

Clean energy from
local biomass sources
Developing bioenergy
communities

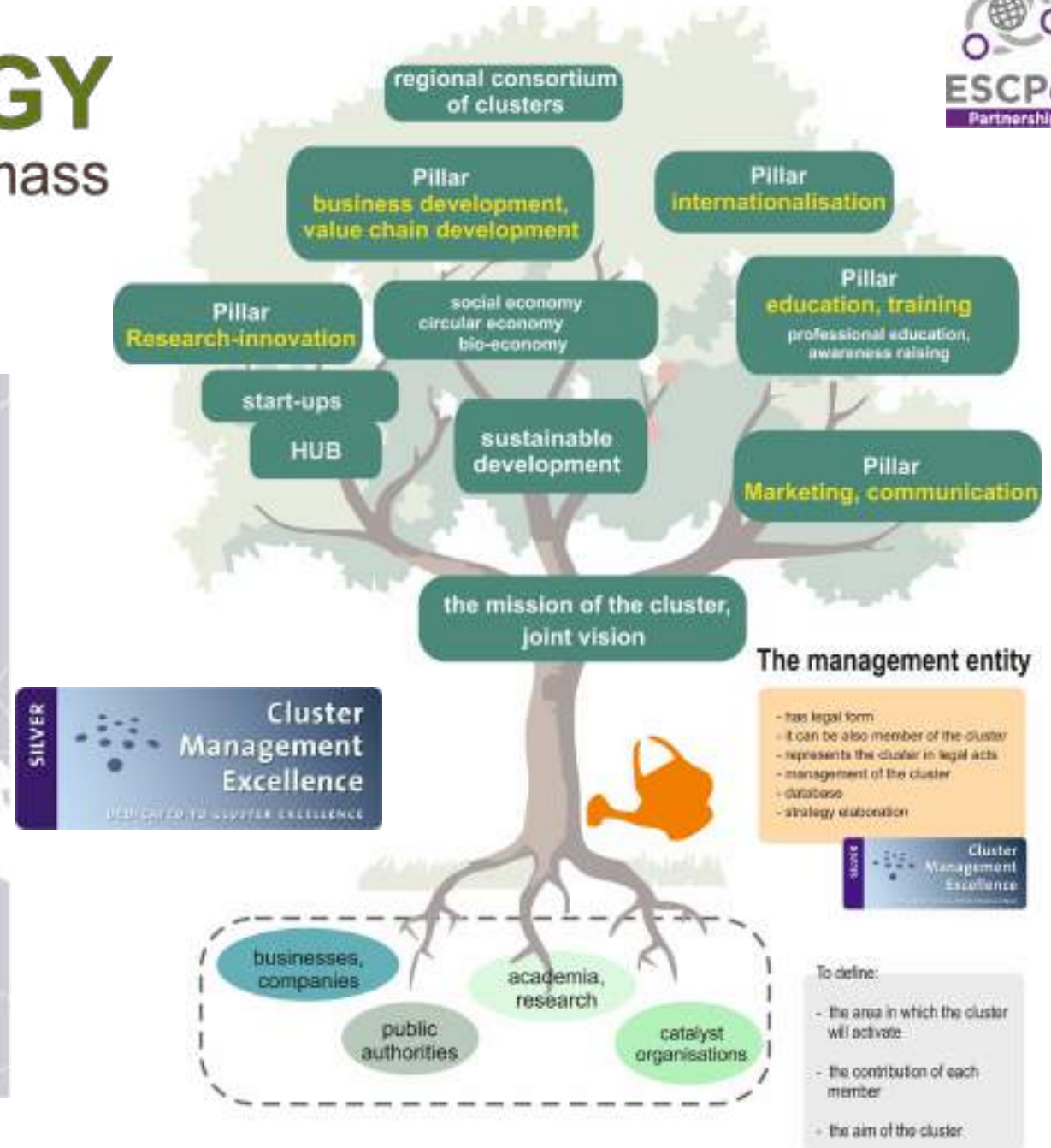


Sebestyen Tihamer, *PhD researcher –
Green Energy Innovative Biomass Cluster*



GREEN ENERGY

Romanian Innovative Biomass CLUSTER





Sustainable ENERGY communities

- Capacity building, awareness raising, CSA actions
- Working with communities, public authorities – **BIOENERGY** villages
- Pilot projects
- Biomass value chain development at local level



Education, training, Business development

- Education in the bioenergy/bioeconomy sector
- Workshops, trainings
- Start-ups accelerator – EIT Innoenergy
- Cluster development



Research and Innovation

- Bio based economy
- nature based solutions
- biomass upcycling
- MSCA action: Exchange of researchers





Promoting the penetration of agrobiomass heating in European rural areas

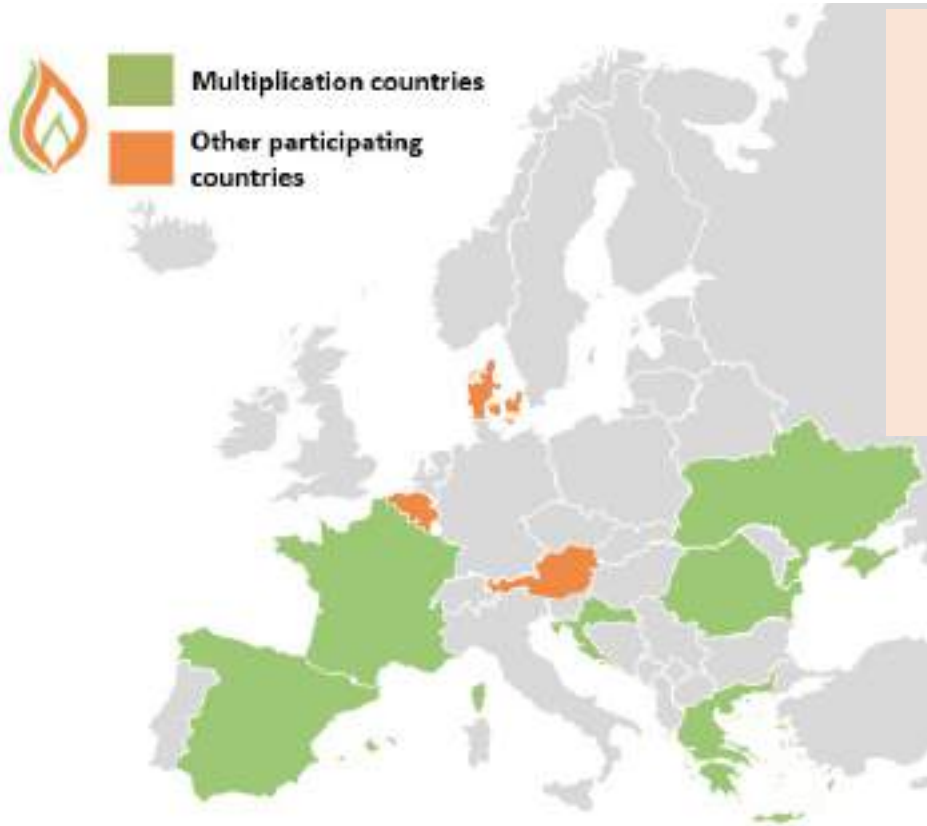
Agrobiomass heating in rural areas

Visit us at: www.agrobioheat.eu

Agrobioheat  #AgroBioHeat  AgroBioHeat 



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 818369.
This document reflects only the author's view. The Innovation and Networks Executive Agency (INEA) is not responsible for any use that may be made of the information it contains.



Overall aim:
support European rural decarbonisation through market uptake of agrobiomass heating solutions

- Funding: Horizon 2020, Grant Agreement 818369
- Granting Authority: European Climate, Infrastructure and Environment Executive Agency (CINEA)
- Topic: LC-SC3-RES-28-2018-2019-2020 - Market Uptake support
- Duration: 1st January 2019 – 31st December 2021
- Total budget / EU funding: 2,998,043.75 € / 2,998,043.75 €
- Website: <http://www.agrobioheat.eu>

Parteneri tehnici (GR, ES, AT)



Asociații europene (BE)



Multiplicatori naționali (RO, UA, FR, ES, GR, HR)



Expertiză în rețele (DK)



Expertiză științe sociale (BE)



Operator instalație agrobiomasă (FR)



Agricultural residues

- Herbaceous, *e.g.* straw, maize residues, etc.
- Woody, *e.g.* prunings, plantation removal biomass

Agro-industrial by-products

- Olive stones / olive cake, nut shells, sunflower husk, rice husk, peach kernels, etc.

Perennial energy crops

- Herbaceous, *e.g.* miscanthus, switchgrass
- Woody / Short Rotation Coppice, *e.g.* poplar, willow

Great range of tradeable forms:

- Whole bales
- Chips or hog fuel
- Pellets or briquettes
- Granular materials



Our approach

Providing Support

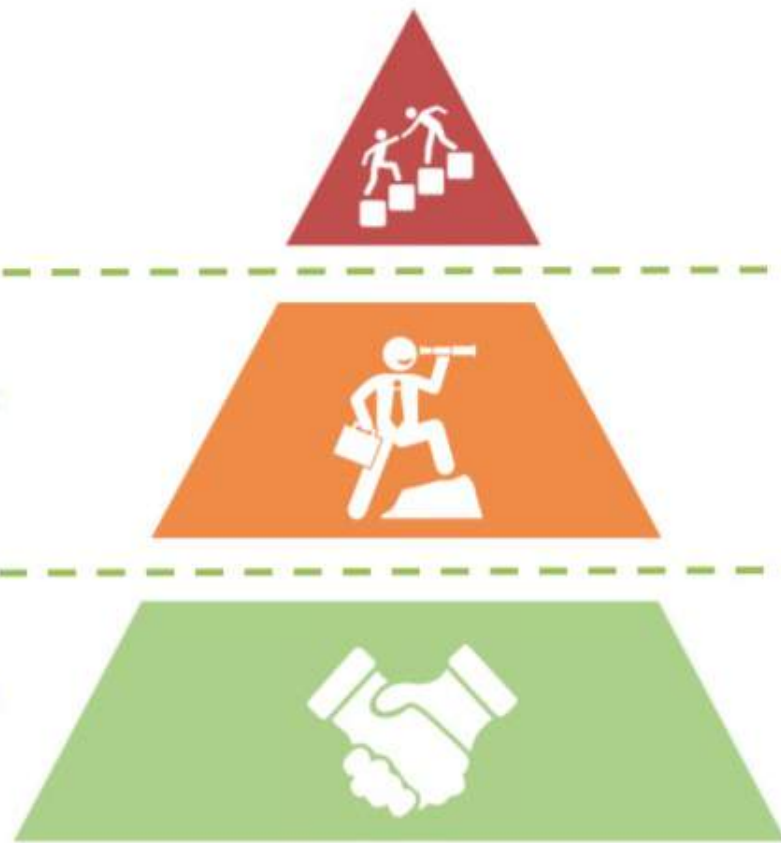
Targeted actions for specific stakeholders and policy makers to assist early adopters and create a level playing field

Generating Vision

Roadmap / vision for agrobiomass heating: inclusion in political agenda, business strategies, local and regional development priorities

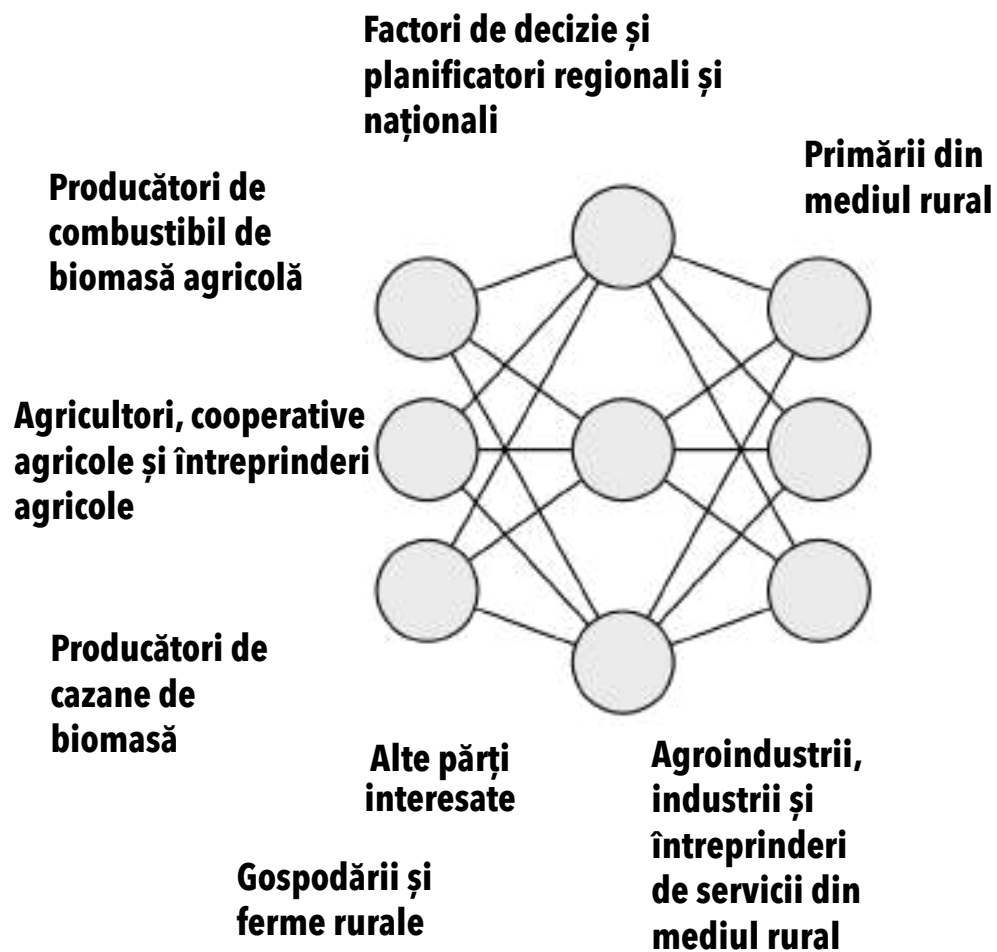
Developing Trust

Proof that agrobiomass heating works, that it is economically, environmentally, socially sustainable and that other adopters have succeeded



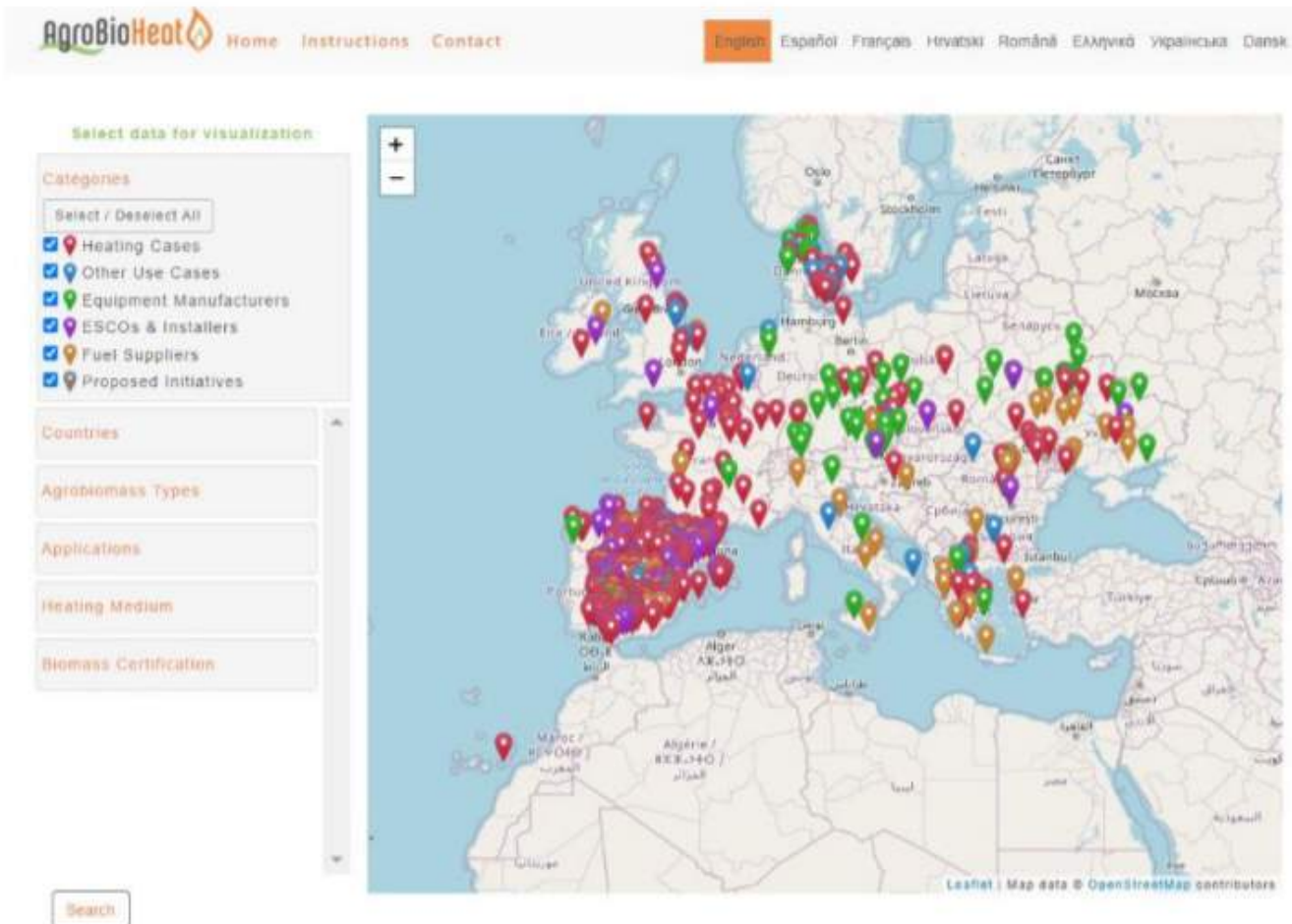
Our strategy for change

- ✓ Accompaniment of new initiatives
- ✓ Policy recommendations for revision of Ecodesign Regulation based on combustion tests
- ✓ Trainings to installers
- ✓ Policy roadmaps / recommendations & advocacy actions
- ✓ Increased sector visibility in fairs & expos
- ✓ Social surveys & local / regional workshops & community hearings
- ✓ Agrobiomass Heating Observatory
- ✓ Visualization and promotion of success cases
- ✓ Organization of site-visits
- ✓ Targeted dissemination actions
- ✓ Performance testing of modern agrobiomass heating devices (lab-scale & operating facilities)



Nivel	Tip de actori	Actori cheie
Nivelul 1 – ACTORI DIRECTI	#1 FURNIZORI DE TEHNOLOGII SI COMBUSTIBIL (BIOMASĂ)	DE DE 1.1 Producători de cazane 1.2 Instaletori (încălzire cu biomasă) 1.3 Companii ESCO 1.4 Furnizori de biomasă 1.5 Furnizori de tehnologii (tocătorare, linii de peletizare, etc.)
	#2 CONSUMATORI PIAȚA DE NIȘĂ	– 2.1 Municipality / servicii municipale (clădiri publice sau termoficare) 2.2 Servicii (hotel, dispensar medical, birouri, etc.) 2.3 Utilizatori individuali (Ferme / Gospodării) 2.4 Sere (încălzire de spații) 2.5 Agro-industrii (căldură procesuală) 2.6 Altele (mici industrii, etc.)
	#3 Alți potențiali actori ai lanțului de valoare	3.1 Utilități de (Bio)energie 3.2 Grupuri de investiții 3.3 Cercetare, experți, consultanță 3.4 Societăți de servicii (agricultură, gestionarea deșeurilor, reziduurilor etc.)
Nivelul 2 – ACTORI CU INFLUENȚĂ	#4 CLUSTERE ORGANIZAȚII SECTORIALE	& 4.1 Organizații sectoriale și clustere/agenții de promovare (Bioenergie / Energie / Agri / Exportul / Camere de Comerț) 4.2 organizații non-profit (mediu / social / sănătate / consumatori)
	#5 ACTORI POLITICI	5.1 Autorități regionale / naționale 5.2 Agenții pentru energie / camere agricole / funcționari publici 5.3 administrație locală (comuna/municipalitatea/ județul) 5.4 Partide politice / Parlamentari
Nivelul 3 – SOCIETATEA	#6 SOCIETATEA	6.0 Publicul / consumatorii

www.agrobiomass-observatory.eu



Up to now more than 1,000 entries

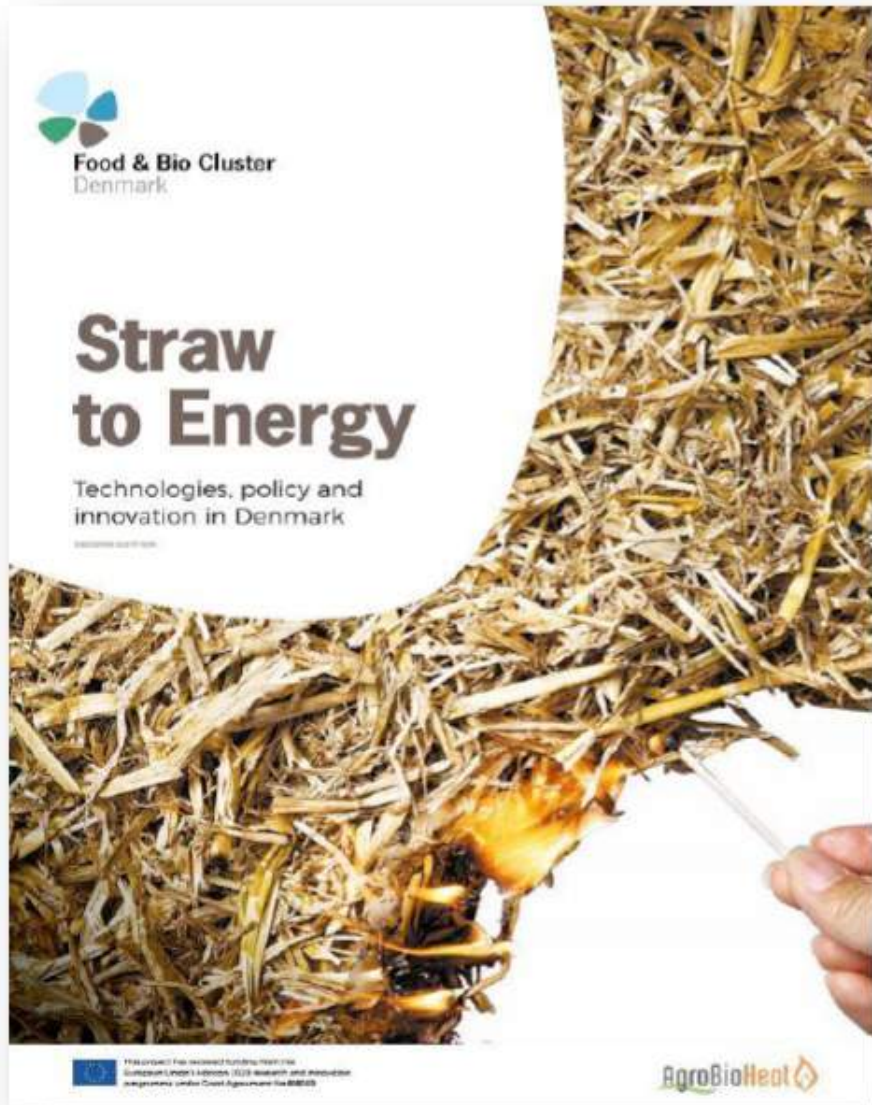
- 679 agrobiomass heating cases (< 50 MWth)
- 51 cases of other types of agrobiomass utilization (power, CHP, industry, large-scale heat, biofuels, bioproducts, etc.)
- 66 equipment manufacturers (mostly boilers and flue gas cleaning systems)
- 108 agrobiomass fuel suppliers
- + others (ESCOs, installers, etc.)

Continuously updated!

Vilafranca del Penedès (ES) – 27th February 2020



- Workshop on using vineyard prunings for heat / energy production
- Site-visit to “La Girada” district heating of local municipality, fueled exclusively with vineyard prunings / 500 kW Heizomat boiler
- Site-visit to Familia Torres / 2.6 MW biomass boiler coupled with adsorption chiller for cooling / fueled by forest wood chips and vineyard prunings
- Further information:
<https://agrobioheat.eu/vilafranca-del-penedes-visit/>



Food & Bio Cluster Denmark

Straw to Energy

Technologies, policy and innovation in Denmark

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THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S Horizon 2020 Research and Innovation programme under Grant Agreement No 801019

AgroBioHeat

AgroBioHeat  **Miscanthus factsheet**

Dedicated energy crops are grown specifically for their energy value. Miscanthus, energy grass can be either perennial (e.g. miscanthus) or annual (e.g. sorghum). Adaptable to a wide range of climates and soil conditions, they can be successfully grown on lands not ecologically suited for conventional farming practices, while delivering several ecosystem services. The genus *Miscanthus* comprises around 17 species of perennial harvested rhizomatous grasses native to subtropical and temperate regions originating from Asia. The main characteristic of one of its exceptional adaptability to different climates, its facility for cultivation on poor quality soil, the high dry matter yields and the extraordinary disease and pest resistance.

Miscanthus can either be mowed and baled or it can be clipped during harvesting using large harvesters (e.g. for silage). If desired, miscanthus biomass can also be further upgraded to pellets or briquettes. For heating applications, miscanthus is usually available in multiple forms or crops:

- **Whole crop**
- **Chips**
- **Pellets**
- **Briquettes**

In 2018, it was estimated that approximately 30,000 ha of miscanthus was being grown in Europe. Most of them were owned in the United Kingdom, Germany, France, Austria, Switzerland and Poland.

In Europe, a large proportion of miscanthus is utilized for conversion to **bioethanol** and/or **electricity**. It is used for production of ethanol power stations, in farm-scale boilers and in small-scale biomass boilers. A market is also being developed for miscanthus pellet-fired heating boilers. Miscanthus can also be used in high water absorption capacity products such as animal bedding and production of building and packaging materials.

Typical yields are approximately 30 t dry matter per hectare per annum. To obtain the best biomass quality for use as a combustion fuel, miscanthus is normally harvested in spring (March or early April) when it has had time to dry in the field.

Indicative fuel composition

Property	Units	Miscanthus*
Moisture content	wt % d.b.	16
Ash content	wt % d.b.	46
Heating Value	MJ/kg d.b.	14.7
Bulk density	kg/m ³ d.b.	116 (chopped)
Energy density	MWh/m ³ d.b.	0.53 (chopped)
H	wt % d.b.	0.7
S	wt % d.b.	0.2
Cl	wt % d.b.	0.2
Ca	mg/kg d.b.	2000
K	mg/kg d.b.	7000
Na	mg/kg d.b.	70
Si	mg/kg d.b.	8000


* For biomass conversion to heat, electricity, the gas mixture and production of pellets which are used for applications, when referenced to the same amount of biomass as per table in terms of dry weight.

Energy density: indicative representative value. Actual values may vary depending on the specific characteristics of the biomass and the conditions of the harvest and the processing.

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AgroBioHeat

AgroBioHeat  **Prunings and plantation removal factsheet**

This pruning is the established horticultural practice of cutting and removing unnecessary parts of a tree in order to strengthen, remove dead/ diseased wood and stimulate the formation of flowers and fruit buds. Currently, thick parts of pruning wood may be used as firewood in some cases but mostly prunings are left on the field and are either burned in open fires or, less frequently, mulched in the soil.

Plantation removal is the clearing out of trees at the end of the lifetime of a plantation. The aerial part of the tree may be used as firewood, but the stumps, roots and thin branches are usually mulched and buried in open fields.

The main permanent crops in Europe are olive, grass and nut, followed by some stone and citrus fruits. The countries in Europe that have a wealth of large areas of permanent crops are Spain, Italy, Greece and France.

Pruning branches can be harvested and stored in bales or they may be chipped, mulched or by mulching systems. From plantation removal firewood and wood chips are usually produced. The chips or log fuel produced from prunings or plantation removal can be further upgraded to pellets.

For 2018, Greece estimated that there are approximately 11.5 million ha of permanent crops in the European Union (EU-28). It is estimated that the technical potential for agricultural prunings biomass in Europe is more than 12.5 million dry tonnes per annum.

Typical annual yield for pruning is between 3-31 mt/ha (dry matter), depending on the crop, the pruning practice and other factors. The biomass yield for plantation removal of mature trees may be in the range of 50 mt/ha (olive, Miscanthus).

Prunings and wood from plantation removal are mostly underutilized in Europe. A small portion is used as firewood but the most common practice is to burn prunings and plantation removal in open fires or to some extent to be mulched in the soil. Their energetic utilization in modern combustion systems usually corresponds to less than 5% of the management practice.

Olive tree and vineyard pruning chips and pollen can be crushed with the Biomass4Energy quality scheme.

Indicative fuel properties

Property	Units	One half (average)	One year (average)
Moisture content	wt % d.b.	17	18
Ash content	wt % d.b.	42	45
Heating Value	MJ/kg d.b.	13.8	15.2
Bulk density	kg/m ³ d.b.	210	710
Energy density	MWh/m ³ d.b.	0.81	1.10
H	wt % d.b.	0.81	0.81
S	wt % d.b.	0.04	0.07
Cl	wt % d.b.	0.04	0.07
Ca	mg/kg d.b.	4000	10000
K	mg/kg d.b.	2000	5400
Na	mg/kg d.b.	400	170
Si	mg/kg d.b.	2000	2800

* For biomass conversion to heat, electricity, the gas mixture and production of pellets which are used for applications, when referenced to the same amount of biomass as per table in terms of dry weight.

Energy density: indicative representative value. Actual values may vary depending on the specific characteristics of the biomass and the conditions of the harvest and the processing.

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AgroBioHeat

<https://agrobioheat.eu/agrobiomass-factsheets/>

- Factsheets on sunflower husk pellets, olive stones, miscanthus, nut shells, prunings, straw, SRC
- Factsheets on boilers and flue gas cleaning systems

Virtual matchmaking event

Bringing VALUE to AGROBIOMASS

February, 10-11-2021

Participation is FREE

AgroBioHeat

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101018444

<https://bringing-value-to-agrobiomass.b2match.io/>

- 259 participants
- > 280 bilateral meetings
- 2nd edition planned for Autumn 2021

WORLD BIOENERGY ASSOCIATION

AgroBioHeat

WBA Webinar Series - Agricultural Residues

Webinar 2: National experiences on feedstock mobilization, policies and regulations

28th January 2020 // 11.00 - 12.30 CET

HEAT ACADEMY INTERNATIONAL

ONLINE MASTER CLASS

Decarbonising Spain Rural Heat - Best Practice - I

17th May

10.00 - 12.00 (CET)

register@heatacademy.eu

IN COLLABORATION WITH:

aveBiom

CYR

MAIR

An outlook to the current state of play of bioheat in Spain, with insights to principal fuels, market niches and expected trends towards 2030, with a practical vision on the technologies and skills required to support the transition.

Od agrobiomase do energije

Zoom 13.5.2021

AgroBioHeat

EUROPEAN UNION

ZZZ



BioVill

Increasing the Market Uptake of Sustainable Bioenergy

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement N° 691661



Bioenergy Villages (BioVill) Increasing the Market Uptake of Sustainable Energy



Key facts

Bioenergy Villages (BioVill) Increasing the Market Uptake of Sustainable Energy	
Objective	The overall objective of the BioVill project is to support the development of regional bioenergy concepts and the establishment of “Bioenergy Villages” in Croatia, Macedonia, Romania, Serbia and Slovenia.
Duration	03/2016 – 02/2019
Budget	EUR 1.99 Mio.
Funded by	European Union’s Horizon 2020 Research and Innovation Programme
No. of Partners	9
No. of Countries	7: Germany, Austria, Slovenia, Croatia, Serbia, Macedonia

The Project Consortium



Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany



Wirtschaft und Infrastruktur GmbH & CO Planungs KG, Germany



KEA

Klimaschutz und Energieagentur Baden-Württemberg GmbH, Germany



Austrian Energy Agency, Austria



REGIONALNA AGENCIJA ZA
POSREDOVANJE U PROMETU
POSREDOVANJE U PROMETU
POSREDOVANJE U PROMETU

Regional Energy Agency of North-West Croatia, Croatia



International Centre for Sustainable Development of Energy, Water and Environment Systems Zagreb - Office Skopje, Macedonia

GREEN ENERGY



Green Energy Association, Romania



Slovenian Forestry Institute, Slovenia



Standing Conference of Towns and Municipalities, Serbia

The Challenge

High biomass potential in Croatia, Macedonia, Romania, Serbia and Slovenia

Biomass Potential is not or inefficiently used for local energy supply and regional economic development

How to address this challenge?

BioVill supports the implementation of the bioenergy village approach in communities in five South East European partner countries Croatia, Macedonia, Romania, Serbia and Slovenia.

Benefits of the bioenergy village approach:

- Increased use of renewable energies
- Support the development of the bioenergy sector
- Strengthening the local and regional economy
- Positive effect on climate change and environmental protection

Bioenergy village

A bioenergy village is a village, municipality or community which produces and uses most of its energy demand from local biomass sources e.g. agriculture, forestry and waste and from other renewable energies.

A bioenergy village usually combines several technologies of different sizes such as woodchip boilers, pellet stoves, logwood boilers, biogas plants, combined heat and power plants.

A small district heating grid distributes the heat to the consumers.

Key Characteristics of a bioenergy village

- Sustainability:** The biomass feedstock is produced locally and in a sustainable way.
- Energy Self Sufficiency:** A large share of the power supply and the heat demand are covered by locally produced biomass or other renewable energies.
- Local ownership:** The business model allows also consumers, farmers and forest owners to become shared owners of the installations.
- Regional development:** The added value remains within the village and supports the local and regional economic development.
- Public Participation:** The creation and management of the bioenergy village is based on a high level of public participation.
- Resource Efficiency:** The energy concept of a bioenergy village includes also energy efficiency and energy saving measures.

Overall Objective

Project Objectives

Fostering the development of the bioenergy sector in selected European countries by means of strengthening the role of locally produced biomass as a main contributor for energy supply on local level, considering opportunities of market uptake or expansion for local farmers, wood producers or SMEs

Specific Objectives

Project Objectives

1. 5 villages have developed the institutional set-up and energy management concept for becoming a bioenergy village.
2. Mobilization of at least 62 GWh/y heat and power based on solid biomass in at least 5 target villages based on the exchange of European best practices.
3. Increase public acceptance of sustainable bioenergy and raise public awareness on commercial opportunities.
4. Capacity Building of users and key actors in business and legislation

Activities of the BioVill project

1. National and local framework analysis (policies, legislation, stakeholder landscape)
2. Technological and economic assessments of local bioenergy value chains
3. Development of the institutional set-up and energy management concepts for the potential Bioenergy villages
4. Capacity building on financing schemes and business models
5. Involvement and active participation of citizens and all relevant stakeholders in the planning and implementation process.



BioVill project, selected Romanian villages



Estelnic
(895 inhabitants)

Ghelinta
(4510 inhabitants)

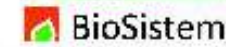
Bio-energy as a driver of small scale bio-economy models: Biovill approach

Boglarka Vajda, Romanian Green Energy Innovative Biomass Cluster

Planning bio-energy heating systems

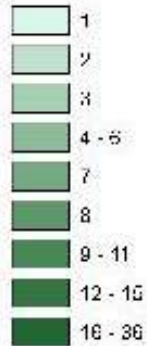


'1 Village 1 MW' Initiative Biomass Heating Systems in Romania

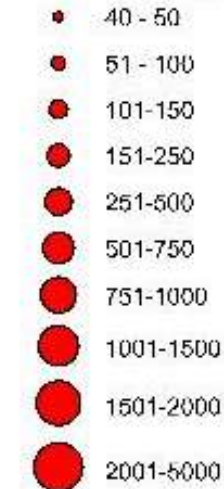


Central Development Region of Romania

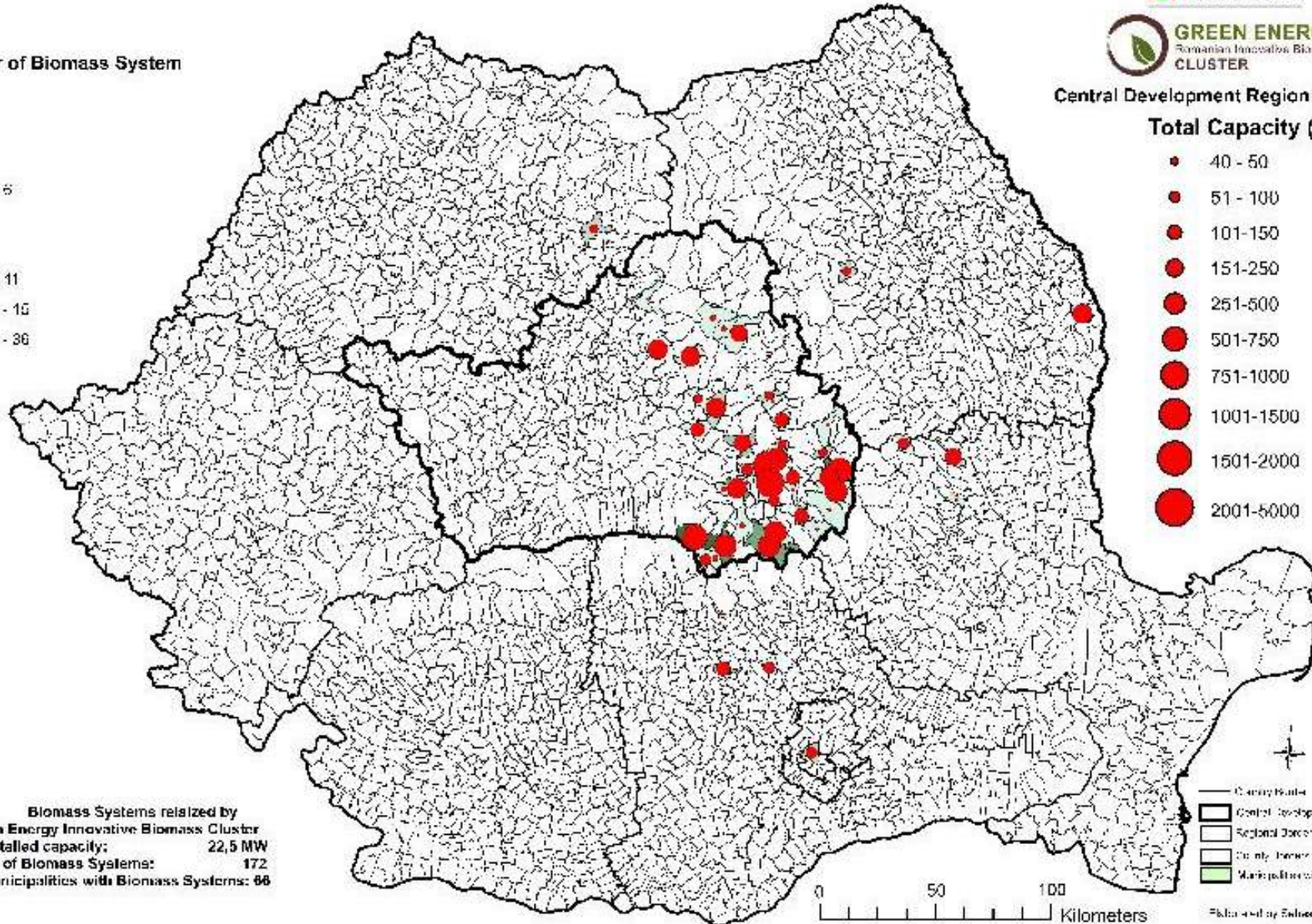
Number of Biomass System



Total Capacity (kW)



Biomass Systems realized by
Green Energy Innovative Biomass Cluster
Total installed capacity: 22,5 MW
Total Nr. of Biomass Systems: 172
Nr. of Municipalities with Biomass Systems: 66



Elaborated by Sebastian Trandafir, 2016

1. Local Supply Value Chain from agrobiomass to bioenergy Enache Mills and Bakery, Huși, RO



2. Local Supply Value Chain, from husks of sunflower seeds, Chicken Farm Avicol Prod SRL, RO



3. Local Supply Value Chain, from energy willow & pasture cleaning to Greenhouses, Dalia Flowers SRL



4. Local Supply Value Chain, from energy willow to Guesthouse, Bicfalau, RO



5. Local Supply Value Chain, Pasture Cleaning to Bioenergy, Locodeni, RO



6. Local Supply Value Chain, Bakeries, Meat Factories. other industries



Ghelința, 1st Bioenergy Village in Romania



12 July 2021

Micro-scale Biomass Based DHS in Rural Areas



Contact

Green Energy Innovative Biomass Cluster

Romania, 520064 Sf.Gheorghe, str.Presei 4

www.greencluster.ro

info@greencluster.ro

greenenergy55@gmail.com

+40 749 096726