# Building a Paris Agreement Compatible (PAC) energy scenario

## CAN Europe/EEB technical summary of key elements

June 2020

## 2.6 Mobilising bioenergy

### Key assumptions

Biomass is an abundant resource with a very limited sustainable potential for energy. Therefore, the PAC scenario implies clear boundaries for bioenergy use:

- In line with EEB's and CAN Europe's principles on sustainable bioenergy use, an increase of forest harvests is excluded. For reasons of forest ecology, areas left out of harvesting increase and a maximum of 70% of residues is available for energy needs. Co-firing and electricity-only use is replaced by cogeneration.[1]
- Only waste and residues with climate benefits and no alternative use feed the biogas production.[2] Due to reduction of waste streams, no substantial increase of available fermentable waste is expected.
- So-called first generation biofuels are phased-out by 2030. Second generation biofuels are limited to aviation and self-consumption in agriculture, with low land footprint and stringent sustainability criteria.

### Evolution of energy supply

In order to phase out coal and fossil gas during the 2030s, bioenergy carriers are kept or redirected towards hard to decarbonise industry sectors such as steel, ceramics, cement and glass. Bioenergy steadily covers around 10% of industry's reducing final energy demand between 2015 and 2050. While biomethane supply increases, solid biomass for direct heating in industry is more than cut in half between 2015 (280 TWh) and 2050 (114 TWh). Solid biomass is however shifted towards a non-energy use as raw material input in the chemicals industry (270 TWh in 2050). This allows to substitute fossil oil products in a circular economy approach.[3] In the residential sector, individual heating with solid biomass (15% of final energy demand in 2015) decreases due to energy savings and switching to other more efficient individual renewable heating systems or connection to district heating.

Biogas is mostly used in small CHP units. As a relatively costly but dispatchable energy carrier, they can turn into "gap fillers" to produce more flexibly and offset variable solar and wind. In the 2030s, most biogas is upgraded to biomethane in order to substitute fossil gas in distinct industry sectors' processes that require methane.

Supply of liquid biofuels reaches a peak in 2020 with 278 TWh to strongly slump to 39 TWh in 2050. The dominant use for blending of first generation biofuels in road transport ends with the quick market introduction of electric vehicles. Biofuel use is reoriented towards hard to decarbonise aviation. In addition, by 2030, 30 TWh are self-consumed in agriculture to substitute fossil oil products in farming machinery.

### Integration of members' and experts' feedback

Priorities for bioenergy use in different sectors were substantiated and adapted in exchange with members and PAC scenario workshops. This included a gradual phasing out of bioenergy from individual and district heating.[4]

1 CAN Europe, EEB et al.: Pitfalls and potentials. The role of bioenergy in the EU climate and energy policy post 2020. NGO recommendations, April 2015; EEB: Burnable carbon. What is still burnable in a circular, cascading, low carbon economy? June 2017.

2 ICCT: The potential for low-carbon renewable methane in heating, power, and transport in the European Union, October 2018. Sequential crops could be a valuable feedstock for biogas production provided they do not drive unsustainable farming practices.

3 Material Economics.

4 CAN Europe/EEB: Summaries of PAC scenario workshops and General Assemblies workshops.

### Sensitivities and limitations

The decrease of bioenergy in heating depends on future costs and flexibility needs that are difficult to assess. Deep renovation could offer an opportunity to shift away solid biomass from inefficient individual heating.

### Key results

- Primary energy supply of bioenergy decreases by almost two thirds between 2015 and 2050. Its share in primary energy supply falls from 9% to 6% in 2050. If the use of solid biomass as non-energy feedstock in the chemical industry is included, supply still more than halves.
- Bioenergy plays an important qualitative role thanks to its flexible and versatile energy carriers that respond to specific demands of sectors and processes where no renewable alternative is accessible.
- Sustainable bioenergy quantitatively loses in importance but respects the boundaries of its potentials.