



Thailand Board of Investment
www.boei.go.th

BIOPLASTICS



INDUSTRY OVERVIEW AND TRENDS

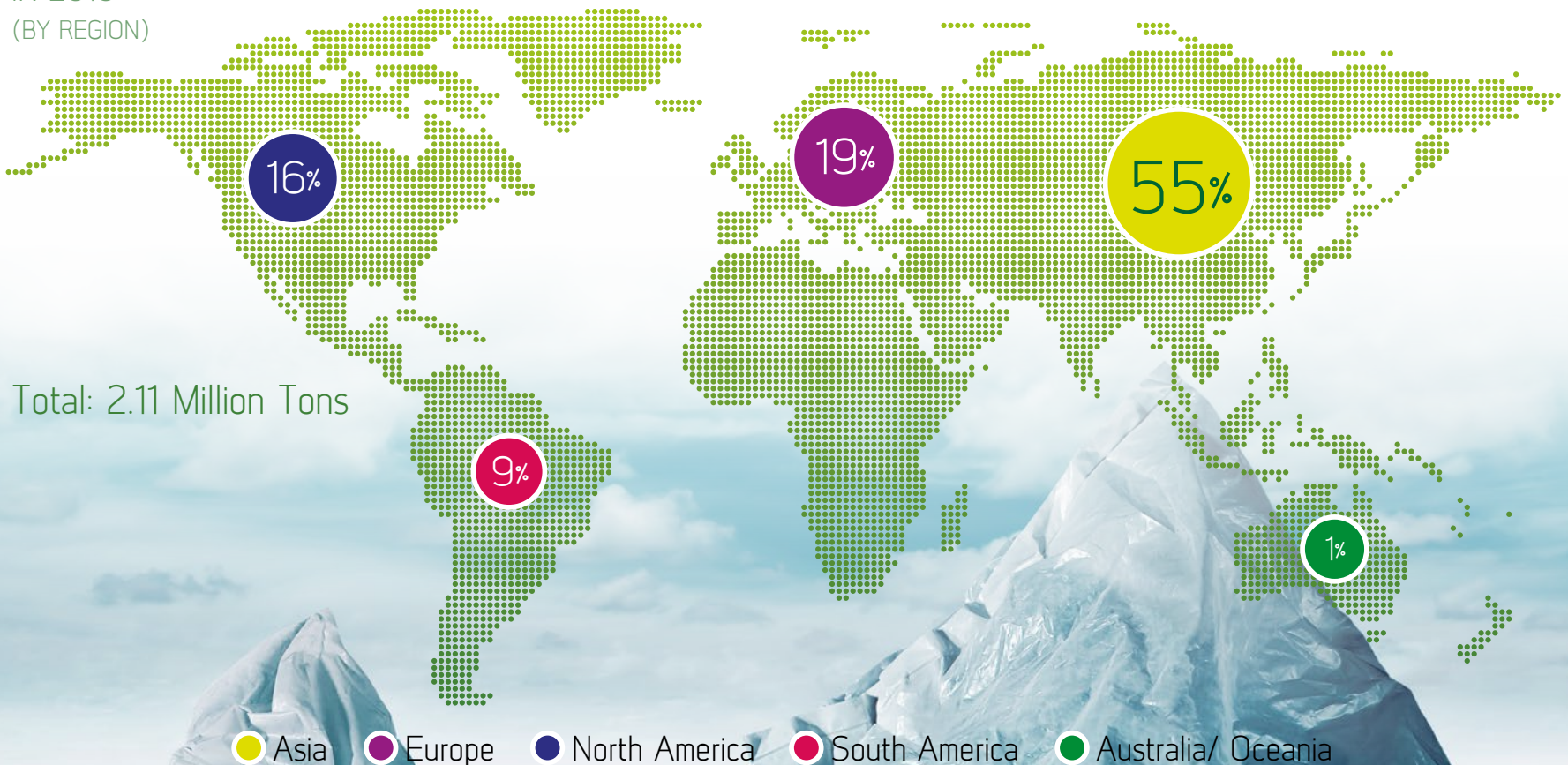
Bioplastics are regarded as a potential solution to address environmental and economic challenges. They represent the fastest growing product line for bio-based products.¹ Several countries have taken action and significantly increased awareness of the use of bioplastics. Under the EU's Plastics Strategy, from 2030 onwards all plastic packaging on the market will be made from renewable raw materials and recycled after use through existing recycling systems.² China is also embracing the trend and will also focus on promoting bioplastics in packaging by increasing production capacity. These shifts also promote bio-based alternatives and enhance innovative bio-economies. In Thailand, the Thailand Industrial Development Strategy 4.0 (2017-2036)

emphasizes the sustainable and eco-friendly growth of the petrochemical and plastics industries. The Thai government has put in place measures to support Thai and foreign entrepreneurs who invest in research and development (R&D) and who use Thailand as a base for exporting bioplastics to the world market.

The global production capacity for bioplastics is expected to increase from 2.11 million tons in 2018 to 2.61 million tons by 2023. Asia remains a major production hub, with over 50% of bioplastics production taking place in the region.³ Additionally, the worldwide bioplastic packaging market is expected to grow from USD 5.94 Billion in 2018 to USD 24.84 billion by 2026.⁴

GLOBAL PRODUCTION CAPACITIES OF BIOPLASTICS IN 2018

(BY REGION)



Source: European Bioplastics, nova-Institute (2018)
More Information: www.european-bioplastics.org/market
and www.bio-based.eu/markets

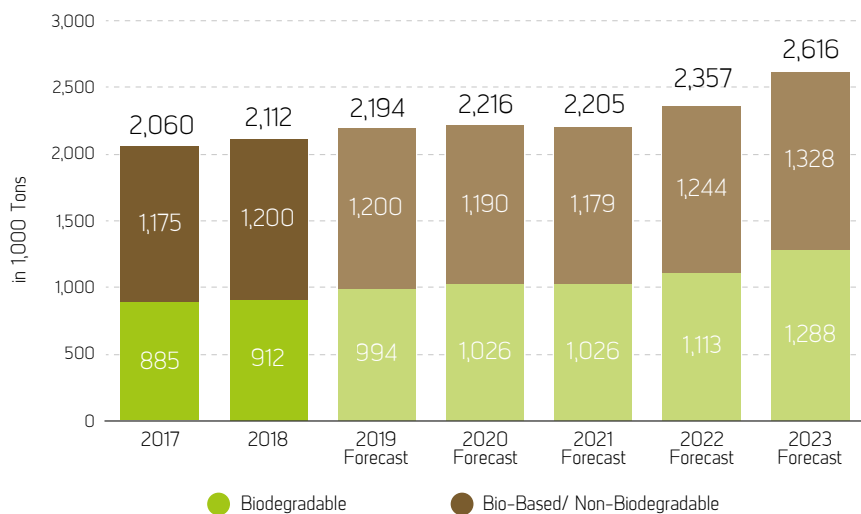
1. OECD (2013-10-28), "Policies for Bioplastics in the Context of a Bioeconomy", OECD Science, Technology and Industry Policy Papers, No. 10, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5k3xpf9rrw6d-en>

2. "Communication from the Commission to the European Parliament, The Council, the European Economic and Social Committee and the Committee of the Regions" A European Strategy for Plastics in a Circular Economy, European Commission

3. Nova-Institute (2019)

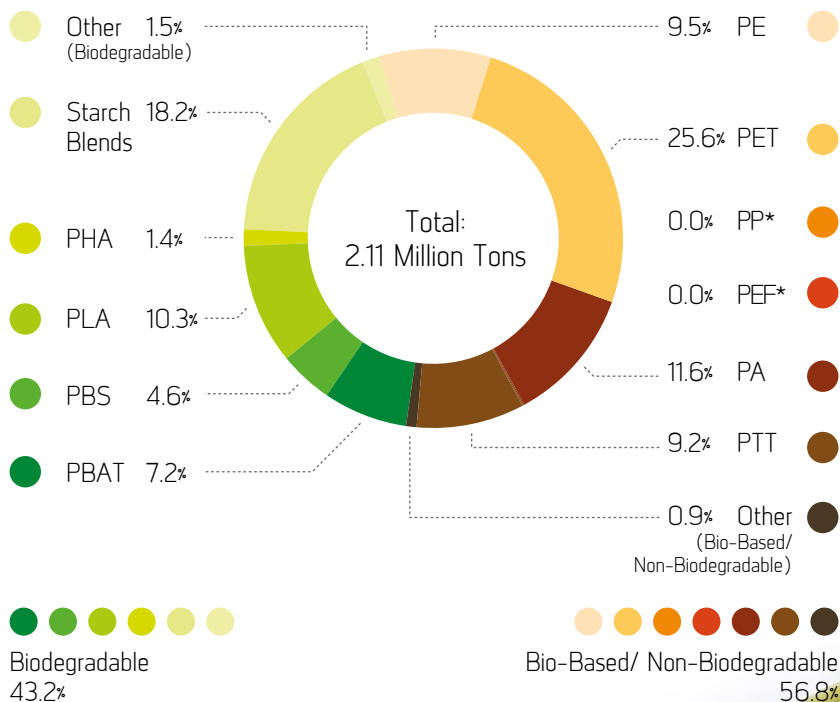
4. Fior Markets

GLOBAL PRODUCTION CAPACITIES OF BIOPLASTICS



Source: European Bioplastics, nova-Institute (2018)
 More Information: www.european-bioplastics.org/market and www.bio-based.eu/markets

GLOBAL PRODUCTION CAPACITIES OF BIOPLASTICS IN 2018 (BY MATERIAL TYPE)



* Bio-Based PP and PEF are currently in development and predicted to be available at commercial scale in 2023

Source: European Bioplastics, nova-Institute (2018)
 More Information: www.european-bioplastics.org/market and www.bio-based.eu/markets

THAILAND AS A BIOPLASTIC HUB

Thailand is well positioned to become a global bioplastics hub. The country is a leading producer of the raw materials needed for bioplastic synthesis and is well equipped with advanced technology and technical expertise through all phases of the supply chain. The Kingdom's strategic location at the heart of Southeast Asia creates market access to consumers all over the region, and strong governmental supporting policy has been implemented to fuel growth in this sector. All of these factors highlight Thailand's readiness to emerge as a global bioplastic hub.

BIOPLASTICS SUPPLY CHAIN



FEEDSTOCK

Thailand is prodigious producer of the feedstock needed for bio-based plastics, most notably cassava and sugarcane. Over 40 million tons of cassava and sugarcane are produced per year,⁵ but less than 1% is currently used for bioplastic synthesis.

Cassava

Thailand is the number one of cassava exporter both in Asia and in the world. Thailand produces approximately 30 million tons of cassava per year, 35% of which is exported for a total value of 3,264.57 million USD, owning 74.2% of the market share.⁶

Sugarcane

Thailand is also the world's second largest exporter of sugarcane, producing over 13 million tons per year, or approximately 13% of the global market share.⁷ As it contains glucose, sugarcane is highly useful raw ingredient for bio-based products. As opposed to other starch-based feedstock, Glucose requires no additional processing before use in biochemical and bioplastic production, thus shortening the conversion process and decreasing production costs.

Feedstock	Production (Million Tons)	World Ranking In Production	Export (Million Tons)	World Ranking In Export	Share Of World's Exports
Cassava	29.37	2 nd	10.3	1 st	74.2%
Sugar	13	4 th	7.2	2 nd	13%



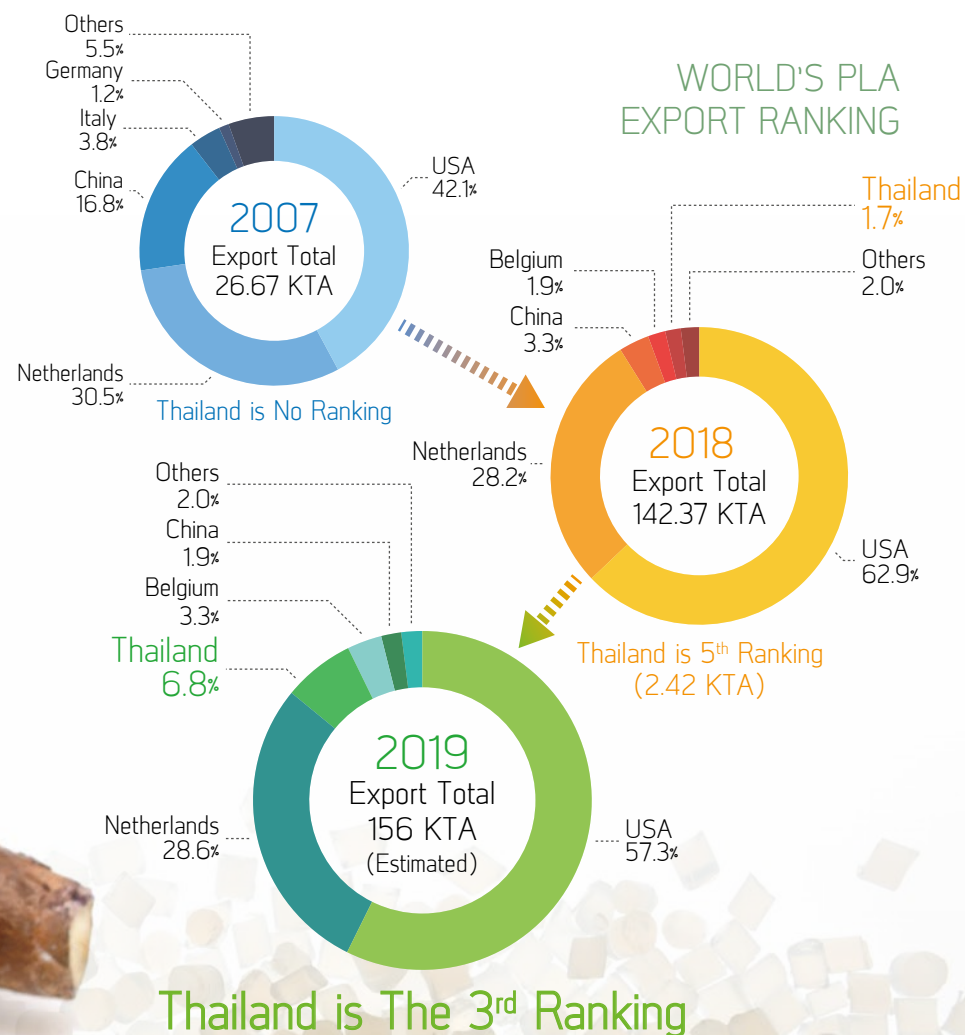
BIOCHEMICAL:

In Thailand, lactic acid is the most vital biochemical for bioplastic industry production. Purac (Thailand), from Corbion Purac, a global Lactic Acid producer, has increased production capacity up to 145,000 tons per year.

Biochemical	Production Capacity (Tons/Year)
Lactic Acid	145,000 ⁸
Lactide	75,000

BIOPLASTIC RESIN

After a new resin plant commenced operations in 2018, the levels of bioplastic resin production and export have increased by more than 300%, from 545 tons in 2017 to 2,422 tons in 2018. Over 15,000 tons of bioplastic resin are expected to be exported in the next year. The major markets are the Netherlands, China, the USA, and South Korea, respectively.



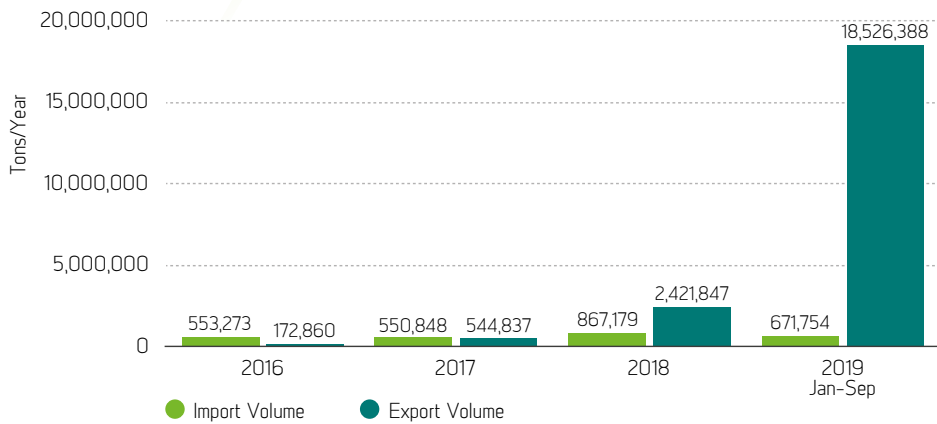
5. Source: Office of Agricultural Economics (OAE) (2018) and Food and Agriculture Organization of the United Nations (FAO) (2018).

6. Source: OAE/ Remark: Exchange rate (BOT, Sep 17, 2019) USD 1 = THB 30.57

7. Source: FAO (2018)

8. Purac (Thailand) is the only company in Thailand who produces Lactic Acid used for Polylactic polymer (PLA) production in particular. (Plastic Institute of Thailand. 2019)

THAILAND'S BIOPLASTIC RESINS IMPORT&EXPORT VOLUME 2016-2019 (H.S.CODE 3907.70)



Source: www.Plastat.com (September 2019)

Key players: Total Corbion, PTT MCC, Advanced Biochemical (Thailand) Co., Ltd.



Total Corbion is a collaboration between Total and Corbion to manufacture world-class polylactic polymer (PLA) with an investment of approximately 100 million USD. Total Corbion began manufacturing PLA in the second half of 2018 in Rayong, Thailand. The current production capacity is 75,000 tons per year, the majority of which is exported to the European market.



PTT MCC is a joint venture between PTT Public Company Limited (PTT) and Mitsubishi Chemical Corporation (MCC) under the BioPBS brand. Based in Rayong, the MTT MCC plant is the first Polybutylene Succinate (PBS) plant in the world, with production capacity of 20,000 tons per year.

Companies	Production	Production Capacity (Tons/Year)
PTTMCC	PBS	20,000
Total Corbion	PLA	75,000

THAILAND'S PLA EXPORT PARTNER COUNTRIES 2019 (JAN-JUL 2019) (H.S.CODE 3907.70)



Source: Plastic Institute of Thailand (July 2019)

■ BIOPLASTIC COMPOUND

Key players: PTT GC, R&B, Thai BAG, King Pac Industrial Co., Ltd., Prepack Thailand, Reangwa Standard Industry Co., Ltd., Thantawan Industrial Plc.

Seventy percent of Thailand's plastic industry, or more than 1,900 companies, are plastic converters.⁹ As global environmental awareness grows, several research centers and institutes are playing significant roles in supporting plastic compound entrepreneurs in Thailand to shift to bioplastic manufacturing. The organizations provide business advice for all stages of the production process and workshop trainings on subjects like design and development, molding, and programming.

9. Plastic Intelligence Unit, Plastic Institute Thailand (2018)



■ STRATEGIC LOCATION

In addition to the abundance of raw materials and the readiness of the upstream to downstream industries, the strategic location at the center of Southeast Asia also strengthens Thailand's position as a high-potential location of bioplastic production. Thailand is ideally located to export and distribute bioplastic resins and products to other ASEAN and Asian countries as the markets for bio-friendly products grow.

■ GOVERNMENTAL POLICY

In June 2019, Thailand's cabinet approved another green measure to promote bioplastic packaging, offering a tax deduction up to 125% from January 2019 to December 2021 to companies that purchase and use bioplastics for their products. The tax policy is expected to motivate 10% of existing plastics companies to transition to bioplastic production.

Under the Thailand Plastics Waste Management Roadmap (2018 – 2030), single-use plastic items and polystyrene foam containers will be banned by 2022. Currently, however, voluntary bans and the use of biodegradable plastics have become increasingly common and have been adopted by many major department stores, hypermarkets, retailers, and associations, including The Mall Group, Big C Supercenter Plc, CP All Plc, and Central Department Store Co.¹⁰



SUPPORTING FACILITIES

The Thai government is working to provide continuous support in improving the investment environment for bioplastics investors. In collaboration with educational institutions, research centers, and the private sector, the government is offering resources for human resource training and research and development as well as providing access to dedicated bioplastics-related faculties in over 20 leading academic institutions.

RESEARCH CENTERS



Center of Excellence on Petrochemical and Materials Technology, Chulalongkorn University

Provides academic training programs and R&D services.



Bioplastics Research Unit, Prince of Songkla University

Supports developing bioplastic for the plastic industry.



Cassava and Starch Technology Research Laboratory, Kasetsart University

Provides R&D services.



Department of Biotechnology, Faculty of Science, Mahidol University

Offers academic training programs, R&D services, and consulting services.



Faculty of Science, Burapha University

Researches, develops and establishes bodies of knowledge, as well as, innovations in science and technology.



Faculty of Engineering and Industrial Technology, Silpakorn University

Researches bioplastics compounding and R&D in technology regarding bioplastic modification and synthesis.



Faculty of Science, King Mongkut's Institute of Technology Ladkrabang

Undertakes R&D in polymers.



Faculty of Science and Technology, Thammasart University

Undertakes R&D in polymers and bio-materials.



ASSOCIATIONS AND INSTITUTIONS



Plastics Institute of Thailand

Promotes and enhances the Thai plastics industry's competencies through R&D and product testing services.



National Science and Technology Development Agency (NSTDA)

Supports R&D in 5 target areas: agriculture and food; energy and environment; health and medicine; bioresources and community; and manufacturing and service industries.



National Metal and Materials Technology Center (MTEC)

Creates and enhances capabilities in materials technology of both governmental and private sectors through R&D.



Thai Bioplastics Industry Association

Assists in the development of the Thai Bioplastics industry to reach international standards and promotes networking within the Bioplastics community.



National Innovation Agency

Supports R&D of innovative products and embeds the innovative strategic direction of firms.



Biodiversity-Based Economy Development Office (Public Organization): BEDO

Supports and promotes a bio-based economy and enhances value-added bio products in the country.



National Center for Genetic Engineering and Biotechnology

Supports R&D, policy research, and international relations in agricultural, biomedical and environmental sciences.



Thailand Institute of Scientific and Technological Research

Promotes and enhances innovations in science and technology R&D capabilities for commercialization and social benefits.

INVESTMENT INCENTIVES

BOI recognizes the importance and value of the bioplastics industry, and offers a wide range of tax and non-tax incentives for projects that meet national development objectives.

NON - TAX INCENTIVES

These activities also receive the following non-tax incentives:

- Permit to bring in expatriates
- Permit to own land
- No restriction on foreign currency

TAX INCENTIVES

Group	Eligible Activities	Incentives	
		Corporate Income Tax Exemption	Exemption of Import Duty
A2	Manufacture of eco-friendly chemicals or polymers or manufacture of products from eco-friendly chemicals or polymers that is incorporated within the same project as the manufacture of eco-friendly chemicals or polymers	8 Years	✓
A3	Manufacture of products from eco-friendly polymers	5 Years	✓
A4	Manufacture of paper container coated with bioplastics	3 Years	✓



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