

# Innovative business model for the energy renewal of Torrelago district

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#### Agenda



## Introduction.

- Torrelago district description.
- Torrelago retrofitting strategy.
- Torrelago business case.
- Discussion.









#### Introduction



#### **EUROPE 2020 STRATEGY**

 Greenhouse gas emissions to be reduced by 20% compared to 1990

 Share of **renewable** energy sources in final energy consumption to be increased to 20%

Energy efficiency to be improved by 20%









#### **CITyFiED Project: Five main pillars**







## **Torrelago district description**



#### **Torrelago district description: Case study**

#### **Torrelago district:**

- **©** Construction in 1970 1980
- 31 residential buildings
- ☑ 1,488 dwellings
- 140,000 m<sup>2</sup> conditioned
- Two heating networks
- Fossil fuels (natural gas)
- Consumption: 14 GWh/yr
- **D** Power installed: 15 MW





#### **Torrelago district description: Residents needs**

- Low comfort level at home and regular damps in the walls
- Old equipment and bad performance of the energy facilities
- Inefficient management of the district heating system
- Expensive energy bill and operation costs
- Instability of the energy price due to external conditions













#### Torrelago retrofitting strategy



#### **Torrelago retrofitting strategy: Objectives**

- Reduction of the buildings' energy demand by a 40%
- Improvement of the comfort level inside the dwellings
- Operation costs savings
- Enhancement of the overall energy performance
- Reduction of the CO<sub>2</sub> emissions
- Increase the share of renewables to a 80%
- Citizens decision-making at district, building and home level





#### **District retrofitting strategy: Energy measures**

- 1. Buildings insulation
- 2. District heating renovation
- 3. Overall energy management
- 4. 3 high-efficiency biomass boilers
- 5. 1 high-performance CHP unit
- 6. Variable flow pumping system
- 7. Optimized control strategies
- 8. Smart energy metering
- 9. Simulation and monitoring
- 10. Home temperature control







## **Torrelago business case**



## **CITyFiED** partners in Torrelago demo site

Partner		Туре	CITyFiED role	
	<b>VEOLIA</b> Energy Services Company		<ul> <li>District Heating Network</li> <li>Design, installation and commissioning</li> <li>Energy management</li> <li>Operation and Maintenance</li> <li>Full guarantee</li> <li>Financing of the DH interventions</li> </ul>	
<b>3</b> a		Building Company	<ul> <li>Buildings Envelopes (Façades)</li> <li>ETICS design, installation and commissioning</li> <li>ETICS guarantee</li> <li>Financing of the ETICS interventions</li> </ul>	
MONDRAGON		University & Research	<ul> <li>ICT platform design and commissioning</li> <li>HEMS installation and commissioning</li> <li>Recommendations for a better energy use</li> </ul>	
	tecnalia Inspiring Business	Research Centre	• Dynamic simulation on energy performance (DH)	
		Infrastructures Company	Static simulation on energy demand (buildings)	
[TECHNOLOGY] CARTIF		Research Centre	<ul><li> Project coordination</li><li> Verification of results</li></ul>	
Ağüntamiento de Laguna de Duero		City Council	• Licensing	

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#### **Veolia: Main activities**

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Veolia designs and deploys solutions for **water**, **waste** and **energy** management, participating in the sustainable development of cities and industries.



#### **3ia Ingeniería y Construction Técnica**







Energy improvement studies. Indoor and outdoor construction. Thermography

Project documentation. Project execution. Acoustic laboratory for buildings and industry

Civil works projects. Technical and traditional construction. Maintenance of Communities Dry partitioning specialists

#### Integral Project Management



## **Business model approach: CANVAS method**

#### **Torrelago business blocks Business model CANVAS** Key Value Customer Value Propositions **Offer/Service Activities** Proposition Relationships Key Customers **Key Partners** Partners **Key Activities** Infrastructure **Key Resources Customer Segments Customer Relationships** Customers **Channels** Key Revenue Costs Channels Resources drawings by JAM Cost Structure **Finances**

**Revenues Streams** 



#### **Offer / Service**





#### Infrastructure









CITYFIED



#### **Finances: Financial scheme**

- Private model of shared risks
- Partnership between an ESCO and a building company
- Partly granted by the European Commission (FP7)
- The investment is covered by the companies (equity and bank loan)
- The payment is returned by the Communities of Owners through **2 monthly bills** (façades and energy) along a **long-term contract**.
- The dwellings' owners keep the same monthly Community fee.





#### **Finances: Share of revenues**







#### **Finances: Long-term contracts**

Community of Owners	Façades contract	Energy contract
Phase I (576 owners)	25 years	20 years
Phase II (912 owners)	20 years	15 years









#### **Finances: Economic figures**

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Intervention	Total investment	EC grant	Private investment
Building retrofitting	14.0 M€	7.0 M€ (50%)	7.0 M€ (50%)
District heating	2.5 M€	1.0 M€ (40%)	1.5 M€ (60%)





#### Discussion



## Key figures in Torrelago business case

- Total share of energy savings: 50%
- CO<sub>2</sub> emissions avoided: 3,000 ton/yr
- Thermal power installed: 3.5 MW (biomass) + 73.4 kW (CHP) + 9.0 (gas)
- Electric power installed: 33 kW (CHP)
- Contract: Long-term (25 yr)
- Total investment for district retrofitting: 16.5 M€ (EC + ESCO + Building)
- Total investment per conditioned area: 118 €/m<sup>2</sup>
- o Total revenues: 1.1 M€/yr
- Internal Rate of Return (IRR<sup>1</sup>): 10%

<sup>1</sup> IRR was calculated using an average of the contract duration



#### **Barriers in Torrelago business case**





#### **Success factors in Torrelago business case**



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#### Lessons learnt in Torrelago business case

- Innovative financing scheme: public institutions (EC), private companies (construction and energy), banking entities (private green bank) and private building owners (1,488 dwellings).
- Classical financial entities do not see the energy savings as a guarantee to endorse retrofitting projects → Need of green banks.
- Company's business models must be flexible, taking into account the customers' needs.
- Large-scale renovation projects towards ambitious energy targets are only possible under long-term financing schemes.
- Close partnership between different entities.
- Users knowledge and citizen engagement are a key factor in accomplishing energy savings.





#### Thank you very much for your attention

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