



Securing financing for biorefinery projects – Insights from investors

Introduction

[The Mission on Integrated Biorefineries](#) is a multilateral collaboration initiative under [Mission Innovation](#). Governments from India, the Netherlands, Canada, Brazil, the United Kingdom and the European Commission are involved. The goal of our mission is to replace 10% of fossil-based feedstock for fuels, chemicals and materials with sustainable alternatives by 2030.

Financing is crucial to get biorefinery projects off the ground. In order to get an idea of the criteria that have to be met to be considered for financing, we spoke to investors in the Netherlands, Canada, the United Kingdom and Brazil. This three-pager provides a summary of these interviews as well as some examples of financed biorefinery projects.

Companies we spoke to

- [Invest-NL, the Netherlands](#): Government related fund, particularly interested in start-ups and scale-ups with innovative complex technology that offers solutions to societal challenges.
- [SHIFT Invest, the Netherlands](#): Venture capital fund that exclusively invests in innovative enterprises with a significant positive environmental impact potential.
- [Business Development Bank, Canada](#): Development bank owned by the government of Canada, looking to fund clean technology companies in the early commercialization stage that will drive significant GHG reductions and other environmental benefits.
- [Sofinnova Partners Industrial Biotech Strategy, UK](#): Venture capital firm that invests in early stage companies in food, agriculture, chemicals, and materials enabled by biotechnology to develop sustainable solutions.
- [Brazilian Development Bank \(BDNES\)](#) Development bank with a philosophy that is based on actions to push the country's development. Among a great variety of financial lines, there is a special financial segment focusing on reducing carbon emissions projects.
- [European Investment Bank \(EIB\)](#) Development bank that is owned the 27 EU states. In 2019 it rebranded itself to the climate bank. Supports projects in the EU but has additional sustainability criteria than the EC.

Insights from the interviews

Types of project financing:

- There are three main types of financing for a project: debt, equity and grants.
 - o [Debt financing](#): company assumes a loan and pays back the loan over time with interest. There is also a hybrid form: Venture debt. In this case the financing is a debt but can be converted to equity at fixed rate after a predetermined time span.
 - o [Equity financing](#): company sells ownership shares in return for funds.
 - o [Grant/subsidy](#): company receives non-repayable funds provided by the government.
- Most biorefinery projects use a combination of debt, equity and grants.

Assessment criteria for biorefinery projects:

- Company and business model
 - o Viable business case: must show a sufficient profitability under realistic assumptions
 - o Team: strong team with ambitious growth plans and preferable experience in industrial experience either in the energy, process technology, or agricultural sector;
 - o Unique tech (since plants need to be build, investors are looking for patented technology)
 - o Ability to secure non-equity sources of financing (debt or grants)



- Feedstock & Product
 - o Feedstock supply, as well as some certainty that feedstock will be available at a certain price
 - o Sustainability of resources
 - o Energy consumption of the plant
 - o Ability to valorize majority of product streams being produced (focus on one particular product prevents getting higher value from side streams)
- Enabling environment & Markets
 - o Market demand: preferably there is a policy on the relevant off-take market
 - o Offtake agreements/number of off-takers (less dependency if there are multiple off-takers)
 - o Does the project receive subsidy? This is considered positive, because the project has been assessed for technical feasibility by the fund that has granted subsidy. On the other hand investment banks always do their own due diligence. From this perspective the impact of a subsidy is minor
 - o Current policies and regulatory environment (regulatory certainty helps to de-risk long-term investments and planning)
- Technical aspects and plant construction
 - o A comprehensive feasibility study carried out by a qualified consultant or agency must be presented, taking into account all business risks.
 - o Proven technology at pilots scale is required, with expert views
 - o Permits must be in place
 - o There needs to be a certain level of comfort about the engineering of the plant. What kind of construction partner is involved? What kind of EPC contract? Who will do the maintenance if it is a first-time plant?

Biorefinery projects are often first-time plants and can therefore be considered risky. Some insight into how investors deal with this:

- The key obstacle is finding debt financing, because commercial lenders are generally not ready to lend to first-of-a-kind project. For these kind of projects, sources of debt generally come from government institution. Government related funds (such as Invest-NL) can often take more risk than banks.
- In general an investment takes 1-1,5 years to go from the first talks to a final investment. Therefore it is important to start the talks with investors at the right time.
- Invest-NL and Business Development Bank Canada try to be a catalyst to attract private investment that typically wouldn't invest in the sector. Backing up the company with public money can reassure private investors.
- Investors look to support the facility itself and address uncertainty in that part of the value chain, not the feedstock supply or end-product, so its important companies have those two items figured out first.
- Investors will price risks into funding/equity agreements and provide supervision assistance during the planning and execution stage.
- Finally, investors are not afraid to take some risk. Projects that require to take risk can potentially be the biggest game-changers but also can have the biggest benefits.



Examples of investments made in biorefinery projects

Avantium (Invest-NL)

Together with a number of Dutch banks, Invest-NL invested in [Avantium](#) (a leading technology company in sustainable chemistry). Invest-NL has committed a €30 million loan to Avantium. The loan is part of a three-year €90 million debt financing by a consortium of lenders consisting, in addition to Invest-NL, of the four Dutch banks ABN AMRO Bank, ASN Bank, ING Bank and Rabobank. Each bank will commit €15 million in the form of a bank loan. This loan is used to build Avantium's FDCA Flagship Plant in the North of the Netherlands.

ChainCraft (SHIFT Invest)

Together with Convent Capital, Horizon 3 and PDENH, SHIFT Invest invested 11 million euros in [ChainCraft](#), a Dutch scale-up that creates circular chemicals from food waste. This equity funding will be used to build a full scale flagship plant.

Afyren (Sofinnova Partners)

Afyren has built a facility using agriculture industry waste to produce carboxylic acids. They financed their facility in a form of JV with a financial investor, through grants and local subsidies.

Bio ethanol industries

BDNES has a portfolio of over 70 billion reais (roughly 14 billion dollars/euro) in the bio ethanol industry. It's possible to identify at the [bank portal](#) the projects covered by the financial lines, categorized by beneficiary, value, date or product. Information is provided since 2002, and actualized until August 2023. Major investment was made in 2018 to LOGUM logistic, concerning 481 km pipeline construction to ethanol and oil products use, connecting the states of São Paulo and Minas Gerais. Different units from Raizen Group have been using this financial support to improve ethanol production capacity, increase energy generation, acquire new equipments or enhance the unit efficiency.

Repsol (European Investment Bank)

EIB supports the construction of an innovative advanced biofuels plant in Cartagena, Spain, therefore supporting Repsol's decarbonisation strategy. The European Investment Bank (EIB) is providing a €120 million loan to Repsol to support the construction and operation of the first advanced biofuels production plant at the company's facilities in Cartagena, (Region of Murcia). The plant will produce second generation and advanced biofuels from different types of waste primarily from the agri-food industry, such as used cooking oils, as part of the transition process towards a more circular economy. Construction work began in March this year and is scheduled for completion in the second half of 2023.

Advanced Fuel Fund (UK government Department for Transport)

Competitive-based allocate of up to £165 million in grant funding to support UK advanced fuels projects until 31 March 2025. The winning organizations that will seek to provide first-of-a-kind (FOAK) commercial and demonstration-scale Sustainable Aviation Fuel projects in the UK at all development stages include alfanar Energy Ltd, Fulcum BioEnergy Ltd, Lanzatech UK Ltd and Velocys plc.

Restorative Aquaculture (Green Angel, WWF)

Oceanium, a UK-based seaweed processing, food and material innovation business, has announced the close of a Seed II Round worth ~ £2 million (\$2.7M, €2.3M) led by Green Angel Syndicate and World Wildlife Fund (WWF). Oceanium will use the funds to scale up its proprietary biorefinery and processing model and simultaneously help to grow the nascent sustainable seaweed farming industry for regenerative food and polymer materials for packaging.