SecureChain
sustainable biomass energy

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www.securechain.eu

Supply chain opportunities for future-proof local bioenergy

WP3 Final Report

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1. Executive Summary

The SecureChain project

The European bioenergy sector requires a wide promotion for strong investments in regional sustainable supply chain solutions. In the framework of the SecureChain project, pilot projects were selected, managed and facilitated in six model regions in the EU (see Figure 1). This report covers the 'Implementation' phase and details the management and facilitation of the pilot projects implemented by small and medium sized enterprises (SMEs).

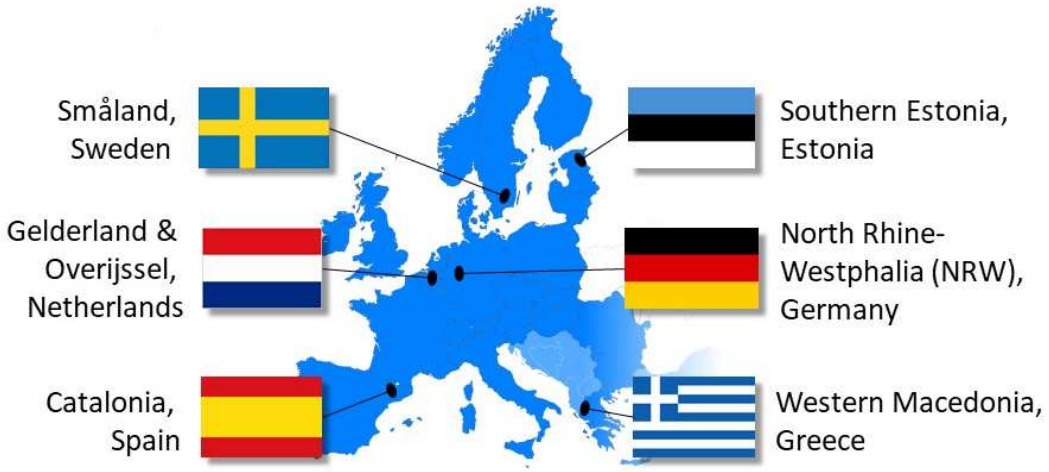

Figure 1: The SecureChain model regions

Selection of pilot projects in the Innovation Voucher Competition

These SMEs were selected during the open *Innovation Voucher Competition (IVC)*. This competition was started by launching an open call for proposals in the six model regions (see Figure 1). It was opened in all regions simultaneously on the 15th of June 2016. Interested SME were invited to submit their bioenergy pilot project, and the winners would receive, depending on the region, a sum of between 3,000 and 5,000 Euro to spend on advice to help their pilot project. Winning proposers would also enter into a two-year collaboration with the consortium to develop and/or implement their project further. The application procedure was kept deliberately simple; e.g. the project proposal page limit was five, application in the national language was possible, and the ranking criteria were fixed and communicated in advance.

The call was open to all parties that met the eligibility criteria. These criteria were the same for all regions. Most important criteria were that 1) only SME-led consortia could apply, and 2) the SMEs should be located in the respective geographical region.

The call was closed on the 15th of October 2016. In total 38 proposals were received. These proposals were evaluated by the Evaluation Committee, consisting of seven consortium members and three external evaluators. In total 20 projects were selected for funding.

Management and facilitation of pilot projects

The management and facilitation of the pilot projects was organised in such a way that Regional Lead Partners were the main contact point for SMEs and ensured region-specific oversight and quality control of the pilots' implementation. BTG as WP leader ensured conformity and synergy, provided tools and models, and monitored progress.

SecureChain's mentoring package comprised the following activities and benefits:

1. Innovation vouchers which could be spend by the SME to receive advice from an external consultant
2. Learning Labs and various trainings were offered to raise capabilities of SME owners and to ensure wider stakeholder engagement in the regions.
3. Sustainability checks. Life Cycle Assessments (LCA) were carried out to evaluate the environmental impacts of SME pilots. Trainings and pre-checks helped SMEs to prepare successfully for certification.
4. Financial risk assessment and advisory services to SMEs facilitated strategic business decisions and new investments into facilities and equipment.

The 20 selected SME pilot projects covered the entire bioenergy chain, from biomass harvesting and fuel production to energy conversion and recycling. The award of an innovation voucher of 3,000-5,000 € entitled an SMEs to obtain specific, dedicated advice from a local consultant of their choice, to support the setup of the proposed solution and their business plan. Furthermore, the SMEs benefitted from the expertise of the consortium, which offered tailored advice and support for each individual pilot.

To ensure participation of more SMEs and other market actors, the project organised a series of regional outreach activities. The Learning Labs included meetings and workshops to sensitize local stakeholders about sustainable biomass use and bioenergy. SME owners presented their pilot projects together, allowing for regular feedback on the progress and impulses from other SMEs, experts and stakeholders.

Lessons learnt and evaluation of results

Sustainable bioenergy projects are challenging for SMEs, because various business and environmental aspects along the supply chain play a role. SecureChain developed and tested the mentoring approach within a variety of companies and regional settings. Not every pilot project is a success story, but it increases the knowledge of the pilot owner and the involved stakeholders.

An ex-post evaluation of the SMEs' experience showed significant appreciation, especially of the networking activities. 70% of SME pilot project owners indicated that they had taken concrete actions based on their involvement in SecureChain. SMART performance criteria indicated that the pilot projects mobilised around 142,000 tons of biomass/year, a final renewable energy production of 2.3 million GJ/year and triggered investments of 10.1 million EUR. The successful results show the potential of this method as a recommendable, transferable practice for support of market uptake by SMEs. This was also confirmed by an evaluation of external experts.

The project has received funding support from the European Commission Horizon 2020 under grant agreement no. 646457 from 01/04/2015 – 31/07/2018. It was coordinated by the BTG Biomass Technology Group BV in Enschede, The Netherlands. The project results including a summary report and a collection of pilot project factsheets are accessible at www.securechain.eu/conference.

2. WP3 coordination activities

WP3 pushes the implementation of the pilot projects. In total 20 selected pilot projects in six model regions have received guidance during the implementation, under the supervision of the responsible RLP (Regional Lead Partners) in close cooperation with the SMEs.

2.1 Main phases and steps in pilot project implementation

Figure 1 shows the main phases and steps of the pilot project implementation.

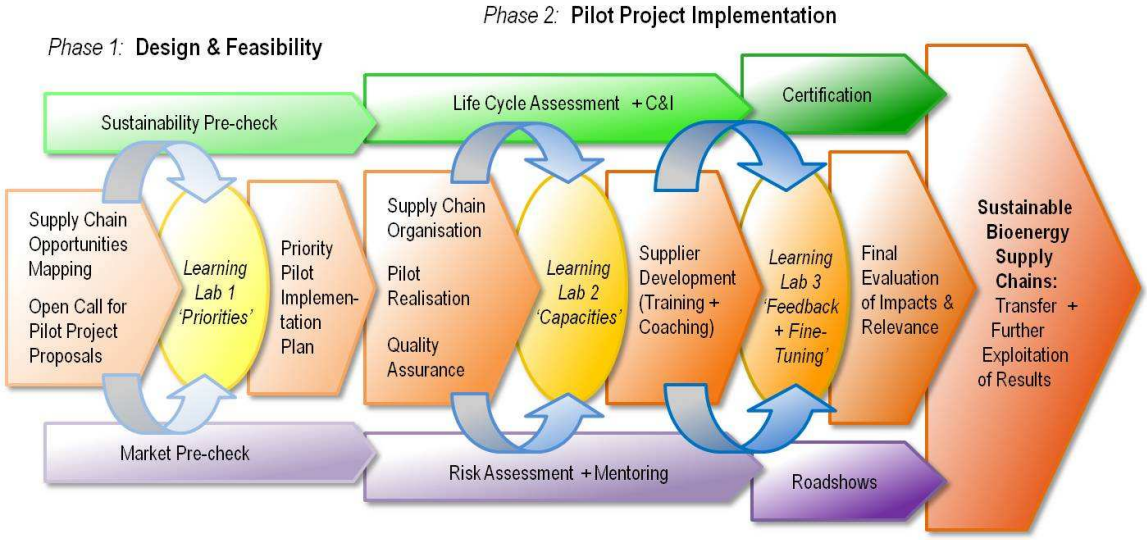

Figure 1 Main phases and steps of the SECURECHAIN pilot project implementation

WP3 (orange) started right after the open call for pilot project proposals (in M10) and has guided and monitored the process until the end of the SecureChain project. In the framework of WP5 financial aspects and mentoring related to finances was carried out. In WP4 sustainability aspects and the Life Cycle Assessments were carried out. WP3 concerned the overall progress of the Pilot Projects during the project lifetime.

2.2 Types of actors, roles and responsibilities

For the implementation of WP3, various types of actors with each their own roles and responsibilities were defined.

1. Role of Pilot project owners

The pilot project owners – namely the applicants that have signed an MoU with the RLP – are responsible for their pilot project. No other actor shares their responsibilities and no other actor should or could claim the pilot project as their own. The responsibility to make the pilot project a success rests therefore squarely on the pilot project applicants. Likewise,

other actors cannot force the pilot project applicant towards any action that is perceived to harm the pilot project. In the interaction with the actors, the pilot project applicants will:

- Implement the pilot project
- Inform the RLP (Regional Lead Partner) on the pilot project implementation progress (WP3), project sustainability (WP4) and project financing (WP5), and provide promotional materials (WP6)
- Inform RLP of relevant changes in the pilot project setup or implementation
- Participate actively in the capacity building activities (Learning Labs and trainings)
- Develop (and update) stepwise a Business Plan

2. Role of Regional Lead Partners (RLP)

Regional lead partners serve as focal point for the usually 3 or 4 pilot projects in their region. The RLP is familiar with the pilot projects in the region, speaks the language (literally), and has specific knowledge about the environment in which these pilot projects can, or cannot, succeed. As such, the RLP has a special responsibility as first contact point for the pilot projects. RLP will:

- Serve as focal point for his/her country
- Bear responsibility for organisation of the Learning Labs and trainings
- Guide and coach the pilot project through (a) targeted ad hoc expert advice, (b) Learning Labs and (c) training workshops
- Monitor progress of pilot project implementation, a.o. the Quality Assurance (QA)
- Support the pilot project to complete (and update) its Business Plan
- Provide the WP3 Leader with translated documents, progress reports and other relevant documents and data on indicators

3. Role of the WP3 Leader BTG

The WP Leader's primary tasks are to oversee the progress of the pilots' implementation as a whole, and to support the RLPs with common tools and templates also to ensure uniformity and a proper information flow. Based on the information provided by the RLPs, the WP Leader deducts a continuously updated overview related to progress, synergies and common deficiencies, and directs other SecureChain partners to take appropriate actions. Point-wise the responsibilities of the WP3 Leader are:

- Develop templates, tools and guidance for activities
- Monitor progress and quality (QA), i.a. SMART indicators
- Identify synergies
- Ensure uniformity in reporting

In this final report the progress with respect to the pilot projects, and more general the 'SecureChain approach' as regard to the mentoring of SMEs during the implementation of their projects is reported upon.

3. WP3 activities per task

In Work Package 3 six tasks have been defined:

- Task 3.1 Supply Chain organisation
- Task 3.2 Pilot Realisation and Quality Assurance
- Task 3.3 Learning Lab 2: Capacities
- Task 3.4 Supplier Development
- Task 3.5 Learning Lab 3: Feedback and Fine-tuning
- Task 3.6 Evaluation and International Transferability

In the following subchapters, the WP3 progress relating to each tasks is being discussed.

3.1 Organising the supply chain (Task 3.1)

As regard to the organisation of the supply chain, the pilot projects that were identified and selected in WP2 had to be organised. The following sub-tasks were carried out in this framework:

1. Review of existing supply chains
2. Developing business plans
3. Memoranda of Understanding (MoU)

3.1.1 Review of existing supply chains

At the beginning of the project, all RLP have drafted Model Region Profiles. These profiles provided a description of the region, and mapping of the supply, refinement and final-use of the bioenergy. Regional priorities regarding bioenergy were detailed and an indication was given on how funds used for the innovation vouchers would be most effective in the current region. In the selection of the pilot projects the evaluators commented on the pilot plant description, thereby providing additional feedback regarding this issue.

3.1.2 Development of business plans

Originally, it was expected that for all pilot projects business plans would be developed. However, it turned out that for many pilot projects no new venture was being established and/or no investment was planned, so it was not possible nor required to draft a business plan. In spite of that, financial aspects were of course important and have been considered in almost all pilot projects.

To accommodate this situation, a tailor-made approach has been devised to make sure that financial data on the pilot projects is collected and reported on. Three distinct cases were defined:

- ***Market introduction new venture by an SME –*** This represent the 'classical case' where an SME is exploring new (or expanding) business. An investment is considered, and it is important to determine the financial aspects, how to set up the project, and to define risks. A business plan is most suited and requested in this case.

- **Implementation of a new biomass energy system to replace fossil fuels –** A common theme in many pilot projects is the replacement of fossil fuels with bioenergy. In some cases, this is carried out by an SME and investments are required. In that case a business plan is appropriate. In many cases the investments are not made by SMEs or it concerns the provision of utilities (e.g. the heating of a village). In these cases, no new venture is established; it is merely needed to determine how the costs of the new bioenergy system compare to the fossil alternative. Instead of a business plan, a cost comparison is thus sufficient here.

- **Cost decrease by new working method –** In some cases the goal is not directly to replace fossil fuels, but to decrease the cost of bioenergy through innovations in the bioenergy chain. This leads to more efficient and competitive bioenergy solutions, but only indirectly. Financial issues relate to the cost decrease that can be achieved by the new installation or process. This cost decrease can be compared with the effort (in time/money) required for the adaptations.

All pilot projects have been assessed and were classified in one of the above-mentioned categories. For all the pilot projects were this was relevant financial data on the pilot project was drafted – based on templates provided by BTG - and received

The level of depth of the financial data varied strongly with the type of pilot project. In some cases, the financial data were needed to attract external finance, in which cases the plans were very elaborate. In other cases, this is not foreseen yet (or not needed), and in these cases the level of detail is more limited.

3.1.3 Memorandum of Understanding (MoU)

Initially it was expected that many pilot projects would involve the setup of collectives of companies working jointly on SSCM, requiring a MoA (Memorandum of Agreement) to define the terms for the cooperation among companies. As most actual pilots were handled by a single SME, another approach was needed. BTG has opted for the development of a MoU (Memorandum of Understanding) template, which describes the roles and responsibilities of the RLP versus the pilot project applicants. The MoU template was translated by the RLP's and was fine-tuned further for each individual pilot project. This MoU template concerned the following topics:

- Responsibility of the parties
- Tasks of the Regional Lead Partner
- Tasks of the SME owners
- Contracting and payment of the external consultant
- Dissemination and confidentiality

It was obligatory for all pilot project owners to enter into an MoU with their RLP. All pilot project owners did sign the MoU with their Regional Lead partners, which formed the bases of the cooperation with SecureChain.

3.2 Coordination of pilot project implementation (Task 3.2)

3.2.1 Quality Assurance

To ensure progress control and quality assurance, BTG has drafted a template for six-monthly progress reports, which were provided by the RLPs. This template has been drafted to make it practical and efficient to fill in and update the key info to monitor the project progress.

For the QA, BTG has reviewed several options and has opted for a system in which a database is set-up containing the key documents from each pilot project, and listing their key characteristics, so as to facilitate their monitoring. QA system elements include:

- IV tender application
- MoU and/or MoA
- Business plan (drafts and final versions)
- Progress reports (every six months)
- Overview sheets summarizing overall progress, to be drafted by BTG and shared regularly with the consortium (every six months)
- A database containing SMART performance criteria
- Identification possible synergies and mutual lessons learned

A shared database (OneDrive) was been set up where all relevant reports were uploaded. It was organised per pilot project and contained the information listed above, as far as it is available.

3.2.2 Progress per pilot project

The 20 pilot projects cover the entire bioenergy chain, from biomass harvesting and fuel production to energy conversion and recycling. In all regions at least 3 pilot projects were initiated, ensuring an appropriate geographical coverage. In the figure below an indication is given of the various topics that were covered by the pilot projects. The topics reflect the variety of technical solutions proposed by SMEs in the open contest.

In the next pages, the progress and achievements of each of the pilot projects is summarised. For dissemination purposes, 15 Factsheets have been prepared showing the project set-up and results. For five projects no factsheet was made, because it was judged that project results dissemination would not be beneficial.

Biomass → Energy Supply Chains *Region*	***Biomass harvesting*** 	***Fuel production*** 	***Energy conversion*** 	***Recycling*** 
Småland, Sweden (4 pilots)	Efficient harvesting of forest residues		Optimal biomass boilers for small municipalities	Wood ash pellets fertilizer
NRW, Germany * (3 pilots)	Improve biomass collection/sorting in trade centres	Valorise wood industry residues into pellets		
Gelderland & Overijssel, Netherlands (3 pilots)	Low-impact harvesting in landscape maintenance	Strategic storage facilities for quality wood chips		
Catalonia, Spain (4 pilots)	Optimise biomass logistics and trade centres	Up-scaling wood chips and pellet production	Renovated heating systems, cogeneration	
Western Macedonia, Greece (3 p.)	Fast growing tree plantations; mixed feedstocks	Wood wastes for energy use in wood industries	Improved biogas plant	
Southern Estonia (3 pilots)			Small CHP plants for village communities	Wood ash fertilizer production
Total: 20 pilots	8	4	6	2

Figure 2: SecureChain pilot projects and the topics they covered

In the overview presented here all pilot projects are presented, and an overview is given as regard to the tasks that were carried out in these projects. The 15 Fact sheets are given in the publicly available Project Summary report (www.securechain.eu/conference).

To be able to quickly summarise the progress, use has been made of the pilot project template tables developed in WP2. This allows the reader to quickly inspect the project characteristics, so that the project progress can be put in perspective.

3.2.1 Småland, Sweden

SE.1 Skogsbränsle Småland

Title	**Testing a pilot plant for functional pelletizing of wood ash**
Supply chain	Energy plants/CHP → wood ash → pellets → spreader → re-fertilization of forest with optimized impacts
Expected outcomes	Demonstration of a pilot plant for pelletizing of ash and a spreader of the ash pellets mounted on a forwarder or tractor to promote the product for the Swedish market. The corporation includes other companies in the energy sector including a big CHP plant, constituting a comprehensive supply chain from plant to wood ash. It also will strengthen links with forest owners to secure sustainable forestry and biodiversity. → Market entry of a full-scale machine system → Proper supply chain solutions engaging forest owners
Company	Skogsbränsle Småland AB Tingsgatan 5 / Box 70, S-360 73 Lenhovda, Sweden www.skogsbransle.se
Partners	Värendskog AB, Box 70; S-360 73 Lenhovda Kalmar Energi Värme AB, Box 822, S-391 28 Kalmar Kalmarsundsregionens Renhållare, Box 868, S-391 28 Kalmar
Consultant	Xylem AB, Jät Petersdal 1, S-362 52 Jät
Main steps	▪ Study of the Finnish and/or German pellet and/or granulation technology. Assessment of the technicians' level of technology ▪ 100 kg of fly ash from Kalmar Energi Värme AB is processed. ▪ Literature study on fly ash to identify: i) the ash constituents, ii) how the ash product leaches over time, iii) advantages and disadvantages of ash recycling Result: product descriptions for forestry and horticulture. ▪ Contacts with forest companies, forestry organizations and technology suppliers for horticulture; negotiations with forest contractors for the spread of the ash.
Activities	▪ The MoU has been signed and the consultant has been hired. ▪ Ash has been granulated by a German company ▪ Contacts with other companies across the value chain have been established ▪ The consultant has reported on the opportunities for the ash granulation, and has drafted a business plan, including the needed investments. There are opportunities, but the capital costs are high (about 1 million Euro), which also increases risks. ▪ Information has been exchanged to facilitate the drafting of an LCA ▪ Appropriate low-cost equipment has been sought, as well as financing to perform a larger scale test.
Assessment	The concept of pelletizing ash is still considered sound, as there are advantages to returning ash to the forest in the form of pellets, such as increased growth through slow release of minerals. The costs for transportations, the large number of required agreements with ash suppliers and high costs for the granulation equipment are serious impediments to implementation. The topic on how to treat and spread the fly as will, however, remain important in the region.

SE.2 Värnamo Energi

Title	**Optimized modern biomass boilers for small communities**
Supply chain	Local solid biomass supply → biomass boilers → heat grid
Expected outcomes	A municipal energy company with 14,000 customers plans to create favourable conditions for new heat supply systems in small nearby communities, exploring possibilities of joint heat supply and grid connection. → Develop local bioenergy heat supplies → Conversion of old fossil fuelled systems → Optimum solutions for rural communities
Company	Värnamo Energi AB Box 2268, S – 351 02 Värnamo, Sweden www.varnamoenergi.se
Consultant	Ekoperspektiv i Vadstena AB Gjuterigatan 1, S - 582 73 Linköping
Main steps	Värnamo Energi AB aims to replace 14 existing oil-fired boilers with pellet boilers and to offer also to external customers an alternative bio-fuelled heat solution. ▪ Investigation of potential new customers to buy district heating ▪ Work out the optimal local technical solutions for the different communities for new boilers, selection of the culvert, and the choice of the fuel (pellets, chips).
Activities	▪ The MoU has been signed and the consultant has been selected. His report has been completed, and based on that an application for external funding to two national funding agencies was made (Klimatklivet, Naturvårdsverket). This application was granted, securing 3.0 million Euro (out of 4.9 million Euro for the entire project). This financing was available for the new boilers but also for the extension of the district heating grid ▪ The investment concerns four communities (Lanna, Bor, Forsheda and Bredaryd. ▪ Actions have been undertaken to attract more customers for the district heating. ▪ Information has been exchanged in support of the drafting of the LCA based on generic literature ▪ Implementation has started in 2017 and is expected to be completed in 2018, before the heating season will start
Assessment	Project has resulted in substantial investment in bioenergy generation, partly because of SecureChain. The activities with the purpose to attract new customers will go on. According to the conditions in the national funding scheme, the implementation must be carried out before the end of 2018.

SE.3 Lessebo Fjärrvärme

Title	**Optimized modern biomass boilers for small communities**
Supply chain	Local solid biomass supply → biomass boilers → grid
Expected outcomes	A municipal company providing district heating aims to create conditions for development of heat supply in smaller communities nearby. Specifically, this concerns the Kosta community, where on cold days a gas fired boiler needs to be used. Exploring options of joint supply of heat, which also includes external properties offering possibilities of a connection to the grid. → Develop local bioenergy heat supplies → Conversion of old fossil fueled systems, now working as reserve for the daily running biobased system. → Optimum solutions for rural communities
Company	Lessebo Fjärrvärme AB Box 13, S – 350 60 Lessebo, Sweden www.lessebofjarrvarme.se
Consultant	Tommy Göransson Fallnaveka Sunagård 2, S – 341 52 Lagan
Main steps	▪ Review of facts and statistics from the company, relevant for the current plant. ▪ Workshop and follow-up meetings with the consultant to obtain input from relevant professionals at the company considering construction plans for new buildings, feedback from company personnel, interest from potential new customers, and other relevant factors. ▪ Proposition of the most appropriate technical solution, e.g. renovation or complete renewal of the biomass boiler system ▪ Initial steps for the realization
Activities	▪ The MoU has been signed and the consultant has been hired. His report has been submitted ▪ The report from the consultant has shown that the heat supply is from the biomass boiler is currently sufficient for both Kosta and Hovmantorp. To alleviate the problem of gas-firing at cold days, it is sufficient to install a condensing installation, which will increase the thermal efficiency of the biomass boiler. This appears to be the most cost-effective way to reduce fossil gas use. ▪ Contacts with Linnaeus University (Energy and Environment Science) were established, and additional in-dept investigations have been made ▪ Opportunities to connect a new heat customer to the heating grid have been investigated.
Assessment	There will be an investment in a flue gas condenser. This condenser is the first-of-a-kind. The construction is based on a new, innovative technology. An additional value for Lessebo Fjärrvärme is that this novel technology guarantees that the emissions will be lower than the new limits for emissions, which will soon be introduced according to EU legislations. A new interesting business model has been agreed on for the purchase of the condenser. The rent Lessebo Fjärrvärme will pay during a couple of years is equal to the cost of the fuel they are going to save because of the higher efficiency of the plant in total.

SE.4 SMF Skogsentreprenörerna Ekonomisk Förening

Title	**Leverage bottlenecks in forest biomass extraction**
Supply chain	Forest residues → harvesting by contractors → transport
Expected outcomes	A national association of Swedish forest contractors plans to carry out a feasibility study on deficiencies in the harvesting of residues supply chain. The identified and measured bottlenecks could be tackled and lead to a considerable increase in efficiency once implemented broadly on a national scale. → Detection of deficiencies in harvesting supply chain → Applied solutions to gain efficiency in harvesting procedure → Raising awareness through broad dissemination and follow-up implementation on national scale
Company	SMF – Skogsentreprenörerna Karl-Magnus Hembjer Hjortvägen 5, S - 330 21 Reftele, Sweden www.skogsentreprenad.nu
Consultant	Hans Olsson Expe AB, Allaboda, S - 370 34 Holmsjö
Main steps	▪ Interviews with forest contractors by phone and an additional web-based questionnaire, compilation and analysis to detect the main deficiencies ▪ National dissemination of initial findings ▪ Deeper investigation to quantify the expenses for various deficiencies in the handling operations. Forest entrepreneurs will use a web application on their smartphones to collect work time related info about deficiencies during biomass handling. Cost calculations to assess most expensive deficiencies. ▪ Proposed solutions for appropriate investments and cooperation models, to be promoted towards forest entrepreneurs during Learning Labs ▪ Continued national dissemination
Activities	▪ The MoU has been signed and the consultant has been hired. Findings from the consultant show a significant number of deficiencies in the forest contractors operation. ▪ An app was developed so that forest contractors could fill in real time when they would have a delay. The app has however so far not been used extensively. ▪ Ways to make sure that the app is actually used have been investigated
Assessment	It has turned out not to be possible to conduct a good survey to determine the work time loss related to deficient working practices. The report on the main deficiencies is however available and can be used to increase forest extraction efficiency.

3.2.2 Southern Estonia

EE.1 Ilmasaare

Title	**Small-scale CHP wood gasifier for village cooperative**
Supply chain	Forest/agricultural biomass → CHP plant → energy supply for village
Expected outcomes	New energy supply for Ilmasaare village. The central concept is that the village is to become energy independent in 10 – 15 years. One of the opportunities to obtain energy-independence is by biomass production of heat and electricity through a CHP unit based on wood gasification technology. Installed equipment in the first stage would have electrical capacity of 45 kW and 110 kW heat power. Supply chain covers storage of biomass materials, CHP unit installation (equipment, technology, woodchips and by-products of forest industry) and selling of produced energy to villagers and enterprises located in the area. → Enlarged energy efficiency and reduction of fossil fuels → Energy autonomy from the grid → Relevant model for rural context, national exploitation
Company	Cooperative Ilmasaare Ilmasoo, Madise village, Padise municipality, Harju county, 76023 Estonia
Consultant	Mr. Ülo Kask, from Tallinn Technical University
Main steps	▪ Acquire new knowledge ▪ Develop cooperation with consultants ▪ Calculate technical-economical aspects o solution ▪ Develop the business model together with experts ▪ Install 45 kWh electricity and 110 kWh heat capacity CHP unit ▪ Production and selling of heat and electricity from installed CHP unit ▪ National dissemination by TREA
Activities	▪ The MoU has been signed, and the consultant has been hired ▪ financial calculations have been completed, with the help of web-based software (iPlanner) Three options were investigated 1) PV only, 2) a micro CHP producing heat and electricity and 3) a biomass-fired CHP. The PV-only option was the most profitable in the short run. For the longer term, a combination of PV with a bioenergy CHP is the best option. ▪ Before further steps are taken, funding needs to be acquired.
Assessment	A number of funding sources have been sought. The opportunities for national funding turned out to be not available. Funding via bank loans and/or private investors was investigated, but the payback period of 16 years is proving to be an obstacle.

EE.2 Taarapõllu

Title	**Small-scale CHP for autarkic farms**
Supply chain	Forest/agricultural biomass → CHP plant → energy supply for farm
Expected outcomes	Taarapõllu farm is an officially certificated organic farm producing a large variety of products in Võru County hills, sold with an ecolabel. The aim is to replace the fossil fuel boiler with a wood gasification CHP and purchase a woodchipper. The targeted CHP capacity is 45kW electricity and 120 kW heat. → Enlarged energy efficiency and reduction of fossil fuels → Energy autonomy from the grid → Relevant model for rural context, national exploitation
Company	Taarapõllu Talu OÜ Kangsti, Varstu vald, Võru County 66103, Estonia
Consultant	Mr. Pavel Bogdanov, from Marja Mont OÜ
Main steps	▪ Feasibility studies between CHP equipment ▪ Technical support to installation ▪ Employee training ▪ Small scale firewood chipper development ▪ Replacing fossil fuel boiler with 45kWh electricity and 120 kWh heat capacity wood gasification CHP. ▪ National dissemination by TREA
Activities	▪ An expert has carried out a preliminary study to determine which bio-energy option is the most advantageous. Alternatives considered are 1) boiler on wood chips, 2) boiler on wood chips connected to a heating grid that can heat all premises of the farm, and 3) a CHP unit running on wood chips. ▪ The calculated energy demand is 340 MWth of heat and 625 MW of electricity, this is now generated using 62 tonne of heating oil per year. ▪ From the three alternatives the payback times were determined, which showed that alternative 1) and 3) were equally profitable with payback times of 6 years without funding. ▪ Because of management and ownership changes at the Taarapõllu farm progress is limited at the moment
Assessment	Based on the payback periods the various renewable heat production options are all viable. There is preference for the heat-only option based on wood chips firing, because of lower up-front investment costs. Currently funds are sought for the implementation.

EE.4 Starfeld

Title	**Development and promotion of CHP on ORC technology for Estonian market**
Supply chain	Biomass → CHPs/ORC technology → heat and power
Expected outcomes	The Innovation Voucher will be used to carry out analysis of the possibilities of introduction and suitability of the CHP unit based on the clients and statistical data, organizing seminars and training sessions in Estonia and at the manufacturers facilities to increase capacity and interest in clients. Analysis for introduction of Ala-Talkkari new and innovative solid biomass micro CHP unit Dynamo, which produces up to 11KW electrical power and is based on ORC technology, in Estonian conditions. Seminars to increase knowledge and familiarization with the product in the factories in Finland and/or in the development centre in Germany with clients interested in the product. The objective is to analyze micro CHP units opportunities and profitability in local energy production (heat and electricity) from solid biomass thereby reducing the share of fossil fuels and the transportation of fuels from long distances.
Company	Starfeld Ltd. Aretuse 7, Märja, Tähtvere vald, 61406 Tartumaa www.starfeld.ee
Consultant	Acer Consult Ltd
Main steps	▪ Business plan development ▪ Presentation of materials and promotion activities in Estonia
Activities	▪ A business plan was drafted ▪ Company hired a consultant from company Acer Consult. This consultant made a study to investigate the market opportunities of the new OCR unit and compare it to another system (the Green Fuel Energi GFT45). The study showed that for multi-apartment buildings, and larger office buildings these units are financially attractive ▪ Further development of The OCR micro station is currently underway
Assessment	The project has experienced difficulties related to the technical functioning of the ORC micro station. Contacts with a new partner are sought to complete the development of the system. However, the development is not completed yet.

3.2.3 Gelderland and Overijssel, The Netherlands

NL.1 Hissink & Zonen

Title	**Innovative biomass harvesting system in landscape maintenance**
Supply chain	Branch and topwood (pruning) → wood chipping → transport → combustion → electricity or heat
Expected outcomes	This project focuses on collection and chipping, developing a collection unit for a new harvester that is specifically suitable for the harvesting of branch wood and top wood in the Dutch context. → Specialized harvesting equipment → Feasibility of low quality biomass processing → Accessing a largely untapped biomass resource segment
Company	Hissink en Zonen Buurtweg 42. 6971 KM Oeken (Brummen), The Netherlands http://www.hissink-oeken.nl/
Consultant	Inodes Zilverlinde 24b, 7131 MN Lichtenvoorde www.inodes.nl
Main steps	▪ Technical development of the harvesting machine ▪ Identification of the opportunities for implementing the harvesting machine ▪ Identification of ways to utilise biomass at new or existing biomass boilers ▪ Determination advantages of using the new harvester through a sustainability analysis ▪ Determination investment costs and financial/economic exploitation
Activities	▪ MoU has been signed and the consultant has been hired. The work of the consultant was completed satisfactory. ▪ The harvester has been developed, and a working prototype is available. This prototype has been tested at the company (Hissink & Zn.) premises. ▪ An exploitation calculation has been carried out which showed that – if enough machines are sold – the investment can be profitable. For the users, the utilisation of the machine can be profitable if the usage per year is sufficient. ▪ Field trials have been carried out at the estate “de Treek”. This showed that further technical development is necessary, but funds for that are not yet available, and need to be acquired.
Assessment	The additional developments required to make the machine ready for the market will mean that extra investments in R&D are needed. Funding for this is being sought.

NL.2 Ribo Holding

Title	**Strategic biomass storage facilities for landscape maintenance**
Supply chain	Biomass from landscaping → strategic storage locations → boilers require specific wood chip qualities → heat for buildings/towns
Expected outcomes	Strategic storage facilities to enable collective maintenance of forest and landscape elements and supply of biomass to local wood boilers. The aim is a gradual increase in production up to 5,000 tons of prunings per year with an energy value of about 50,000 GJ. Same order of magnitude of the potential savings (boiler losses are not expected to exceed 10%). The environmental benefit amounts to roughly 2,500 tons of CO_2 emission reduction per year (based on replacement of natural gas). → Enhances supply opportunities for wood chips in the area → Combines chips from forest and landscape maintenance → Synergies with German pilot ECO GmbH DE.2
Company	RiBo Holding, Krollerweg 11, Kootwijkerbroek, The Netherlands riboholding@gmail.com
Partners	Various partners, a.o. The Agricultural Nature Association (ANV) Vallei Horstee and the municipalities of Ede and Barneveld.
Consultant	Borgman Beheer Advies, Dreijenlaan 2, 6703 HA Wageningen, The Netherlands www.borgmanbeheer.nl
Main steps	▪ Design and operational plan for the strategic biomass storage places ▪ Implementation strategic biomass storage places ▪ Coaching of ANV and others in the storage and upgrading of wood chips
Activities	▪ The consultant has been hired, and has completed his report ▪ Technical aspects of biomass storage have been investigated. Other storage places have been visited ▪ An operational plan for the biomass storage facilities has been developed. Technical needs and investment requirements have been detailed. ▪ Exploitation calculations have been conducted to determine the financial viability of the new business. It has been determined that a certain minimum volume of wood chips need to process in order to validate significant investment. So far, these quantities have not been processed. Activities are however continuing relatively low-key.
Assessment	At the moment the storage space is in use, but faces challenges acquiring enough biomass. This is on the one hand a problem of lack of local supply, and on the other hand caused by increased competition from other market players. Priority is given to intensify actions to increase the wood supply before making a decision about new investments.

NL.3 Bruins & Kwast

Title	**Enlarge supply from landscape maintenance via better harvesting techniques**
Supply chain	Various types of landscape elements → improved biomass harvesting → increased + ensured supplies
Expected outcomes	The project focuses on harvesting residues from agricultural landscape *inter alia* for the generation of energy. Landscape elements could include hedgerows, single-line tree stands, small forests and parks and avenues. The natural landscape will not be included, because of the precarious balance between nature and use. → Toolbox of suitable tested harvesting methods → Engagement and training of farmer and landscape managers → Meaningful collaborative supply chain management
Company	Bruins en Kwast Biomass Management Mossendamsdwarsweg 1, 7472 DB Goor, The Netherlands www.bruinsenkwast.nl
Partners	▪ Municipality of Wierden ▪ Landschap Overijssel
Consultant	Eelerwoude, Mossendamsdwarsweg 3, 7472 DB Goor, The Netherlands http://eelerwoude.nl
Main steps	▪ Kick-off meeting and start of the research ▪ Preparation of the implementation ▪ Implementation ▪ Monitoring of results ▪ Presentation of results to the relevant actors
Activities	▪ The MoU has been signed and the consultant is hired ▪ An environmental science student from Saxion Hogeschool has carried out part of the research. Her work is now complete and has yielded interesting results. Costs and benefits of maintenance were determined from literature ▪ Another student, this time from the VHL University of applied sciences has investigated the ecological aspects. This has led to important information on the benefits of regular maintenance of landscape elements. ▪ Because of the clear interest in local biomass for bioenergy applications, the project owner has developed a project to use the biomass from landscape maintenance for pellet production. Financial close for a 10,000 tonne/year wood pellet plant was reached in 2017, and construction is underway ▪ Certification advice has been given to explore possible ENplus certification. An LCA study was conducted by BOKO to determine the CO_2-eq. emission reduction compared to waste wood pellets.
Assessment	Though originally a study project, it has led to substantial investment in a new pellet plant. Wood pellets are produced from biomass from landscape maintenance, which means that transport distances are minimal and wood residues from the area are used locally.

3.2.4 North Rhine-Westphalia (NRW), Germany

DE.2 ECO Energiecontracting Ostwestfalen GmbH

Title	**Local biomass sales outlets for rural municipalities**
Supply chain	Local biomass sources/potentials → new biomass trade centre (wood chips) → develop best locations for new heat sinks → collaborative heating networks
Expected outcomes	An energy contracting company (10 employees) plans to mobilize local biomass market potentials in a rural municipality (population 15,700 inhabitants) and surrounding municipalities to develop the best locations for outlets of solid biomass fuels in conjunction with installations of new heat sinks. → Relevant model for collaborative bioenergy SCM in rural communities → The target is three locations with a larger heat amount of 1,000 to 1,500 MWh rural areas; total heat sales from 4,000 to 5,000 KWh per location. → Synergies with pilot projects Ribo Holding NL.2 and Värnamo Energi SE.2
Company	Energiecontracting Ostwestfalen GmbH Rathausstraße 23, 33813 Oerlinghausen, Germany www.energie-contracting-ostwestfalen.de
Partner	Municipality Kalletal Rathaus / Rintelner Straße 3, 32689 Kalletal, Germany www.kalletal.de
Consultant	Energieagentur Lippe GmbH Rathausstraße 23, 33813 Oerlinghausen, Germany www.energieagentur-lippe.de
Main steps	▪ Assessment of fuel types, fuel fractions and fuel qualities which are suitable, approved and economically available for wood chip boilers. ▪ Assessment of suppliers, traded biomass fractions and varieties and prices, already operational heating systems, available heat sink locations ▪ Supply opportunities from local resources ▪ Energy potentials, economic benchmarking, ecological effects ▪ Financing and operational models with local partners
Activities	▪ The MoU is signed, and the consultant is hired ▪ Assessments have been concluded, and the demand for biomass appears to be significantly less than expected. There are however good opportunities for a district heating network. The project has therefore shifted in focus, from establishing biomass outlets in combination with heat provision to the sole provision of heat to consumers ▪ Financial calculations have shown that the total costs of the project are 1.6 million Euro, and that the costs for heat for consumers would be higher than currently with natural gas
Assessment	It has turned out that It would not be viable to implement a biomass district heating plant. Costs for consumers would be higher than heating with natural gas. Consequently, there was no interest anymore to implement the project.

DE.3 AVEA

Title	**Improved wood recovery from biowaste sorting**
Supply chain	Local waste → extraction (sorting) of the wood fraction → thermal conversion of the wood fraction to provide renewable energy
Expected outcomes	A regional waste management company plans to improve the process of biowaste sorting to make the inadequately utilized wooden fraction of municipal biowaste accessible for thermal utilization in local incineration plants. The project includes a feasibility study and a cost-benefit-analysis of the enhanced bioenergy chain. It will help to optimize biowaste sorting logistics, valorise a larger share of the wooden fraction from biowaste and enhance the biowaste handling capacity from currently 45.000 t/a to approx. 75.000 t/a by 2020. → Will help with the logistics of the entire biowaste chain → Cost-benefit analysis is included
Company	AVEA Gmbh & Co.KG Im Eisholz 3, 51373 Leverkusen, Germany www.avea.de
Consultant	BAV Bergischer Abfallwirtschaftsverband Braunswerth 1, 51766 Engelskirchen, Germany www.bavweb.de
Main steps	▪ Feasibility assessment of improved logistics of the biomass terminal ▪ Cost-benefit analysis of the enhanced biowaste sorting process ▪ LCA of potential improved waste-to-energy streams ▪ Exploration of suitable waste sorting equipment ▪ Market study along the local supply and consumer chain ▪ Increase of wood chip production from biowaste
Activities	▪ The MoU is signed, and the consultant is hired ▪ LCA information (for WP5) has been exchanged ▪ The company has implemented the enlargement of its yard. This investment of 50,000 Euro was financed from own sources. ▪ Additional investment of 100,000 Euro in a new sieve unit and a modernisation of the sieving machine was decided to be realised. ▪ Because of these investments the amount of biomass retrieved for energy generation is expected to increase to 13,000 tonnes per year, while at the same time the renewable energy gain per tonne of green waste increases from 1.69 GJ/tonne to 4.36 GJ/tonne.
Assessment	Investments have been made, leading to significantly more biomass available for renewable energy generation, combined with a higher amount of renewable energy generation per tonne of biomass

DE.5 Füngeling

Title	**Regional market feasibility of efficient biomass heating**
Supply chain	Pallets → Residual wood → Chipping → Separate impurities → Pelletization
Expected outcomes	The enterprise group Fungeling is specialised in wood-based packaging solutions, including production, trade, repair and recycling of wooden pallets. The pilot project aims to develop wooden wastes in the company as a raw material source for the production of wood pellets, which can be traded for biomass heating. Those available materials are of a high waste category (A1) but are currently only used internally for heating in a wood chip boiler. They could however be valorised in a more efficient, higher value product (pellets), offering new business opportunities for the company. The pilot shall investigate the technical and economic feasibility of the new pellet production unit and its readiness for certification. Furthermore, a Life Cycle Assessment (LCA) of the positive environmental impacts shall be explored (benefits of cascade use).
Company	Füngeling Industrieservice Wildweg 4a, D-50374 Erftstadt, Germany www.fuengeling.de
Project partner	Regetherm GmbH Schönblick 1, 51515 Kürten, Germany www.regetherm.de
Consultant	TU Koln – Cologne institute for renewable energy Claudiusstr. 1, 50678 Köln, Germany https://www.th-koeln.de/anlagen-energie-und-maschinensysteme/cologne-institute-for-renewable-energy_13385.php
Main steps	▪ Assessment of raw material quality through lab tests ▪ Pelletisation tests; optimisation of internal processing chain ▪ Market feasibility study ▪ Preparation for certification; pre-check (supported by DINCERTCO) ▪ LCA of environmental benefits (supported by BOKU)
Activities	▪ The MoU has been signed and the project is now up and running. ▪ Preparatory communications with BOKU for the LCA analysis and DINCERTCO concerning certification has taken place. Because of the problems with the certification, the LCA analysis has been put on hold
Assessment	The market situation was analysed in order to assess the current demand. Private and industrial customers were identified as the main customer groups. The technical feasibility has been analysed and no technical problems were identified. Certification has however proven not to be possible. Since the wood pellets would be produced from waste wood, contamination with harmful chemicals cannot be excluded.

3.2.5 Catalonia, Spain

ES.1 Sala Forestal

Title	**Up-scaling of logistic centers for quality wood chip production**
Supply chain	Forest biomass + wood wastes → local logistic centres for chipping → enlarged production + reduced transportation → efficient boilers
Expected outcomes	A well-established forestry company aims to scale up their current wood chip production and scale up the supply chain to biomass boilers. → Targets: increase wood chip production by 15,000 tons in next 2.5 years. → Competitive supply logistics and market promotion in a regional growth market → Valorization of underused local biomass resources
Company	SALA FORESTAL SL Crta. Palamós, 85 - 17460 Celrà, Spain www.salaforestal.com
Consultant	Name: Best Practice
Main steps	▪ Kick off meeting ▪ Participation in Learning Labs ▪ Market study of areas with possible potential new consumers. ▪ Development of an optimised logistics model ▪ Increase of wood chip sales and reduction of logistical costs by implementing two strategies: ▪ Deploying automatic dispensing stations ▪ Redefining the transport routes and transport vehicle sizes
Activities	▪ The MoU was signed and the external consultant hired. ▪ A Grant for R&D support (to develop the dispenser prototype) has been obtained from the Catalan government. Grant size is 35,000 Euro. ▪ A prototype dispenser was built and tested. ▪ External consultant has assisted in characterising the operational analysis and the strategic planning. ▪ Company is a member of the newly founded Biomass Cluster of Catalonia ▪ Collaboration with another Catalan pilot project (La Fageda) has been arranged. Sala Forestal supplies the biomass for the boiler of La Fageda. ▪ So far, the wood chips sales have increased by 35% during the SecureChain project mentorship., which is a significant milestone towards the goal of reaching an annual production of 15,000 tonnes set by Sala Forestal at the beginning of the project.
Assessment	The project has yielded an accurate insight in the quantity of woodchips that can be mobilised when the new logistics model is applied. The company is expected to expand its production base in 2019, and fully implement the new logistics system in 2020.

ES.2 La Fageda Fundació

Title	**Demonstration plant sourced from local forest resources**
Supply chain	Unused forest biomass from fire prevention → chipping/processing → transportation → local combustion in renovated heating systems
Expected outcomes	La Fageda is a pioneering social integration group of entities that has reached a great success in the dairy product sector. The goal is to provide employment and social integration for vulnerable workers (unskilled, mentally impaired or young unemployed) by scaling up a recently started business line based on wood chipping from local forests, own consumption, sales to industrial and public consumers and eventually energy services under an ESCO approach. Specific outcomes are: → Integration of the complete local supply chain from forest to energy end use → Engagement of multiple actors → Promotion of socially responsible business
Company	1) La Fageda Fundació: takes care of the forestry management aspects. Els Casals, s/n, 17811 SANTA PAU (Girona), Spain, www.fageda.com
Partners	2) Wattia-Innova: SME based in La Garrotxa County, focused on energy efficiency, renewable energy and particularly on control and regulation systems. i) facilitate the pilot biomass boiler or CHP implementation in a local industrial plant, ii) disseminate of results and iii) stimulate of the industrial sector for a larger scale replication. 3) Aiguasol: Catalan SME specialized in engineering and technical research in the fields of energy optimization, thermal energy systems design and simulation. i) lead all technical aspects and ii) ensure a reliable biomass pilot implementation
Consultants	Social Forest
Main steps	▪ Participation to Learning Labs ▪ Scaling up of the forestry management ▪ Pilot demonstration in an industrial plant ▪ Communication and dissemination campaign. ▪ Business plans preparation and investor attraction rounds. ▪ Dissemination and roadshows by UPC and ACCIO
Activities	▪ The MoU has been signed and the external consultant has been hired ▪ The external advisor (Social Forest) has provided training and coaching of the forestry works performance with vulnerable workers. The first forestry validation works have been conducted in river bank public areas; results show low productivity rates, with high costs per wood chip tonne obtained. ▪ A feasibility study has been conducted to assess the viability of a 1 or 1.5 MW wood chips boiler in a local pharmaceutical plant. Securing a minimum number of sales is a key aspect in the business model.
Assessment	The concept of using social labour for forest activities is still being considered. However, based on the trials it has turned out that productivity is too low for the project to be viable. Additional funding – and secured off-take - would be needed to make the project viable.

ES.3 Novalia Sinergie

Title	**Up-scaling of pellet production for a new large cogeneration plant**
Supply chain	Forest biomass → expanded pellet production → use in cogeneration plant(s) → commercialization of generated heat
Expected outcomes	A leading pellet factory aims to expand their production of pellets for domestic use and develop a new line of pellets for industrial consumption. → Replace the natural gas cogeneration plant GAROFEICA SA by biomass (6 MW). → Sell pellets and electricity / heat generated. → Full supply chain model handled by a mayor market player, leveraging considerable biomass targets and maximum efficiency In the long term (2018 to 2020), it is aimed to replace the actual fuel oil cogeneration plant ROFEICA ENERGIA SA, by biomass (19 MW). The activities include the entire value chain: from wood extraction in the forest, the making of bio-fuels, the biomass cogeneration and its commercialization. This enables a maximum efficiency and effectiveness in an economic and environmental sustainable model.
Company	NOVALIA SINERGIE (RENERBIO group) Av. del Riu Anoia, 6, 08787 La Pobla de Claramunt (Barcelona), Spain www.novaliasinergie.com
Consultant	Josep Maria Matencio (TRANSENERGY 2050, SL)
Main steps	▪ Negotiations with municipalities ▪ Participation to Learning Labs ▪ Engineering design to increase the pellet production capacity ▪ Project's sustainability certificate, including a study of the lifecycle ▪ Meetings with potential investors ▪ Design for the replacement of the natural gas cogeneration plant ▪ Legal, administrative and planning permitting ▪ Installation and start up
Activities	▪ The MoU has been signed ▪ The commercial strategy for expanding wood pellets sales in for the domestic market has been defined ▪ DINplus certification of the wood pellets has been obtained ▪ The company is participating – as chair in the biomass resource commission - in the newly founded Biomass Cluster of Catalonia ▪ A financing proposal for regional (commercial) banks was presented, and in total 1.5 million Euro was secured against good conditions. ▪ The company has participated in an international investment forum facilitated by the SecureChain partners in WP5
Assessment	With the arrangement of additional funding for wood pellet production expansion, the scale-up of the production to 64,000 tonne/year is secured.

ES.4 Probiomassa

Title	**Enlarging pellet production and full customer service (ESCO model)**
Supply chain	Forest biomass → expanded pellet production → flexible supply for multiple end-users in proximity
Expected outcomes	A biomass company, which is a daughter company of a well-established local utility in Vallès region, aims to scale up their current pellet distribution business, in both ways of the bioenergy supply chain: → Upstream, by opening a either a pellet manufacturing line or a wood chip manufacturing line. In either case, wood would be sourced from local forests where preliminary arrangements with forest owners have been reached. → Downstream, by selling boilers and stoves together with pellets and woodchips, or even by selling final energy (heat, electricity) under an ESCO scheme. → The specific target is to mobilize at least 10kton/year of wood chips (50% for pellet production, 50% as chips).
Company	PROBIOMASSA (daughter company of Electra Caldense S.A., local utility) Plaça Catalunya 6, 08140 – Caldes De Montbui, Barcelona, Spain www.probiomassa.com
Consultant	Name: Best Practice
Main steps	▪ Economic and business strategy analysis ▪ Participation to Learning Labs ▪ Internal staff selection ▪ Assessing pro's and cons of investing in a plant and corporate operations ▪ Report to the Electra Caldense's board and approval of the project progress
Activities	▪ The MoU was signed and the external advisor (operation strategy and project development consultant) was hired to help in the market segmentation definition and production costs modelling. ▪ The model developed has helped Probiomassa to identify the minimum annual sales volumes that justify the investment in a pellet production. ▪ Sales of 700 tonne/year have been secured. This is short of the 20,000 tonne/year minimum needed for a financially viable pellet production facility; until such sales threshold is met, the company's strategy is focused on securing new customers and providing distribution and final commercialisation services to large pellet producers. ▪ In 2016, Probiomassa secured a new woodchip supply contract to the Termosolar Borges power plant, as well as a strategic partnership alliance with COMSA, one of the largest Catalan Engineering and Civil Works firm. ▪ In 2017, Probiomassa has also reached an agreement as sales agent for the second largest pellet producer in Catalonia.
Assessment	The company has decided for now not to invest in its own pellet production line, but instead to focus on expanding its customer network. Several new clients have been identified, which has increased turnover and viability of the company.

3.2.6 Western Macedonia, Greece

EL.1 AZ Bioenergia

Title	**Biomass supply for power plants from fast-growing tree plantations**
Supply chain	Short rotation coppices (Paulownia) → collection → chipping → plants (heat/electricity) → end use (district heating, greenhouses, national grid)
Expected outcomes	An SME active in selling bioenergy fuels and boilers plans to build a power plant of 2,5MWe and 7.5 MWth. The plant shall be sourced partly from own short rotation coppices (SRC) and partly from unused biomass in the region. → Valorisation of unused biomass resources and uptake of efficient systems → Innovative demonstration showcase of high regional relevance
Company	AZ Bioenergeia 5km Kozani – Ptolemaida, 50100 Kozani, Greece - www.azbioenergeia.gr
Partner	AZ Energeiaki LTD 5km Kozani – Ptolemaida, 50100 Kozani, Greece - www.azenergeiaki.gr
Consultant	KOEM consulting Venizelou 2, 50100 Kozani, Greece - www.koemconsulting.gr
Main steps	▪ Explore and spread good practices of SRC cultivation models with local farmers / landowners ▪ Engagement and training of farmers and land owners ▪ Analyse possible valorisation / utilisation of unused biomass ▪ Cooperation with local organizations and foundations (TEI, University of Western Macedonia, CERTH) ▪ Creation of green house for production of energy plants ▪ Implementation and investment plan for the power plant (permit pending from the National Power Authority DEDMIE)
Activities	▪ The MoU was signed and the consultant was selected. ▪ A business plan was produced. ▪ LCA information exchange is on-going ▪ It was expected to perform the first harvesting in late 2016/early 2017. This has been postponed, because of internal reorganisations ▪ An adjustment of the business concept is considered because an operational licence to produce energy from the biomass is not progressing, while at the same time a large bioenergy plant (25 MW) is planned to be constructed nearby (40 km distance). The company AZ now considers supplying biomass to that new bioenergy plant.
Assessment	So far, the results are encouraging as regard to the first 3 years of growth, and there are opportunities for biomass supply to a nearby planned bioenergy plant. Regular supply to that plant would remove uncertainties associated with own bioenergy production. The implementation – and hence the biomass supply – is however not yet certain.

EL.2 Alfa Wood Pindos SA

Title	**Mobilize bark wastes in wood industries for internal energy supply**
Supply chain	Raw timber → wood processing → bark waste → thermal heating
Expected outcomes	A wood panel producing company (MDF medium density fibreboard) aims to develop a forest residues waste stream (bark), to improve resource and energy efficiency of internal thermal heat use (two boilers for drying purposes and space heating). → Accessing a currently unused biomass resource from forest → Benefits for protection against fungi (raw timber) and forest fires (ecosystem) → Demonstrate feasibility of innovative model for Greece
Company	Alfa Wood Pindos S.A 7th km Grevena - Mavranaioi, 51100 Greece www.alfawood.gr
Partners	Forest Associations of Grevena, Prefecture of Grevena Dept. of Forestry
Consultant	Dr George Ntalos, Professor Wood quality Laboratory, Technical Educational Institute of Karditsa V. Griva 11, GR 43100 Karditsa, Greece
Main steps	▪ Explore specific knowhow for use of bark in plants for the energy production ▪ Investigate the unused biomass resources in view of accessible quantities to cover the needs of the daily operation of the plant ▪ Promote the pilot solution by engaging forest harvesting operations and other wood processing companies ▪ Implement the re-organisation of the supply chain, through re-formation of suppliers, storage of raw material, and re-structuring of the production site
Activities	▪ The MoU has been signed and the consultant has been hired ▪ First results from the bark qualitative analysis have been received from CERTH. These results were promising. CERTH also assisted BOKU in performing the Life Cycle Inventory (communication with the company to collect the required data). ▪ LCA information has been provided ▪ Application of the ash as fertilisers was investigated by all actors involved in the IV. Mineral analysis has been carried out. The quantities are too low to be commercially exploited, but deposition as fertiliser on agricultural land is possible. ▪ Different wood/bark ratios were tested in the laboratory.
Assessment	In this project it has been made clear that substituting part of the wood fuel with bark is technically possible and financially feasible. Due to issues with the supply chain – a required merger of feedstock suppliers – the supply situation is however volatile, which means that implementation of new solutions is put on hold.

EL.3 Matesion

Title	**Solid biomass feedstock to improve efficiency of biogas plants**
Supply chain	Various biomass sources (agricultural residues, wastes)→ collection / supply logistics → improved operation of biogas plants
Expected outcomes	A biogas plant of 120 kW, which is mainly using wastes from the agricultural sector (manure from cattle and mink farming, residues from fruit production), plans to improve efficiency of the plant by diversification of the feedstock with solid biomass (pre-fermentation process efficiency, seasonal productivity, +30%, +200 MWh). →Interesting supply chain solution to integrate mixed feedstocks →Access large biowaste potential in regional context
Company	Grigoriadis and Sofologis OE (Matesion) Kastorias 1, 50100, Kozani, Greece www.matesion.gr
Partner	Fertigas Agro
Consultant	Mr Dimitrios Kouras, consultant Diamantopoulou 31, GR 50100 Kozani, Greece
Main steps	▪ Data collection of available resources according to distance, seasonal availability, supply chain costs ▪ Estimation / Calculation of energy output per mass unit (kwh/tn) ▪ Organisation of suppliers (waste producers) according to feedstock availability ▪ Supply chain optimisation of solid feedstocks according to profitability ▪ Secondary optimisation according to distance ▪ Potential scale up of plant production according to available resources / wastes
Activities	▪ A business plan has been drawn up by the external consultant. In this business plan the opportunity for maize as input in the digester is investigated. Maize residues are a good input material, but main problems are the collection of the maize and transport to the digester. Costs for that are estimated at 50 Euro/tonne. ▪ LCA was not performed due to the high inconsistency of the raw materials used. ▪ A good additional input material that is been used at the moment is expired dairy products. Furthermore, residues from refinery oils have also been entered in the process with excellent outcome. All these residues have a high biogas production potential. ▪ Treatment of the solid fraction of the digestate was investigated. Composting would result in volume reduction, but there are technical difficulties.
Assessment	The biogas yield has increased substantially (20%) because of the change in substrates. Simultaneously, downtime has been reduced by 40%. This has had obviously positive effects on renewable energy production and financial feasibility

3.2.7 Post-project implementation planning

The post-project implementation of the pilot projects, as it is currently foreseen, is described in the following table.

Nr.	Project name	Subject	Post-project implementation planning
1	SE1.Skogsbransle	Wood ash pelletisation	For this initiative there are serious impediments to implementation. The topic will however not go away and future implementation could still take place
2	SE2.Varnamo	heat supply small communities	Implementation of the heat boilers is on-going and likely finished at the end of 2018
3	SE3.Lessebo	bigger bioenergy boiler	The flue gas condensor will be implemented.
4	SE4.SMF	Supply chain optimisation	Report on main deficiencies in the supply chain is available and can be used to increase forest extraction efficiency
5	EE1.Ilmassaare	CHP unit implementation	The search for funding for implementation of the CHP unit is continuing
6	EE2.Taarapollu	CHP	Funding will still be sought for implementation of a renewable heat option
7	EE4.Starfeld	Market introduction CHP/ORC technology	The introduction of the CHP/OCR technology in the Estonian market is still a goal; new partners are sought to make the system market ready.
8	NL1. Hissink	new harvesting machine	The new harvesting machine is not market ready yet, and additional funding is needed for the further development
9	NL2. RiBo	biomass storage facilities	small scale operation underway, additional biomass supply is needed to enlarge operations
10	NL3. Bruins en Kwast	Maintenance of landscape elements	The pelletisation plant is now being implemented and will be started up in 2018.
12	DE2.ECO	District heating network	Project will not be implemented as financial conditions are not favourable
13	DE3.AVEA	Improving biowaste sorting	Implementation complete; +95% biomass for energy
21	DE5.Füngeling	Promote biomass boilers	Implementation of a pellet plant was considered unfeasible because the required certification was not possible
14	ES1.Sala Forestal	upscaling wood chips production	Expansion of production base is expected in 2019, and full implementation of the new logistical system in 2020
15	ES2.La Fageda	wood chipping and social integration	Productivity using social labour is too low for viable forest extraction. Additional funding is needed for that
16	ES3.Novalia	6 MW biomass plant, upscaling pellet production	Scale up to 64,000 tonne/year is secured and will be carried out
17	ES4.Probiomassa	Pellet distribution	The company is now looking to expand its consumer base
18	EL1.AZ	large CHP	implementation hinges on the growth results, and the ability for off-take at a new bioenergy plant planned nearby
19	EL2.Pindos	Bark for energy	New legislation is required to make implementation viable
20	EL3.Matesion	Biogas plant capacity increase	Post project implementation involves continuing with the search for better feedstocks to achieve higher yields and downtime reduction.

3.3 Learning Lab 2: Capacities (Task 3.3)

To ensure proper dissemination to, review and participation of the relevant stakeholders, Learning Lab workshops have been organised by the RLP.

Purpose and set-up

The central idea of a regional Learning Lab is that Pilot Projects could present themselves to regional stakeholders in a way that feedback and be given and the weak and strong points can be identified and discussed.

At the start of the project, WP Leader BTG has provided guidelines to RLPs on how to organise Learning Labs. These guidelines contained a procedure on how to organise these meetings, who to invite, and how the ensure that there would be meaningful interaction with respect to the pilot projects and other stakeholders.

First round of Learning Labs

The first round of Learning labs took place in 2015/2016 (part of WP2). The results of these Learning Labs were discussed during the General Assembly Meeting in Växjö in April 2016, which served as guidance for the second round of Learning labs that were held in 2016/2017.

Second round of Learning Labs

In the second round of Learning Labs that were held in 2016/2017 roughly the same procedures were followed as in the first learning labs. Below an impression of several learning labs is given:

Impression of a site visit to one of the pilot project owners' facilities as part of the **Swedish Learning lab held on October 17, 2017.** The Learning Lab was focussed on the status of the pilot projects, and on information dissemination regarding SecureChain in general and the recent benchmarking visit to the Ukraine.

During the **German Learning Lab of 24 April 2018** the results of the AVEA and the Fungeling pilot project were presented. Implementation at AVEA of the new biomass sorting systems was already underway, and the on-going work in that area was inspected as well during a site visit at the Metabolon in Lindlar, Germany.

The **Estonian Learning lab of November 2016** included a discussion on the pilot plant progress, and a seminar on the preparation of business plans. The Learning Lab was focussed on the pilot projects and on the consultants.

The structure underpinning a regular business plan was discussed, as well as the iPlanner web-based software that was to be used to draft the Estonian business plans.

The **Dutch Learning Lab of April 5, 2017** focussed on wood mobilisation from landscape elements, as this is closely related to two of the Dutch pilot projects (NL2.Ribo and NL3.Bruins en Kwast). An important discussion point was the use of biomass for combustion, since this has been criticised by certain environmental groups in the Netherlands. Criteria and maximum quantities for Overijssel were discussed. Also this Learning Lab was combined with a site visit.

The **Spanish Learning Lab of February 1, 2017** was focused on the pilot project progress, and themes that were directly related to that. It was organised in two blocs: a) a common session for the 4 pilot projects, and b) individual thematic sessions. The common session was devoted to communication and marketing. A second topic was finance and financial risk management. In the individual sessions, company specific issues related to finance, LCA, certification and legal/regulatory issues were discussed.

The **Greek Learning Lab of July 2016** was focussed very much on sustainability aspects and financial issues for SMEs that are interested in bioenergy, which were the main target group of the Learning Lab. In this learning lab cooperation was sought with the Kozani Chamber of Commerce to ensure uptake and dissemination.

In a presentation of Sylvia Scherhaufer of SecureChain partner BOKU the instrument of Life Cycle Assessment was explained, as well as the way it was utilised in the SecureChain framework. Frederic Horta of UPC gave a subsequent presentation on the financial aspects of setting up new bioenergy ventures and how this issue was tackled in SecureChain.

Conclusions of the Learning Lab process

In total 12 learning labs were held in the six model regions. The following conclusions are drawn based on the Learning lab process:

- In general, it was considered very useful by the Regional Lead Partners to have a learning lab based on progress reports and/or presentations of the pilot projects themselves, since this allowed the pilot projects a showcase opportunity, and an opportunity to receive feedback from stakeholders that are not intimately involved in the project. All Regional Lead Partners received positive feedback as regard to the Learning Labs.

- Number of participants: An upper limit of about 35 should be maintained. The Dutch RLP reported that with a total number of participants totalling 32 the possibility for open discussion and actual information exchange was just possible.

- To generate interest from stakeholders some RLPs used activities like a site-visit or an external presentation. It was generally considered advantageous to mix these activities together with the core Learning Lab activities (presentation of the pilot projects), so that the appropriate stakeholders would indeed continue to visit the regional Leaning Labs.

3.4 Supplier Development (Task 3.4)

3.4.1 Setup of training and supplier developments

Aim of this task is to enhance the capabilities of essential supply chain parties and create a strong basis among members for the formation of sustainable supply chain management systems.

In the set-up of the training activities the following procedure was adopted:

- WP Leader BTG provides a long list of possible topics
- RLP's submits a short draft description detailing how they aim to conduct the training
- BTG identifies synergies and points to selected training documents/manuals.
- Training is organized and carried in the regions by the RLPs, possibly with other consortium members, associated partners and/or stakeholders in the regions

An indicative list of suitable topics was prepared by BTG. Based on this list, and on the particular training needs in their regions as determined by the RLPs, training outlines have been drafted by the RLPs. An analysis of suggested topics showed a large variety. Topics ranged from very technical (biomass stove emissions) to more horizontal issues like patenting and branding, communication. Topics span the entire biomass chain from forest harvesting and extraction to conversion and end-use. LCA and certification were considered important topics, as four regions had included it in their training programme.

BTG (as WP leader) has provided training manuals and guidelines to help with the set-up of the training programmes. Starting in the summer of 2016 the training programme is underway, and a number of events have been organised. In the next paragraph an overview and some highlights are given.

3.4.2 Overview of training events

The following training events have been organised (see Table 1)

Table 1: SecureChain training evens organised

Region	Date	Attendance	Subjects
The Netherlands	25 May 2016	26	Bioenergy value chains in rural area's in Twente
Spain	16 September 2016	31	Certification
Spain	20,23 November 2016	8	Specific training seminar about solid biofuels productions and forest techniques in La Fageda
Spain	23 March 2017	30	Forest harvesting and solid biofuels production
Spain	25 May 2017	20	Biomass in tourist sector

Region	Date	Attendance	Subjects
Spain	24 February 2017	31	Business-to-business seminar
Spain	25 May 2017	65	Electricity self consumption
Estonia	15 March 2017	29	Certification
Estonia	18 April 2017	60	Bioheat stove installation and use
Sweden	25 April 2017	25	Conversion to bioenergy for industrial applications
Greece	26 June 2017	33	District heating Grevena
Greece	29 June 2017	44	Certification
Spain	11-12 October 2017	20	Wood pellet Certification
Spain	19 October 2017	50	Energy Self Consumption
Spain	27 October 2017	15	Update of Bioenergy Strategic Plan in Catalonia
Ukraine	2-3 November 2018	34	Certification
Sweden	9 November 2017	110	Co-funding of investments in renewable fuels
Estonia	23 November 2017	32	Renewable energy finance and business development
Spain	29 November 2017	12	Alternative financing options for SME Bioenergy business ideas

Highlights of the training sessions

The training session on **pellet quality assurance and certification** in Ukraine of 3 November 2017 was on held in Lviv, Ukraine. This certification training sessions was arranged by SecureChain partner DINCERTCO in cooperation with the Ukranian NGO FORZA.

The training seminar topic was pellet quality assurance in the production process and product certification of wood pellets in Ukraine. There was a high interest of the local manufacturers for the seminar. It was an open discussion and many answered questions gave the audience ideas how to improve quality of their production process via certification.

Figure 3: Training seminar on pellet quality assurance and certification in Kiev, Ukraine on 23 May 2018

The Estonian seminar on **Renewable energy finance and business development** was held on 23 November 2017 in Tartu, Estonia. The event was organised by TREA in combination with the Estonian University of Life Sciences

The topics of learning lab: (1) renewable energy business projects, (2) renewable energy or energy efficiency projects aimed at optimizing overall administrative costs, and (3) renewable energy projects that are a result of community's common interest and/or need.

Participants discussed the planning and financing of business ideas and development projects, the differences between the money as a purpose and as a tool, the involvement of external financing (including loans) in development projects, community/cooperative financing, and the use of public finances to support the renewable energy and resource efficiency projects. While discussing the possibilities and obstacles of financing and implementing the energy-related development projects, a particular emphasis was placed on projects implemented in rural areas.

Figure 4: Training event in Estonia on 23 November 2018 on renewable energy finance and business development

3.5 Learning Lab 3: Feedback and finetuning (Task 3.5)

3.5.1 Setup

Feedback was collected from RLP, SMEs and advisors regarding the pilot project implementation. Many pilot projects have been successful. The 'objective' success was measured via SMART criteria (e.g. investment, biomass mobilised, etc.). However, this tells only "What happened", and not "Why did this happen". To ensure that this aspect was also reflected upon, a 'soft' evaluation was carried out. The goal of this evaluation was to judge the success and the appropriateness of the activities carried out in SecureChain.

The information has been gathered through semi-structured interviews of key persons that were involved in the pilot projects. It was considered that these one-on-one semi-structured interviews would yield better and more honest feedback than public meetings with stakeholders. In the semi-structured interview, interviewees were invite to describe their situation before and after SecureChain, their involvement in the various activities carried out in the framework of SecureChain, and how beneficial they considered these activities. It was also asked if the project has caused changes in behaviour.

As regard to data protection and privacy, a data protocol was developed. This data protocol stipulated the rights of the interviewees, what type of information was collected and for what reason, and who would have access to the data. This protocol was given to the interviewees before the interview. In Annex A the RLP instructions regarding the feedback interviews, as well as the information protocol is listed.

3.5.2 Results and feedback conclusions

General results

Feedback was gathered from all pilot projects. All interviewed pilot project owners considered SecureChain valuable. Of those specifically question on this subject, 70% mentioned that SecureChain has led to concrete change. It should in this context be mentioned that change not always meant new investment. In some cases a pilot project owner considered a different strategy or business model as a result of SecureChain.

SecureChain activities that were considered useful:

The following aspects have been included in the survey:

1. **Innovation Vouchers:** The vouchers that pilot plant owners could spend on externa advice
2. **Regional Stakeholder meetings:** Meetings of pilot project owners with other stakeholders in the region (learning labs)
3. **Assistance with finance:** The assistance offered through WP5 as regard to financial issues and funds acquisition

4. **Sustainability/certification:** The assistance given in the framework of WP4 related to the LCA analysis and certification support
5. **Training/study tours:** Training conducted by the RLP and the (national and international study tours) organised by SecureChain
6. **Regional Lead Partner:** The direct assistance/advice that pilot project owners received from their Regional Lead Partner
7. **Other EU information:** Information from other SecureChain regions related to all relevant aspects of bioenergy chains
8. **Other SecureChain partners:** Information/advice received from other SecureChain partners (other than the Regional Lead Partner)
9. **Other pilot projects:** Information/advice/cooperation received from other pilot project owners.
10. **Other regional partners:** Information/advice/cooperation received from other regional partners when contact was instigated through SecureChain events

As part of the semi-structured interviews it was asked which aspects of SecureChain were considered beneficial. The results are shown in the figure below:

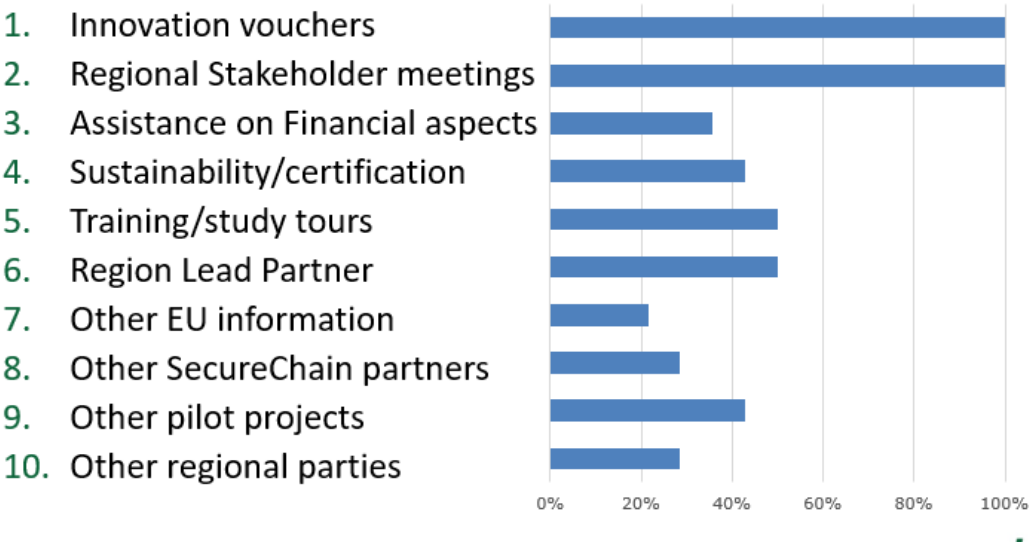

Figure 5: Results of the SecureChain semi-structured interviews with pilot project representatives. The question was which aspects of SecureChain were considered useful.

These results show that all the pilot project representatives considered the Innovation Vouchers useful. This is to be expected, since the innovation voucher money could be spent freely at the discretion of the pilot project owner. It is furthermore clear that the regional stakeholder meetings were clearly considered useful, as 100% of respondents indicated these were beneficial.

For the other aspects of SecureChain it is clear that these were valued by at least a number of SMEs, whereby a large variety showed in the answers. This means that activities that were not relevant at all for one SME (e.g. the LCA analysis), were of paramount importance for other SMEs. Similarly, study tours were only undertaken by a selected section of the SMEs, but if they participated they considered these very useful.

One other part of this evaluation was the suggestion for improvement of the SecureChain activities. The following suggestions were collected:

- Higher monetary value Innovation Vouchers
- Additional outreach in the region/more meetings
- More involvement of local authorities
- More international events
- Setting-up a SecureChain loan fund

These suggestion for improvement show again that SMEs considered the events and activities that were organised in the framework of SecureChain useful. The above suggestions in general show a willingness to engage more in the activities carried out by SecureChain, and not so much a desire to undertake different activities.

Conclusions

The following conclusions can be drawn from this evaluation:

- SMEs highly valued the general SecureChain approach. The appreciation for the regional stakeholder meetings stands out.
- Participation/involvement in other aspects of the project varied, with slightly more interest in regional aspects as compared to (inter)national events/info.
- SMEs were positive about the events they participated in.

3.6 Evaluation and international transferability (Task 3.6)

3.6.1 SMART performance criteria

The following SMART performance indicators are selected as most useful to assess the impacts of the project:

1. **Tonnes of solid biomass mobilised**, broken down according to types of resources.
2. **Final renewable energy production**. In case of projects aimed at mobilising biomass, the expected amount of renewable energy production will be determined using standard conversion factors.
3. **Reduction of GHG emissions**, based on figures derived from the WP4 Life Cycle Assessment (LCA).
4. **Direct and indirect jobs created**, assessed as far as possible through hard data, or derived from literature references and realistic assumptions.
5. **Total investments triggered** through the implementation of pilot projects.

These SMART performance criteria have been defined earlier and progress with respect to these criteria is monitored. In order to monitor these properly, a more precise definition of these performance criteria was made. Specifically, the following definitions were set:

- The criterion “Tonnes of solid biomass mobilised, broken down according to types of resources” was subdivided into the categories: forestry (forest residues), agriculture (straw), landscaping (hedges and roadside greenery, riparian greenery), and waste (municipal solid waste). The unit is tonne (fresh weight) per year.
- The unit for the criterion “Final renewable energy production” is GJ/year. Any other form of renewable energy production is converted to this unit
- The unit for employment is FTE/year (Full Time Equivalent per year). It will be difficult to determine the indirect employment generated by the project. Typical values from literature will be used for this.
- All criteria are listed separately per pilot project; this means that a project in which 1 tonne of additional forestry residues is converted to 9 GJ of energy, both figures, as well as the associated CO2 emission reduction and possible employment and investment effects are listed.
- The SMART criteria will only measure/note the additional effects since the start of the SecureChain project. This way, the SMART criteria will measure the impacts changes that occurred during the project.
- Part of the project outcomes will only materialise after the project. To make a – as clear as possible – distinction to what is included and what is not included, it has been agreed that when hardware is actually implemented or when a definitive

investment decision is made, the resulting extra investment, biomass mobilised, etc. is included in the SMART performance criteria. The Regional Lead partners have determined whether projects have already made definitive investment decisions.

Based on the above definitions, an inventory was made in May 2017 to determine the status of the SMART criteria with respect to the pilot projects. This inventory was completed near the end of the project (June 2018) (see Table 2).

This table shows the status of the SMART criteria in three columns. The first column is the status at the start of the project. By definition everything is zero. The second column shows the status in May 2017, one year before the end of the project. The first results are already showing. The last column is the value of the SMART indicators at the end of the project.

From this table it is clear that that already during the project substantial results have been achieved, both in terms of biomass mobilised, renewable energy generated, jobs created and investment triggered.

Table 2: Update SMART criteria (assessed status in May 2017 and in June 2018)

No.	SMART criteria	Value at start of project (1/4/2015)	Value on May 2017	End of SecureChain (1/7/2018)	
1.	Tonnes of solid biomass mobilised, broken down according to types of resources (ton/year)	0	28,763	100,500	
	- Forestry (forest residues)	0	27,963	79,685	ton/year
	- Agriculture (straw)	0	150	100	ton/year
	- Landschaping (hedges and roadside greenery, riparian greenery)	0	0	1,960	ton/year
	- Waste (municipal solid waste)	0	150	15,736	ton/year
	- Other biomass (please specify)	0	500	3,019	ton/year
2.	Final renewable energy production (GJ/year)	0	434,778	1,608,077	GJ/year
3.	Reduction of GHG emissions, based on figures derived from the WP4 Life Cycle (ton CO2-eq./year)	0	24,958	50,163	ton CO2-eq/year
4.	Direct and indirect jobs created, assessed as far as possible through hard data (FTE/year)	0	4	58	FTE/year
5.	Total investments triggered through the implementation of pilot projects (Euro)	0	2,655,000	10,112,350	Euro

3.6.2 External evaluation: results and conclusions

The SecureChain results have been evaluated by external experts. The goal of this evaluation was to reflect on the setup, methodology and results of the SecureChain project, discern lessons learned from this approach and determine general transferable findings as regard to market uptake of bioenergy in Europe. This evaluation was carried out in the summer of 2017. Four external evaluators were requested to give their opinion. Of this four, two evaluators mentioned that they lacked the knowledge to provide adequate feedback.

Two experts agreed to take part in the evaluation:

- Leire Iriarte Cerdán, Research Fellow at IINIAS, Germany
  https://www.researchgate.net/profile/Leire_Iriarte
  http://iinas.org/iriarte.html
- Dominik Rutz, Head of Unit Bioenergy & Bioeconomy WIP Renewable Energies, Germany
  https://www.researchgate.net/profile/Dominik_Rutz
  https://www.linkedin.com/in/dominik-rutz-a1322952/

Their opinion was gathered via a questionnaire, in which they were asked to reflect on specific parts of the SecureChain project. Main topics were the SecureChain benefits for Pilot Projects and the possible improvements/alterations that would be beneficial as regard to the market uptake of bioenergy in Europe. The questionnaire is included in Annex B of this report.

According to the evaluators the pilot projects have benefitted a lot from the SecureChain project. The instrument used to select the pilot project was considered appropriate. As regard to the type of support given (Innovation vouchers, Regional Learning Lab meetings, Assistance in finding finance, sustainability/certification/LCA, Training/study tours, and information from other regions) was generally considered useful. The support given to SMEs with respect to finding additional finance was considered only moderately useful by one evaluator. It was suggested that more on-demand assistance could have been provided to the SMEs.

In the view of the evaluators, the sort of assistance which SecureChain offered to SMEs, could very well be transferred to other regions. One evaluator suggested to start with similar regions, and proceed from there on to other contexts. The SecureChain choices regarding the number of regions (6) and geography was considered to be representative and well appropriate. Also the project's focus on the entire bioenergy value chain, the focus on SMEs and the emphasis on market-ready or near market-ready technologies was considered right and target-oriented. The evaluators therefore considered that SecureChain approach is very suitable to be replicated, with a continued focus on the actual needs of SME companies.

Annex A Pilot Project Innovation Voucher Evaluation

Introduction

During the SecureChain project we (the SecureChain consortium) have provided support for Pilot Plant Owners in our respective regions. In total 20 pilot projects have been supported by SecureChain in a variety of ways:

- Innovation Voucher money
- Financial Mentoring
- Sustainability/certification/LCA
- Other support deemed necessary

Many pilot projects have been successful. We will measure the 'objective' success with the SMART criteria (e.g. investment, biomass mobilised, etc.). However, this will only tell us "*What happened*", and not "*Why did this happen*". We would like to know this as well, because we think that the SecureChain approach has been beneficial to the Pilot Project development. We would like to conduct a more qualitative evaluation to determine this.

This short manual will detail:

- What needs to happen and who needs to do it
- How the evaluation needs to be carried out
- What results are expected
- Planning
- Data protection and privacy

If you have any questions or comments, please do not hesitate to contact me (Patrick Reumerman).

What needs to happen and who needs to do it

What: Conduct semi-structured interviews with pilot project owners and report on it

Who: Regional Lead Partners

The goal of the evaluation is to determine if the SecureChain evaluation caused change, and helped the Pilot Project, and also what aspects were considered beneficial. To find this out, we think that the best way to determine this is to interview key persons that have been

involved in the Pilot Project. We are thinking of one or two persons per pilot project, that were involved. Who that is going to be is left to the Regional Lead Partner. Please use your own judgement in the selection of the best persons to interview.

How the evaluation needs to be carried out

What is a semi-structured interview: It is an interview with a list of questions to provide some structure. However, it is not the intention to get a "yes" or "no" answer to each question, but also the context. What is behind the yes or no? Ideally you get a free-flowing conversation which your interview subject, while you are also touching upon all your questions.

A sample list of questions is given in Annex A. I expect that each interview lasts between 30 minutes and 45 minutes. You can do it over the telephone or in-person.

One or two persons per pilot project will imply 3 to 8 people in total to be interviewed per RLP. The sample is kept small, to limit the workload.

Expected result

When you have selected one or two persons per pilot project and have conducted the interviews, you are advised to make a short summary of about 1 to 2 pages from the interview. This can be done in your own language.

From these short summaries you can then – in a separate document in English – summarise the answers that the interviewees gave to the interview questions. We would like to receive that document from the RLP's, which would ideally be 2 to 5 pages long.

We (BTG) will then subsequently bundle these reports, and draw conclusions. In the final WP3 report (D3.3) BTG will formally report on these results.

Planning

- Conducting interviews: March 2018
- Reporting to WP3 (BTG): April 30, 2018
- Results analysed by BTG: May 15, 2018

With this planning it would be possible to present the results at our final meeting on June 7, 2018

Data protection and privacy

In the EU Horizon 2020 programme, there is increased attention towards ethical aspects. In this context it means that we have to deal with the privacy and consent aspects of the people we interview.

To arrange this, a data protocol has been developed. This data protocol needs to be translated into your local language, and sent to the interviewees.

Annex A: Draft list of questions for the semi-structured interviews

1. Describe your background and your situation in general before the pilot project started. Were you involved in bioenergy earlier, what gave you the idea of the pilot project?

2. What was your involvement in the project? What did you do? Did you attend any project meetings such as the Regional Learning Labs, trainings or other SecureChain meetings?

3. Describe the situation after the project. Have you:

    a. learned new knowledge or new skills, and if yes what and how did you acquire these?

    b. Been able to plan or implement something new according to the SecureChain Pilot project? What, how and how much?

4. Have you done anything differently as a result of the project?

5. Was the involvement of SecureChain as a whole of value to you? If yes why?; if no why not?

6. What aspect of the project was of value to you:

    a. Innovation Voucher
    b. Regional Learning Lab meetings
    c. Assistance in finding finances
    d. Sustainability/certification/LCA
    e. Training/study tours
    f. Information from other EU regions/projects
    g. Other (please specify)

7. Which aspects of the SecureChain involvement could be improved upon? Was there support that you could have used or have missed?

Annex B: SecureChain Interview Information Protocol

Introduction

This Information Protocol is handed over to people to be interviewed in the framework of the SecureChain project.

In the EU project SecureChain (www.securechain.eu) we aim to increase the market uptake of bioenergy in Europe. To this end we have supported a number of Pilot Project. To check how this support has been received by Pilot Project owners, we are conducting several semi-structured interviews.

Information protocol content

Participation will not lead to benefits, risks or discomfort by participants. Participation is voluntary, and can be withdrawn at any moment without any consequences.

Personal data is handled as follows:

1. The reporting will not contain any personal data

2. During the interviews interviewees are asked if they are okay with:
    a. The company name being included in the intermediate reporting
    b. Them being listed as a contact person in case of follow up questions

3. If the EC asks for a list of persons consulted the consortium will provide the list of company and individual names except for those that have asked to be omitted.

4. If the EC asks for interview notes, the consortium provides the notes with the company and individual name, except for those that have asked to be omitted.

5. If someone chooses to be neither listed by company name or individual name a general descriptor of the company (e.g., fuel producer, investor, technology developer, project developer)

Annex B Questionnaire for external evaluators

Questionnaire for external evaluators

Personal data

8. Name: _____
9. Function: _____
10. Organisation: _____
11. I agree that my name, function and organisation is mentioned in the public SecureChain D3.3 report
    0 Yes 0 No

    (Answers will not be directly attributed to you)

SecureChain benefits for Pilot Projects

12. Do you think that the Pilot Projects that were supported by SecureChain have benefitted from the SecureChain project?

    (1= no – 5= a lot):

    _____
13. Do you think that the IV voucher competition was an appropriate instrument to select pilot projects for support?
    0 Yes 0 No

    Possible additional remarks

    _____
14. What aspects of the support that was given to the pilot project owners do you consider useful?

    a. Innovation Voucher

(1= not useful at all – 5= very useful):

b. Regional Learning Lab meetings
(1= not useful at all – 5= very useful):

c. Assistance in finding finances
(1= not useful at all – 5= very useful):

d. Sustainability/certification/LCA
(1= not useful at all – 5= very useful):

e. Training/study tours
(1= not useful at all – 5= very useful):

f. Information from other EU regions/projects
(1= not useful at all – 5= very useful):

15. What other support could have been provided to the pilot projects?
_____

Possible improvements and additional remarks

16. Do you think the Pilot Project business models can be easily transferred to other regions?
0 Yes 0 No
If yes, which regions? _____

17. In what way could the SecureChain set-up and activities be improved upon

a. Number of regions (in SecureChain 6 regions were focussed upon)
(1= a lot less to 5= a lot more):

b. Should the project have focussed on other EU regions (SecureChain regions were: Gelderland/Overijssel (NL), Småland (SE), Catalonia (ESP), NRW (D), Estonia, Macedonia (GR))?
0 Yes 0 No
If yes, which regions? _____

c. Amount of IV voucher value of 3,000 Euro to 5,000 Euro per company
   0 More 0 Ok 0 Less
   If more or less, how much would be ideal: _____

d. Was it a good choice to focus on the entire bioenergy value chain?
   0 Yes 0 No
   If no, why and on which part should the focus have been?
   _____

e. Was it good to focus on SME companies?
   0 Yes 0 No
   Possible additional remarks
   _____

f. Would it have been good to focus more on innovative projects?
   0 Yes 0 No
   Possible additional remarks
   _____

18. Do you think the 'SecureChain approach' should be used again, for example in other EU projects or in a regional context?
    0 Yes 0 No
    Possible additional remark
    _____

Citation, Acknowledgement and Disclaimer

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Supply chain opportunities for future-proof local bioenergy. SecureChain, Horizon 2020 project no. 646457, WP3 Progress Report D3.3. BTG Biomass Technology Group BV, Enschede, The Netherlands. www.securechain.eu

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