



# NatureWorks

We are an advanced biomaterials company offering a portfolio of renewably-sourced polymers and chemicals we call **Ingeo™**.

We believe at the intersection of science, technology, and sustainability, we can change the world without changing it at all.

ingeo



## Naturally advanced materials

Back in 1989, we had a big, crazy idea. What if we could turn greenhouse gases like carbon dioxide in products?

Nature does it all the time turning carbon dioxide into plants, entire forests, and huge structures like coral reefs.

At NatureWorks, we're doing the same thing – using our best technologies to turn greenhouse gases into a portfolio of performance materials called Ingeo.

## How is Ingeo made?

Today, we use plants to capture and sequester CO<sub>2</sub>, transforming it into long-chain sugar molecules. We ferment those sugars to make lactic acid, the same chemical produced by our muscles after some hard exercise. This lactic acid is the building block of the whole range of advanced materials we call Ingeo.

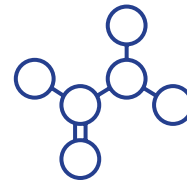
It took some real innovations to bring these new materials to market, but today we partner with companies around the world to transform Ingeo into a wide-range of innovative products like coffee capsules, tea bags, coatings for paper, diapers, and appliances.



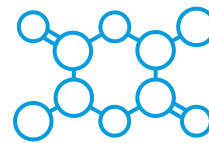
Greenhouse Gases



Plant Sugar (Dextrose)



Lactic Acid



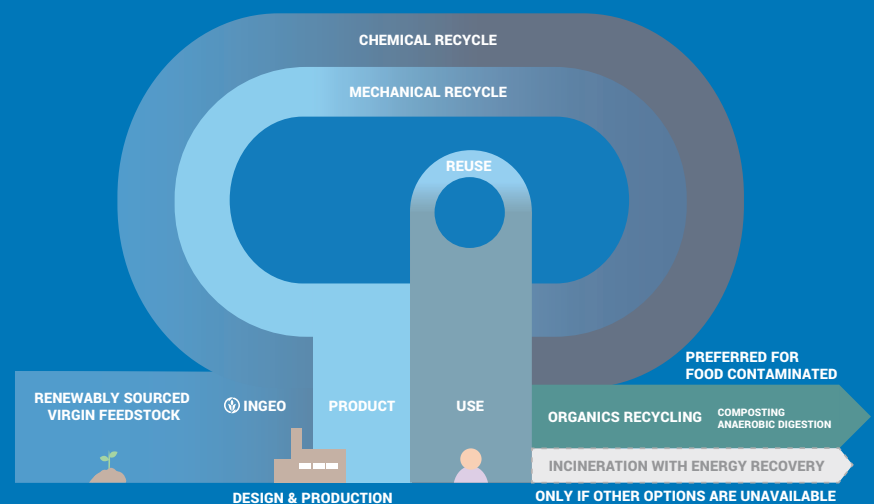
Lactide



Ingeo (polylactic acid or PLA)

## Designing materials for the circular economy

Since 2015, NatureWorks has partnered with the Ellen MacArthur Foundation to support the foundation's New Plastics Economy Initiative, which is a comprehensive strategy for creating a global plastics system based on circular economy principles. Using the three primary ambitions, we are able to partner with customers and brandowners to design biomaterials that source from renewable feedstocks and fit with multiple after-use options like mechanical recycling, composting, chemical recycling, incineration with energy recovery, and anaerobic digestion.



## Our commitment to Sustainable Agriculture Certified sustainability for 100% of our feedstock

For the last three decades, NatureWorks has been working to critically assess, diversify, and assure the sustainability of our feedstocks.

A new initiative at NatureWorks will ensure that by 2020 100% of the agricultural feedstock used for the production of Ingeo will be certified by the International Sustainability & Carbon Certification System (ISCC) to the ISCC PLUS standard of best practices in agricultural production.



ISCC PLUS is a 3rd party administered, comprehensive scheme certifying the sustainability of agricultural feedstocks used for biobased products including both the environmental and social aspects of agricultural production. ISCC provides practical solutions for fully traceable and sustainable agricultural practices. Site specific audits and certificates ensure full traceability along the supply chain.

### Mandatory agricultural practices for farms supplying NatureWorks with ISCC certification



#### PROTECT BIODIVERSITY

No sourcing from land with high biodiversity, high carbon stock or peatland.



#### FARMING BEST PRACTICES

Implement best practices for fertilizer and pesticide use, disposal, irrigation, & tillage.



#### ENVIRONMENTAL PROTECTION

Protect natural vegetation & water courses, soil erosion, and soil organic matter.



#### SOCIAL SUSTAINABILITY

Adopt protections on labor conditions, child labor, workers protections, land rights, & water rights.



#### REDUCE GREENHOUSE GASES

Reduce greenhouse gas emissions on the farm level (no burning, etc).

## 3 AMBITIONS for the Circular Economy

- 1 Decouple plastics from fossil feedstocks
- 2 Create an effective after-use plastics economy
- 3 Contribute to the reduction of food waste and increase diversion to compost.



Global Commitment

As part of our commitment to decoupling plastics from fossil feedstocks through the use of renewables, the Ellen MacArthur Foundation recently announced that NatureWorks, along with other global brandowners and manufacturers, signed the New Plastics Economy Global Commitment. As a signatory, we committed to having 100% of our agricultural feedstocks certified as sustainably and responsibly managed via ISCC PLUS.

## Markets & Applications

From coffee capsules to food serviceware and appliances to 3D printing, NatureWorks has been leading applications innovation for biomaterials for over 20 years. These applications demonstrate how Ingeo can be tailored to enhance performance attributes critical to application performance from barrier, to heat and impact resistance, to thermoformability, all while embracing the concepts of a circular bioeconomy.

For example, the barrier properties of Ingeo make it an ideal material for refrigerator liners where it can help retain insulative properties reducing energy use 7-13% over the life of the appliance. In markets such as single-serve beverage capsules and foodservice, Ingeo-based products can be 3rd-party certified compostable, and enable food waste diversion away from landfills.

- SINGLE-SERVE BEVERAGE CAPSULES
- 3D PRINTING
- FOOD SERVICeware
- MEDICAL AND HYGIENE
- LANDSCAPE AND AGRICULTURE
- BUILDING AND CONSTRUCTION
- ELECTRONICS AND APPLIANCES
- FOOD PACKAGING
- BEAUTY AND HOUSEHOLD
- NONWOVENS FOR FILTRATION AND INFUSION
- INDUSTRIAL CHEMICALS



Driven by curiosity and obsessed with science, NatureWorks meets the challenges of our partners and a changing world creating more responsible high performance materials for a more sustainable future.

NatureWorks' headquarters and R&D is in Minnetonka, MN, and has a 150,000 MT/yr production facility in Blair, NE and a dedicated Ingeo Applications Development Facility in Savage, MN.

NatureWorks is jointly owned by PTT Global Chemical and Cargill.



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