

Science for Environment Policy

Towards a bioeconomy: quantifying the residual biomass potential in the EU-27

The EU-27 have committed to a strategic goal of developing an innovative economy based on biotechnology and renewable resources — a so-called 'bioeconomy'. To achieve this, however, the EU must successfully mobilise resources such as residual biomass — or waste products from organic matter resources. A new study¹ has quantified the potential of key residual biomass streams in the EU-27. The results show that residual biomass has a theoretical energy potential equivalent to the annual energy consumption of Italy and Belgium combined, with straw and forestry residues comprising the two most productive potential sources. The findings also reveal specific opportunities for regions including Paris (France) and Jaen (south-central Spain).

In order to achieve its environmental, economic, and social goals, the EU has committed to developing an innovative bioeconomy. This commitment is reflected in the updated [EU Bioeconomy Strategy](#) of 2018², as well as in other legislation, strategies, and policy and communication papers adopted by the EU in recent years.³

Biomass residues — such as crop and forestry residues, and municipal and agricultural biowaste — are expected to play an important role in supplying the feedstock needed for sustainable bioeconomy pathways. The researchers, therefore, set out to quantify the maximum theoretical potential for a variety of key residual biomass streams. The authors note that these theoretical potentials do not account for environmental, economic or technical restrictions. For example, straw residue is already used for animal feeding, animal bedding, mushroom production, etc., and also plays a major role in preserving long-term soil quality by inputting carbon to soils. Both of these factors limit straw's "actually available" potential.

Estimates were based on data collected from the EU-27 countries (plus Switzerland) in 2010, which was then geographically localised at the [NUTS-3 region level](#) (the smallest regional division in Eurostat's latest Nomenclature of Territorial Units for Statistics). This enabled the researchers to comprehensively analyse a broad variety of residual streams across the entire EU at a relatively detailed regional scale, and so identify general as well as specific regional trends requiring different biomass management strategies.

Overall, residual biomass could provide 8 500 PJ (petajoule, or one quadrillion joules) of energy per year, found the study. This corresponds to the total annual energy consumption of Italy and Belgium combined, and represents 18% of the annual EU-27 total. The streams with the highest potential were found to be straw (3 800 PJ per year) and forestry residues (3 200 PJ per year), which accounted for 44% and 38% of the EU-27 total respectively.

The results also revealed specific opportunities for NUTS-3 regions. Notably, the highest biomass concentration was found in the NUTS-3 region of Paris, stemming from food waste. In addition, Jaen was highlighted as the densest region for both agri-industrial biowaste and pruning residues, due to its role in the olive oil industry.

Since these findings are based on theoretical potentials, they represent the maximum residual biomass available. The researchers therefore advise that regional stakeholders make judgement of the share available after considering local constraints, including competing uses and sustainability, environmental and economic concerns.



18 April 2019
Issue 524

**Subscribe to free
weekly News Alert**

Source: Hamelin, L., *et al.* (2019). A spatial approach to bioeconomy: Quantifying the residual biomass T potential in the EU-27. *Renewable and Sustainable Energy Reviews*, 100: 127–142.

<https://doi.org/10.1016/j.rser.2018.10.017>.

Contact: hamelin@insa-toulouse.fr

Read more about:
[Agriculture](#), [Green infrastructure](#),
[Resource efficiency](#),
[Sustainable consumption and production](#), [Waste](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions. To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1. The findings discussed here are based on research results from the project [BioBoost](#), supported under the 7th Framework Programme of the European Commission. Funding for additional analysis and relations to bioeconomy was supplied through the Horizon 2020 research project [New Strategies on Bioeconomy in Poland](#), funded by the EC.

2. [A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment](#), 2018, European Union.

3. These include the [Renewable Energy Directive](#), [EU Forest Strategy](#), [Common Agricultural Policy beyond 2020](#), [Blue Growth Strategy](#), [Energy Roadmap 2050](#), [Action Plan for the Circular Economy](#), and [Low Carbon Economy Package](#).