

JRC default GHG emissions calculations for solid and gaseous biomass



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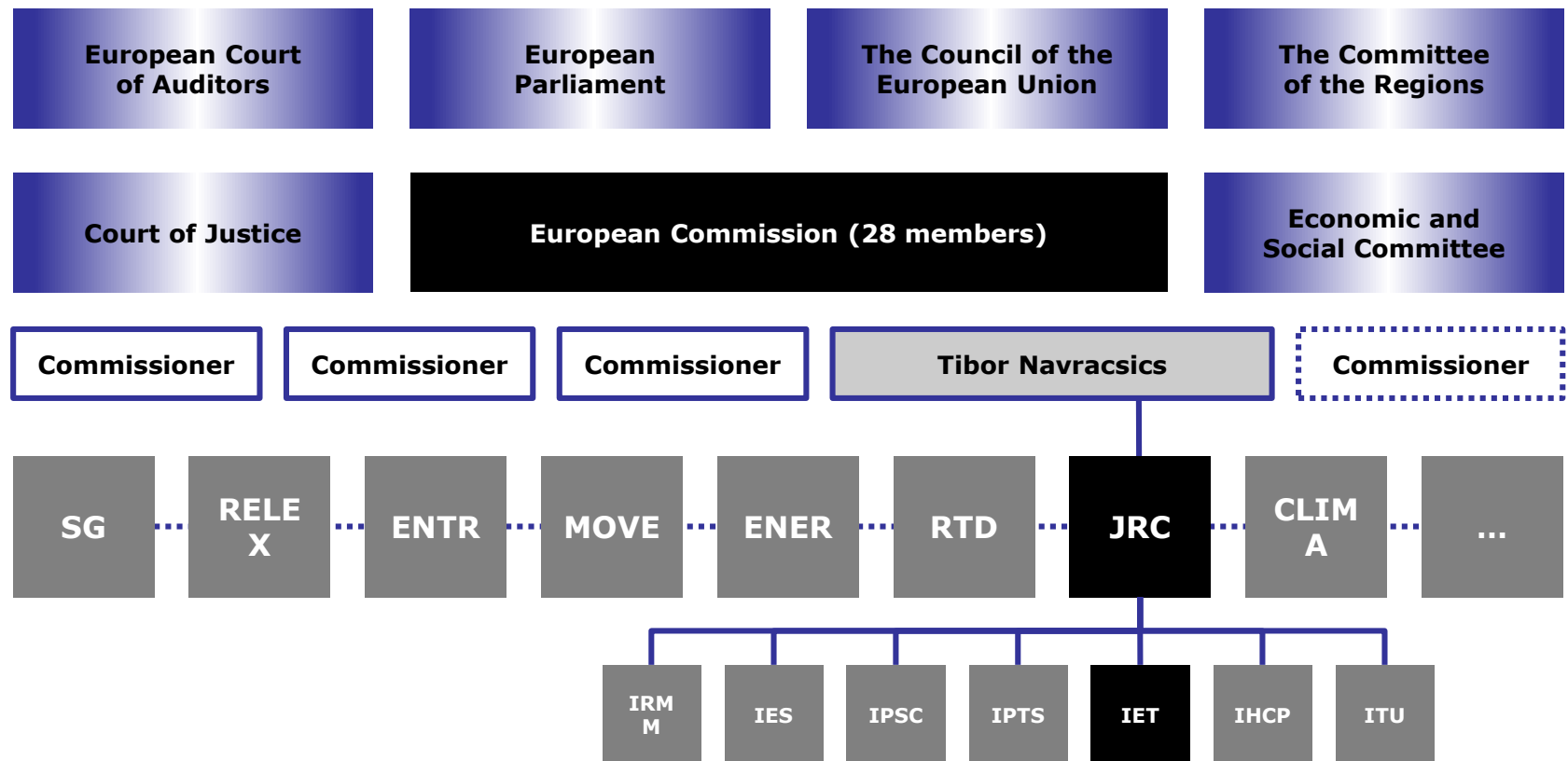
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Outline

- Joint Research Centre
- Default Values definition process
- Default values for operators
- Datasets and pathways definition for solid and gaseous biomass
- Stakeholder involvement

Panorama of the European Union

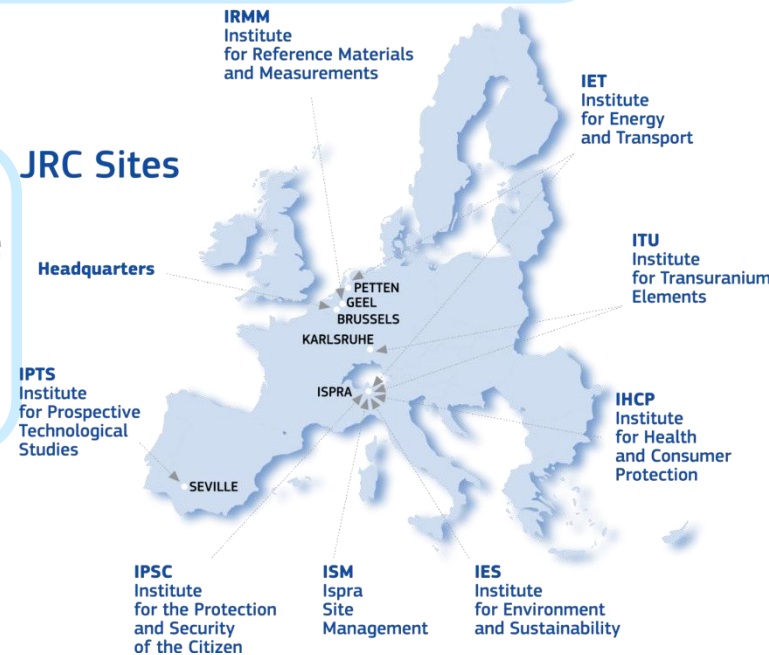


JRC's Mission and Role

... is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Direct research:

JRC is the European Commission's in-house science service and the only DG executing direct research; providing science advice to EU policy.



Serving society, stimulating innovation, supporting legislation



**Institute for Energy
and Transport**



Petten, The Netherlands



Ispra, Italy



Extended experience on GHG calculations and Carbon footprint of bioenergy:

- Well-to-Wheels report (JEC consortium + E3 Database)
- Default values for Directive 2009/28/EC
- Default values for COM(2010) 11 and SWD(2014) 259
- Several iLUC papers and reports
- Carbon accounting of forest bioenergy

The “path” to Default Values

1. Request from stakeholders / Initiative from Commission

2. Definition of the pathway and transport schemes

The pathway is defined in all of its processes, including the definition of typical import routes to EU and typical transport means and distances.

3. Data collection for each process

For each process involved, data collected from several sources: peer reviewed publications, published handbooks, LCA databases, **consultation with stakeholders** etc...Data chosen (whenever possible) to be representative of the European situation. Critical evaluation of the data done by JRC experts and consulted with stakeholders.

4. Data conversion to common energy basis

5. GHG emissions calculations

The data acquired and converted, are inserted into a LCA calculation tool that applies the methodology set in the SWD document and, via a set of emission factors (available in the JRC report), produces the final “typical value”.

6. Definition of the DEFAULT VALUE



Default values for operators

- All calculations should be transparent, reproducible and as flexible as possible.

1. Transparency: JRC Input Values Report

2. Reproducibility: Biograce 1 + Biograce 2 tools

3. Flexibility of default values use:

- a) Final energy conversion efficiency
- b) Emissions allocation for co- or tri-generation
- c) Biogas co-digestion formula
- d) 3 technology options for pellets + 6 options for biogas electricity + 4 options for biomethane

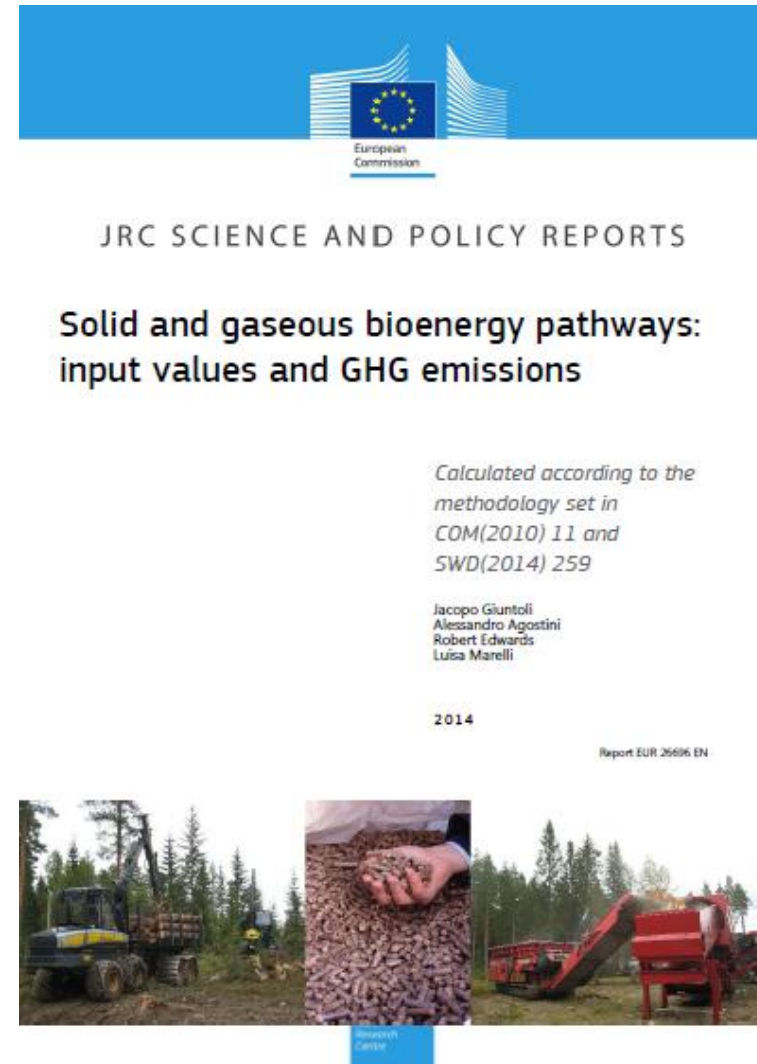


Stakeholders involvement

Database of input data continuously updated:

- On-line since 2005 (from WtW)
- Consultations with MS experts (November 2011), EU and foreign stakeholders (May 2013)
- Biograce tools: JRC input data and results
- MoU (under development) with biofuels industries associations
- Formal and informal communications with organizations to provide operational data

Report JRC EUR 26696 EN



Solid biomass pathways

Feedstocks

- Logging residues
- Short rotation coppice (Eucalyptus + Poplar (fertilized) + Poplar (not fertilized))
- Wood industry residues
- Stemwood
- Agricultural residues
- Straw
- Sugar Cane Bagasse
- Palm kernel meal

Biomass Form

- Chips
- Bales
- Pellets

Process utilities

- Natural Gas Boiler + Grid Electricity
- Wood Chips Boiler + Grid Electricity
- Wood Chips CHP

Transport

- 1 - 500 km by truck
- 500 – 2500 km by truck and bulk carrier
- 2500 – 10000 km by truck and bulk carrier
- > 10000 km by train and bulk carrier

1. Woodchips from forest logging residues;
2. Woodchips from SRC (Eucalyptus + Poplar);
3. Woodchips from wood industry residues;
4. Woodchips from stemwood;
5. Wood pellets from forest logging residues;
6. Wood pellets from SRC (Eucalyptus + Poplar);
7. Wood pellets from wood industry residues;
8. Wood pellets from stemwood;
9. Agricultural residues with bulk density < 0.2 t/m³;
10. Agricultural residues with bulk density > 0.2 t/m³;
11. Straw pellets;
12. Bagasse pellets;
13. Palm kernel meal;

93 values in total

Biogas pathways

Feedstocks

- Fresh Manure
- Maize whole plant
- Biowaste

Processing alternatives

- On-site generation of power and heat
- Open/closed storage of digestate
- Biomethane upgrading: Off-gas combustion / venting

1. Biogas for electricity from Manure;
2. Biogas for electricity from Maize whole plant;
3. Biogas for electricity from Biowaste;
4. Biomethane from Manure;
5. Biomethane from Maize silage;
6. Biomethane from Biowaste.

End-use

- Electricity (& Heat)
- Upgrading to biomethane

30 values in total + any arbitrary mixture of substrates



Stakeholders involvement (1)

- We welcome primary data from industrial stakeholders:

More empirical data from stakeholders

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More detailed JRC input values and more realistic assumptions

- We are open to discuss JRC assumptions and how they relate to real world applications, but:
 - Not always possible to distribute sensitive data and assumptions;
 - **Specific situations \neq Default values (EU scope);**
 - **Actual values = big scope to reduce declared emissions.**
 - We need to assess and keep into account also worst-case scenarios;

Stakeholders involvement (2)

- Some of the choices are value judgments and the result of the political process. They should be interpreted in a broader policy context.
- On the other hand, we are available to discuss methodological choices and how they could be improved.



Stakeholders involvement (3)

Some examples of stakeholder comments and JRC actions:

Comment) Bulk carriers: fuel consumption too high and unrealistic assumptions

Action) Based on data received from stakeholders, JRC has revised the assumption of "empty return" and updated carriers types used.

Comment) Pellet mills: electricity consumption too high

Action) Based on data received from stakeholders, JRC has first lowered then confirmed its assumptions.

Comment) Truck / train consumption: too high, too little payload.

Action) JRC has re-checked data against other sources and updated the values (but not to the level hinted at by stakeholder).

Thank you for your attention

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JRC report EUR 26696EN can be found at:

https://ec.europa.eu/jrc/sites/default/files/eur26696_online_final_v3.pdf?search