Forest Bioenergy in the Protected Mediterranean Areas

SPAIN

Transferring of past and current know-how

4.3.2 Training courses material

Work package 4 - Transferring

Activity A.4.3. - Transferring of past and current know-how.

D 4.3.2 Training course materials

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EXECUTIVE SUMMARY

ForBioEnergy is an innovative and ambitious project because it bets on the sustainable development of the rural areas using the forest biomass of the protected areas as driving force.

Most of the forest areas are included in the protected areas, so, they represent a great opportunity to produce sustainable energy from biomass. But the current regulatory restrictions as well as the lack of appropriate plans impede and slow down the forest biomass exploitation.

And this is exactly the overall objective of the project: fostering the bio-energy production in the protected areas providing transnational solutions for reducing barriers that hinder the development of the sector and planning models in order to exploit the full potential of biomass and at the same time to preserve the biodiversity of the natural areas.

This objective will be achieved through the definition of:

- ✓ an Action Plan for shaping new regulatory framework and permit route aimed at removing technical and administrative barriers that hinder the energy use of biomass;
- ✓ a multi-level planning process: regional, local and operating;
- ✓ a set of sustainability requirements and quality standards of forest biomass.

Project activities will be implemented through a transnational process for highlighting the most significant gaps as well as the best practices. Furthermore, key actors (who propose/change norms, regulations and plans, and who deal with bioenergy and biodiversity issues) will be actively involved.

Through **transferring** activities knowledge gained through this project and other relevant projects will be passed to defined target groups. This is a key element of ForBioEnergy project: “bringing knowledge to end users”.

Training courses have been organized as one of the activities to train policy makers and other decision makers and professionals. Within the ForBioEnergy project, in the Comunitat Valenciana, 6 training courses have been implemented.

1. TRAINING NO. 1: ECOINNOVATION: MANAGEMENT, USE AND VALORIZATION OF FOREST BIOMASS

1.1 . Introduction to training material

	Authors of presentation	*Title of the presentation*
1	Fernando Pradells, AMUFOR	Forest Bioenergy in the Protected Mediterranean Areas
	Rebeca Aleix, AMUFOR	Analysis of the barriers and opportunities across the forest-based bioenergy value chain
2	Victoria Lerma, ITACA-UPV	Comparison of two methods of forestry interventions for bioenergy purposes
3	Rebeca Aleix, AMUFOR José Vicente Oliver, ITACA-UPV	Practical case: environmental assessment after forestry interventions
5	Bruno Armengot, ITACA-UPV	Ecoinnovation. Valorisation of the biomass through a District heating
6	Edgar Lorenzo, ITACA-UPV	Forest bioenergy: integral management of the emissions
7	José Vicente Oliver, ITACA-UPV	Next steps within the ForBioEnergy project

1.1.1 Main aim and goals of training

Main objective:

- To transmit the advances and outputs of the experiences in forest management in protected areas, leading to new use of the wood as bioenergy.

Training objective:

- Presentation of the results and technical advances of the ForBioEnergy project.
- Transferring of the knowledge about the management, use and valorisation of the forest biomass based on real studies acquired in the ForBioEnergy project as well as in other relevant European projects and initiatives.

1.1.2 Description of topic

The programme was organized to train experts, professionals and decision-makers to acquire new knowledge about the current situation of the forest sector, its barriers and opportunities, as well as the real experiences that have been done and other which are in developing across all bioenergy-based forest value chain.

1.1.3 Methods used

The methods used were:

1. Oral presentations
2. Interactive question after each the thematic presentation: the objective of doing the questions is to interact with the participants about challenges and opportunities introduced, as well as to consider new options to fight against climate change.
3. Practical case
4. Final discussion

1.1.4 References

- ForBioEnergy project brochure.
- ForBioEnergy project (2017) D.3.2.1. Baseline review of the study areas
- ForBioEnergy project (2017). WP3 D.3.3.1 Barriers and potential solutions for increasing biomass production in the protected areas.
- Lerma Arce, V. (2015). Planificación, logística y valorización de biomasa forestal residual en la provincia de Valencia
- PATFOR (2013): Plan de Acción Territorial de la Comunitat Valenciana. Conselleria de Agricultura, Medio Ambiente, Desarrollo Rural y Cambio Climático. Generalitat Valenciana.
- Integral SimBioTIC project from the multidisciplinary group ICTvsCC of the Institute of Information and Communication Technologies (ITACA), belonging to the Polytechnic University of Valencia (UPV)
- Argos. Generalitat Valenciana. Conselleria d'Infraestrucutres, Territori i Medi Ambient
- Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente. Red Natura 2000.

1.2 English summary: training materials

Training title: Ecoinnovation: management, use and valorization of forest biomass

Authors of the training materials:

- Rafael Mossi, COCINSV
- Fernando Pradells, AMUFOR
- Rebeca Aleix, AMUFOR
- José Vicente Oliver, ITACA-UPV
- Victoria Lerma, ITACA-UPV
- Bruno Armengot, ITACA-UPV
- Edgar Lorenzo, ITACA-UPV

Short presentation of training materials

The programme was organized to train experts, professionals and decision-makers and to acquire new knowledge about the current situation of the forest sector, its barriers and opportunities, as well as the real experiences that have been done and other which are in developing across the bioenergy-based forest value chain.

Target group reached

- Sectoral agencies, local public authority, business support organization, association, infrastructure and (public) service provider and universities.

Training process:

The topics dealt with the biomass value and its uses for bioenergy purposes. First of all, the objectives and outputs of the project were explained, as well as its connection with other European initiatives. Secondly, the result of the common barriers and opportunities analysed in the project were introduced to the assistants. Furthermore, in relation with the outputs of other European initiatives, the different systems of forestry interventions, which will be studied in the ForBioEnergy project, were explained in detail. Thirdly and concerning the final step of the value chain, real cases were presented; concretely, the valorisation of the biomass through a District heating and the integral management of the emissions.

Regarding the **practical case** which was done between the presentations, its objective was an environmental evaluation after having executed forest interventions at short, mid and long term.

The forestry interventions explained for the evaluation were:

- Case 1: shelterwood method
- Case 2: environmental restoration after forest fires. The method uses for the 2nd case was according to the Forest Strategy Plan of the Community of Valencia - Plan de Acción Territorial Forestal de la Comunitat Valenciana (PATFOR).

The criteria to assess were: quality of soil, biodiversity, carbon, erosion, aquifer recharge, forest fires risk and landscape.

Short description of the content:

PPT ForBioEnergy project: Forest Bioenergy in the Protected Mediterranean Areas / Proyecto ForBioEnergy: Bioenergía Forestal en áreas protegidas del Mediterráneo

The ForBioEnergy project is in the priority Axis 2 and in the specific objective 2.2 "To increase the share of renewable local energy sources in energy mix strategies and plans in specific MED territories". The ForBioEnergy project arose based on Proforbiomed project (2007-2013).

The Project involves 1 Lead Partner and 6 Project Partners from 4 Mediterranean countries: Italy, Spain, Slovenia and Croatia. The key message of the project is to overcome the barriers to develop forest-based bioenergy value chain as pillar of the bioeconomy at local level, promoting the sustainable and subsidiary forest management as a tool to rural development in protected areas. It is noted that it is highly important to preserve the current state of nature, but also to stimulate sustainable rural development.

PPT Analysis of the barriers and opportunities across the forest-based bioenergy value chain / Análisis de barreras y oportunidades en la cadena de valor bioenergética de base forestal.

In the presentation is included the results of the D.3.3.1 "Barriers and potential solutions for increasing biomass production in the protected areas". Concretely, it is explained the administrative, technical, social and economic barriers and potential solutions for enhancing forest-based bioenergy projects in the Mediterranean protected areas, involving the active participation of the key stakeholders. The selection of the 6 key barriers has been the result of a previous exhaustive analysis of the participating regions in the ForBioEnergy project.

PPT Comparison of two methods of forestry interventions for bioenergy purposes / Comparación de dos métodos de aprovechamiento forestall con fines bioenergéticos

The general objective of this presentation is to compare harvesting methods (integrated wood-biomass and whole tree harvesting system) in a representative 60 years old

reforestation of *Pinus halepensis* for bioenergy purposes. The harvesting and logistics costs between forest and bioenergy plant were analysed, as well as the assortment of woodchip quality in laboratory. The factors evaluated were: performance; economic/financial profitability; impacts; energy balance and biomass quality.

PPT Practical case: environmental assessment after forestry interventions

An environmental assessment is introduced to evaluate the executed forest interventions at short, mid and long term.

The forestry interventions are:

- Case 1: shelterwood method
- Case 2: environmental restoration after forest fires. The method uses for the 2nd case is according to the Forest Strategy Plan of the Community of Valencia - Plan de Acción Territorial Forestal de la Comunitat Valenciana (PATFOR).

The criteria to assess are quality of soil, biodiversity, carbon, erosion, aquifer recharge, forest fires risk and landscape.

PPT Ecoinnovation. Valorisation of the biomass through a District heating

The concept, advantages and the development of a District Heating (DH) is reflected in this presentation. Specifically, the development of the DH includes:

- Audit: the demand curve of the buildings and suggested improvements (energy efficiency)
- Network district design in Llíria: setting limits of the network (selection of the users' buildings of the network and calculation of the thermal energy demand); hydraulic calculation; choice equipment and budget.
- Characterization of the availability of the agroforest resources

Other District heating examples are given in the PPT.

PPT Forest bioenergy: integral management of the emissions

The SimBioTIC project is introduced as a solution at local level which has been implemented in Llíria (Valencia). The project is for smart and sustainable cities because it is included:

- Development of ICT tools to fight against climate change
- To improve the sustainable facilities
- To increase the efficiency of the use of resources.
- Active civic participation uso de los recursos

The presentation is focused on its scorecard which includes the GHG emission management tool, policy-making and simulations based on social, economic and environmental criteria.

PPT Next steps within the ForBioEnergy project

ForBioEnergy implements innovative tools and operating procedures to overcome the existing gaps in the bioenergy sector in regions and countries with high potential. The next steps of the project are explained, emphasizing the Action Plan for a new regulatory framework and permit route promoting the energy use of biomass and the application of sustainable indicators in the assessment of forestry interventions in Natura 2000 sites.

1.3 Training course material (PPT presentations)

Presentation number	Title of the presentation in English and national language
1	ForBioEnergy project: Forest Bioenergy in the Mediterranean protected areas. *Bioenergía forestal en áreas protegidas del Mediterráneo*
2	Analysis of the barriers and opportunities across the forest-based bioenergy value chain. *Análisis de barreras y oportunidades en la cadena de valor bioenergética de base forestal*
3	Comparison of two methods of forestry interventions for bioenergy purposes. *Comparación de dos métodos de aprovechamiento forestal con fines bioenergéticos*
4	Practical case: environmental assessment after forestry interventions *Caso práctico: evaluación ambiental tras intervenciones forestales*
6	Ecoinnovation. Valorisation of the biomass through a District heating. *Ecoinnovación. Valorización de la biomasa a través de un District heating*
7	Forest bioenergy: integral management of the emissions. *Bioenergía forestal: Gestión integral de las emisiones*
8	Next steps within the ForBioEnergy project. *Próximos pasos en el proyecto ForBioEnergy*

2 TRAINING NO. 2: ASSESSMENT OF OPPORTUNITIES AND BENEFITS OF THE UTILIZATION OF FOREST BIOMASS

2.1 Introduction to training material

	Authors of presentation	*Title of the presentation*
1	Rafael Mossi (COCINSV)	Presentation of the ForBioEnergy training courses program
2	Rebeca Aleix (AMUFOR)	Opportunities of forest bioenergy for the development at the local level
3	Victoria Lerma (ITACA-UPV)	Forest biomass utilization for bioenergy purposes in the Mediterranean forest
4	Edgar Lorenzo (ITACA-UPV)	Interactive ICT tools in the field of forest bioenergy and climate change mitigation
5	Bruno Armengot (ITACA-UPV)	Valorization of forest biomass in District Heating solutions

2.1.1 Main aim and goals of training

Goal of the training

The objective of the 2nd training course is to present the results and technical advances of the ForBioEnergy project, as well as to transfer knowledge through the presentations and the active discussion among the participants on the assessment of opportunities and benefits arising from the utilization of forest biomass in the Mediterranean protected areas.

The aim of the training was:

- To present the opportunities and benefits arising from the utilization of forest biomass in Natura 2000 sites.
- To present the potentials of wood biomass extraction for bioenergy purpose in Mediterranean protected forest.
- To present interactive ICT tools in the field of the forest bioenergy and the climate change mitigation.
- To present how the valorisation of the forest biomass can be accomplished.

Target groups: technicians of local administrations and technicians in general with regard to environment, forest management, renewable energy sources and innovation, energy companies and business organizations.

Target groups reached in the training: Forest technicians, companies, environment research centers, researchers and regional deputies.

2.1.2. Description of topic

The training course was focused on the benefits and opportunities of the utilization of forest biomass in the Mediterranean protected areas. The objective of the ForBioEnergy project and its connection with the situation of the Valencia region was explained. The lectures allow understanding what are the opportunities and benefits issuing from the extraction of forest biomass and its valorisation, as well as the use of new ICT tools to tackle climate change. For this reason, besides emphasizing the necessity to propose new actions to unblock the situation of the forestry sector, during the training was also pointed out the importance to implement forest assessment across the forest-based bioenergy value chain in the Natura 2000 protected areas.

2.1.3. Methods used

The methods used were an oral presentation with good forest practices examples, interactive questions after each thematic presentation and a final active discussion.

References

- ForBioEnergy project (2018). D.3.5.1: Impact assessment of increase biomass use in the short, medium and long term in the protected areas.
- ForBioEnergy project (2017). WP3 D.3.3.1 Barriers and potential solutions for increasing biomass production in the protected areas.
- ForBioEnergy project (2017) D.3.2.1. Baseline review of the study areas
- ForBioEnergy project brochure (2017).
- Lerma Arce, V. (2015). Planificación, logística y valorización de biomasa forestal residual en la provincia de Valencia
- PATFOR (2013): Plan de Acción Territorial de la Comunitat Valenciana. Conselleria de Agricultura, Medio Ambiente, Desarrollo Rural y Cambio Climático. Generalitat Valenciana.
- Integral SimBioTIC project from the multidisciplinary group ICTvsCC of the Institute of Information and Communication Technologies (ITACA), belonging to the Polytechnic University of Valencia (UPV).

2.2. English summary: training material

Training title: Assessment of opportunities and benefits of the forest biomass utilization.

Authors of the training materials:

- Rafael Mossi, COCINSV
- Rebeca Aleix, AMUFOR
- Victoria Lerma, ITACA-UPV
- Bruno Armengot, ITACA-UPV
- Edgar Lorenzo, ITACA-UPV

Short presentation of training materials:

The programme started with the introduction of the ForBioEnergy project (objectives and results obtained), including the role of AMUFOR and CCV in it. There is a misinterpretation regarding the guidelines to manage Natura 2000 sites in the Community of Valencia which difficult its adequate application in the region. In the lectures are explained the opportunities and benefits to carry out good forest practices in the Mediterranean protected areas.

PPT ForBioEnergy training seminars program

The relevance of the training course in the ForBioEnergy project was explained, providing information about the next trainings till the end of the project: Dates and specific subjects were given.

PPT Opportunities of forest bioenergy for the development at the local level

This lecture starts with the explanation of the current situation of the forestry sector in the Community of Valencia "Lack of management and socioeconomic activity" which is traduced in "barriers". Therefore, with unblocking these barriers, there are opportunities in the sector which allow improving rural development through the creation of (in)direct employment and providing education and training. Moreover, the application of a SFM has multiple benefits in the environment (e.g. prevention of forest fires, improvement of the ecosystem and its services, etc.) and in the economy (e.g.: forest enterprises across the forest-based bioenergy value chain, local investors, valorization of forest residues, etc.).

Hence, it is important to do an assessment derived from the forest biomass utilization in different terms (short, medium and long) in order to quantify the impacts, which allow

determining the social, economic and environmental (biotic and abiotic) effects that a forest operation has across the forest-based bioenergy value chain.

PPT Forest biomass utilization for bioenergy purposes in the Mediterranean forests

The low energy needed to mobilize forest biomass results in a great potential for replacing non-renewable fuels by forest biofuels. Furthermore, the mobilization of forest biomass contributes to the reduction of fires through SFM and the reactivation of the local economy by the valorization of natural resources, as well as the diminution of energy dependence.

Finally, the integrated harvesting system optimizes the use of biomass in a 60 years old reforestation of *Pinus halepensis* compared to the "whole tree" system at a productive, economic and ecological level.

PPT Interactive ICT Tools in the field of forest bioenergy and climate change mitigation

GEMINIS (Global Emission Management INteractive Information System) is a tactical and operative tool to manage the GHG emissions for decision making by public decision makers, which is included in the SIMBIOTIC project. Concretely, the GEMINIS tool allows doing simulations as, for example, the implementation of a centralized system "District Heating" in a municipality or the replacement of a "X" kW C diesel boiler with a biomass boiler. Furthermore, there are business opportunities for local enterprises with respect to the digital platform for evaluation and discussion of opportunities for system companies (e.g. carbon compensation mechanisms) and technology-based for the efficiency in the management of emissions (e.g. TICs) and in low-carbon economy (e.g. bioenergy).

1. Presentation: VALORIZATION OF FOREST BIOMASS IN DISTRICT HEATING SOLUTIONS

The District Heating (DH) system performs a valorization of the forest residues. The forest residues generate after implementing a SFM are calculated through the application of a methodology based on the thesis of Lerma V. (2015). A zoning of the agroforestry stand of the municipality is done, as well as the calculation of the availability of usable residual forest biomass and the availability of residual agricultural biomass. Concretely, the DH provides the supply of sanitary hot water and heating with residual biomass from the local forest. On the other hand, where the thermal central is located, the objective is that this serves as a showroom, giving visibility to the utilization of biomass as a renewable energy source and raise-awareness by means of education, training, divulgation and exemplification.

2.3. Training course material (PPT presentations)

Presentation number	Title of the presentation in English and national language
1	Presentation of the ForBioEnergy training courses program. *Presentación del programa de seminarios de formación ForBioEnergy*
2	Opportunities of forest bioenergy for the development at the local level. *Oportunidades de bioenergía forestal para el desarrollo a nivel local*
3	Forest biomass utilization for bioenergy purposes in the Mediterranean forest. *Aprovechamiento de biomasa para usos bioenergéticos en monte mediterráneo*
4	Interactive ICT tools in the field of forest bioenergy and climate change mitigation. *Herramientas TIC interactivas en el campo de la bioenergía forestal y la mitigación del cambio climático.*
5	Valorization of forest biomass in District Heating solutions. *Valorización de la biomasa forestal en soluciones District heating*

3. TRAINING NO. 3: ACTION PLAN FOR UNBLOCKING THE BARRIERS THAT HINDER THE SUSTAINABLE FOREST MANAGEMENT IN PROTECTED AREAS

3.1 Introduction to training material

	Authors of presentation	*Title of the presentation*
1	Rebeca Aleix, AMUFOR	Environmental and socioeconomic evaluation of the use of forest biomass.
2	Gregor Baez, HEIZOMAT	Biomass valorization to energy: boilers, wood chippers and equipment of the use of biomass with energy purposes.
3	Fernando Pradells, AMUFOR	Conflict situation in the local area: representative case study "Forest Management Plan in Enguera (Valencia).
4	Rebeca Aleix, AMUFOR José Vicente Oliver, UPV-ITACA	Action Plan to unblock administrative, technical, environmental and socioeconomic barriers.
5	José Vicente Oliver, UPV-ITACA	Dynamic group of priority barriers referred in the Action Plan.

3.1.1. Main aim and goals of training

Main aim and goals of training

Goal of the training:

The objective of the 3rd training course is to introduce the results and technical advances of the ForBioEnergy project, as well as to transfer knowledge through the presentations and the active discussion among the participants on the Action Plan for unblocking the barriers that hinder the sustainable forest management in protected areas.

The aim of the training was:

- Importance of environmental and socioeconomic assessment in the short, medium and long term.
- Energy valorization of the biomass: boilers, wood chippers and equipment of the use of biomass with energy purposes.

- Conflict situation in the local area: representative case study "Forest Management Plan in Enguera (Valencia)".
- Action Plan to unblock administrative, technical, environmental and socioeconomic barriers

Target groups: The seminar is aimed at technicians in local administrations and technicians in general in the field of environment, forest management, renewable energy and innovation, energy companies and business organizations or organizations.

Target groups reached in the training: The participants were mostly researchers and technicians. Moreover, in the training was represented as target groups the local public authorities, SME, enterprises and interest group including NGOs.

3.1.2. Description of topic

The objective of the ForBioEnergy project is "To develop the forest-based bioenergy value chain as a pillar of circular bioeconomy at the local level in the rural Mediterranean areas based on regional cooperation, overcoming the barriers that slow-down its development"

The current regulatory restrictions, as well as the lack of appropriate action plans, prevent and slow down the use of biomass. A key element of the forest preservation effort is the environmental assessment derived from the short, medium and long term exploitation, as well as the development of an Action Plan for a new regulatory framework that facilitates the energy valorization of forest biomass and simplifies the roadmap, ensuring the sustainability of this particular value chain and the forestry sector, in general.

3.1.3. Methods used

The methods used were:

1. Oral presentations.
2. Interactive question after each thematic presentation.
3. Final discussion.

3.1.4 References

- ForBioEnergy project (2018). D.4.2.1 Workshops' reports. Action Plan for unblocking the barriers that hinder the sustainable forest management in protected areas.
- ForBioEnergy project (2018). D.3.5.1: Impact assessment of increase biomass use in the short, medium and long term in the protected areas.
- ForBioEnergy project (2017). WP3 D.3.3.1 Barriers and potential solutions for increasing biomass production in the protected areas.
- ForBioEnergy project (2018). WP3 D.3.6.1 Action Plan for a new regulatory framework and permit route in protected areas.
- HEIZOMAT (2018). Presentation of the energy valorization of the biomass.
- LIFE+ BIOENERGY AND FIRE PREVENTION (2013). Contribution of forest biomass generated in the prevention of forest fires in the EU energy strategy. LIFE09 ENV/ES/000450. 2011-2013.

3.2 English summary

Training title: Action Plan for unblocking the barriers that hinder he sustainable forest management in protected areas

Authors of the training materials:

- Rebeca Aleix, AMUFOR
- Gregor Baer, HEIZOMAT
- Fernando Pradells, AMUFOR
- José Vicente Oliver, UPV-ITACA

Short presentation of training materials

The program started with the introduction of the ForBioEnergy project (objectives and results obtained), including the role of AMUFOR and CCV in it. The importance of the Natura 2000 sites in the Valencian Community was also explained; Natura 2000 represents 40% of the territory.

The forests of the Natura 2000 sites have to be managed to achieve multiple functions (e.g. wood production); as long as the specific conservation objectives of the site are respected and actively contribute to its achievement (EU 2015).

Finally, it was explained the previous seminars held (December 20, 2017 and April 13, 2018) and the objective of this one: importance of environmental and socioeconomic assessment in the short, medium and long term; energy valorization of the biomass; conflict situation – representative case of Enguera; Action Plan for a new regulatory framework and permit route in protected areas

PPT Environmental and socioeconomic evaluation of the use of forest biomass

Description of the ForBioEnergy methodology for the impacts assessment derived from the use of biomass with its indicators at short, medium and long term. The environmental impact –measured by its magnitude and reversibility- is the effect that the human activity generates on the environment (negative and positive impacts). Within the ForBioEnergy project the assessment has been done in: plant and animal communities, abiotic and socio-economic components and in environmental services.

Apart of explaining deeply the environmental and socio-economic indicators and showing an example of the matrix filled in, the conclusion was that the use of biomass improves the socio-economic and environmental role of the area in which it is implemented, allowing that Natura 2000 areas be an important opportunity for the development and growth (also in economic terms) of the populations and local activities.

PPT Biomass valorization to energy: boilers, wood chippers and equipment of the use of biomass with energy purposes

Heizomat develops and manufactures energy systems since 1982 in order to cover energy needs with natural renewable resources.

Heizomat analyses the situation of the biomass for energy purposes, including examples of some facilities and future project regarding the vision of its enterprise. The examples analysed are linked with the burning of agroforestry residues which are not used to provide bioenergy. The current situation is that there are no boilers, there is no consumption and the biomass has no value. In addition, there is an ignorance of the possibilities offered by the biomass and little confident about the functioning of these works and the gas oil is cheaper and people do not want to complicate their life.

Moreover, a part of the conservation of the forest with the use of biomass, this biofuel substitute other non-renewable fossil fuels to provide heat, DHW, air conditioning at residences, industries, Therefore, the benefits of the valorisation of the forest biomass are the avoided emissions of GHG, to save money, creation of local jobs - improve the economy at the local level, stability of the expenses, among many more environmental benefits such as forest conservation and the reduction of the risk of forest fires. Finally, additional value has to be found for this type of projects, to put boilers in order to use the prunings (public administration), to provide local works, to encourage the good practices...

PPT Conflict situation in the local area: representative case study "Forest Management Plan in Enguera (Valencia)

Within the ForBioEnergy project and D.3.6.1 "Action Plan for a new regulatory framework and permit route in the protected areas" a representative case study is analysed which is the forest management plan of Enguera.

In order to introduce participants the situation, in the PPT is explained: what is a forest management plan; the obligation of the administration to have it; the ancestral management of the public forests in Enguera, as well as the actions implemented by other public administrations.

In the PPT is explained the procedure which had to be followed in order to get the approval of the forest plan and the recent performance. Nevertheless, during the execution of the plan, some news appears denouncing the forest management in Enguera.

The consequences were the legal non-compliance to manage, dismissal of more than 30-40 people and the strengthening of the *Tomicus* plague.

Finally, it is noted that the project was pioneered and applauded by all estates, but the social pressure of specific groups and the acquiescence of the regional government concludes that the forestry sector is a weak sector in the Valencian Community.

PPT Action Plan to unblock administrative, techncial, environmental and socieconomic barriers

The objective is to promote the socioeconomic and environmental activity of rural municipalities through the use of forest resources, while they are conserved for future generations, in addition to unblock the situation of the forestry sector in the Valencian Community and implement a simplified roadmap to ensure the sustainability (social, environmental and economic) of the forest-based bioenergy value chain.

During the PPT, the previous analyses were introduced to participants (D.3.3.1, A.4.3, A.4.2.). After that, the regional action plan was explained including the specific objectives (SO) with the context and the associated barrier, the required actions which have to be achieved and who are the stakeholders involved. Therefore, 3 SO, 3 barriers, 7 actions and 13 specific actions were explained.

Finally, it is concluded that formulas as the public-private cooperation have to be established, to mobilize the biomass in a sustainable and active way, as well as the encouragement of agroforestry cooperatives and associative management.

PPT Dynamic group of priority barriers referred in the Action Plan

During the presentation of the Action Plan, the participants of the training course provided us a feedback about the priority barriers referred in the Action Plan.

3.3 Training course material (PPT presentations)

Presentation number	*Title of the presentation*
1	**Environmental and socioeconomic evaluation of the use of forest biomass.** *Evaluación ambiental y socioeconómica del aprovechamiento de biomasa forestal*
2	**Biomass valorization to energy: boilers, wood chippers and equipment of the use of biomass with energy purposes.** *Valorización energética de la biomasa: calderas, astilladoras y equipos de aprovechamiento energético*
3	**Conflict situation in the local area: representative case study "Forest Management Plan in Enguera (Valencia).** *Situación de conflicto en el área local: estudio de caso representativo "Proyecto de Ordenación Forestal en Enguera (València)*
4	**Action Plan to unblock administrative, techncial, environmental and socieconomic barriers.** *Plan de Acción para desbloquear barreras administrativas, técnicas, ambientales y socioeconómicas*
5	**Dynamic group of priority barriers referred in the Action Plan.** *Dinámica en grupo de barreras prioritarias contempladas en el Plan de Acción*

4. TRAINING NO. 4: PLANNING OF BIOMASS FOR ENERGY PURPOSES

4.1. Introduction to training material

	Authors of presentation	*Title of the presentation*
1	David Vinué, UPV-ITACA	Forest planning for bioenergy in the protected areas: local analysis.
2	José Vicente Oliver, UPV-ITACA	Forest-based bioenergy supply chain in the protected areas, policy coordination and integration in a sustainable bioeconomy.
3	Victoria Lerma, UPV-ITACA	Planning biomass for energy and its potentials.
4	Rebeca Aleix, AMUFOR	Impact of the carbon footprint in the forest-based bioenergy value chain.
5	Edgar Lorenzo, UPV-ITACA	Greenhouse Gas (GHG) emissions management tool as Smart City against Climate Change.

*Only technical PPTs are included.

4.1.1 Main aim and goals of training

The objective of the training course is the presentation of the results and technical advances of the ForBioEnergy project, as well as the transfer of knowledge on the planning of biomass for energy purposes.

Target groups: The training course is aimed at technicians in local administrations and technicians in general in the field of environment, forest management, renewable energy and innovation, energy companies and business organizations.

Target groups reached in the training: The participants were mostly researchers; local councils – mayors, technicians, workers; associations of municipalities, provincial council, companies related to the forestry sector.

4.1.2 Description of topic

ForBioEnergy aims to achieve the use of forest biomass in the protected areas (Natura 2000 sites) for rural development and mitigation of climate change.

Firstly, it is necessary to quantify the biomass that our forests have and the potential to valorise it as bioenergy. In this case, the use of new technologies such as remote sensing is noted due to its efficiency and low cost to estimate it.

The forest-based bioenergy value chain has a high potential at the three levels of sustainability (environmental, social and economic). The coordination of policies and its integration within the sustainable bioeconomy framework is essential to overcome the barriers and implement the actions proposed by ForBioEnergy. Hence, the use of solid biofuels is a renewable alternative that has to be considered in policies; their high quality has been already shown by scientific analysis.

On the other hand, a key issue is the role of forest ecosystems in capturing and storing carbon atmosphere and their impact across energy value chain. At this point, there are ICT tools which are managing GHG emissions to face climate changes in a context of Smart City. The aim is to contribute in the decision making of companies and public administrations.

4.1.3 Methods used

The methods used were:

1. Oral presentations.
2. Interactive question after each thematic presentation.
3. Final discussion.

4.1.4 References

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4.2. English summary

Training title: PLANNING OF BIOMASS FOR ENERGY PURPOSES

Authors of the training materials:

- David Vinué, UPV-ITACA
- José Vicente Oliver, UPV-ITACA
- Victoria Lerma, UPV-ITACA
- Rebeca Aleix, AMUFOR
- Edgar Lorenzo, UPV-ITACA

Short presentation of training materials

PPT Forest planning for bioenergy in the protected areas: local analysis

The quantification of the biomass and the cost of obtaining this data is essential. Biomass is increasing; there is a lack of management of forest stands and the means of planning and execution. However, there has been an advance in remote sensing (Copernicus), there is a imbalance between physical studies and forestry. In addition, the forest should be considered as a carbon sink and simple replication.

Therefore, the study of three zones in Castellón, Valencia and Alicante is introduced, in which a segmentation of forest stands and a forest inventory is implemented. Thus, through remote sensing, minimal errors are obtained for forest management, cost reduction and investment in productive work.

Finally, the aim is to include remote sensing information in the management plans, as well as to overcome the multiple administrative barriers that impede forest management.

PPT Forest-based bioenergy supply chain in the protected areas, policy coordination and integration in a sustainable bioeconomy

The ICTvsCC group deals with ICT against climate change. The group develops advanced technological solutions and tools to support decision-making for the adaptation and mitigation of climate change and the development of the low-carbon bioeconomy.

In this presentation, the EU Strategic Research Agenda was addressed, specifically the 2020 vision of the European Forestry Platform, the R&D areas that include new products, process optimization, raw materials, sustainable forest management, strengthening of the sector, as well as the experience in FP7 and H2020.

Regarding the new strategic approach to forestry research, the situation of the S-Europe is presented, which result is an expenditure of public funds due to the abandonment of SFM and the rising costs of preventing and extinguishing forest fires. Thus, in the strategic framework of FAO, the forest bioeconomy and climate change - technological solutions - are presented as a solution to this situation.

The traditional forestry sector of the twentieth century together with R+D+i "creation of companies" forces (emerging drivers) and enables (enabiling drivers) the forest bioeconomy and mitigation of climate change of the 21st century. The hierarchical planning of the research has to be at three levels: "operational (4 years), tactical (10 years) and strategic (20 years)".

On the other hand, the challenges R&D forest bioeconomy, applied to the territory, have to address the revitalization of SFM, the forestry sector as an engine of adaptation and mitigation to climate change, improving the quality of products and services in global competition, the improves perception and consumption by urban society and the stopping rural depopulation.

Finally, the necessary pillars, the integral system of governance of emissions and sinks and future initiatives are introduced,

PPT Use of biomass for energy and its potential

The bioenergy in the development in the Comunitat Valenciana is based on the huge potential of biomass sources. The forest biomass is characterized to be more than 50% of the forest land, the increasing forest area and stocking volume in large unmanaged forests and the fire prevention silviculture.

The sustainability of the forest-based bioenergy value chain at the local level is explained in terms of the social impact, local economy and environmental benefits.

On the other hand, the forest-based bioenergy potential is also explained, including the stocks and the possibility of the wood and biofuels in the forest land of the Comunitat Valenciana according to the PATFOR (2013), in addition to include how the forest resources could supply the regional energy demand and the reduction of CO_2 emissions.

The quality of biofuels is explained according different systems of harvesting, as well as the industrial projects at a small scale in a CHP (combined heat and power plant) and pellet plants. Finally, the direct employment was also detailed as example of the integral project in Enguera, including the next challenges to face.

PPT Impact on the carbon footprint in the forest-based bioenergy value chain

Forests are the biggest terrestrial carbon sinks, being the atmospheric carbon the most GHG that contributes to global warming. Therefore, there is need a transition to multifunctional management of the ecosystem that integrates active carbon management.

The roadmap marked by the EU in order to reduce its emissions is in line with the Paris Agreement COP21 (2016-2020) whose objective is to establish "a low carbon economy by 2050". Forests have a key role in mitigating carbon emissions as

a sink (capture CO_2), storage (amount of C stored in forest ecosystems) and substitution (amount of carbon sequestered in products derived from wood plus avoided emissions).

Therefore, sustainable use and active management are key elements in the energy transition towards carbon neutrality. However, the regional context is different; currently, it could be extracted 7 times more than what is currently obtained.

Finally, the current challenge is to quantify the sink effect of the different forest stores, as well as the emissions due to deforestation, forest fires and other disturbances in the different stages of the forest-based bioenergy value chain (forest harvesting, transport, transformation in solid biofuels, distribution and energy consumption) to obtain the analysis of energy balances (inputs and outputs).

PPT Greenhouse Gas (GHG) emissions management tool such as Smart City against Climate Change.

With the industrial revolution, the global fossil carbon emissions have increased, as well as the effects of the climate change. TRUST 2030 is a project which aims at the "TRansición Urbana Sostenible medianTe métricas para la decisión pública basadas en herramientas big data - Sustainable urban transition through metrics for public decision based on big data tools". Specifically, governance is integrated in different modules: "alerts, simulation, stock management, financing mechanisms, risk management, business opportunities and standardized reports" at the sectorial level; urban mobility (energy - without transport), integrated water management (energy (without transport and waste) and green areas (agriculture, livestock and other land uses).

TRUST 2030 is based on developing solutions based on Big-data tools to the common challenge of the active fight against climate change and the energy transition towards a low-carbon economy. In addition, it is explained how companies are working on this project, providing information on integral management of water and GHG emissions; the interrelation between green infrastructures and carbon sinks and the interrelation between transport and mobility and GHG emissions in an urban environment. Within this training course, the methodology and the different results were introduced to participants.

One of the conclusions refers to the importance of integrating companies in projects in order to obtain better results, precision and to ensure simulation and decision-making based on the quantified environmental impact.

4.3. Training course material (PPT presentations)

Presentation number	*Title of the presentation in English and national language*
1	**Forest planning for bioenergy in the protected areas: local analysis.** *Planificación forestal orientada a la bioenergía en áreas protegidas: análisis locales.*
2	**Forest-based bioenergy supply chain in the protected areas, policy coordination and integration in a sustainable bioeconomy.** *Cadena de suministro bioenergética de base forestal en áreas protegidas, coordinación de políticas e integración en el marco de una bioeconomía sostenible.*
3	**Planning biomass for energy and its potentials.** *Uso de la biomasa para energía y sus potenciales.*
4	**Impact of the carbon footprint in the forest-based bioenergy value chain.** *Impacto de la huella de carbono en la cadena de valor de la bioenergía.*
5	**Greenhouse Gas (GHG) emissions management tool as Smart City against Climate Change.** *Herramienta de gestión de emisiones de Gases de Efecto Invernadero (GEI) como Smart City frente al Cambio Climático.*

TRAINING NO. 5: CURRENT SITUATION OF BIOENERGY VALORIZATION OF FOREST BIOMASS. REQUIREMENTS AND QUALITY STANDARDS.

5.1 Introduction to training material

	Authors of presentation	*Title of the presentation*
1	Joaquín Panella	Presentation of the training course
2	Rebeca Aleix	Barriers of the forest-wood-energy supply chain in the Comunitat Valenciana.
3	Bruno Armengot	Energy valorization of the forest biomass at the local level through District heating.
4	Victoria Lerma	Requirements and standards of woodchips quality.
5	David Bordes*	Dossier for field trip.

It is noted that Joaquin Panella of the Local Action Group (LAG) – *Grupo de Acción Local (GAL)* - of "Rural Munyanta d'Alacant" started the training course, explained its area of work. At the end, after the theoretical part, David Bordes of PegoViu gave to participants a dossier for the field trip with practical information about the 2 visited plots.

5.1.1 Main aim and goals of training

Goal of the training:

The objective of the 5th training course was focused on the results and technical advances of the ForBioEnergy project, as well as on the transfer of knowledge about the requirements and quality standards of forest biomass. In a second part, we discussed on the field the constraints to face in the management of the forest stand for the extraction of biomass.

The aim of the training was:

- The restrictions or barriers across forest-based bioenergy value chain at MED partner level in general and in the Comunitat Valenciana, in particular.
- Energy valorization of the biomass through a district heating at the local level.

- Requirements and standards of woodchips quality.
- Discuss in the field the constraints to face to use the forest biomass.

Target groups: The training course is aimed at technicians in local administrations and technicians in general in the field of environment, forest management, renewable energy and innovation, energy companies and business organizations or organizations.

Target groups reached in the training: The participants were from the university, local actions groups, councils, agricultural cooperative and collective defense of the territory.

5.1.2 Description of topic

First part of the training course: theoretical part with presentations about the project. Specifically, about the barriers of the forest-wood-energy supply chains, the energy valorization of forest biomass at the local level, as well as what are the requirements and standards of the quality of woodchips. A high participation of the attendants is noted. After each presentation, participants answered the document of questions.

Second part of the training course: practical part where participants were to the plots located in two municipalities "Beniaia" and "Vall d'Alcalà" in order to see the historical evolution of the landscape and the possibility of extracting forest biomass in private and public areas.

5.1.3 Methods used

The methods used were:

1. Oral presentations.
2. Interactive question after each thematic presentation.
3. Interactive discussion in the practical part of the training (field trip)

5.1.4 References

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Proforbiomed (2010-2013), proyecto MED estratégico financiado por el programa de Cooperación Territorial Transnacional con el objetivo de promover el uso de la energía renovable en las zonas mediterráneas europeas mediante el desarrollo de una estrategia integrada para el uso de la biomasa forestal, la recuperación de su potencial, el desarrollo de los aspectos técnicos y jurídicos y la promoción de su uso para producir energía. http://proforbiomed.eu/

REHAU. Unlimited Polymer Solutions. PUEBLOS BIOENERGÉTICOS. El camino hacia el abastecimiento energético renovable.

UNE-EN ISO 17225. Biocombustibles sólidos. Especificaciones y clases de combustibles.

5.2 English summary

Training title: Current situation of bioenergy valorization of forest biomass. Requirements and quality standards.

Authors of the training materials:

- Joaquín Panella
- Rebeca Aleix
- Bruno Armengot
- Victoria Lerma
- David Bordes

Short presentation of training materials

PPT Barriers of the forest-wood-energy supply chain in the Comunitat Valenciana.

In this presentation, the ForBioEnergy project was introduced, with the selected objectives according to D.3.6.1, being focused on the implementation of a new regulatory framework and permit route to improve the integral use of the forest biomass with energy purposes.

The six key barriers identified in D.3.3.1 were explained and after that, it was presented the two levels of action. The first one was at the MED participants countries level (Croatia, Slovenia, Italy and Spain) and second one at Comunitat Valenciana level.

Concretely, at the MED level, the barriers were classified in three bocks according their character "social (1) economic and administrative-legislative (2) and technical (3)". In each block, the specific barriers and the main actions were mentioned. At the Comunitat Valenciana level, the classification was done by barriers. In total, there were three barriers with different characters: technical (1), social (2) and administrative-legislative (3).

Each type of barrier was explained, including: specific barrier, reason (why it is a barrier), solution and action.

Finally, it was introduced that all this actions are done to get a sustainable development in which there is a synergy between the forest management/use and the protected areas, as Natura 2000.

PPT Energy valorization of the forest biomass at the local level through District heating

The Simbiotic project is developed by the ICTvsCC group at the University Polytechnic of Valencia. The project is structured in 5 axes: digital platform and participation (1), energy efficiency in public buildings (2), energy transition (3), balanced scorecard (4) and communication (5).

Concretely, the conference was focused on axis 2 in order to explain how the biomass can be valorised through a district heating and what the main advantages to implement it are. A clear example with data was shown to participants based on the study done in Llíria (Valencia) with the objective of supplying SHW (Sanitary Hot Water) and heating with residual biomass from the forest of LLíria. For that, a thermal energy with biomass is loaded to cover, in a first instance, public buildings. The specific technical requirements were also explained, the consumption forecast (energy demand, fuel consumption, supply forecasting), as well as the emissions and cost of the DH.

Other examples from the other regions were introduced to partners.

PPT Requirements and standards of woodchips quality.

The current situation-problematic of the Mediterranean forests included in the Natura 2000 site was introduced, in addition to how the use of biofuels based on residual forest biomass - such as woodchips and pellet - can reverse this situation. For this, it is required to know the solid biofuel's quality of the most representative species in the region, as well as the variables which determine this quality.

In the presentation, it was also explained who has the competences to normalize and certify the solid biofuels, what are the requirements to achieve the certification and the list of standards (ISO/UNE, ENplus, BIOmasud…).

The different steps to elaborate them and the obtained results according to the different biomass systems were explained with detail, as well as the main discriminant factors in the assessments for each solid biofuel.

Dossier: field trip

In the dossier which was given to participants, it was included:

- Orthophotos with the cadastral plots
- Evolution of the population in the two municipalities.
- Explanation of containment areas.
- Explanation of the area of infrastructure protection in urban forest interface; isolated infrastructures.
- Engineering manual: infrastructures to prevent forest fires. Technical standard for fire protection areas (GVA)
- Practical example of fragmented forest ownership.

5.3 Training course material (PPT presentations)

Presentation number	Title of the presentation in English and national language
1	**Presentation of the training course.** *Presentación del seminario*
2	**Barriers of the forest-wood-energy supply chain in the Comunitat Valenciana.** *Barreras de la cadena monte bioenergía en la Comunitat Valenciana*
3	**Energy valorization of the forest biomass at the local level through District heating.** *Valorización energética de la biomasa forestall a nivel local mediante District heating*
4	**Requirements and standards of woodchips quality.** *Requisitos y estándares de callidad de astillas de madera*
6	**Dossier for field trip.** *Dossier campo.*

TRAINING NO. 6: CURRENT SITUATION OF THE INTEGRAL USE OF THE FOREST BIOENERGY IN MEDITERRANEAN CONDITIONS. NEXT STEPS.

6.1 Introduction to training material

	Authors of presentation	*Title of the presentation*
1	José Vicente Oliver Edgar Lorenzo	Current situation of the integral forest biomass use for energy purposes in Mediterranean conditions
2	Rebeca Aleix	Action Plan of the forest-based bioenergy value chain in the Mediterranean basin
3	Bruno Armengot	Case study of the energy valorization of forest biomass at the local level through District heating
FIELD TRIP	Héctor Vives	Explanation of actions implemented in the recreational area of La Tejería and Artaj.

6.1.1 Main aim and goals of training

Goal of the training:

The objective of the 6th training course was focused on the results and technical advances of the ForBioEnergy project, on the transfer of knowledge about current situation (and the next steps) of the integral use of forest bioenergy in Mediterranean conditions), as well as on the acquisition of knowledge about the forest actions implemented in Andilla.

Target groups: The training course is aimed at technicians in local administrations and technicians in general in the field of environment, forest management, renewable energy and innovation, energy companies and business organizations or organizations.

Target groups reached in the training: Regional public authority, local public authority, higher education and research, SMEs and business support organisation.

6.1.2 Description of topic

The 6th training course was focused on:

- the results and technical advances of the ForBioEnergy project, as well as on the transfer of knowledge about:
    - Current situation of the integral forest biomass use for energy purposes in Mediterranean conditions
    - Action Plan of the forest-based bioenergy value chain in the Mediterranean basin
    - Case study of the energy valorization of forest biomass at the local level through District heating
- the forest actions implemented in Andilla and concretely:
    - In the recreational area of "La Tejería" where post-fire (1993) silvicultural treatments have been implemented in the young forest and,
    - In Artaj where silvicultural actions have been implemented to potentiate the regenerate of the fire (2012).

6.1.3 Methods used

The methods used were:

1. Oral presentations.
2. Interactive question after each thematic presentation.
3. Interactive discussion in the practical part of the training (field trip)

6.1.4 References

ForBioEnergy project (2018). WP3 D.3.6.1 Action Plan for a new regulatory framework and permit route in protected areas.

Integral SimBioTIC project from the multidisciplinary group ICTvsCC of the Institute of Information and Communication Technologies (ITACA), belonging to the Polytechnic University of Valencia (UPV)

PATFOR (2013): Plan de Acción Territorial de la Comunitat Valenciana. Conselleria de Agricultura, Medio Ambiente, Desarrollo Rural y Cambio Climático. Generalitat Valenciana.

REHAU. Unlimited Polymer Solutions. PUEBLOS BIOENERGÉTICOS. El camino hacia el abastecimiento energético renovable.
Technical reports (2019) https://www.camaravalencia.com/es-ES/competitividad/medioambiente-energia/Paginas/ForBioEnergy.aspx

6.2 English summary

Training title: Current situation of the integral use of the forest bioenergy in Mediterranean conditions. Next steps.

Authors of the training materials:

José Vicente Oliver (UPV-ITACA)

Edgar Lorenzo (UPV-ITACA)

Rebeca Aleix (AMUFOR)

Bruno Armengot (UPV-ITACA)

Héctor Vives (Municipal technician of Andilla)

Rafael Mossi (COCINSV)

Short presentation of training materials

PPT Current situation of the integral forest biomass use for energy purposes in Mediterranean conditions

Within this presentation, the context of the forestry sector, the Valencian Community challenges, the situation of the forest-based bioenergy value chain in the protected areas, in addition to the European strategy with the strategic challenges of forest research and the application to the territory was explained to participants. The presentation finished with the comprehensive model of forest bioenergy business at the local level and three business units.

It is noted the Sustainable Forest Management is an essential tool to face climate change and the forest biomass a resource to be valorised. Specifically, the forest biomass is a competitive resource in the renewable energy market. The use and valorziation of this resource for thermal and/or electrical energy purposes leads to multiple positive effects, among which are: decrease risk of forest fires; diversification of energy sources; decrease in external energy dependence; stability to the Spanish economy; lower GHG emissions and a higher employment generation (rural development).

The main strategic challenges of forestry research and application to the territory are

(1) SFM revitalization

(2) Forestry sector as an engine for adaptation and mitigation of climate change.

(1) Improve quality of products and services in global competition.

(2) Improve perception and consumption by urban society

(3) Stopping rural depopulation in rural areas.

Finally, three business units were commented on the training:

(1) Advanced forest harvesting systems according to forest type and wood-industry logistics.

(2) Integral energy valorisation at the local level

(3) Solid biofuels with high added value.

PPT Action Plan of the forest-based bioenergy value chain in the Mediterranean basin

In this presentation, the Action Plan was explained in the two levels of action "at MED area level and at the Comuntiat Valenciana level". This presentation was also done within the training course in Planes (03.05.2019) and replicate to the comarca "Los Serranos (Valencia)".

The actions explained at the Valencian Community level were (D.3.6.1)

(1) Definition and professionalization of the Technical Instructions for Forest Management in the Comunitat Valenciana, providing them with a normative character

(2) Development of consensual and single guidelines to control forestry activities of environmental agents in the execution of forestry works

(3) Realization of dissemination and awareness workshops for media on challenges and good practices of sustainable forest management for bioenergy purposes in Mediterranean conditions and in the protected areas

(4) Development of revitalization courses in the forestry sector at the local level aimed at forestry and environmental technicians of the Comunitat Valenciana
(5) Development of a communication plan on the environmental and socio-economic benefits of sustainable forest management and the development of the agroforestry bioenergy value chain based on a multidisciplinary working group
(6) Preparation of a protocol for delegation of powers of the Generalitat Valenciana to local entities that own Public Forests (M.U.P.)
(7) Development and definition of standardized models and guidelines for the management of habitats and species that has to be annexed to the Forestry Resources Management Plans (PORF), and which are used for the drafting of the Forest Management Projects (or Technical Plans Forest Management).

PPT Case study of the energy valorization of forest biomass at the local level

The presentation explains the motivation of the project; the Andilla forest fire in 2012 that affected 50% of the public forests (MUP) of the municipality

There is a need to implement forestry activities in order to increase the resilience of forest ecosystems and reduce the risk of bushfires.

A District heating allows the valorization of forest biomass from the forestry operations and to obtain an economic saving that is reverted in the forests where management is being implemented.

Thus, the development of a district heating is composed of 3 parts:

(1) Audits: building demand curve and improvement proposals (energy efficiency).
(2) District heating design: network dimensioning (choice of buildings that use the network and calculation of thermal energy demand); hydraulic calculation; equipment choice and budget.
(3) Network consumption.

In the presentation, the district heating explained is focused on the supply of sanitary hot water and heating from forest biomass. The data obtained show the advantages of implementing the district heating: > 350 t CO_2 equivalent avoided and a saving of 110,000 euros per year.

Forest actions implemented in Andilla:

Recreational area of "La Tejería": post-fire (1993) silvicultural treatments have been implemented in the young forest stand.

Artaj: silvicultural operations have been implemented to potentiate the regenerate of the stand after the fire (2012).

6.3 Training course material (PPT presentations)

Presentation number	Title of the presentation in English and national language
1	Current situation of the integral forest biomass use for energy purposes in Mediterranean conditions. *Situación actual del uso integral de la bioenergía forestal en condiciones mediterráneas*
2	Action Plan of the forest-based bioenergy value chain in the Mediterranean basin. *Plan de Acción de la cadena de valor bioenergética en la cuenca Mediterránea*
3	Case study of the energy valorization of forest biomass at the local level through District heating. *Caso práctico de valorización energética de la biomasa forestal a nivel local mediante District heating*

Forest Bioenergy in the Protected Mediterranean Areas

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REGIONE SICILIANA
ASSESSORATO REGIONALE DELL'AGRICOLTURA, DELLO SVILUPPO RURALE E DELLA PESCA MEDITERRANEA
DIPARTIMENTO REGIONALE DELLO SVILUPPO RURALE E TERRITORIALE

Municipality of Petralia Sottana

ENVELAND

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