



## Biorenewable Insights: Renewable Ethylene, Ethylene Oxide, Ethylene Glycol

**Renewable Ethylene, Ethylene Oxide, Ethylene Glycols is one in a series of reports published as part of NexantECA's 2023 Biorenewable Insights program.**

### Overview

With sustainability and decarbonization commitments by various organizations, renewable or bioethylene, ethylene oxide (EO) and ethylene glycol or monoethylene glycol (MEG) production is one of the pathways to reduce waste, improve circularity and reduce carbon intensities of the associated products. These routes produce bio-based plastics using renewable feedstocks into existing value chains and have gained a significant attention and price premium in recent years, as concerns over sustainability mount. The bioplastics from bioethylene and its derivatives offer an attractive alternative to achieve sustainability in the chemicals industry.

This Biorenewable Insights report provides an overview and update of the commercial and developing technologies for producing bioethylene, EO and MEG, and addresses questions such as:

- What are the major production technologies for bioethylene, EO and MEG?
- Who are the technology holders and licensors?
- What are the on-going and upcoming projects by the major bioethylene, EO and MEG producers and technology licensors?
- What are the benefits, challenges, and constraints of the respective technologies?
- Which technology has the lowest carbon intensities and is the technology economically viable?
- What are the upcoming trends or technologies for bioethylene, ethylene oxide and ethylene glycol?

### Technologies

The report covers the following technologies:

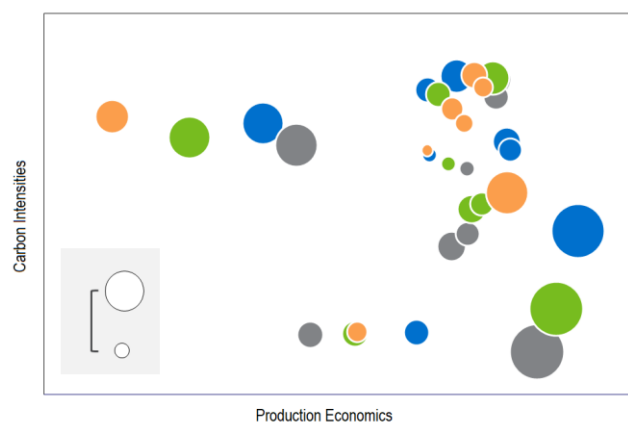
- Bioethylene:
  - Bioethanol dehydration
  - Steam cracking of renewable naphtha
  - Biomass gasification for methanol-to-olefins
  - Dry reforming of methane

- Electrochemical reduction of carbon dioxide
- Ethylene Oxide: Oxidation of ethylene
- Ethylene Glycol:
  - Ethylene oxide hydration
  - Glucose hydrogenation
  - Glycerin hydrolysis
  - Electrochemical reduction of carbon dioxide

### Process Economics

The report provides detailed cost of production estimates for different bioethylene, ethylene oxide and monoethylene glycol production technologies by region (U.S. Gulf Coast, China, Brazil and Western Europe) based on Q3 2023 pricing. The process economics for the technologies are mapped against the corresponding carbon intensities to determine the decarbonization potential and the economic viability.

#### Example of Carbon Intensity Correlated to Production Economics for Different Technologies and Regions



### Commercial Impact and Strategic Insights

- Constraints and limitations from the correlation between production economics and carbon intensities are discussed for potential implications on commercial or conventional ethylene production technologies.

**For more information. please contact  
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BI's comprehensive studies include detailed technology analyses, process economics, as well as capacity analysis and impacts on conventional industry. Reports typically cover:

- Trends in technology
- Strategic/business overviews and/or developer profiles
- Process Technology
- Chemistry
- Process flow diagrams and descriptions of established/conventional, new and emerging processes
- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Capacity tables of plants and analysis of announced capacities
- Regulatory and environmental issues where relevant

### Subscription Options

A subscription to BI comprises:

- PDF reports including detailed technology analyses, process economics, as well as commercial overviews and industry trends
- Cost of production tables in spreadsheet format (as requested)
- Consultation time with the project team

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**Technology and Costs** comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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