

INDORAMA

V E N T U R E S

1 in 5



*PET bottles
are made
from IVL
polymers*

1 in 2



*Premium baby
diapers
are made from
IVL fibers*

1 in 4



*Tires are
made from
IVL fabrics*

1 in 4



*Airbags are
made
from IVL
yarns*

*Note: As of November 26, 2018
Source: Industry Data, Management Estimates*

Indorama Ventures: EU Plastics Strategy - Pledge

Introduction:

- Indorama Ventures Public Company, (IVL) a Global Chemical Manufacturing Company, headquartered in Thailand with 16,000 employees in 29 countries, 85 operational sites
- IVL is the largest producer of Polyethylene Terephthalate (PET) globally
 - In excess of 6.0million tonnes of capacity
 - In excess of 1.1million tonnes capacity in Europe
- IVL is a large recycler of PET Post Consumer Packaging
 - Eleven locations globally of which four are in Europe
 - European capacity for recycling post consumer PET bottles and polyesters is in excess of 100,000 tonnes
- IVL makes a separate Business Unit for Recycling with specific targets for growth and leadership in this sector
- Sustainability performance:
 - A copy of IVL Sustainability Report 2017 can be obtained at the web-site
<http://e.issuu.com/embed.html#33166322/63273266>
 - IVL has received recognition for its performance in its Sustainability Strategy through its listing on the Dow Jones Sustainability Index

Recycling Initiatives to date

- IVL has announced a global initiative, in a JV Partnership with Loop Industries, to develop a process to chemically recycle PET & Polyesters back to polymer monomers
<http://www.indoramaventures.com/en/updates/other-release/1162/indorama-ventures-and-loop-industries-jv-to-introduce-new-era-in-pet-and-polyester-recycling>
- IVL is developing a “chemical recycling business model” for PET & Polyesters in Europe with the start up company Ioniga to create a circular economic proposition to rejuvenate waste packaging as well as other waste streams back to virgin polymer materials. Leading Brand Owner Unilever has made a public announcement related to this embryonic technology highlighting the potential for complete circularity in PET packaging and zero waste to incineration and/or landfill
<https://www.unilever.com/news/press-releases/2018/unilever-to-pioneer-breakthrough-food-packaging-technology-together-with-ioniga-and-indorama-ventures.html?criteria=search%3dcircular%26monthfrom%3d1%26yearfrom%3d2001%26monthto%3d12%26year%3d2018>
- IVL invests in further enhancing its foundational expertise in “mechanical recycling” by the acquisition of Sorepla France, with the intention to bring new “bottle to bottle” recycling of post consumer PET materials
<http://www.indoramaventures.com/en/updates/other-release/1150/indorama-ventures-expands-pet-recycling-capabilities-with-acquisition-of-sorepla>

Indorama Ventures – Recycle Leadership



Making the PET Value Chain Circular

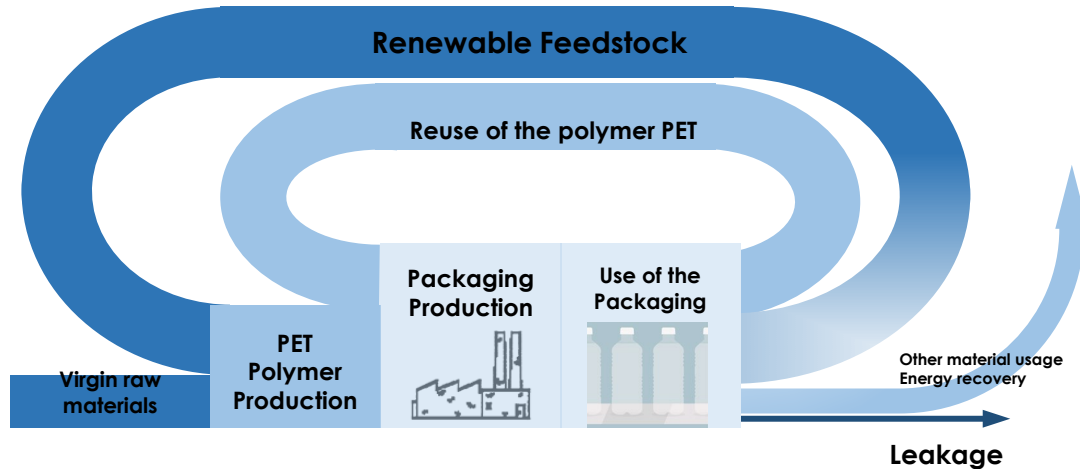
Indorama Ventures: EU Plastics Strategy - Pledge

Indorama Ventures Recycle Progress Milestones:

IVL will increase the capacity to handle post consumer PET packaging to recycle the material back into the virgin PET stream

- **2019:** New Capacity of 16,000 tonnes of RPET (recycled PET Pellets from 100% collected PET Post Consumer) brought into operation.
- **2019:** To demonstrate the Circular Economic Model of rejuvenating waste polyester materials back to pristine virgin PET, Indorama will start to include “feedstock from post-consumer PET” to displace “fossil feedstock” in the manufacture of virgin PET resin..
- **2020:** Full year of incorporation of “feedstock from waste” at the demonstration stage. Further development to increase the percentage of “feedstock from waste” being implemented
- **2023:** Invest in new technology which remains yet to be proven, whereas IVL scales up “Monomers from Waste” to be additional to / displacement of feedstock from fossil
2x 50,000 tonnes scale up operations adjacent to PET Plants in Europe envisaged in the first phase.
- **2025:** On scale up in 2023, further envisage commercial scale “Monomer from Waste” plants to be realized converting collected PET/polyester post consumer products back to virgin PET packaging products.

Indorama Ventures: Circular PET Value Chain



Indorama Ventures European Pledge:

- Polyester for fibers and PET for packaging is chemically the same
- Fully circular process can be infinite
- IVL Pledge:
 - By optimizing technology make PET/Polyester production more circular
 - By **2025** use **20% post consumer PET** as feedstock in new and recycled PET resin
 - Equates to > **200,000 tonnes post-consumer PET** displacing fossil/oil feedstock
 - Global Scale 2025: >**750,000 tonnes post-consumer PET** displacing fossil/oil feedstock

European Milestones:

Mechanical Recycling:

- 2011 – 2018: Acquired PET bottle washing assets, current annual capacity 100,000 tonnes approx. of rPET Flake
- 2019: Start-up of a new facility to produce 16,000 tonnes/yr PET pellets from 100% post consumer PET flake
- 2022: Growth in capacity to recycle PET bottles to exceed 300,000 tonnes

Feedstock from Post Consumer PET:

- 2019: Initial trials using feedstock chemicals from Post Consumer PET bottles ~5,000 tonnes
- 2020: Continued demonstration of proof of technology ~10,000 tonnes
- 2022: Envisage first commercial production at scale > 50.000 tonnes per annum output

Indorama Ventures: Circular PET Value Chain

Key Message for Support from Stakeholders

- Collection and sorting is key. Segregated Waste Stream and the implementation of deposit Schemes will ensure enough feedstock reaches the recyclers.
- The market pull by the consumer for recycle content in packaging, induced by education will encourage the retention of PET packaging from entering the environment as waste. Value must be generated to promote capture of the packaging
- Single Use Food Containers such as trays for fresh foods already uses a high percentage of recycle content. This must firstly be understood as a benefit, and secondly food containers should be handled similar to PET bottles for collection
- Ultimately waste packaging will become a feedstock of value. Reduces and displaces the dependency on non-sustainable feedstocks. Reduction of CO2 emissions and the reduction of the carbon footprint of plastic packaging will follow
- Indorama Ventures understands the Plastics Industry is undergoing a renaissance.
- **Indorama Ventures is committed to the circular business model as the future for PET Packaging.**