Advanced biofuels
- what holds them back?

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Toshimasa Masuyama, Bioenergy Analyst
Sakari Oksanen, Consultant

International Renewable Energy Agency (IRENA)
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Can be downloaded via IRENA’s publication website
https://www.irena.org/publications
Transport sector decarbonization pathways (REmap)

2016
- Oil: 93%
- Gas: 3%
- Electricity: non-renewables: 1%
- Electricity: renewables: 0%
- Biofuels: 3%

Energy consumption: 118 EJ

REmap case 2050
- Oil: 34%
- Gas: 4%
- Electricity: non-renewables: 6%
- Electricity: renewables: 36%
- Biofuels: 20%

Energy consumption: 86 EJ

CO2 emissions reduction by 70% (8.5 Gt CO2/yr → 2.4 Gt CO2/yr)

Liquid biofuels

- Ethanol: 94 Billion L
- Biodiesel: 35 Billion L
- Biojet: <1 Billion L

5-fold increase of liquid biofuels

- Ethanol: 366 Billion L
- Biodiesel: 180 Billion L
- Biojet: 105 Billion L

Source: Global Energy Transformation – A Roadmap to 2050 (2019 Edition) (IRENA)
To achieve the 5-fold increase goal, more than 100 refineries should be developed annually at an investment cost of USD 20+ billion.

More than 10% of bioliquids should be allocated for aviation but the buildout of biojet refineries is slow.

Source: BNEF
Scope of the study

(Objective)
✓ Clarify the factors explaining the stagnating investment activity in advanced biofuels

(Method of analysis)
✓ A review of past literature + survey by questionnaire with industry executives in companies that have invested in 2G biofuel productions (14 respondents)
✓ Statements evaluated on a five-point agreement scale (the Likert Scale) under the five following groups
  • feedstock (8 statements)
  • technology and financing (7 statements)
  • markets through mandates and targets (16 statements)
  • trends in consumer demand (12 statements)
  • environmental and social concerns (11 statements)
✓ A ranking question about the level of various possible barriers (rank a minimum of three of the most important areas of risk or barriers from among 14 categories)
  • highest scored barrier = value of 3
  • second scored barrier = value of 2
  • third scored barrier = value of 1
Barriers to investment in advanced biofuels - feedstock, technology and financing -

There is not enough feedstock for advanced biofuels business expansion.

Competing uses for biomass feedstock (e.g. heat, power and bioproducts) pose a major risk for our biofuel business.

Technology is not ready for large scale advanced biofuels deployment.

Lignocellulosic biofuels will reach significant volume by 2030.

Availability and cost of financing is a major barrier to investment in advanced biofuels.
Barriers to investment in advanced biofuels - mandates, targets and demand -

- Regulartory uncertainty impedes investments in advanced biofuels production.
- Technology neutral fuel standards are better than fuel specific mandates.
- EVs pose a serious threat for biofuels business in the coming years.
- Flex-Fuel Vehicles are necessary for decarbonizing the transport sector.
- We count on aviation sector being a major customer.
Barriers to investment in advanced biofuels - environmental and social concerns -

There is too much confusion about how life-cycle GHG emissions, LUC and ILUC are estimated.

Methods used for estimating land use change impacts of various biofuels are accurate and reliable.

Environmental advocacy groups have helped advanced 2G biofuels.

Investments are hampered by worries that sustainability criteria may become more stringent.
The most important group of barriers relates to lack of stable regulation, including mandates and subsidies.

It is followed by the difficulty of financing (availability and cost) and cost competitiveness of advanced biofuels production, including conversion efficiency & CAPEX.