The Alterenergy Project – Energy Sustainability for Adriatic Small Communities

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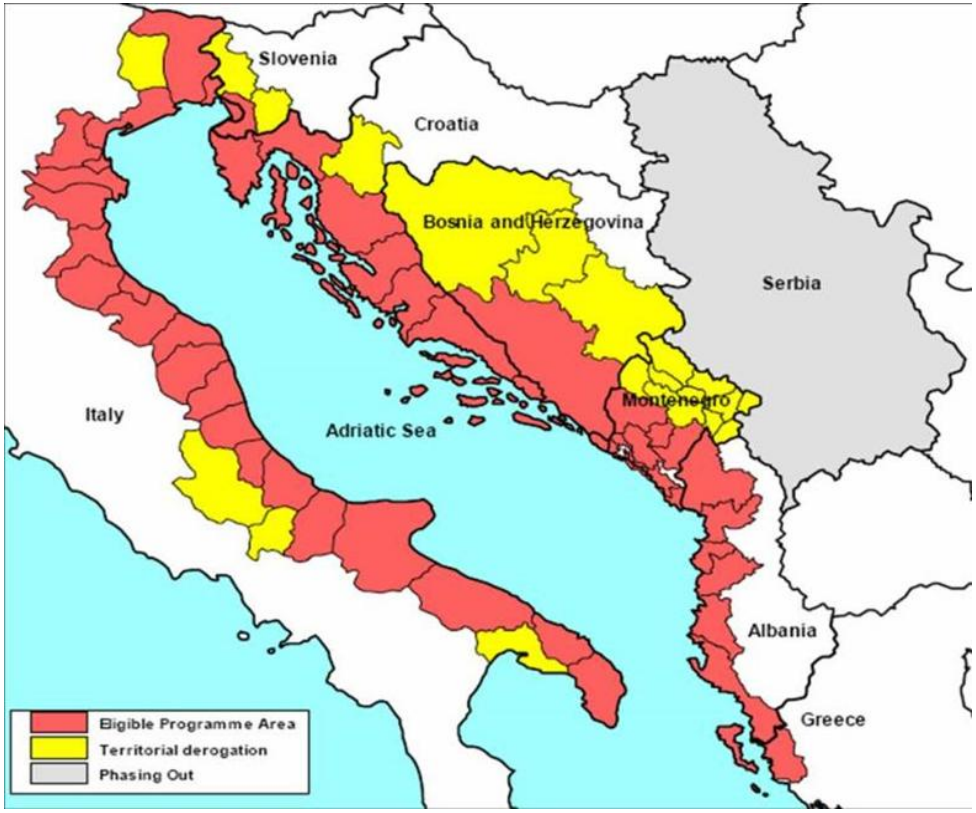
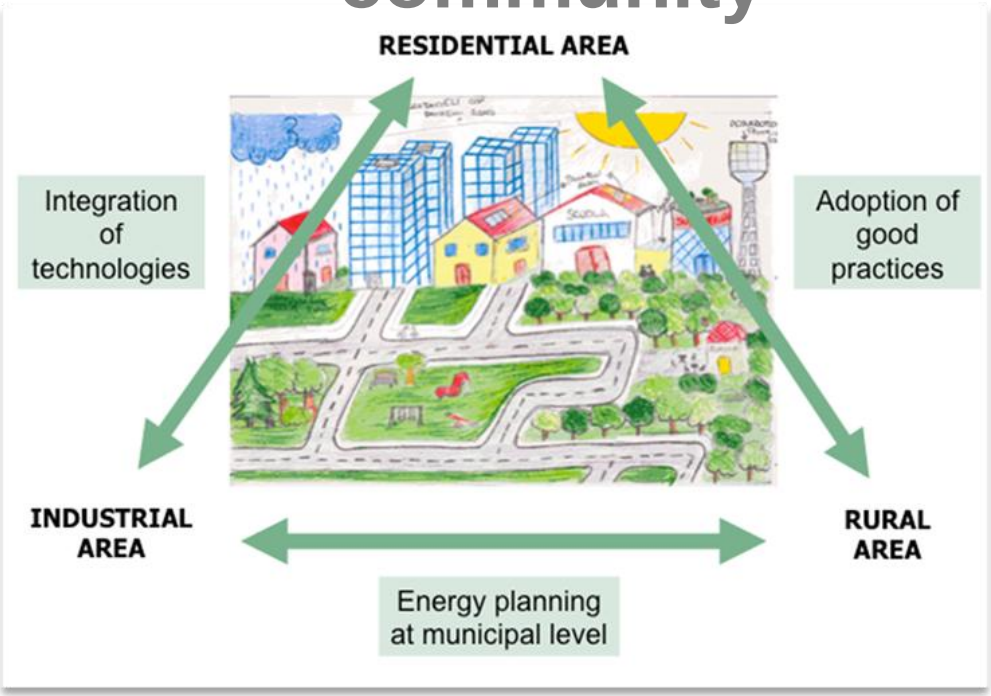
Workshop on geothermal energy - Status and future in the Peri-Adriatic Area Veli LošinjCroatia 25-27 August 2014

Project partnership and target area



- **Adriatic relevance** a wide partnership 8 Countries: **Italy, Albania, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Greece 18 project partners**
- **Political commitment** Robust partnership made up by public administrations with specific competences in energy planning
- **Technical competence**: involvement in project activities of energy agencies and technical bodies

Objective - The energy sustainable small community



- To develop replicable models for the **sustainable management** of energy resources in **small Adriatic communities**, improving their capacity to plan on energy saving and renewable energy sources
- Adopt a **participated approach** that involves local stakeholders
- Implementation of two **pilot interventions in the Puglia Region and Albania and 6 demonstrative actions**

Focus on energy planning at the local level

- *Key role of small communities in the Adriatic area*
- *Lack of energy planning skills at Municipality level*
- *Attitude of municipality to implement decentralised energy models*
- *Role of bottom up policies and actions to meet EU targets (Covenant of majors initiative)*
  - *Land, transport and building policies are set up at local level*
  - *Integration with surrounding RES*
  - *Engagement of citizens and local stakeholders*
  - *Municipality can act as a energy services provider and utility*

Expected results 2011-2015

- Integrated sustainable energy management **models** for small Adriatic communities
- Improved **capacity** of local communities to plan and implement energy saving and distributed energy production
- Improved **awareness** and involvement **of citizens and local economic operators (SMEs,professionals**) of opportunities/benefits of energy efficiency and energy mix changeover
- Availability of reference case studies on integrated energy sustainability planning in selected communities of the Adriatic area with **feasibility studies and pilot projects**
- **Investments on RES and EE in pilot areas**

Overall achievements so far

- 60 communities have been selected (13 in the Friuli Venezia Giulia Region) and 38 have signed an agreement
- 10 Energy assesssments
- 25 feasibility studies
- 9 Energy sustainability integrated plans
- 9 Capacity building reports
- Almost 79 events with 8700 participants, 50 press releases
- **Ongoing activities**
  - Guidelines for business partnership and investment support
  - **Two pilot projects – Albania and Puglia**
  - **6 demonstrative actions – Croatia, Bosnia and Herzegovina, Greece**

Alterenergy case studies
The example of 4 energy sustainability communities

Albania - Energy efficiency projects in Lezhe and Lushnje

Italy

-The example of Sant'Agata - energy sustainability in an old town

- Forni di Sopra: a model of a decentralised energy town in mountain areas

Slovenia - The Brda community example

Pilot project in Albania

Partner: Minister of Economy Trade and Energy (METE)

Two target regions – LEZHE, LUSHNJE

Objective - Improve energy efficiency in public buildings

Feasibility studies and capacity building

↓

Energy assessment studies and audits

«Promotion of public&private business for thermal insulation »

↓

Sustainable planning «Energy efficiency measures in public building schools»

Pilot project in Albania

Targets - Improving energy efficiency in public buildings – Key sector by the National Energy Strategy as one of the most important measures to overcome problems in the electricity system.

Implementation of EE measures on the building envelope (roof and floor insulation, double glazed windows/doors)

Central heating system, solar installations, lightning refurbishment

Promotion of public and private business for thermal insulation
Lay out an energy policy plan
Promotion of energy efficiency of appliances
Promotion EE and RES in Elementary Schools

Results: energy consumption before 182 kWh/m2 after 101kWh/m2 45% savings

Budget ~ € 2,3 M

Pilot project in Puglia - The municipality of Sant'Agata

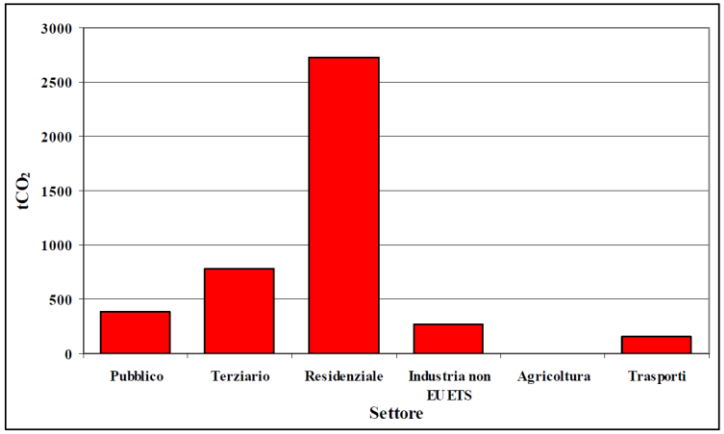
Baseline

- Medioeval town in the mountains (800 m slr), 2200 inhabitants
- Committment to sustainability - Experience on RES - EE - sustainable tourism
- SEAP (Covenant of Major) 2011 + energy audits, biomass cogeneration plant, windfarms, public ligthning refurbishment, urban mobility

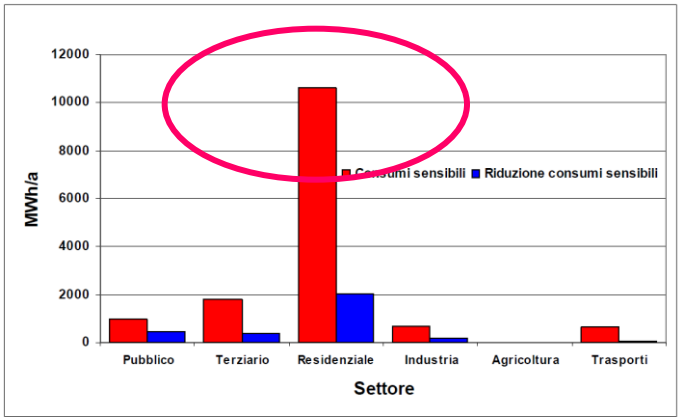
Vision and objectives

- Develop a smart village integrating new technologies in a urban context
- More involvement of the population in energy targets and activities

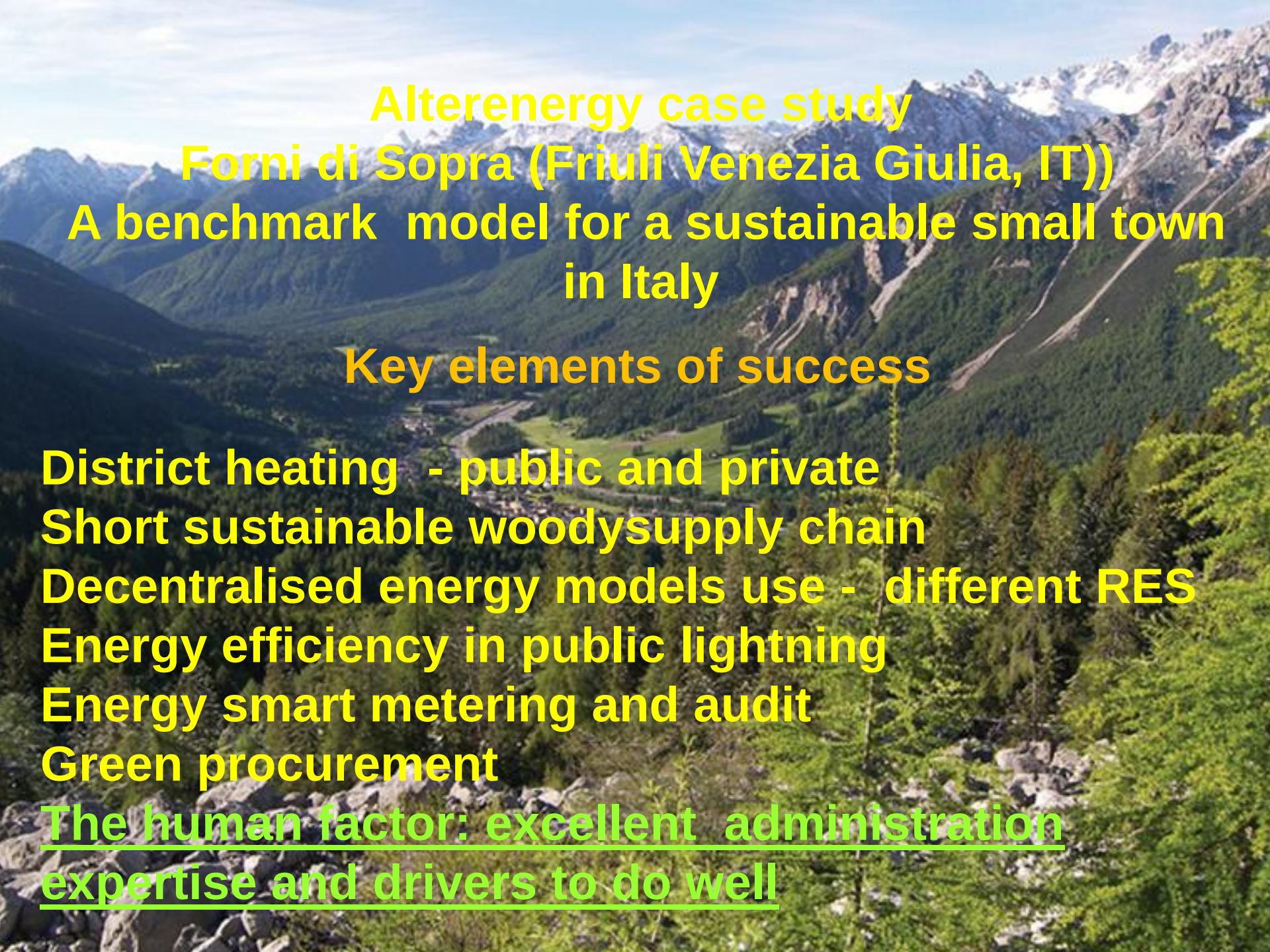
CO2 emissions by sector in 2005



Energy consumption reductions targets



- **Capacity building activities – energy training , laboratories on domestic energy consumption**
- **Focus Engagement of households in energy activities**
- **Feasibility studies (ongoing) and implementation 2014-2015**
- **Energy balance and SEAP update**
  - **Drivers of energy consumption at domestic level**
  - **Energy audit at domestic level: heating &electricity**
  - **Status of EE in buildings and appliances**
  - **Mobility outlook**

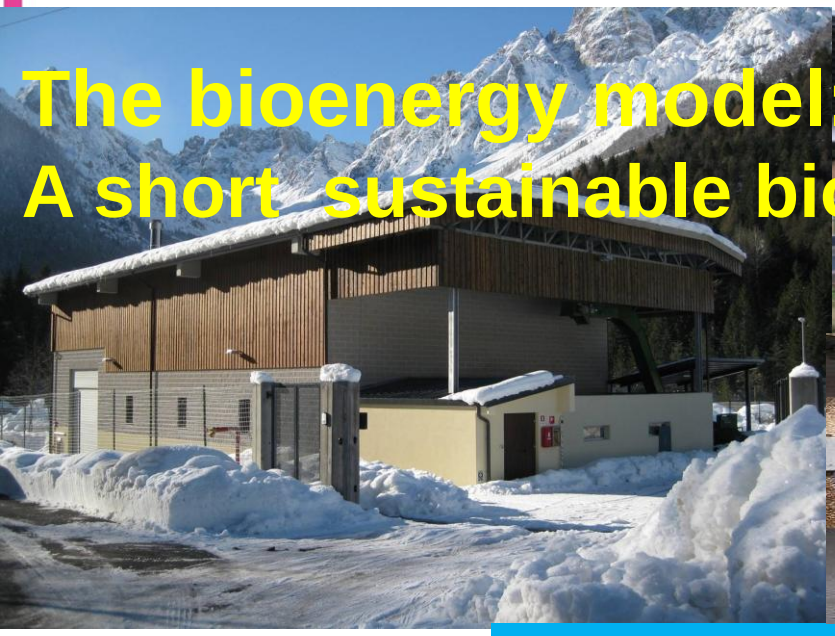


Alterenergy case study
Forni di Sopra (Friuli Venezia Giulia, IT))
A benchmark model for a sustainable small town in Italy

Key elements of success

District heating - public and private
Short sustainable woodysupply chain
Decentralised energy models use - different RES
Energy efficiency in public lightning
Energy smart metering and audit
Green procurement
The human factor: excellent administration expertise and drivers to do well

The bioenergy model:
A short sustainable biomass supply c



TECHNICALITIES OF THE MODEL

Energy input

Biomass plant 1,4 MW
Clean technology – no polluting ash
Sustainable short supply chain
Use of local biomass from PEFC forest
1270 mc/year
50% biomass from local sawmills
40% from forest maintenance
10 % from private forests - local employment

Energy output

Heat generation: 10153 MWh th
Heat use 6600 MWh th 2008-2014
13 public buildings connected to the DH system

The smart remote controlled system in Forni di Sopra

Urban Wi-Fi

Info traffic /meteo service

Smart control station by powerline communication station

Services – Parking management

Electric charging

Video surveillance

Public ligthning remote control

An energy efficient approach to public ligthning

- **Re*p*lacement of old public lights with LED and remote controlled - 534 new lights**
- ***Cut off* lights to avoid light pollutio**

- **Smart remote controlled systems**
- **Energy savings fortnightly 2013 – 42 % of KWh, - 40 % of overall cost – OVERALL 2012-2013**
- **Energy saving cost/light € 78/yr 125 W, € 239/yr 250W**
- **White certificates $$$$**

Forni di Sopra results and future vision

- **Local energy self sufficiency and net producer**
- **Implementation of a full decentralised model**
- **Several awards: WWF, Legambiente, FVG Regione SAVE Award**
- **Frontrunning policies and actions (Green procurement) smart town**
- **Wide consensus gained through education campaigns**
- **Diversify incomes: sustainable energy tourism**

4° Sustainable town case study

The Municipality of Brda (Slovenia)

Use of geothermal energy in district heating

Feasibility study elements

Potential customers of Geothermal DH

Brda - small town 5749 inhabitants close to Italian border

- **Brda is made up of 45 villages**
- **BRDA has a SEAP**
- **Dobrovo village – 413 inhabitants- is the target of the geothermal district heating study**
- **Feasibility study to carry out technical analysis, analysis of the environmental impacts, financial analysis and sensitivity analysis.**

Two technical solutions

	Variant 1	Variant 2
Annual heat demand	2.211 MWh	3.801 MWh
Number of customers	8	9
Network length	2.970 m	3.540 m
Density consumption	745 kWh/m	1.074 kWh/m

- **Analysis of heat demand ex-ante: current (2080 MWh) and future (1270 MWh)**
- **Technical analysis:**
  - **System design 800 m deep well followed by a 2000 m deep well**
  - **Input T°C at -2000 m is 42°C**
  - **Heating network lenght: different options 2970 m and 3540 m**
  - **N° of customers: 9**
  - **Heat demand breakdown (for space heating, water)**
  - **Energy density KWh/m2**
  - **Estimated geothermal energy potential 5300 MWh**

Economic and financial assessment

- **Investment cost € 4,2-5 M**
- **Operating and maintenance cost € 52-87 K**
- **End user heat price (variable + fixed costs) roughly € 65/MWh**
- **Connection costs**
- **Net Present Value (NPV): with 5% discount rate and 20 years lifetime**
- **NPV depends substantially on the level of subsidies on capital cost. NPV is positive only with a 50% subsidy and all customers connected, IRR 6,2% , heat sold at € 65/MWh**
- **Sensitivity analysis: level of investment, rate of heat sales, electricity price**

More sustainable small communities examples on

www.alter-energy.eu

Thanks for the attention, questions are welcome!

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