



European Research Council

Established by the European Commission

Highlight:

Tree harvest in Belgium shows use of biomass reduces CO₂ emissions

19 February 2014

There are three questions that have never been fully answered about the use of biomass from plants as a renewable energy source: Is it efficient? Is it economically profitable? Does it really reduce greenhouse gas emissions? To answer these questions, a research team led by ERC grantee Prof. Reinhart Ceulemans, a leading expert in forest ecosystems and bio-energy crops from the University of Antwerp (Belgium), has been working for five years on the potential of poplars as a substitute for fossil fuels. This week, he and his team are harvesting the largest experimental tree plantation in the world. They presented today their results which show that poplars and willows produce six times more energy than they consume and reduce CO₂ emissions.

‘The POPFULL project is the first in the world to draw up these complete figures,’ explains Prof. Reinhart Ceulemans, head of the research group in Antwerp. ‘The results confirm that poplars and willows are exceptionally suited to biomass plantations operating in our temperate climate. We have calculated that, in terms of energy, this bioenergy plantation is very profitable (six times more energy output than input) and mitigates a considerable amount of greenhouse gases.’

Short rotation coppice

The project, which is funded by a EUR 2.5 million Advanced Grant from the European Research Council (ERC), involves work on a short rotation coppice plantation (SRC) field of poplars in Lochristi, East Flanders (Belgium). This is the biggest bio-energy plantation of Belgium (18 ha). SRCs are highly dense plantations of fast-growing trees grown in rotations of less than five years, which provides many benefits in terms of energy balance, CO₂ emission, protection and purification of water, maintenance of biodiversity, landscape preservation and decrease in land erosion.

Prof. Ceulemans’ research results also prove that the biomass produced at plantations which use short rotation coppices (SRC) significantly reduces CO₂ emissions produced during renewable energy production. However, significant emissions of nitrous oxide (laughing gas) and methane – two powerful greenhouse gases – were observed at the plantation, which was formerly farmland, between 2010 and 2013. This means that the greenhouse gas balance is dependent upon the soil conditions and on the amount of fertilisers used in the past.

‘The first harvest took place on 2 and 3 February 2012,’ explains Prof Ceulemans. ‘Now, the trees are two years old again and ready to be harvested a second time. They currently have an average stem diameter of 4 cm (max. 7 cm) and an average height of 6 m.’

The value of bio-energy production

The second harvest of the 18-hectare plant is taking place between 18 and 20 February 2014. Because of the very mild, wet weather conditions over the past few weeks, it will be impossible to harvest with a normal self-propelled harvester.



European Research Council

Established by the European Commission

'The harvest is quite a chore. It is carried out using an impressive range of tools, such as a tractor and caterpillar tracks, which will limit soil compaction and rutting,' says Ceulemans. 'Harvesting in this way will also mean that the trees are cut in their entirety and transported using a single machine in a single process. This also lowers the risk of soil damage.'

The harvested trees will then be stored until the springtime, when the soil will have enough bearing capacity to allow for the use of wood chippers. The wood chipping will take place under drier circumstances, and then the chips will be transported and dried. After that, they will be burnt in biomass installations designed for heating industrial greenhouses, stables or pig sheds.

The POPFULL plantation is due to begin its third rotation in April 2014.

Note to the editors

European Research Council

Set up in 2007 by the EU, the European Research Council (ERC) is the first pan-European funding organisation for frontier research. It aims to stimulate scientific excellence in Europe by encouraging competition for funding between the very best, creative researchers of any nationality and age.

From 2007 to 2013 under the seventh EU Research Framework Programme (FP7), the ERC's budget was €7.5 billion. Under the new Framework Programme for Research and Innovation (2014-2020), Horizon 2020, the ERC has a substantially increased budget of over €13 billion. Since its launch, the ERC has funded around 4 000 researchers and their frontier research projects.

The ERC consists of an independent Scientific Council and an Executive Agency. The Scientific Council, the ERC's governing body, is composed of 22 distinguished scientists and scholars, including the ERC President, who define the scientific funding strategy and methodologies. They act on behalf of the scientific community in Europe to promote creativity and innovative research. Prof. Jean-Pierre Bourguignon has been the ERC President since 1 January 2014. The ERC Executive Agency implements the ERC component of the EU Programme Horizon 2020 and is led by Director Pablo Amor.

University of Antwerp

The University of Antwerp is a research university for frontier and innovative research. With 18,000 students, it aims to raise a bridge between education, industry and the entire society. The University of Antwerp, which employs 5,000 staff members, is one of the most important employers in Antwerp, the biggest city in Flanders.



European Research Council

Established by the European Commission

Links

[ERC website](#)

[ERC special feature on bioeconomy](#)

[Researcher's webpage](#)

[Project webpage](#)

ERC Press contacts

Maud SCELO

Press and Communication advisor

(Mobile: +32 (0) 460 752 466)

Phone: +32 (0) 2 298 15 21

ERC-press@ec.europa.eu

Madeleine DRIELSMA

Press and Communication advisor

(Mobile: +32 (0) 498 98 43 97)

Phone: +32 (0) 2 298 76 31

ERC-press@ec.europa.eu