



GC Circular Living Symposium

Eamonn Tighe NatureWorks
November 12, 2020





150,000 MT

Ingeo PLA plant in Blair, NE USA



1 Million MT Milestone in 2019

Aggregate volume sold since 2005



**Dedicated Applications
Development and R&D Facilities**



Jointly owned by Cargill and PTTGC



Established global market channels

- Commercial partnerships with global brands
- Sales team in 15 countries across North America, Latin America, Europe, and Asia

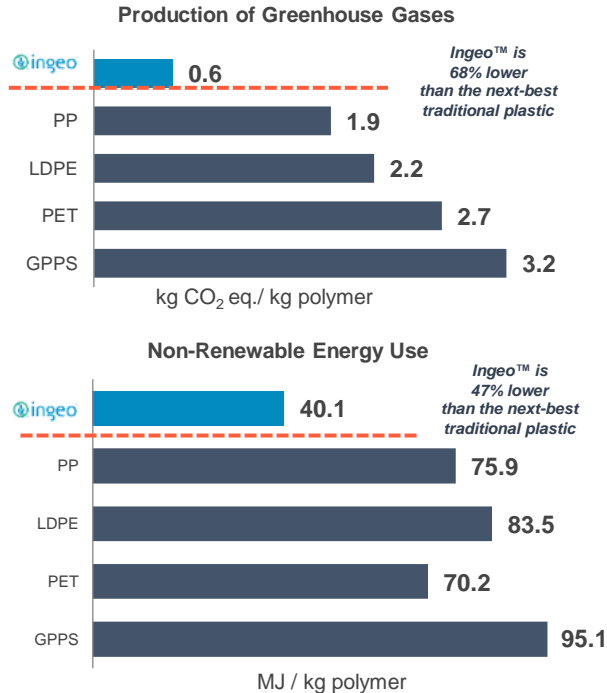


**Strong environmental expertise and
product characteristics**

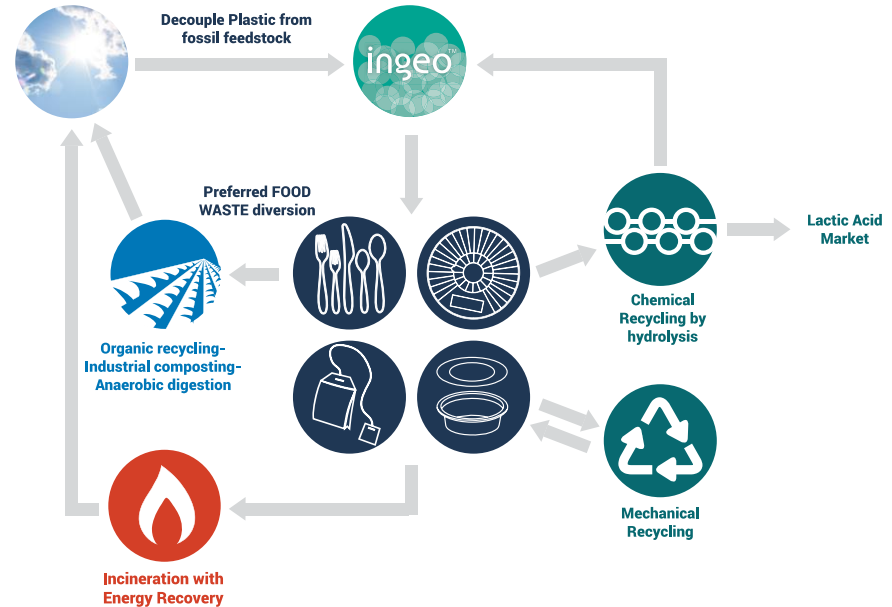
- Peer reviewed LCA's and eco-profile demonstrate smaller carbon footprint and lower fossil energy use
- Products enable portfolio of end-of-life options
- Dedicated internal team for understanding environmental and end-of-life impacts

Sustainable from the beginning to the end

Low Impact Manufacture



After-Use Options



1. Ingeo data: Life Cycle Inventory and Impact Assessment data for 2014 Ingeo™ Polylactide Production. Industrial Biotechnology, Vol 11, No. 3. Pgs 167-180. June 2015
 2. US polymer production data: American Chemistry Council, <http://plastics.americanchemistry.com/LifeCycle-Inventory-of-9-Plastics-Resins-and-4-Polyurethane-Precursors-Rpt-Only>, 2011

Markets for Ingeo continue to evolve



3D PRINTING



HOUSEHOLD



**BUILDING AND
CONSTRUCTION**



BEAUTY



**COFFEE AND TEA
PACKAGING**



**ELECTRONICS AND
APPLIANCES**



**LANDSCAPE AND
AGRICULTURE**



FOOD PACKAGING

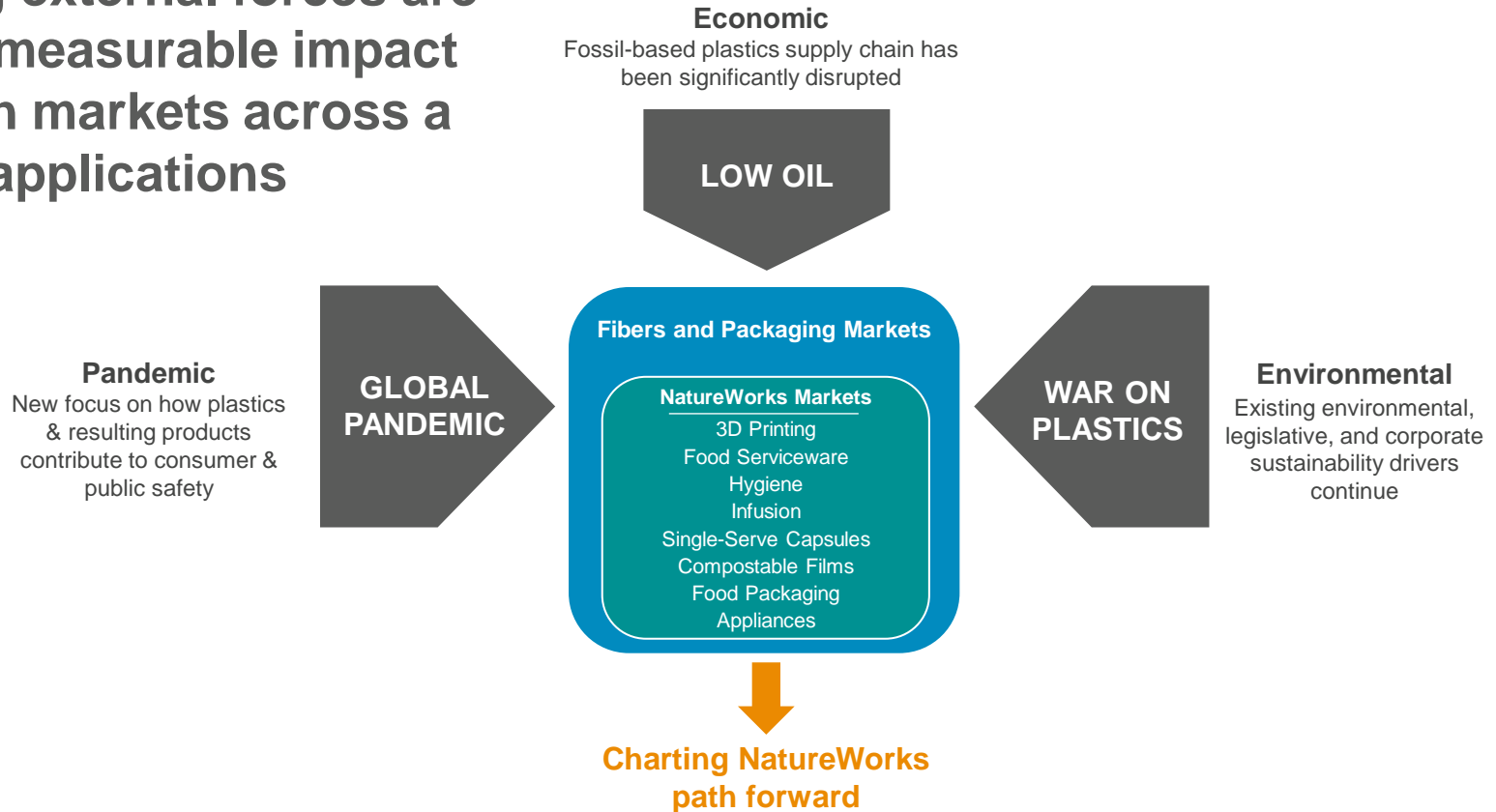


FOOD SERVICEWARE



**MEDICAL AND
HYGIENE**

Changing external forces are having a measurable impact on growth markets across a range of applications



Supporting the use of Ingeo in PPE during the global pandemic

3D printing industry and our supply chain has demonstrated speed & flexibility in emergency manufacturing



'A worldwide hackathon': Hospitals turn to crowdsourcing and 3D printing amid equipment shortages

The efforts come as supply shortages loom in one of the biggest challenges for health care systems around the world.




THE VERGE

REPORT

3D PRINTERS ARE ON THE FRONT LINES OF THE COVID-19 PANDEMIC

Massive PPE shortages pushed DIY volunteers to get creative

By Nick Statt | @nickstatt | May 25, 2020, 9:30am EDT



MatterHackers

COVID-19 Maker Response Hub
Print or Donate to Help Fight COVID-19

3D Printed PPE Delivered
75,235

Hospitals Served
181

Proto-pasta



Ultimaker

STACKER
INDUSTRIAL GRADE 3D PRINTERS

LANT
3D



MakerBot

color**Fabb**



In EU, new Nespresso-compatible capsule launch and large brands are putting Ingeo-based capsules on store shelves



This market is taking advantage of the stay-at-home trend during the pandemic.

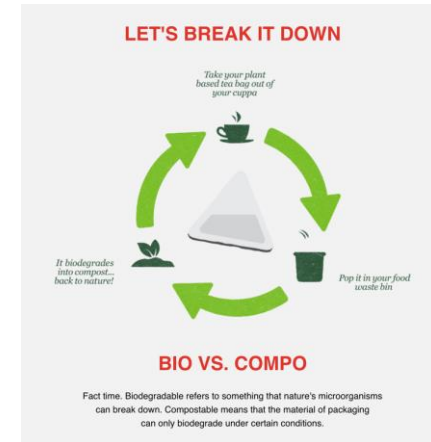


Demand for compostable tea bags from brands continues unabated in nonwoven & woven structures

9th March 2020

Plastic in tea bags - the switch begins!

Posted in [Environment](#).



Simple Paper Cup?

Safe Serviceware

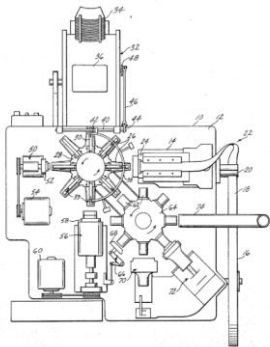
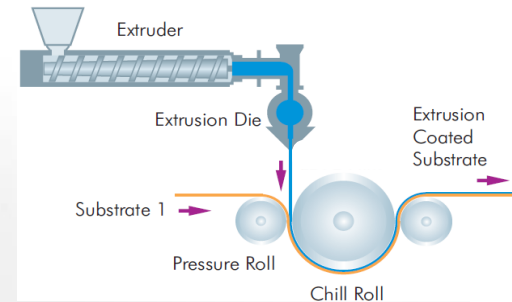
- Certified **compostable, repulpable, & recyclable**
- FDA compliant
- No taste or odor impact
- Approach 100% biobased

Melt Processing

- Modeled the process of coating paper to recommend optimizations that increase output and line speeds by 150-200%
- Stable web for faster line speeds, lower coating weights, less scrap

Cup Making

- Tougher coating for pinhole free cup at fastest production speeds
- Improved flow and penetration into paperboard to reduce coating weights and improve cup sealing range



INVENTOR:
PAUL Z. CORAZZO

Supporting the use of Ingeo in PPE during the global pandemic

NatureWorks Partners with the Nonwovens Institute to Support Production of 10 Million N95 Masks for Healthcare Workers Fighting COVID-19

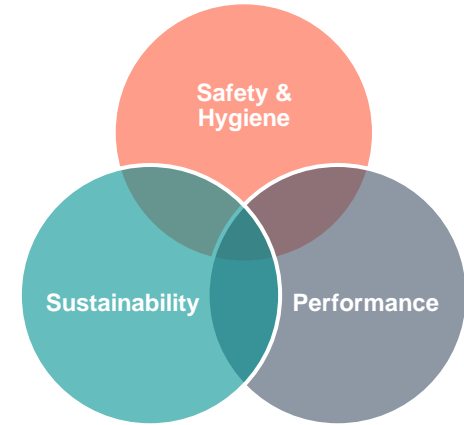
- Long partnership with NWI & previously developed spunbond technology came together for a faster, better way to make N95 surgical masks
- Bicomponent fiber made with PP & Ingeo increases processing efficiency by up to 30%
- Early tests show up to N99 levels of filtration
- New masks are reusable unlike traditional meltblown nonwoven surgical masks



A Fort Bragg soldier uses Ingeo-based material created by the Nonwovens Institute to create face masks during the COVID-19 pandemic.

The pandemic has confirmed...

- Plastic and single-use has important performance benefits for hygiene & critical applications
- Importance of sustainability, a low carbon footprint, and reducing plastic waste
- Biomaterials, like Ingeo, offers a unique solution





ingeo