TEAM PROCESS

- Understanding the views of many different stakeholders

- Technical and economic preferences of processors, traders and feedstock producers
- Sustainability concerns of policy makers, NGO’s and users

- Explored a wide range of ideas, targeted at
  - Technical solutions
  - Organisation of the supply chains and of the feedstock production
  - Monitoring, certifying and communicating the sustainability aspects
# THE TEAM EXPLORED TWO PATHWAYS TO MOBILISE BIOMASS

## Crops

- Practically preferred but not politically accepted
  - Best fit from technical point of view
  - Nature provides very useful chemical structures
  - High carbon yield per hectare
  - Policy makers do not accept & support it
  - Seen as competing with food
  - Seen as causing ILUC

## Waste

- Politically desired but practically challenging
  - Resource is cheap
  - Generally accepted because circularity appeals
  - Many technologies exist and innovation ongoing
  - Netherlands leading in waste collection, separation and treatment
  - Big variety of sources – requires many approaches
  - Potential is limited – may not be sufficient for some products
  - Technology is (relatively) expensive
  - Competition with less optimal incumbents
CROPS

• Example: sugar beets

• Some directions for options
  • Identify unused land close to home (like land that cannot be used for food crops)
  • Replace sugar as a sweetener with low calorie alternative, the sugar can then be used for bio based goals
  • Create new land, offshore or in the Markerwaard
  • Develop land in the tropics connected to sustainable development goals
  • Concurrently improve the valorization of crop components, to decrease price of remaining biomass

• Challenge
  • Not accepted by NGOs and policy makers
  • Especially as it is seen as food crop and as causing ILUC

• Team found it extremely difficult to reconcile the concerns with the wishes
  • Understand that we cannot realistically ask to support this option
  • Team asks to keep the option in the discussion, so to explore how food crops can be used in the biobased economy and how their production can be increased in sustainable ways
WASTE

- Many technical innovations
- Netherlands is leading
- Separate at household level
- Separate centrally (OMRIN)
- Advanced processing (SuikerUnie, AVB, Enerkem, Avantium, Empyro)

Potential in Netherlands
- Increase number of options
- Increase deployment

Potential abroad
- Export approaches and know-how to tap into potential elsewhere
- Like waste collection in urban areas in developing countries

MSW – RDF
Municipal Solid Waste and Refuse Derived Fuel
- RDF and cellulosic fractions are already separated – infrastructure exists
- Direct streams to higher value use

Waste Wood & forest residues
- End of life waste wood is already collected
- Collectors want new offtake markets
- Use of new technologies (pyrolysis, torrefaction)
- Harvest biomass from ditches, extract proteins
- Forest residues: unclear how much is already utilized in the Netherlands

Sewage with kitchen waste (green waste)
- Innovative process to boost the methane production and collect nutrient (phosphate)
- Cooperate with water boards
- Connect to existing household collection
- Support of gas sector is existing

Manure
- Processing at larger scale central hubs
- Between source and use
- Increases value of the separate fractions
- Recover nutrients
- Need stable regulation for manure treatment
TEAM MEMBERS

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• Erik Evers – DEKRA
• Aldert van der Kooij – Biobased Delta
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