

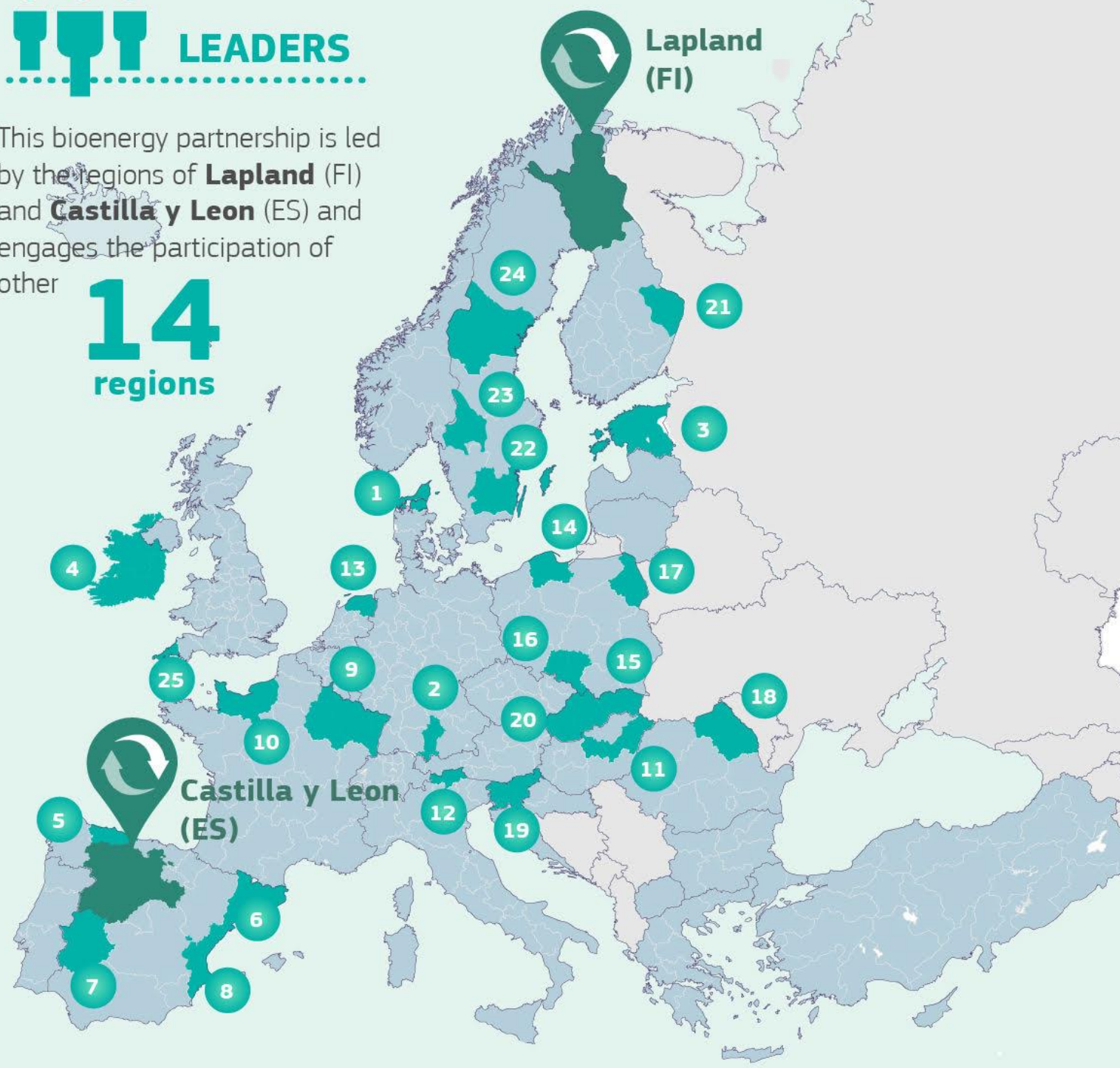
# BIOENERGY



## LEADERS

This bioenergy partnership is led by the regions of **Lapland (FI)** and **Castilla y Leon (ES)** and engages the participation of other

**14**  
regions



## S3 Partnership on Bioenergy Cross regional projects

Brussels, 26 January 2018



## Context

- Identify cross-regional collaboration opportunities
- Based on the collected information from the questionnaire, a set of interested regions and specific areas for collaborations including synergies/ complementarities is identified for each topic, in order to tackle specific challenges and embrace opportunities.



## **Cross regional project: “Implementation of rural and small-scale biomass installations”**

- The objective of this tool is to facilitate the adaptation and implementation of successful rural and small scale biomass installations and initiatives based on the experience gained in already implemented initiatives.
- For each proposal, the characteristics and the actions undertaken to tackle specific challenges are described



## Cross regional project: “Implementation of rural and small-scale biomass installations”

Three initial proposals :

- Eno Energy Cooperative: Heat entrepreneurship by wood chips (North Korelia, Finland)
  - The co-operative was established in 1999 by 12 local forest owners (54 at the moment) and aims to produce inexpensive district heat for the local community and private customers with locally sourced energy wood.
- “1 village 1 MW” - solid biomass boiler (Centru Region, Romania)
  - Green Energy Cluster’s concept about setting up small-scale biomass heating systems, fueled with local biomass resources, was applied.
- Decentralized energy recovery system for treatment of wet biomass based wastes (East Slovenia, Slovenia)
  - Accepted by the local community by using exclusively local resources, now in the phase of installation



	North Korelia	Centru	East Slovenia
<b>Name – Type of installation</b>	<p>Eno Energy Cooperative</p> <p>Heat entrepreneurship by wood chips</p> <p>The enterprise is located in Eno (about 6 000 inhabitants) North Karelia, Finland (Municipality of Eno was merged to the City of Joensuu in 2009)</p>	<p>“Lia Wolter Foundation” – woody biomass (woodchips as fuel, heating system) in Locodeni, Romania</p>	<p>Decentralized energy recovery system for treatment of wet biomass based wastes – Ihan, Slovenia. 0,3 MW heat input.</p> <p>Under development, in the phase of installation.</p>
<b>Business model</b>	<p><b>Cooperative</b></p> <p>The co-operative was established in 1999 by 12 local forest owners (54 at the moment)</p>	<p>Non-profit activities, <b>self-sustainable foundation</b></p> <p>Social business (involving people from disadvantaged groups in producing biofuel)</p>	<p>Reduction of external dependencies, exploitation of in-house resources, reduction of costs via internal management of process waste. <b>Nearby residents are paying for management of waste biomass.</b></p>
<b>Type of heating system (initially and after installation)</b>	<p>Aims are to produce inexpensive district heat for the local community and private customers with <b>locally sourced energy wood.</b></p>	<p><b>Decentralized heating system</b></p>	<p><b>Decentralized, island operation.</b> Possibility to use heat for internal or external installations. Currently the unit is planned to be used as waste management facility for use of locally produced sludge, possibly combined with wood chips. The heat output will replace the need for biogas plant in the vicinity.</p>
<b>Types of suppliers of raw materials</b>	<p><b>Forest chips</b> by private forest owners</p>	<p>Local working group for <b>forest</b> maintenance activity</p>	<p>Local <b>waste</b> management facilities and wastewater treatment companies. Collection and management of raw materials is done by the operators of the decentralized system. Supply is from local communities (contracts), residents are able to deliver the materials themselves.</p>
<b>Conversion techniques and technologies</b>	<p><b>Bio boilers</b> in three plants</p> <ul style="list-style-type: none"> <li>- Alakylä: 1.2 MW<sub>th</sub> + 0.8 MW<sub>th</sub>,</li> <li>- Yläkylä: 0.8 MW<sub>th</sub> and</li> <li>- Uimaharju 1 MW<sub>th</sub> + 1 MW<sub>th</sub>.</li> </ul> <p>Combustion method: mechanical grate.</p> <p>Feeding: Stoker dischargers and drag chain conveyors.</p>	<p><b>Woodchips based Biomass Boiler</b></p>	<p><b>Small scale moving grate unit, w/ or w/o dehydration system for wet materials.</b></p> <p>Possible direct use of generated heat for self-supply or use through heat exchangers for further exploitation.</p> <p>Possible use of external low-grade waste heat for dehydration.</p> <p>Wide spectra of biomass-based materials can be used, thus season variability in terms of moisture content or composition is not an issue.</p>

	North Korelia	Centru	East Slovenia
<b>Information used/created in order to set up the installation?</b>	<p>The first negotiations concerning the cooperative began already in 1996, but it was not until 1999 when the business was started.</p> <p>Members <b>visited many existing heating plants, benefitted different kinds of consultations and info lessons</b> and learned from couple of forestry centres' projects, which helped to evaluate the profitability of the plant. Also target mapping was offered in the projects.</p>	<p><b>Green Energy Cluster's concept about setting up small-scale biomass heating systems, fuelled with local biomass resources</b> (project supported by Norway grants)</p> <p>Cooperation between solid biofuel producers, a local boiler manufacturer and installer (ErPek Ltd., own patent)</p>	<p><b>Technical feasibility studies, financial risk assessment</b>, analysis of potential revenue increase for owners/operators, local community acceptance, stability of supply chain and environmental impact.</p>
<b>Studies to be shared</b>		<p><b>Technical and economic assessments are available</b> regarding to the installation, energy costs analysis before and after the biomassboiler installation</p>	<p>Number of ex-post studies are limited as the business model/technical approach is relatively novel and oriented towards niche applications. <b>Part of technical feasibility studies could be shared.</b> Other information is available with permission of operators/developers/owners.</p>
<b>How were suppliers convinced? What are their role in the business model?</b>	<p>In practise, there are two sides to think about – members and customers. What is important for the members is <b>the better price for the energy wood and good forest management.</b></p> <p>The customers expect that wood energy is cheaper than other energy. In addition, also the municipality wanted to profile itself as a clean and environmental friendly place.</p>	<p><b>First a biomass boiler was installed</b> at the Lia Wolter Foundation, <b>than the biomass based heating system was enlarged</b> to several households and guesthouses</p>	<p>Key suppliers are the <b>residents of nearby local communities, managed by local waste management facilities.</b> The benefits for them are planned to be lower waste biomass treatment costs and lower expenses for waste removal.</p>
<b>How were users/consumers convinced? What are their role in the business model?</b>	<p><b>Heat is cheaper for the consumers when compared to light fuel oil.</b> As a result of replacing fossil oil used for heating up the properties net carbon dioxide emissions were reduced by almost 5 million kilos annually. The ashes and its nutrients can be returned back to the forest.</p>	<p><b>Seeing the first biomass boiler</b> at the Lia Wolter Foundation, the local decision makers <b>decided to enlarge</b> the biomass based heating system</p>	<p>Users and Consumers are in the end also residents of nearby communities. <b>Their benefit is the reduction of waste manipulation costs and involvement in the process of treatment of their won waste biomass.</b></p>

	North Korelia	Centru	East Slovenia
How was the security of supply ensured?	There are many kind of backup systems.	The <b>employees</b> of the Lia Wolter Foundation collect the wood/forest residues, produce woodchips and <b>ensure the supply</b>	<b>Due to decentralized, small system, stability of supply is less important</b> than in large scale systems, thus occasional shortages of input material are easily managed by providing back-up materials in the form of wood chips or biogas. Generally, the input materials are abundant and short chain from generation of waste biomass to its exploitation offers a lower manipulation cost, thus making interruption of supply by 3 <sup>rd</sup> parties less common (i.e. by offering more stimulating financial terms)
Optimal location	Local forest owners and the municipality of Eno were active at the same time and <b>willing to replace properties oil heating systems with district heat produced with local wood chips.</b>	<b>As near as possible</b> to the heat energy consumers	As a crucial part, <b>location was chosen to be close to the source of waste biomass</b> which allows the residents to treat the input materials as “their own”. As the feedstock is local and generated by residents themselves, it is well accepted albeit the environmental impact is perceived to be on the negative side. Important factor is also the facility equipment (possibility to store and manipulate stockpiled material, availability of hot water network at least within the facility, etc...)
Main achievements of the initiative	<p><b>District heating replaces about 2 million liters oil every year.</b> About € 2 000 000 were saved by the local economy. As a result net carbon dioxide emissions were reduced by near 5 million kilos annually. All employment effects of using the forest chips at this consumption rate are between 7-10 man-years.</p> <p>Eno energy cooperative has received two national level recognitions:</p> <ul style="list-style-type: none"> <li>• was nominated as a winner in heat entrepreneur competition in autumn 2014</li> <li>• was nominated as an emission reducer of the month in October 2017 by Finnish Environment Institutes coordinated Towards Low Carbon Municipalities (HINKU) - network</li> </ul>	<p><b>Shaping the mind set of the locals, after the project they are “pro-bioenergy”</b></p> <p>Convince the local decision makers, the change behaviour, move from the classical heating systems to the more efficient and clean technology</p>	<p><b>Making the installation acceptable for local community by using exclusively local resources that are generated as waste by residents.</b> The rough principle can be summed into the moto; “Deal with your own waste”, thus the acceptance is good since biomass waste is not transported from distant regions.</p>
Main bottlenecks	In the beginning there were many who <b>doubted skills of the members</b> and also the sufficiency of energy wood resources.	<b>The lack of real information,</b> therefore dissemination activities are crucial	At first the <b>adoption of approach by investors</b> , secondly the <b>acceptance</b> of environmental agencies and community, third technical difficulty.



Eno Energy Cooperative:  
Heat entrepreneurship by wood  
chips



- ✓ Name – Type of installation (raw material and process) – Location (number of inhabitants)
- ✓ Business model
- ✓ Type of heating system (initially and after installation)
- ✓ Types of suppliers of raw materials

- ☐ Conversion techniques and technologies
- ☐ Information used/created in order to set up the installation?
- ☐ Studies to be shared
- ☐ How were suppliers convinced? What are their role in the business model?
- ☐ How were users/consumers convinced? What are their role in the business model?
- ☐ How was the security of supply ensured?
- ☐ Optimal location
- ☐ Main achievements of the initiative
- ☐ Main bottlenecks

“1 village 1 MW” - solid biomass boiler



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- ☐ Optimal location
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Decentralized energy recovery  
system for treatment of wet  
biomass based wastes



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## Possible areas for cross regional collaboration

- Biomass installations in rural areas/communities (*ongoing*);
- Energy Plants (chips plants): Building and strengthening the value chain - consumers interest, Farmers and harvesters collaboration and logistic of supply (*Asturias, Centru, North-West Croatia, Slovenia*)
- Power plants (biogas plants): Convincing studies about possibilities in order to tackle controversy (*Asturias, East Slovenia*)
- Bioenergy raw materials from forestry:
  - Management harvesting, Forestry machinery (*Asturias, South Ostrobothnia, Castilla y León*)
  - Logistic of supply (*Asturias, East Slovenia, Centru, North-West Croatia*)