

# Case studies of biomass in Spain

Aula Magna (ESTCE), July 2014



CURSOS  
D'ESTIU  
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14

Biomass for Sustainable Rural  
Development

Universitat Jaume I  
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## ■ OBJECTIVES

## ■ INTRODUCTION

## ■ CASE STUDIES IN SPAIN

- HTC PLANT (NAQUERA)
- BIOMASS MARKET DINAMIZATION (LLUÇANES)

## ■ CONCLUSIONS

# OBJECTIVES

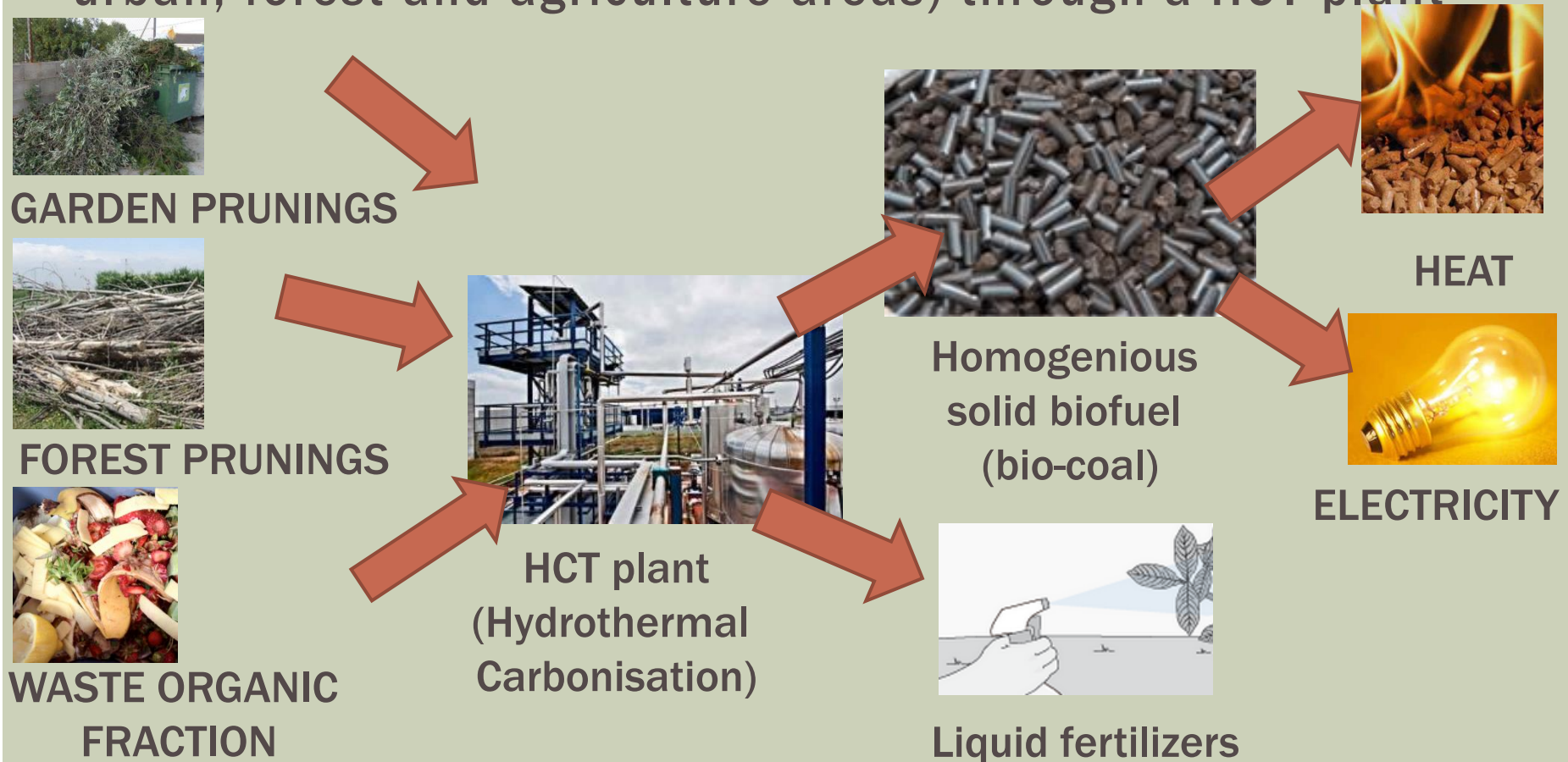
- Collect examples and best practices of regional development of sustainable and renewable energy based on biomass resources
- To extract as much information and lessons learned / threats from previous experiences
- To exchange knowledge and experiences to inspire new applications of use of biomass

# INTRODUCTION

- Part of this presentation is the result of one of the activities developed by the Spanish students in the ITforest project
- Along the selection process, the students were required to **identify and describe** an example of use of biomass for rural development including:
  - Objective
  - Location
  - Description
  - Timescale
  - Technical data / cost
  - Beneficiaries
  - Lessons learned

# CASE 1: HTC PLANT (NAQUERA)

- **OBJECTIVE:** To produce biocarbon from biomass (pruning in urban, forest and agriculture areas) through a HCT plant



# CASE 1: HTC PLANT (NAQUERA)

- **LOCATION:** Náquera, (Valencia, Spain). Population 6.500, area 39 km<sup>2</sup>, forest and agricultural area, tourism (spread second residence houses)
- **DESCRIPTION:**
  - HTC plant: dehydrates and carbohydrates under high temperature, pressure and acid conditions in short time (4-16 hours) and in a water solution (biomass humidity is not a problem)
  - The plant transforms heterogenous wastes (urban, garden, forest) into a fuel of high energy density (biocoal)

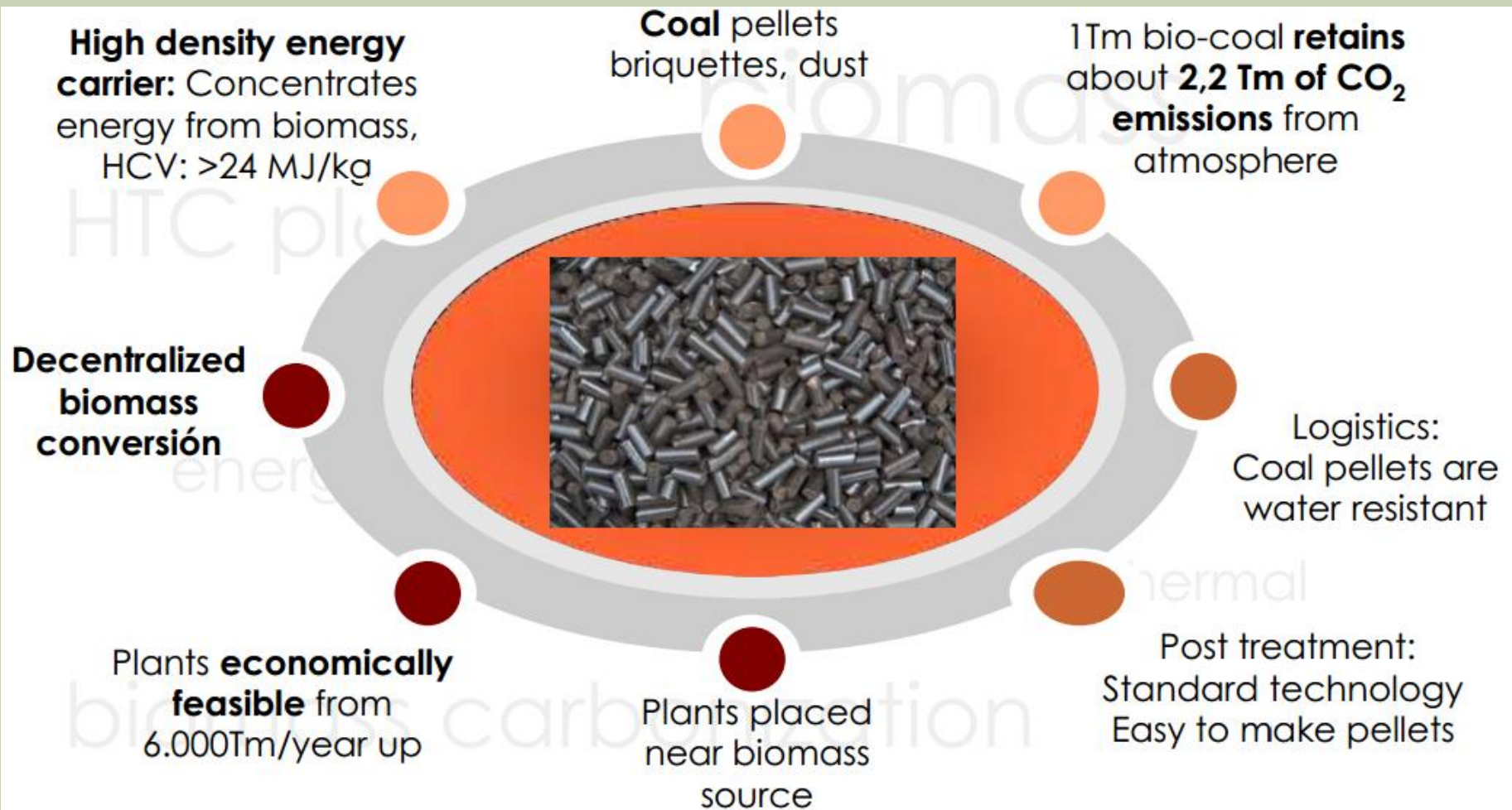


# CASE 1: HTC PLANT (NAQUERA)

- **TIMESCALE:** The enterprise started the plant development in 2006. They are operating since 2010.
- **TECHNICAL DATA:**
  - Operating parameters: Temp. 180-220°C ,Pressure 17-24 bar
  - Yearly capacity of biomass treatment : 2500 tn
  - Integrated and automated plant control
  - Modular technology: flexibility, operational security, modular expansion
  - Self sufficient in water, very low electricity requirements
  - Low emission technology, odor free, and highly silent operation



# CASE 1: HTC PLANT (NAQUERA)





# CASE 1: HTC PLANT (NAQUERA)

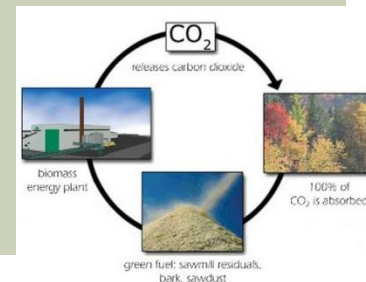
## ■ BENEFICIARIES:

### • Naquera townhall:

- Prevention of devastating fires in the area, linking the forest maintenance with a economic benefit (production of biocoal)
- Reduce cost of municipal vegetable waste (2000 tons /year) transport and treatment from:
  - Forest fire prevention: mountain firewalls, forest thinning works
  - Public gardens and green areas
  - Private cottages disseminated in the area

### • Sorrounding society:

- Reduction of CO<sub>2</sub> in the area (biomass: green energy)
- Increase in the local employment
- Fire risk reduction in the area
- HTC subproduct (liquid fertilizers) for local farmers
- Better use for the local taxes



# CASE 1: HTC PLANT (NAQUERA)

## ■ LEASSONS LEARNED:

- **The problem of high cost of treating municipal vegetable wastes can be turned into a economic income using biomass**
- **Forest thinning and maintenance can be associated to biomass generation and therefore be economically feasible (apart from preventing fires)**
- **Biomass can generate local employment**
- **Using biomass generated in the same area reduces energetic dependence and also reduces the CO<sub>2</sub> emissions**
- **Research, innovation and inversions were required to start the process**
- **Early state of maturity of the HTC plants**
- **Biomass production before biomass demand**

# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

- **OBJECTIVE:** To promote biomass as local renewable energy source and revitalize the forestry sector to produce biomass in the consortium of municipalities

**TERRITORY IMPROVEMENT**  
Increase forest management  
Reduce fire risks

**RENEWABLE ENERGY**  
Zero CO<sub>2</sub> Emissions

**LOCAL ENERGY**  
Local job creation  
Socioeconomic dinamization  
Economic saving



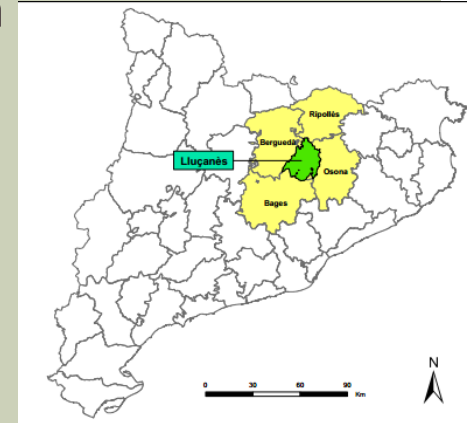
# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

■ **LOCATION:** 13 municipalities (Lluçanes) Population 8.000, area 400 km<sup>2</sup>, primary sector

■ **INITIAL PROBLEMS:**

- Young biomass market: not consolidated
- Lack of knowledge & mistrust from potential users
- Lack of training is involved sector (installers, architects,..)
- Higher initial cost of biomass boilers
- Poor support for small rural townhalls

■ **TIMESCALE:** Project started in 2005 and active till 2011



# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

## ■ DESCRIPTION:

- Aware the population about biomass: conferences, news, seminars, leaflets, meetings
- Technical assessment for biomass boilers and heaters potential users (public entities, general public, forest owners)
- Support biomass sector: training courses for technicians, biofuel promotion, financial support for new biomass heaters
- Engage forestry sector: elaboration of strategic plan of action for the use of biomass, workshops, creation of owner associations



# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

## ■ TECHNICAL DATA - RESULTS:

- 9 biomass boilers installed in public buildings
- Average saving compared to initial Diesel boilers:
  - 46% for wood chips
  - 28% for pellet
- Biomass annual consumption: 210 tons
- CO<sub>2</sub> annual reduction: 270 tons
- Over 50 biomass boilers in the area
- Over 2MWh total biomass installed power

### Wood Chips



### Wood Pellets



# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

## ■ BENEFICIARIES:

- **Municipalities:**
  - Prevention of fires
  - Reduce cost of heating in public buildings
- **Sorrounding society**
  - Reduction of CO<sub>2</sub> in the area
  - Reduce cost of heating in domestic houses
  - Specific training for biomass installations: job creation
  - New economic income to forest owners
  - Local enterprise that produces biomass with local material
  - Increase in the local employment

# CASE 2: BIOMASS MARKET DINAMIZATION (LLUÇANES)

## ■ LEASSONS LEARNED:

- **The formation of consortium of villages (specially in small rural areas) working together helps in the implementation of strategic lines**
- **Training and dissemination of results is a good starting point for increasing the use of biomass**
- **The generation of a demand, together with a technical training in biomass installations, helps in the better exploitation of the boilers**
- **The initial use of biomass in public building increase the awareness and demand of this energy for domestic use**
- **Once the biomass demand is created in a area with biomass potential, the local economic activities around this energy develop**



# CONCLUSIONS

- **Biomass is a resource available in many rural areas**
- **The use of biomass can imply a local development**
- **There are many previous examples to inspire present initiatives to link biomass and rural development**