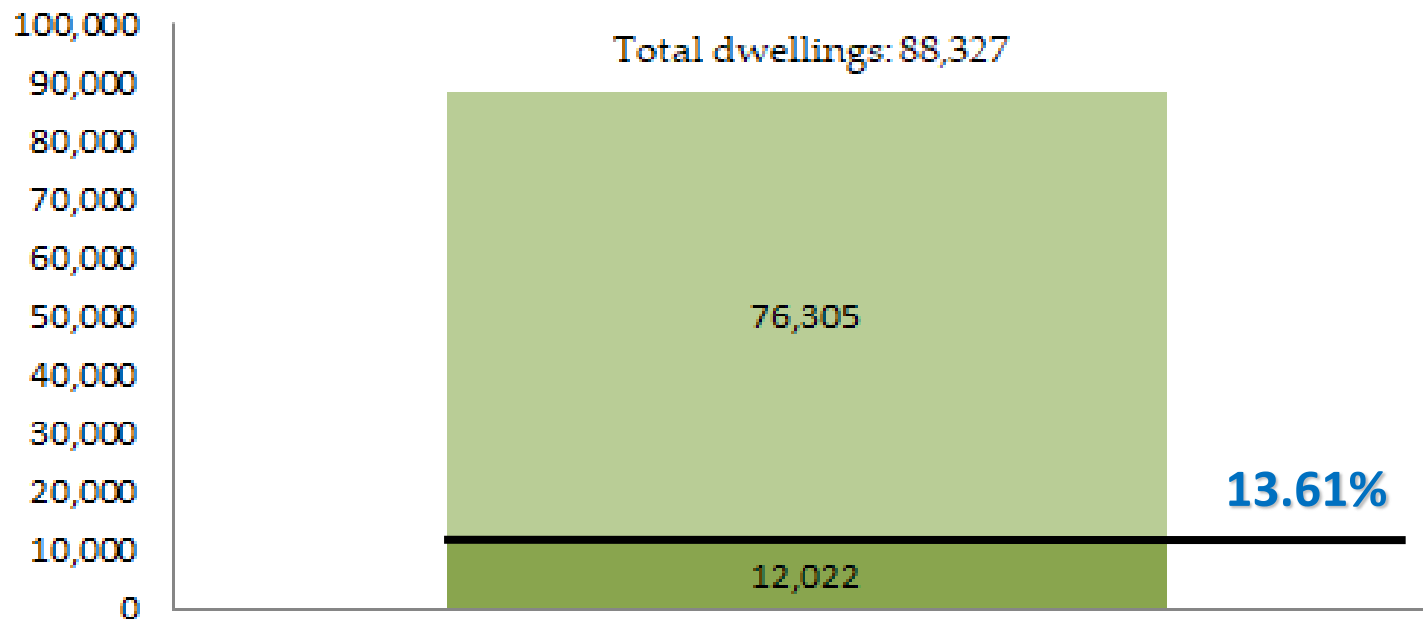


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NUMBER OF DWELLINGS AFFECTED BY AN REFURBISHMENT REGULATED BY THE ENERGY ORDINANCE

*Period: 2009/06/1 – 2016/12/31



- Number of dwellings without a refurbishment regulated by the Ordinance
- Number of dwellings affected by interventions regulated by Ordinance

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RESULTS...

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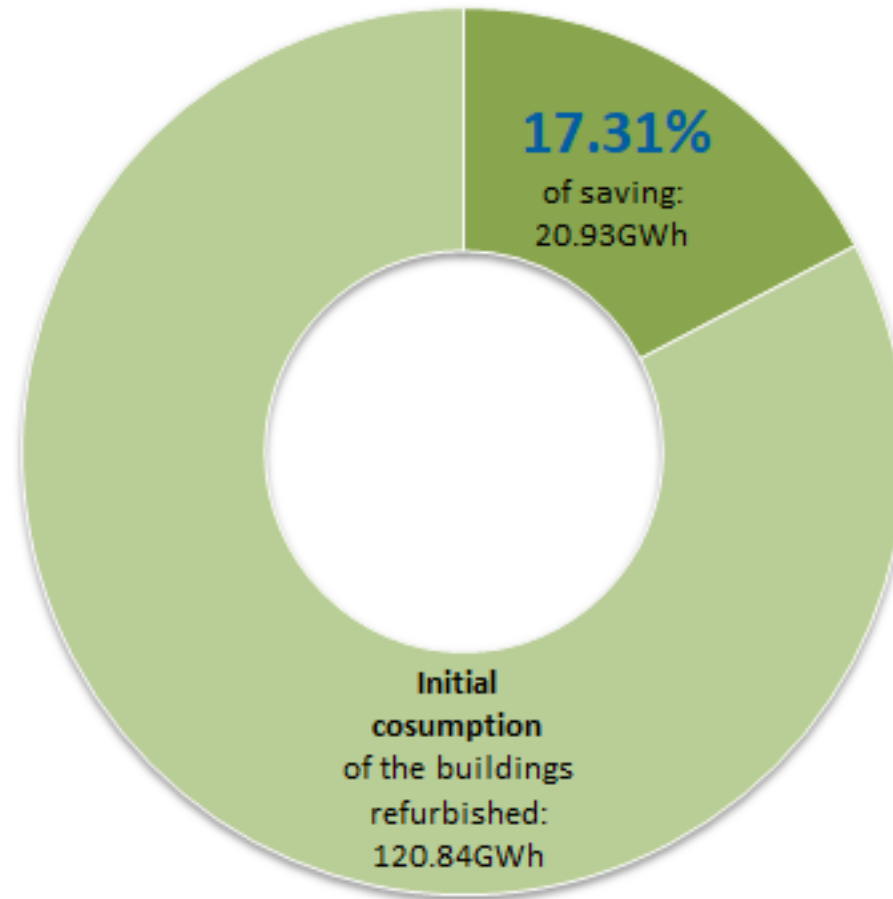


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ESTIMATED ENERGY SAVING PER YEAR IN BUILDINGS THAT HAVE SUFFERED A THERMAL ENVELOPE

*Period: 2009/06/1 – 2016/12/31



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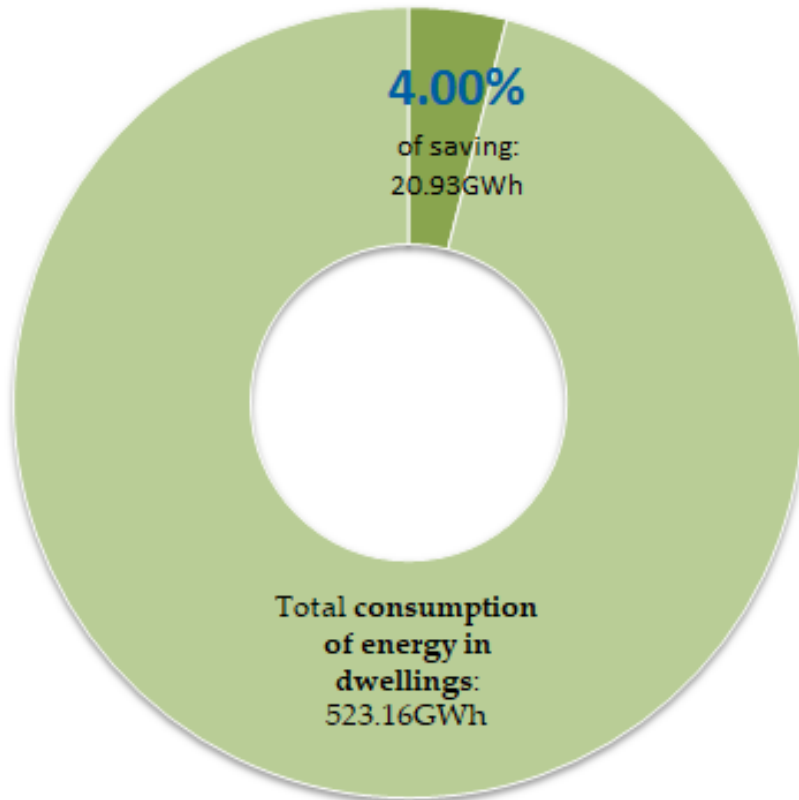
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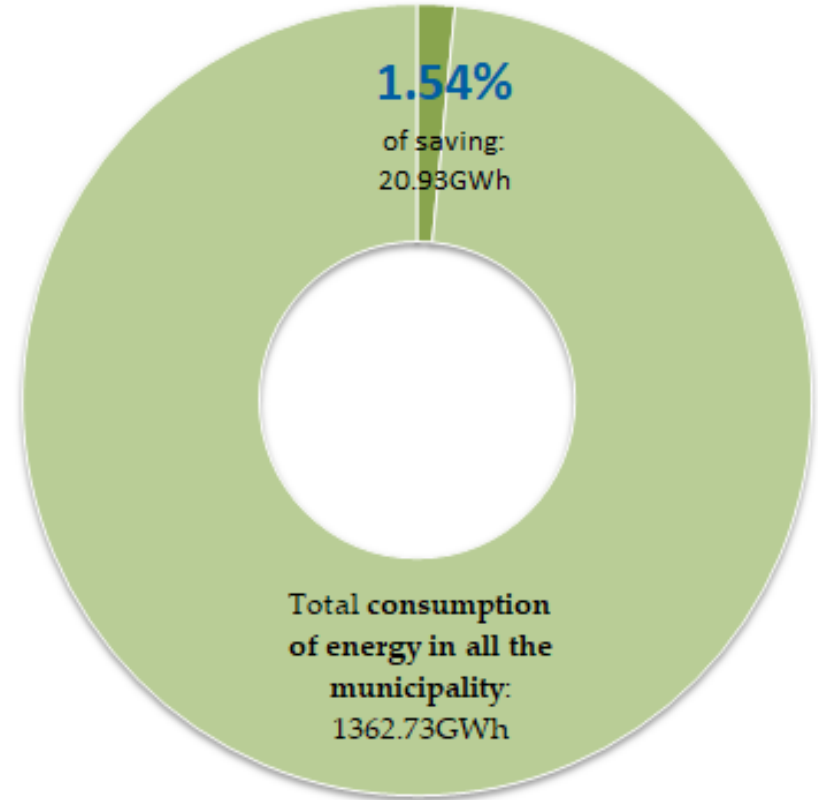
COMPARISON OF ENERGY SAVINGS WITH CONSUMPTION OF ELECTRICITY AND GAS in the city

*Period: 2009/06/1 – 2016/12/31

Comparison scope: RESIDENTIAL BUILDINGS



Comparison scope: ALL THE MUNICIPALITY



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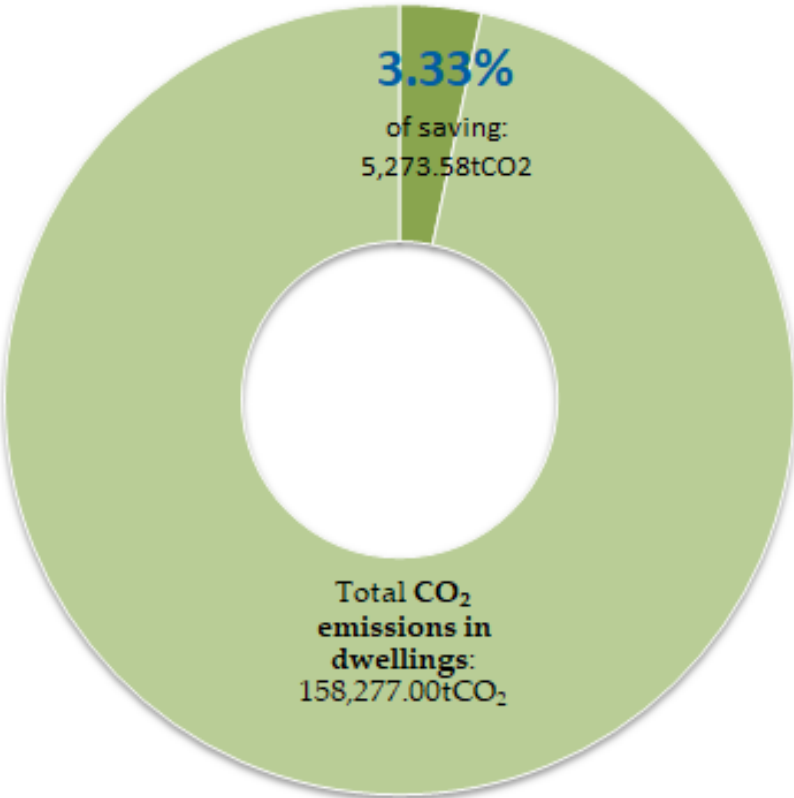
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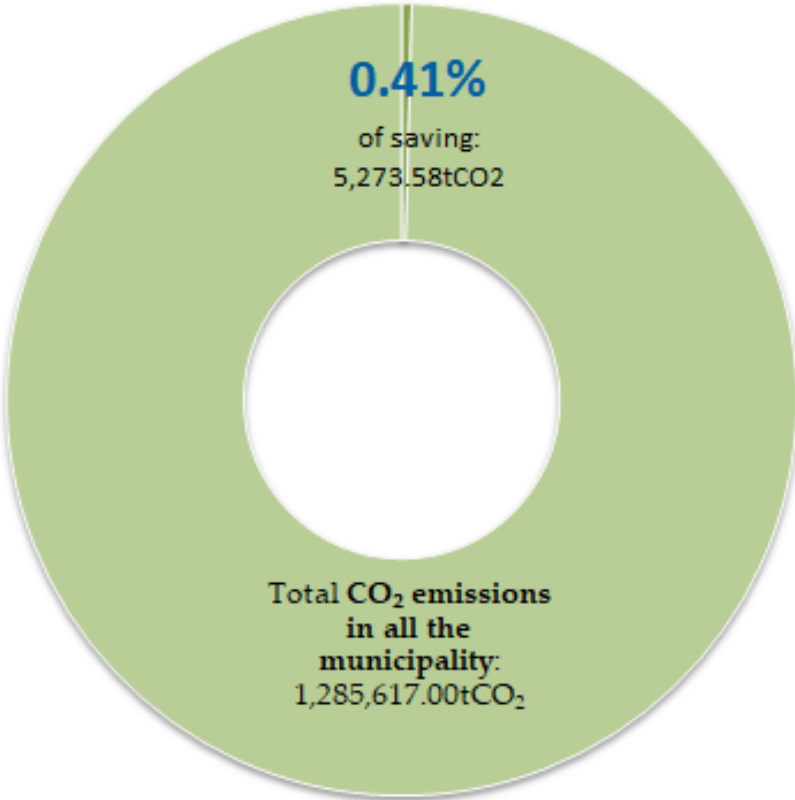
COMPARISON OF THE AVOIDED CO₂ EMISSIONS WITH CARBON EMISSIONS in the city

*Period: 2009/06/1 – 2016/12/31

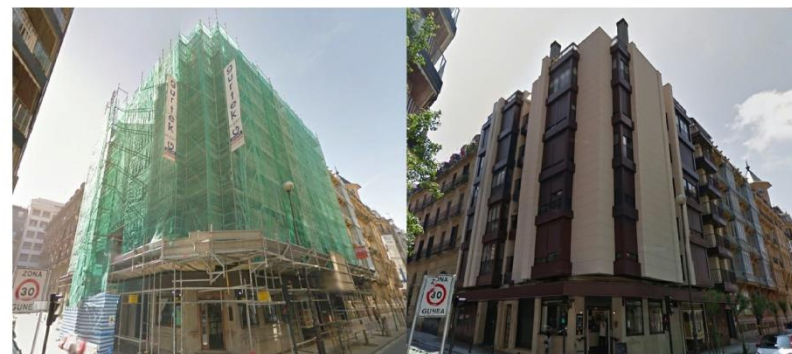
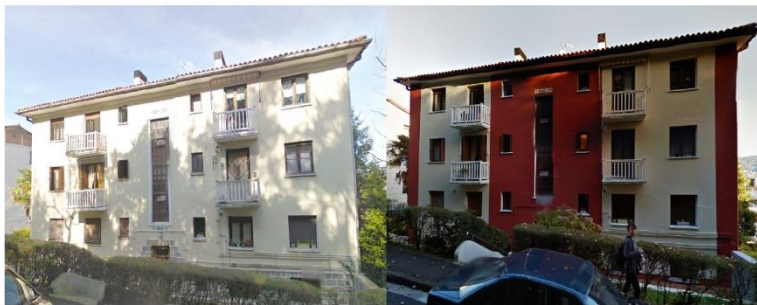
Comparison scope: RESIDENTIAL BUILDINGS



Comparison scope: ALL THE MUNICIPALITY



SOME EXAMPLES...



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AWARD FOR GOOD LOCAL PRACTICES FOR CLIMATE 2016



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BUILDING AND SITE REGENERATION: PILOT PROJECT: REFURBISHMENT OF KATALIN ERAUSO EDUCATION CENTER



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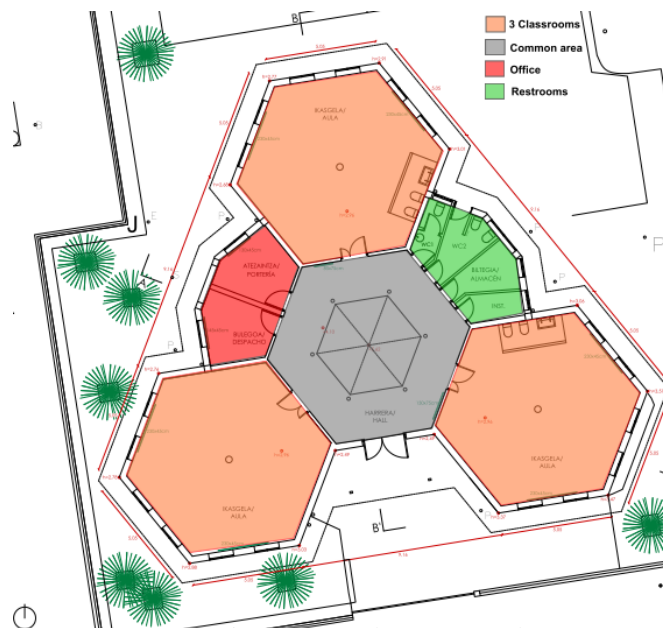
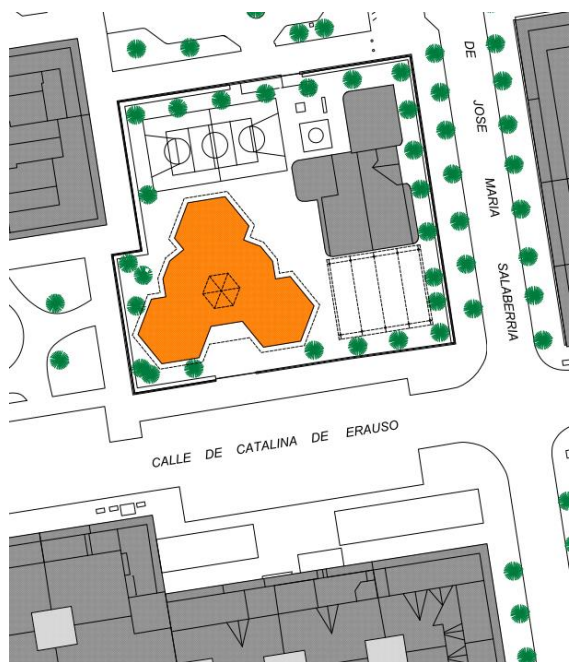
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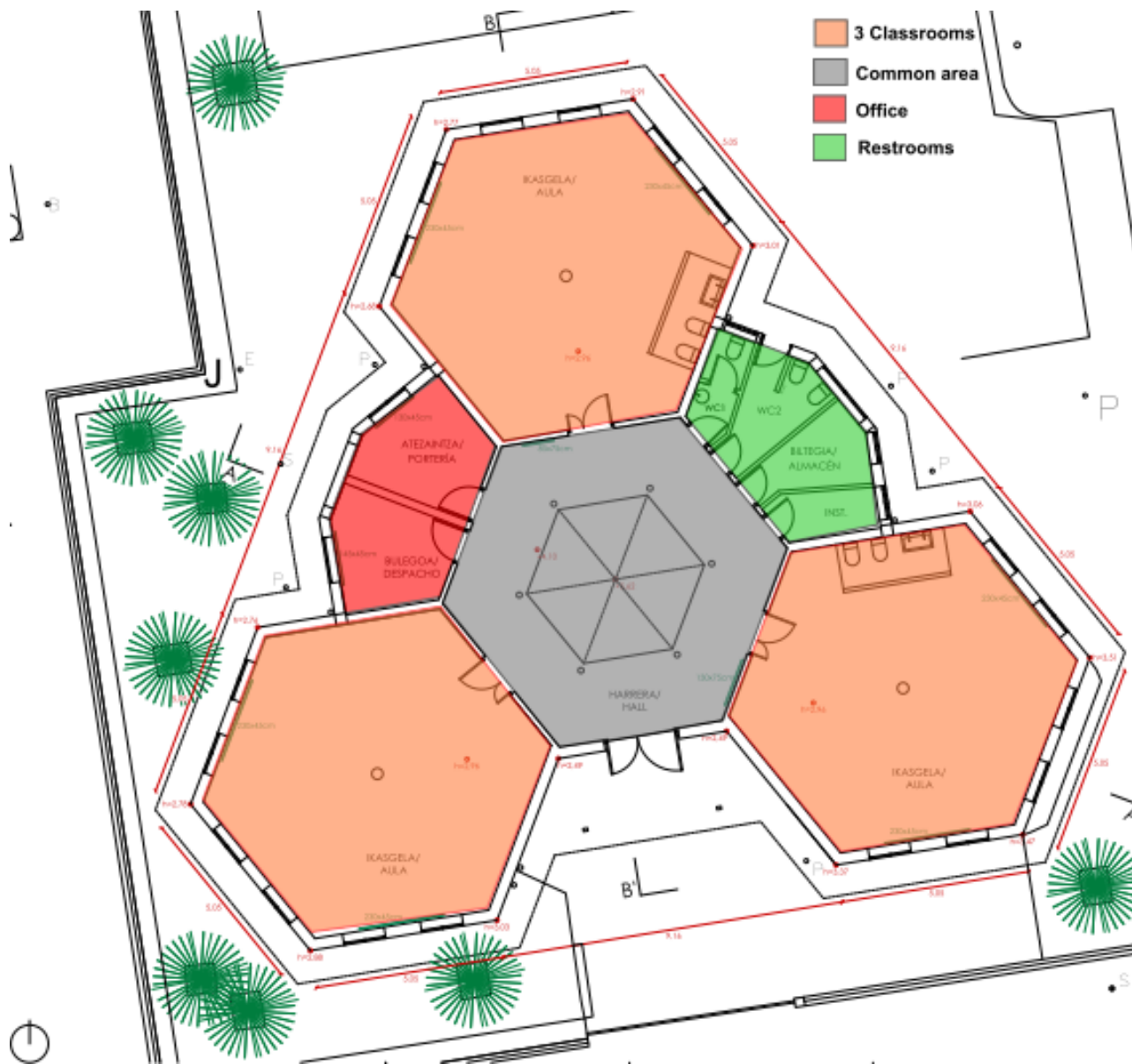
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- 3 Classrooms**
- Common area**
- Office**
- Restroom**

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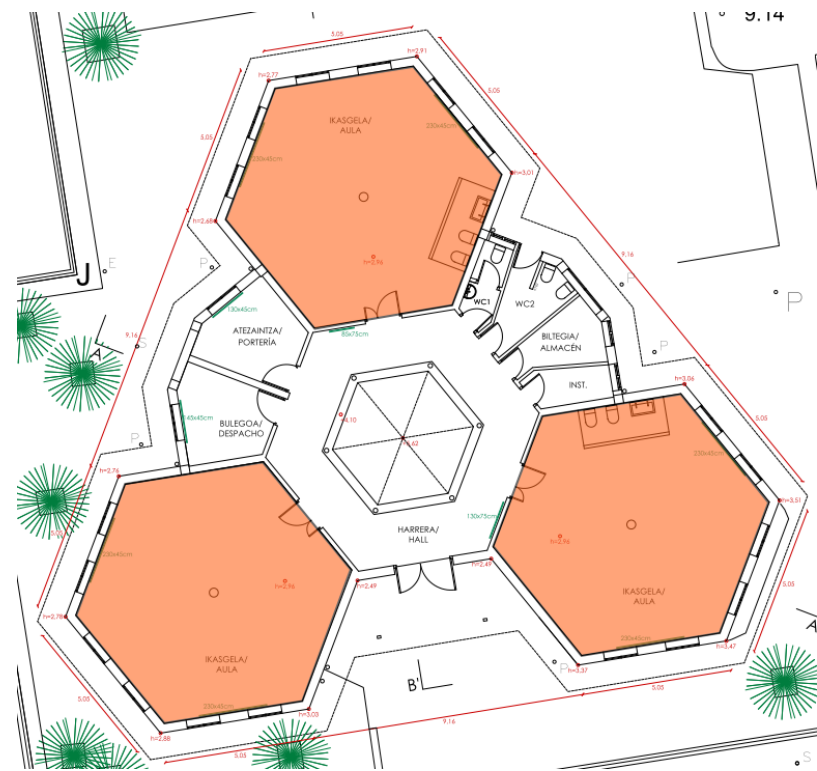
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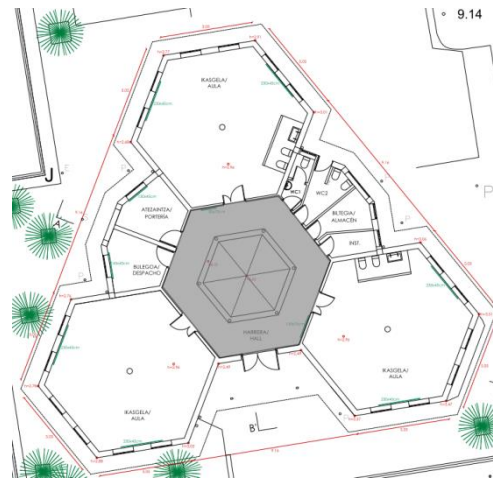
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Common area

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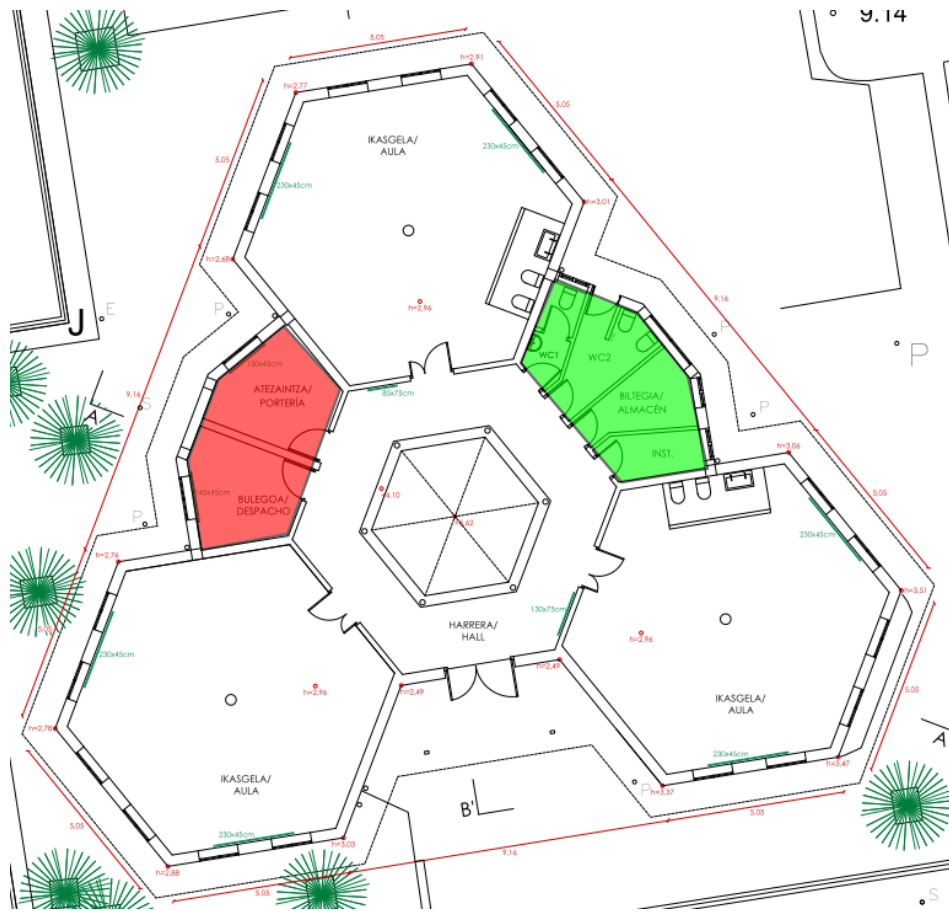
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- Office**
- Restroom**

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¿WHY DID WE SELECT THIS BUILDING?

- Problem with thermal discomfort
- Affected users
- High energy consumption
- An ability to scale
- Example for society
- Short execution period of time

Climate: 

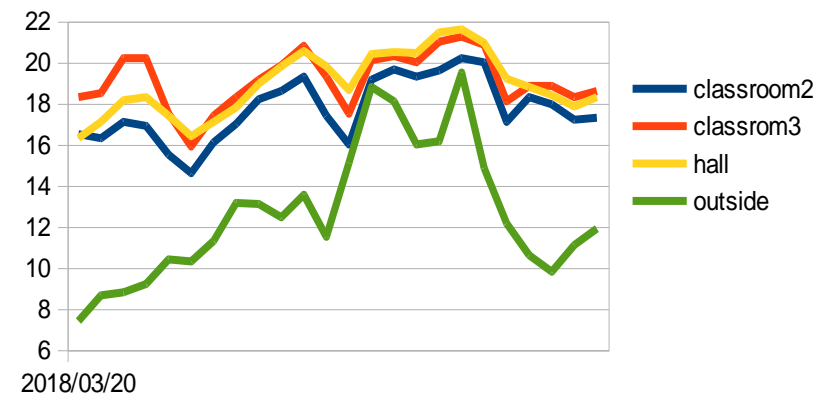
- Average temp. 14°C
- Average humidity 78%
- N° days 141 with rain & average rainfall 1506 mm
- Average solar radiation 1243 W /m²year

COLLECTION OF DATA

- The energy consumption of the building
- Measurement of temperature
- Measurement of humidity
- Measure changes of CO2
- Outside temperature

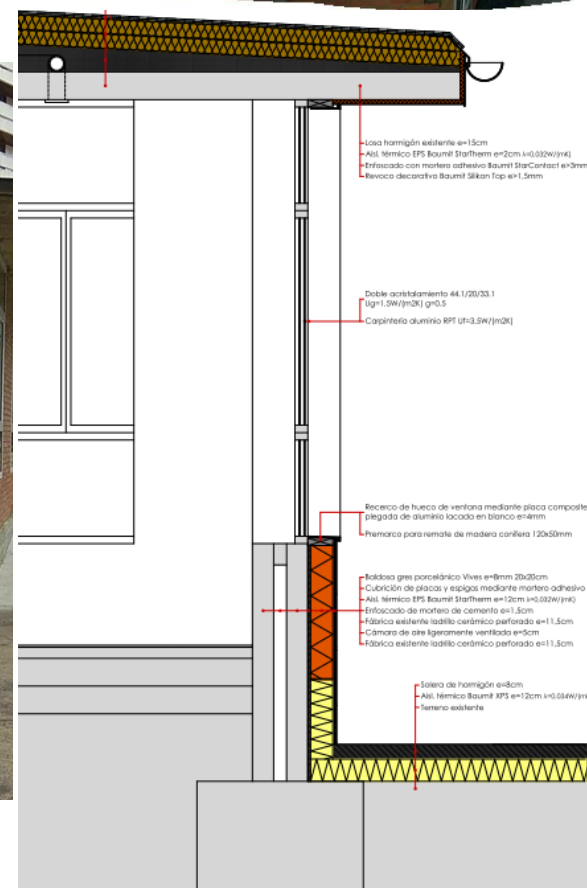


AVERAGE TEMPERATURA COMPARISON



REFURBISHMENT CONSISTS OF:

- Add insulation
- New ventilation system
- Budget of 170.000€ // 22.500.000 JPY TAX excluded
- Execution time: 2 months



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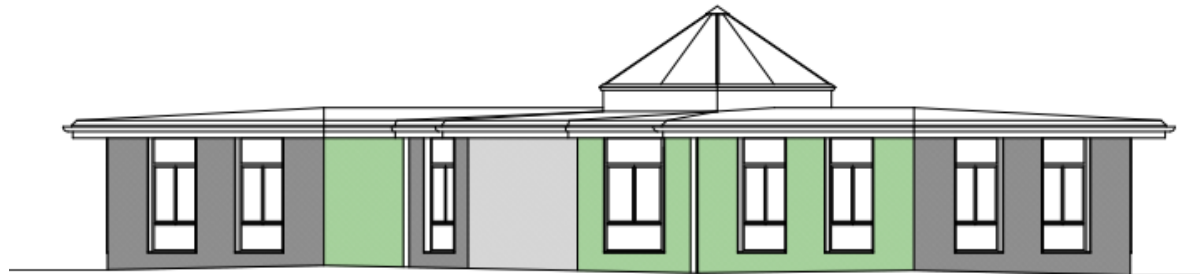


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¿WHAT DO WE WANT TO KNOW?

- How much energy we can save
- Check differences in thermal comfort
- The evolution of CO2 level
- Publish the results and conclusion obtained



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THANKS

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