Potentials and costs of biofuel feedstocks

Key outcomes of the REFUEL feedstock assessment
REFUEL at a glance

Supported by Intelligent Energy Europe, REFUEL has provided an EU road map for biofuels in the EU27 plus Ukraine until 2030. This road map and its supporting documents focus on a variety of aspects related to a biofuels development strategy. Key messages of the project are:

- The EU biofuels target for 2020 can be met by conventional biofuels, predominantly produced from European conventional feedstocks without major agricultural land use changes and environmental consequences.
- Second-generation biofuels using lignocellulosic feedstocks are expected to, on average, provide a more substantial contribution to reducing greenhouse gas emissions and increasing energy security.
- The introduction of these second-generation biofuels requires substantial investments, and therefore supporting measures at several policy levels. The production technologies need to be further developed and deployed, as well as new supply chains for agricultural and forestry residues and crops. Overcoming these hurdles will require a favourable and stable investment climate.

The road map and background documents can be found on www.refuel.eu. As feedstock availability and costs are currently in the centre of the debate, this leaflet focuses on the REFUEL messages regarding these aspects.

How much land is available for energy crops?

According to REFUEL, a substantial amount of land in Europe may become available for energy crops, ranging from more than 40 to almost 70 million ha. For comparison: meeting a 10% biofuels target in 2020 with domestic feedstock would require somewhere between 10 and 20 Mha, depending on the types of biofuels and productivities per ha. The major share of this potential can be found in Ukraine and in the EU12 new Member States. For this analysis a ‘food first approach’ was used: land potential for energy crops consists of agricultural land that becomes redundant for food & feed production due to a stronger increase in agricultural productivity compared to projected demand. The EU self-sufficiency for food & feed was kept constant.

Key factor determining the size of this potential is the growth rate in agricultural productivity per ha, including improvements in feed conversion efficiency in animal husbandry. This rate is strongly affected by:

- The rate of rationalisation and modernisation in Eastern European agriculture (intensification, farm and land restructuring, access to new crop varieties and overall efficiency improvement);
- The amount of conventional agricultural land that might be converted into organic farming, into nature reserves, or into extensively managed agricultural land to safeguard biodiversity while keeping land productive.

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What would be related costs?

The REFUEL cost assessment indicates that a significant feedstock potential can be realised.
- For oil crops such as rapeseed, with their relatively low yields per ha, it adds up to some 3 EJ/year of feedstock (or ca 3 EJ/year of biofuel) by 2030;
- For woody and grassy crops (for 2nd generation biofuels) the potential may be over 10 EJ/year of feedstock (or over 6 EJ/year of biofuel) by 2030.

As a reminder: Meeting a 10% biofuels target by 2020 will require ca 1.5 EJ/year of biofuel. By this year, feedstock potential is still several tens of percents lower than by 2030, but still more than sufficient to meet demand. Least-cost production potential is mainly concentrated in Ukraine and in the EU12 new Member States.

How does this assessment relate to other studies?

Many recent studies have analysed the relation between biofuels and agriculture. There are two main approaches:
- Agro-technical: Usually more positive on the prospects for productivity growth; assuming agriculture will respond to increasing demand by shifting towards more productive and efficient cultivation practices;
- Agri-economic: More conservative on fundamental changes in agriculture, including changing international trade patterns and shifts to new types of crops.

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<td>Focus</td>
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<td>Key message</td>
<td>‘Much possible in EU, No “unacceptable” land use changes required’</td>
<td>‘Ex-EU imports will occur, Adverse land use changes (deforestation) as well’</td>
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<td>Weakness</td>
<td>No market dynamics, (often) no imports How productivity increases be realised?</td>
<td>(often) no 2nd generation feedstocks How will productivity and land use respond to higher prices?</td>
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<td>Neglects constraining “real world” aspects: (too) optimistic?</td>
<td>Neglects fundamental changes in land use: (too) pessimistic?</td>
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As often, reality will probably lie somewhere in-between. But it is clear that a responsible development of biofuels will require additional measures, for example a safeguarding mechanism for biofuels feedstock demand to increase in a gradual manner, so that supply can respond to it by increasing productivity.
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The REFUEL road map 'Eyes on the track, mind on the horizon' and supporting documents can be found on www.refuel.eu