

Biomass—a possible source of green energy

15 December 2015, by Clara Attene

Bioenergy represents two-thirds of the energy produced from renewable sources in Europe, though biomass sustainability is not taken for granted. A study conducted by researchers in Sicily, southern Italy, gives a revealing cross-section of how biomass may have both positive and negative impacts on the environment.

Researchers from the Department of Agriculture, Food and Environment of the University of Catania, are testing the best mix of local organic residues, mainly citrus skins, to compose the "diet" of five anaerobic digesters located on the University's farm. They aim to create a local source of renewable energy from the 400,000 to 700,000 tons of orange residue from fruit juice production, the disposal of which costs between €12 and 21 million every year. However, about 150 km from Catania, plans for a 21MV power plant between Enna and Caltanissetta have met with resistance from local communities and green activists.

The plant was supposed to use fuel from one of the island's green lungs, which would have meant cutting about 6,000 hectares of Eucalyptus trees, thus increasing the hydrogeological instability in the region. For the moment the demonstrators have won their battle in Sicily. The contract between the power plant management and the regional government, which owns the woods, has been stopped.

"Context is everything when evaluating sustainability," says Ben Allen, senior policy analyst at the Institute for European Environmental Policy, "because it determines the feasibility of a power plant, the availability of the resources, the conditions of supplying and the interaction with the wider business community."

From this perspective, residues seem to be a promising solution for improving biomass sustainability, as shown by the report "Wasted – Europe's untapped resources," which weighs up the potential of farm and urban wastes to produce biofuels. The research has found that every year in

Europe, 220 million tons of wasted cellulosic materials, which include crop residues, forest slash and municipal solid waste, can potentially be converted into biofuels, thus cutting GHG emissions by 60 to 85 percent and covering 16 percent of transport fuel needs by 2030.

"The consultants looked into all alternative uses of waste—its displacement impact and its benefits, especially for [municipal solid waste](#), resulting from avoiding decomposition and methane," explains Allen, who helped in coordinating the research for the project.

Biomass, indeed, is not neutral in terms of [greenhouse emissions](#), with a variable impact ranging from lower values for forest residues to the highest, related to palm kernel. Considering that the 2030 EU climate goal aims to cut greenhouse emissions by 40 percent compared to 1990, tight controls are required.

In Spain, at Laguna De Duero, three biomass boilers are fed with woodchips from local forests to heat 1,488 dwellings situated in the Torrelago district.

"In this way, we are able to cut CO2 emissions by up to 85 percent, which corresponds to about 3,000 tons per year," explains Javier Martín Sanz, engineer at Veolia and in charge of the European project CITYFiED. "Moreover, each boiler has a system that removes ashes through blasts of compressed air. The detached particles are then filtered out and collected, minimising the final dust emissions."

The quality of wood biomass and the treatment of smoke are, indeed, key factors regarding types and quantities of GHG emissions.

"We should only choose fuels from certified production chains," says Vito Pignatelli, chief of the Laboratory of Biomass and Biotechnologies at Enea.

The agency is working on a new generation of ceramic filters able to cut particulate emissions by up to 92 percent. "These filters are made of silicon carbide and dipped in a copper ferrite catalyst, which makes them able to decompose particulates when heated," Pignatelli concludes.

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