



Supporting Sustainable Energy Production from Biomass from
Landscape Conservation and Maintenance Work

Summary of SWG results

SWG	LCMW Utilisation Pathway Strategies
Date of the conference	21 st January 2016
Participants	<ul style="list-style-type: none"> - Bert Annevelink - Rainer Zenthöfer - Dagnija Lazdina - Aline Clalüna - Marie Bergmann - Federico De Filippi - Jana Žůrková - Kathrin Ludewig - Luigi Pari - Dirk De Boer - Frederik Köster - Dimitris Kourkoumpas - Giannis Violidakis - Daniel García - Maider Gomez
Topics	<ul style="list-style-type: none"> - Introduction to greenGain, purpose of the SWG (10min) - Self-presentation of participants (max 2 min. each) - Identification of most suitable final use for each type of LCMW biomass - Pretreatment requirements for the different LCMW biomass types. - Feasible supply chain configurations: pros and cons of harvesting and pre-treatment technologies
Summary	<p>The central part of the discussion focused on the most promising pathways available for each type of LCMW biomass.</p> <p>For the LCMW biomass from the road side cleaning operations it was established that different types of feedstocks can be obtained (grass, stem or branches) depending on how the operations are carried out. It is not always a mixture.</p> <p>When grass is obtained from this type of operations composting seems the most feasible pathway. For the small size woody fraction obtained it would be combustion and for the large size woody fraction pellet production.</p> <p>Any biomass can be converted in the HTC process but the stone content has a high importance. Moisture is not a problem since it is even required in the process but the stones can destroy the HTC reactor and the quality produced is not good. Depending on the type of biomass entering the process, the residence time on the reactor and the temperature, the final result can go up to activated charcoal. There is currently a huge market for normal charcoal or activated charcoal as well as for energy. Another use for charcoal is for fertilizer production as organic amendments. The HTC path could solve the use of heterogeneous biomass with high moisture content. Additionally HTC could also be used for absorption.</p> <p>Gasification of wood is an available and known technology.</p> <p>Regarding the pellet production we can even find the utilisation of grass, even though it is not so common. Grass is a feedstock that could also be used for animal bedding.</p> <p>It should be taken into account that the pathways identification might differ if we are looking for technologies in the long term or in the short term.</p> <p>Regarding the LCMW biomass obtained from the hedge and tree rows as field boundaries it was established that woody fractions (branches and stems) are the main products produced during the cleaning of branches invading a field.</p>

The limitation that might be faced in some cases to the access the field are quite an important aspect; in this sense also the harvesting technologies should be compatible with the access to the field in each case and additionally the limitations related to the season need to be taken also into account. The Impact on soil from the operation is furthermore an issue.

The HTC technology is compatible with any kind of feedstock so it could be integrated in any chain.

Final use that applies for this type of feedstock could be combustion in a plant and gasification, but it can also be used as firewood.

Regarding the LCMW biomass obtained from Moorland, as occurred for the biomass obtained from the hedgerows as field boundaries the access to this type of areas might involve some difficulties from the exploitation. It is usually carried out by using a chain excavator and normal forestry equipment (forwarder with cutting head).

Based on the experience of the experts the cost of the operations involved are quite high and the quality obtained is an issue to be considered. From their experience the work is carried out most commonly by using an excavator, build a pile and chipping.

In this type of operations it is important to harvest all the available biomass, not only the branches, so that the carbon content obtained from the feedstock is high due to its importance for the combustion. If only the branches are harvested the amount of carbon is lower.

Small installations need a high quality material, with a small amount of fines for example. Big installations instead are able to operate with a material with lower quality even though they also have some requirements regarding the feedstock quality and they even might have bigger problems with the ash content. Therefore bigger plants are not the solution for any type of biomass.

The quality of the chipping is a main issue, using for example the wrong drum chipper for a specific type of biomass or a chipper bad maintained might decrease significantly the quality of the material. Good chips can be made from the harvesting of the entire tree and branches. It is important to choose the right machinery and to carry out a correct maintenance. Based on the type of LCMW biomass targeted in the greenGain project from the expert experience the most convenient chipper for non-homogenous material is a mobile drum chipper.

Small bushes are quite a difficult feedstock to process. The type of machinery commonly used are more focused towards large plants that can work with good and bad quality chips but for the bushes case this type of machinery is probably not economically profitable. However, these operations have to be carried out, even though they are not profitable due to the necessity to maintain the infrastructures.

The storage represents another important issue. Related to this matter the moisture of the biomass and possible content of inorganics affects the quality of the biomass. It is an aspect to be considered where and how it will be stored (covered or not, at the field or intermediate point, etc.).

Regarding the LCMW biomass obtained from the riverside cleaning operations it was mentioned, just as for the previous types of LCMW, that sometimes the exploitation of this type of feedstock is restricted due to access limitations. The types of feedstock obtained from these maintenance operations are grass, trees, branches (pruning), reeds, etc. depend on the specific case. If grass or trees are considered, the feasible conversion pathways could be the same ones as the ones described in previous types of LCMW for since the type of biomass obtained is similar. However, there is a different type of biomass that can be extracted from the riverside maintenance operation which is the biomass that is directly extracted from the river: "wet biomass".

In this case, the environmental constraints can be a quite restrictive for this type of biomass exploitation so there should be taking into account when assessing the possible supply chain.

Regarding the LCMW biomass obtained from the urban spaces the exploitation chain might need some coordination with the authorities since this feedstock is in most cases under the municipality competence.

Regarding the LCMW biomass obtained from vineyards and olive groves, the pruning obtained with this type of feedstock can undergo similar pathways as the branches obtained from the road side cleaning.

Regarding the LCMW biomass obtained from ravine cleaning it was established that the work carried out involves bushes vegetation cleaning and thinning and cleaning of the surrounding forest area. From the cleaning of the bottom part of the ravine (valley) the biomass produced are mainly bushes and grass. From the cleaning of the surrounding forest areas regular forest wood is obtained. The fermentation process could be an option for the conversion of this mixture obtained. It was pointed out that since the grass obtained from this type of LCMW can be really dry during summer, biogas does not seem like an alternative pathway. However, it could be used in a straw-fired biomass plant if this type of material could be baled. An expert mentioned there is a project in which the dry fermentation process was used to process the biomass from a municipality. For a dry fermentation process the presence of stones is not a problem therefore it is a very good option to produce heat and electricity and afterwards it is possible to compost the material to be used in agriculture.