



Building a Paris Agreement Compatible (PAC) energy scenario

CAN Europe/EEB technical summary of key elements

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1.4 Agriculture

Key assumptions

Final energy demand of the agriculture sector decreases by 63% between 2015 and 2050 due to renovation of the building stock and higher energy efficiency of processes and machinery.

- Refurbishment of the building stock follows assumptions on buildings in the residential and tertiary sector.¹
- Final energy demand for space heating, warm water and processes decreases. Electricity demand for these uses increases because of heat pumps becoming the most important technology.
- Fossil fuel demand for farming machines, motor drives and pumping devices is largely substituted by electricity and partly covered by sustainably sourced liquid biofuels.

Evolution of energy demand

The dominating fossil fuel demand for space heating, hot water and processes disappears after 2035. Electricity demand for heating increases as a consequence of the broad introduction of heat pumps. In addition, heat demand will increasingly be covered by district heating. Its contribution to agriculture's final energy demand however remains relatively small, compared to the residential and tertiary sector. Because of the lower population density in rural areas, individual heating systems remain more important.

Farming machine drives gradually phase-out the use of fossil oil products. Energy demand will be covered instead by liquid biofuels. Electrification of farming machines is not considered. Pumping devices will be electrified. Final energy demand for lighting, ventilation, motor drives and other specific electricity uses in agriculture reduces at the same pace like in the residential and tertiary sector. In addition, the direct availability of bioenergy carriers in agriculture is considered as a decisive factor. In 2040, agriculture's final energy demand is by 41% covered by self-generated biogas, by solid biomass and by liquid biofuels.

Integration of members' and experts' feedback

Following discussions with members and experts, limitations for the use of bioenergy for covering energy demand in general were defined (see also chapter 2.6). The agriculture sector mobilises only a small share of the biomass potential that is integrated into the PAC scenario.² The most efficient use of biogas exclusively in combined heat and power (CHP, cogeneration) is considered as a priority and as realistic.

Sensitivities and limitations

Energy demand of farming machines is important. If no electrification is assumed, it can be covered by liquid biofuels or by biomethane. Both available combustion technologies allow to fully substitute fossil oil demand. The conditions for this fuel switch however have not yet been assessed more in detail.

¹ Key assumptions are taken over from tertiary sector figures in Fraunhofer ISI.

² EEB: Burnable carbon. What is still burnable in a circular, cascading, low carbon economy? Position paper, June 2017; ICCT: The potential for low-carbon renewable methane in heating, power, and transport in the European Union, October 2018; CAN Europe/EEB: Summaries of PAC scenario workshops and General Assemblies workshops.

Key results

- The agriculture sector mobilises comparably high energy savings likewise the residential and tertiary sector. Final energy demand drops by 63% in 2050 compared to 2015.
- Overall electricity demand decreases slightly despite electrification of space heating, hot water, processes and pumping devices. The first reason is the lower heat demand, the second one is the higher energy efficiency of appliances and machinery.
- In 2040, 36% of final energy demand is electricity. Demand for fossil fuels disappears after 2035. A relatively high demand for bioenergy is preserved given the availability of sustainably sourced solid biomass and biogas for direct use on premises.

