

The Role of Synthetic Yarn and Fabric in a Sustainable World

Srinivasan Prabhushankar (Shankar)

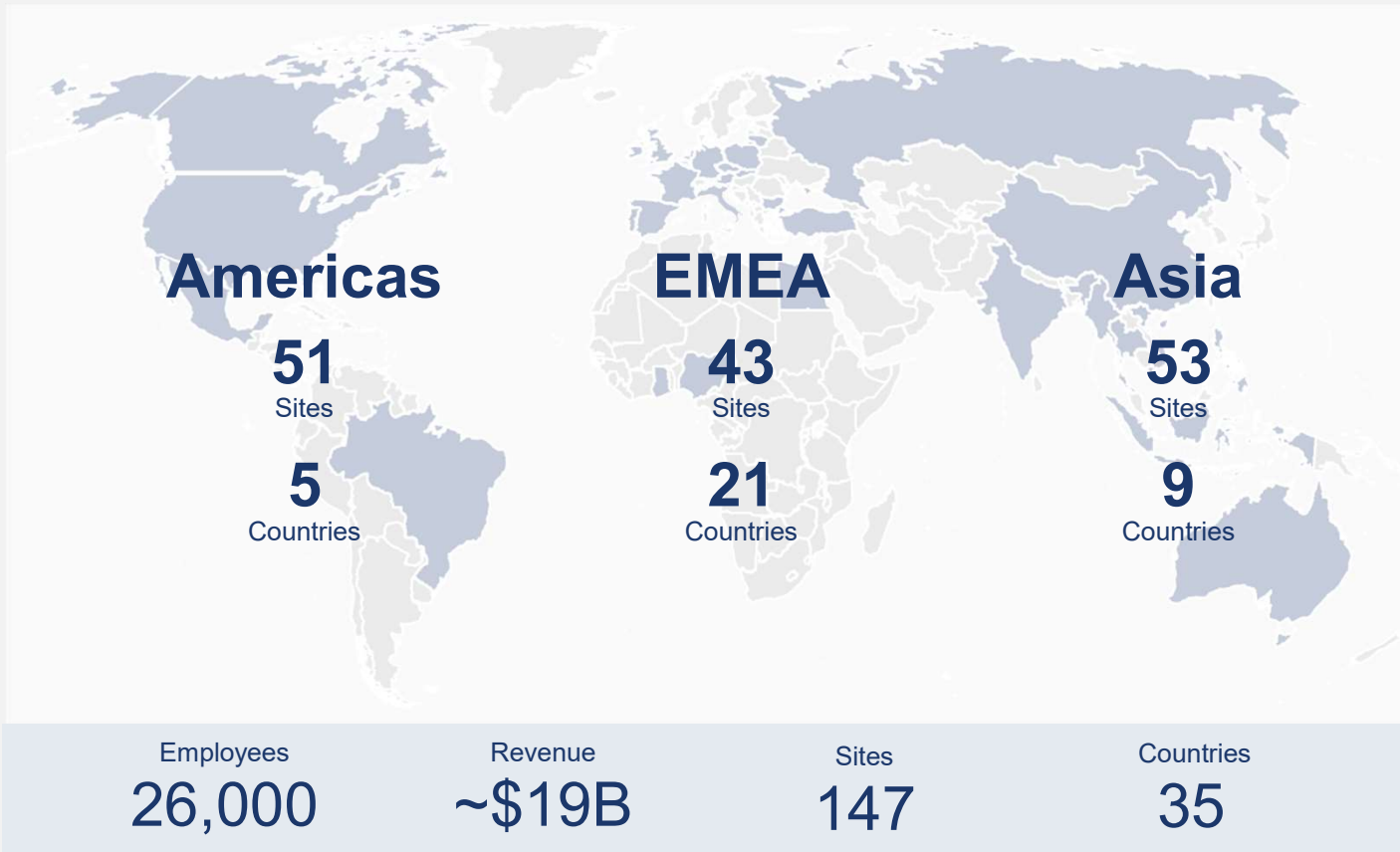
Synthetic Yarn and Fabric Association
April 21, 2023



Our Purpose

*Reimagining Chemistry
Together to Create
a Better World*

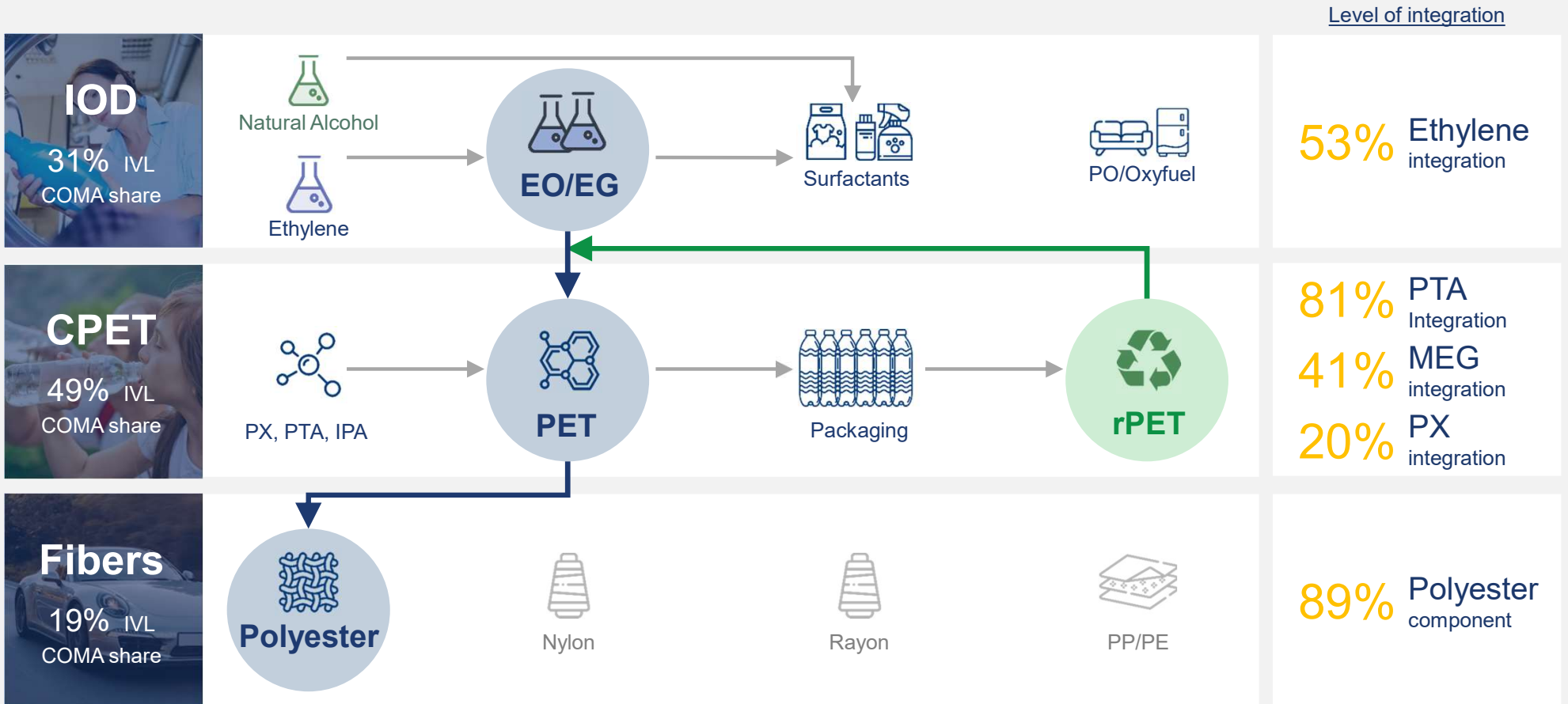
Indorama Ventures (IVL) is a diverse and integrated business, well-positioned for growth



Our platform:

- 1 Integrated and diverse portfolio
- 2 Inter-connected businesses through raw materials, customers and R&D
- 3 Leading position in attractive and growing end markets

Our global platform is vertically integrated to scale with a diversified product portfolio

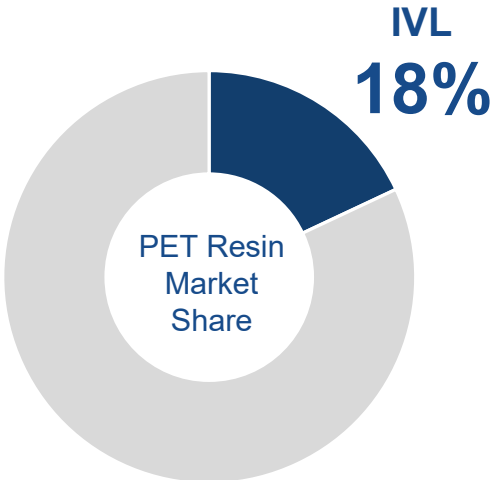


Note: 2022 contribution margin (COMA)

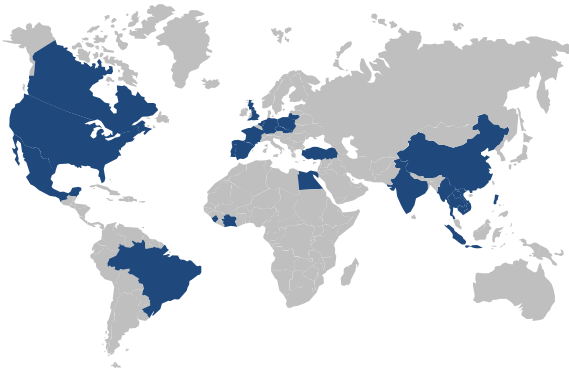
Making us the world's leading PET producer



Largest global PET resin producer



Geographically diverse footprint



60 manufacturing sites
22 countries
5 continents



High levels of portfolio integration

81% PTA integration
41% MEG integration
20% PX integration



Strong customer relationships



And widely recognized as a sustainability champion

Member of
**Dow Jones
Sustainability Indices**
Powered by the S&P Global CSA



Sustainability Award
Silver Class 2021
S&P Global



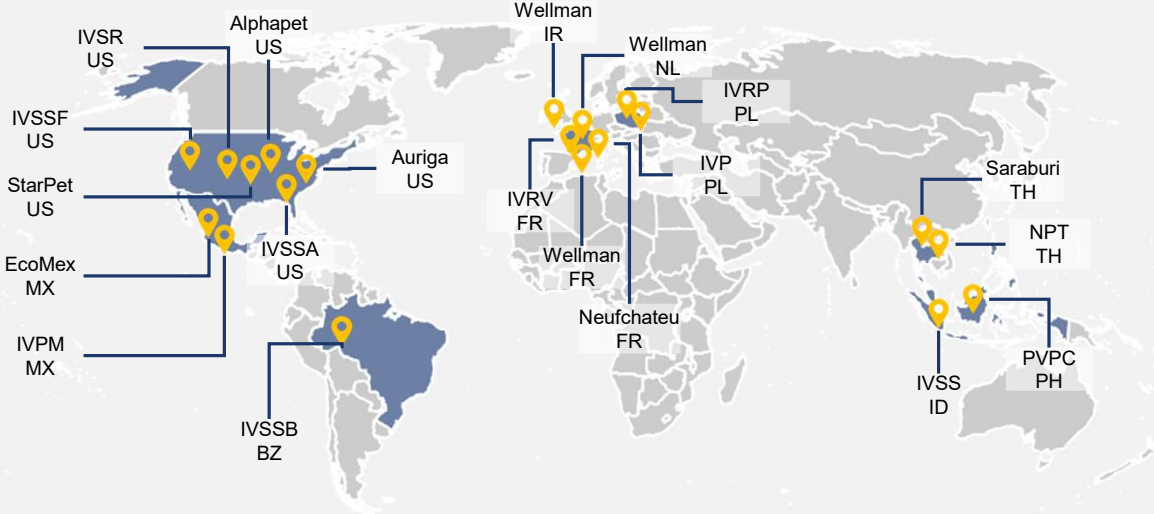
FTSE4Good

chemsec
CHEMSCORE
#1 of 50 chem
companies



Our global footprint is growing, and we are on track to meet our recycling targets

Growing global rPET footprint



- Engage with our partners and stakeholders
- Further build out capacity
- Improve operational and cost efficiency
- Investing into Bio Raw Materials & Advanced Recycling

Our recycling targets



50 billion bottles recycled every year from 2025
 (2022: 89 billion since 2011)



Recycling Capacity¹
750 KTA by 2025
 (2022: 690KTA)



Invest up to
\$1.5B
 (2022: \$0.5B)

Ensuring delivery of a circular economy for bottles and fibers

Customer rPET Content Targets



Plastic bottles from 50+% recycled material by 2030 (in Europe)



25% recycled content in plastics packaging by 2025



100% from 2024 onwards – use recycled polyester only



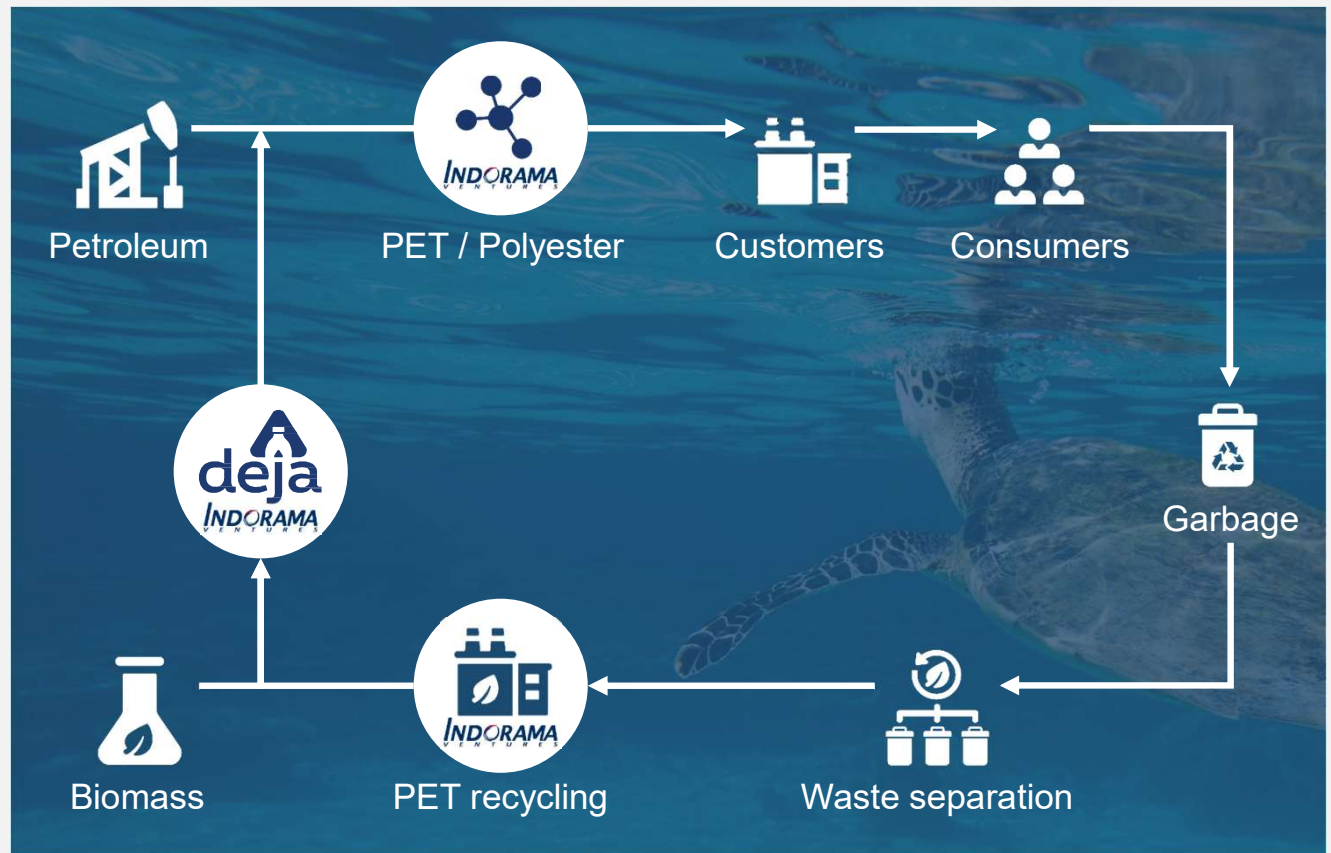
100% by 2030



100% sustainable or recycled linen & polyester by 2025



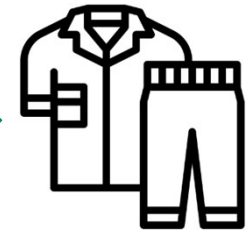
>60% renewable materials and >7% recycled materials by 2030



Growing demand of recycled fibers for textiles



PET is preferred in textiles because it offers the best combination of performance and low environmental footprint, increasing customer demand



All sectors of the ecosystem have taken steps to join this sustainability efforts

Government & NGOS

- Tax breaks & incentives (monetary or otherwise)
- Public policies & legislation (in recent years significantly in Korea, Australia, some US states)
- Pushed by international bodies & non-governmental organizations (NGOs) (e.g. COP26/27)

Businesses & Trade Bodies

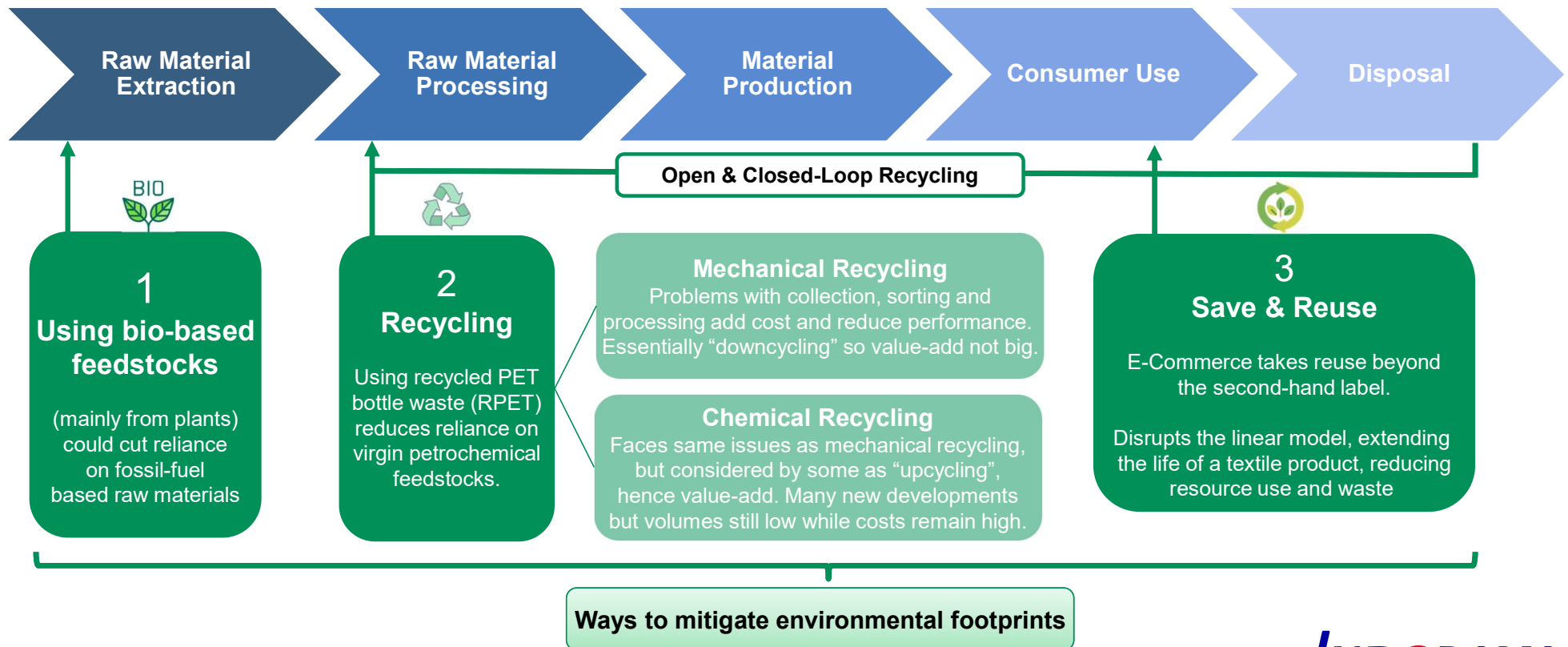
- Growing trend among brands, especially major ones
- Basel Convention, Plastic Pacts Network and UNSEDA
- Not only textiles, but also food & beverage and almost all forms of packaging

Consumers

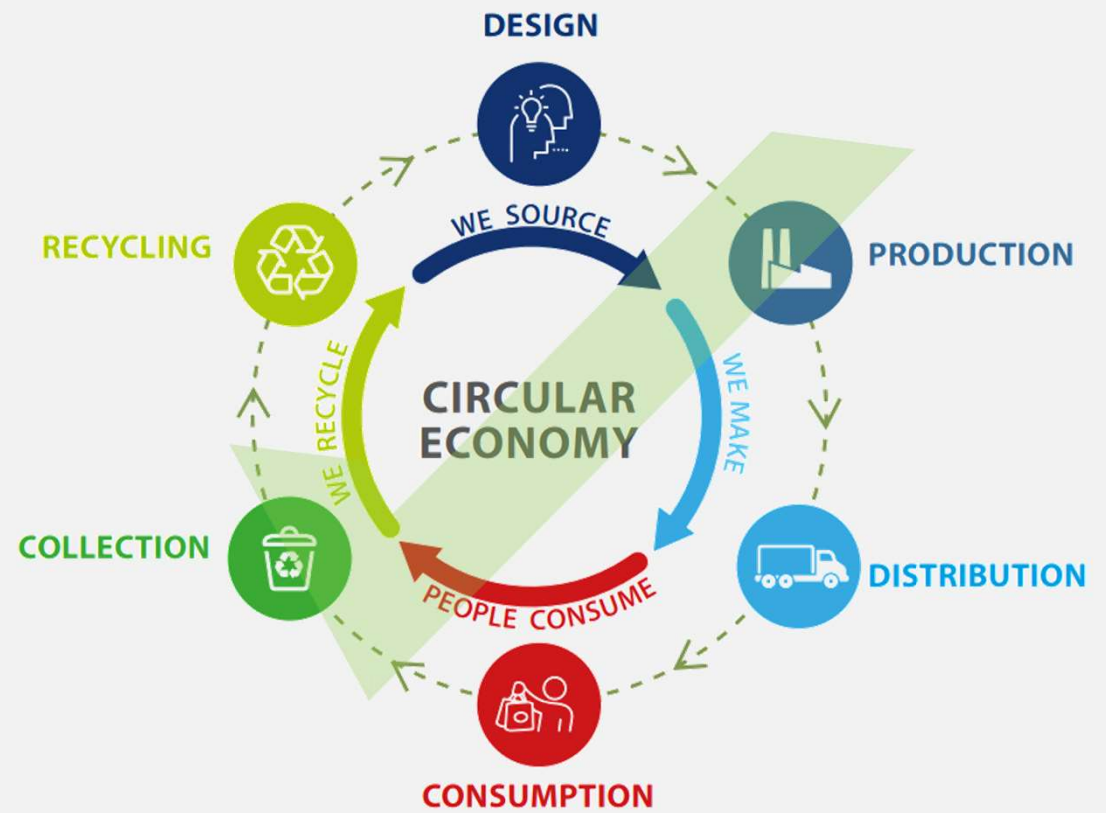
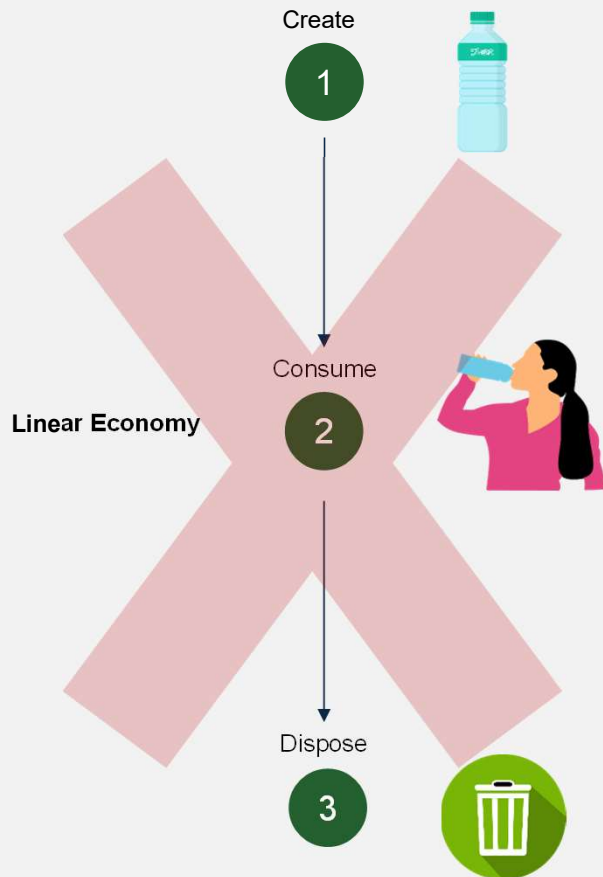
- The "Greta Thunberg" phenomenon: encouragement & pressure from consumers
- Internet, social media & metaverse
- Rise of Generation Z & their values.'

Recognition of polyester sustainability

Fiber made from recycled PET bottles has similar strength as virgin PET fiber, so should not be considered downcycling.



However, stakeholder's investment in infrastructure continues to be linear



Resulting in a limited supply of PET bales for recycling

Packaging & apparel companies are set to compete over the availability of recycled polyesters from PET bottle waste

Uses of recycled fibres in textiles are increasing

Simultaneously, the use of recycled materials in bottles & packaging are also increasing



The low rate of recycling for polyester textiles is the main argument against “downcycling”

Claiming that a “circular” item (PET bottle), is being turned into a “non-circular” item (T-shirt)

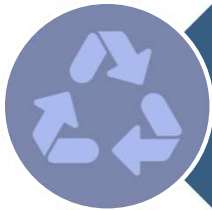
This is not true. The real issue is the lack of PET bales to recycle due to low collection rates

The current US recycling rate of PET is 29% (according to recent NAPCOR study)

Mechanical recycling of PET bottles and containers has become the focal point in this sustainability effort

Intensifying the debate about closed loop recycling

To understand this fully we need to explore the terms downcycling, recycling and upcycling



Recycling is the process of converting waste materials into new materials and objects. The recovery of energy from waste materials is often included in this concept. The recyclability of a material depends on its ability to reacquire the properties it had in its virgin or original state.



Upcycling is the conversion of waste materials to something useful, valuable, and underlining. It is a useful concept that can be applied not only to the waste design industry but also to waste utilization and resource circulation.



Downcycling is to recycle something in such a way that the resulting product is of a lower value than the original item / to create an object of lesser value from a discarded object of higher value.

At IVL, our position is...

We recycle PET bottles into new bottles. If this is not possible, recycling bottles into other applications is the next best choice.



Our vision is aligned with global sustainable trends



CIRCULAR ECONOMY

- 750 kt of recycling capacity through M&A, organic growth, and partnerships
- Partner with organizations to contribute to a circular economy

GHG REDUCTION & RENEWABLE ENERGY

- 30% reduction in combined GHG (Scope 1 & 2) intensity
- 25% of energy consumption is renewable by 2030

COLLECTION & WASTE REDUCTION

- Expand recycling capabilities to increase production of rPET
- Promote collection by supporting legislation and education

CIRCULAR ECONOMY

- National Plastic Pacts: reusable, recyclable, or compostable
- Legislation: minimum recycled content in packaging

NET ZERO CO2 & GHG EMISSIONS

- EU, UK, US, Canada by 2050
- More and more GHG targets

COLLECTION & WASTE REDUCTION

- Collection legislation, such as EPR and DRS programs
- Brands openly backing deposit return systems

Note: *proposal
Source: IVL Sustainability Report 2019, Press searches

Through our partnerships we drive decisions that impact investments in infrastructure & technology to enhance recycling of PET

Membership



PET Recycling Coalition Goals

- ✓ Increase capture by 250M lbs/year by 2027
- ✓ Achieve >60% access for PET thermoforms by 2025
- ✓ Create resilient recycling in practice and at scale for pigmented / opaque PET by 2025

Steering Committee



Coalition Member



Advisory Committee



Created and launched programs for Global Recycling Education



Audience

Schools

- Teachers & Students from Kindergarten to College

Youth Activists

- Youth focused on and Interested in Recycling

Universities

- Sustainability and Entrepreneurship Centers at Universities

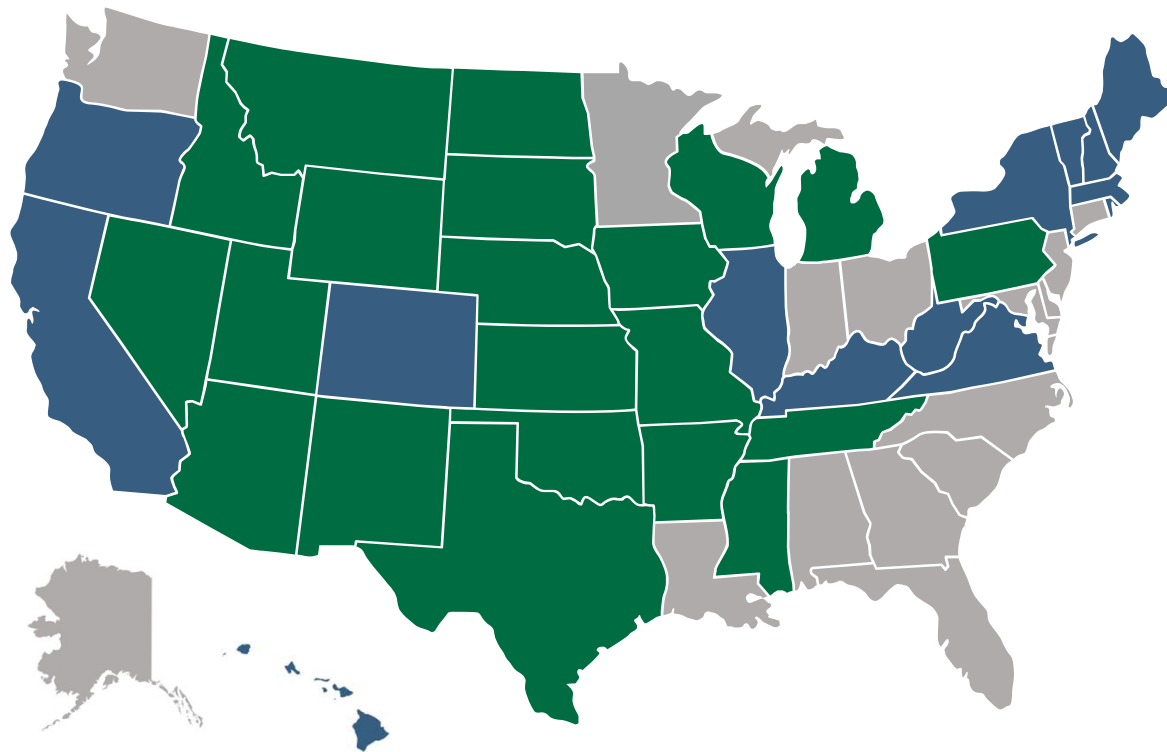
CONTENT	TOPIC		
	Beginner Lesson	Intermediate Lesson	Advance Lesson
Level 1 (Pre- Kindergarten to Grade 2)	Introduction to Recycling	What can you recycle?	Find it, Recycle it
Level 2 (Grades 3-5)	Recyclable, Non-Recyclable, and Potential Recyclers	Where does the trash go?	What Can You Make From Recycling?
Level 3 (Grades 6-8)	Waste Leakage in the Environment	A Waste Hero's Story	My Waste Audit
Level 4 (Grades 9-10)	Linear vs Circular Life Cycle	Creating the Circular Economy	Circular Design Challenge
Level 5 (Grades 11-12)	Circular Case Study	Redesign for Circularity	Circular Economy Model Canvas
Level 6: Workshop & SDGs (Universities & Youth Clubs)	<ul style="list-style-type: none"> Workshop 1: Problem Tree Workshop 2: Mind Mapping Workshop 3: Circular Business Model Canvas <ul style="list-style-type: none"> SDGs Workshop 		

Support well-crafted collection and waste reduction legislation

In 2021 – 2022:

4 states **passed** EPR bills and 7 states introduced / passed **amendments to existing DRS bills**

15 states **introduced EPR bills** and 6 states **introduced bills for new DRS programs**



**The last time a new DRS program was established was in 2002 (Hawaii)*

Inside the Putin show
What next for SoftBank?
Graphene and decarbonisation
Is China uninvited?

MAY 25th - 27th 2022

The coming food catastrophe



Target: WEF in Davos

©Indorama Ventures PCL

Get the messages that matter, to the people that count

ADVERTISEMENT

Enabling a circular plastics future

Indorama Ventures is the world's largest producer of polyethylene terephthalate, a recyclable plastic. It wants to be the largest recycler as well.

When the first fully synthetic plastic was invented in 1907, it was quickly dubbed "the material of a thousand uses." Over the next century, it would undergo multiple revisions to become exactly that—ubiquitous today in everyday products.

A circular plastic.
The plastics industry is not singular. Made up of myriad types, each differs in their strength, use and environmental impact. Polyethylene terephthalate (PET) is just one of the plastics used everyday. After arriving on the global scene in the 1970s, it revolutionized the plastic game as a lightweight, safe and affordable option. Other qualities, including its durability and strength, make PET the go-to material for food and household packaging, and beverage bottles.

Crucially, what sets PET apart is its circular factor. As a fully recyclable plastic with a credit to sustain the cycle, recycling PET packaging can be easily ground into flakes, washed, decarbonized and turned back into new products made of recycled PET—a process that can be repeated again and again.



Reimagining Chemistry together to create a better world.
Central to the global PET market is Indorama Ventures Public Company Limited (IVL). With operations in 148 sites across 38 countries, along with 18 recycling facilities, the Bangkok-based multinational is not just the world's largest producer of PET, but also a leading recycler, with long-term plans to keep sustainability as a priority.

IVL has done well in this space thus far, with tangible results to show for it. Over the past decade, the firm has recycled over 70 billion PET bottles, reducing over 2.4 million tons of carbon footprint from the product lifecycle.

And there is much more to come. As climate change continues to threaten ecosystems and economies, avoiding the worst impacts will require the world collectively rearing heads by 2050. Recognizing the urgency, IVL is committed



to walk the talk with its new 'Vision 2030' strategy, powered by their purpose of 'reimagining chemistry together to create a better world.' Under it, IVL wants to phase out coal, reduce and capture carbon from its operations and increase its renewable energy consumption. In concrete figures, IVL aims to reduce coal intensity by 50% and increase renewable energy consumption by 20% by 2030.

Currently, a majority of IVL's feedstock is polyester-related. To be more circular, the firm will also work towards increasing bio-renewable or circular feedstock. In alignment to its commitment, the firm recently signed Codelco's Lithium Africa and US manufacturer of surfactants with one-third of its products containing renewable ingredients. In taking this step, IVL becomes the leading sustainable producer in the Americas.

A processing tomorrow
Since embarking on its sustainability journey over a decade ago, IVL has led by example in the industry its global PET recycling capacity has grown nearly a hundred-fold since 'Sustainability and responsible business are not just slogans to us,' says Founder and Group CEO Alokje Lohia. 'Sustainable manufacturing is critical if we are serious about protecting our planet and our people.'

And indeed they are, with IVL's ambitious green journey continuing to unfold the global ambitions. The firm's focus is that working towards the closed loop recycling of PET will have an eventual effect that doing so will drive a less wasteful and more sustainable world for the following generations.



ADVERTISEMENT

Enabling a circular plastics future

Indorama Ventures is the world's largest producer of polyethylene terephthalate, a recyclable plastic. It wants to be the largest recycler as well.

When the first fully synthetic plastic was invented in 1907, it was quickly dubbed "the material of a thousand uses." Over the next century, it would undergo multiple revisions to become exactly that—ubiquitous today in everyday products.

A circular plastic.
The plastics industry is not singular. Made up of myriad types, each differs in their strength, use and environmental impact. Polyethylene terephthalate (PET) is just one of the plastics used everyday. After arriving on the global scene in the 1970s, it revolutionized the plastic game as a lightweight, safe and affordable option. Other qualities, including its durability and strength, make PET the go-to material for food and household packaging, and beverage bottles.

Crucially, what sets PET apart is its circular factor. As a fully recyclable plastic with a credit to sustain the cycle, recycling PET packaging can be easily ground into flakes, washed, decarbonized and turned back into new products made of recycled PET—a process that can be repeated again and again.



Reimagining Chemistry together to create a better world.
Central to the global PET market is Indorama Ventures Public Company Limited (IVL). With operations in 148 sites across 38 countries, along with 18 recycling facilities, the Bangkok-based multinational is not just the world's largest producer of PET, but also a leading recycler, with long-term plans to keep sustainability as a priority.

IVL has done well in this space thus far, with tangible results to show for it. Over the past decade, the firm has recycled over 70 billion PET bottles, reducing over 2.4 million tons of carbon footprint from the product lifecycle.

And there is much more to come. As climate change continues to threaten ecosystems and economies, avoiding the worst impacts will require the world collectively rearing heads by 2050. Recognizing the urgency, IVL is committed



to walk the talk with its new 'Vision 2030' strategy, powered by their purpose of 'reimagining chemistry together to create a better world.' Under it, IVL wants to phase out coal, reduce and capture carbon from its operations and increase its renewable energy consumption. In concrete figures, IVL aims to reduce coal intensity by 50% and increase renewable energy consumption by 20% by 2030.

Currently, a majority of IVL's feedstock is polyester-related. To be more circular, the firm will also work towards increasing bio-renewable or circular feedstock. In alignment to its commitment, the firm recently signed Codelco's Lithium Africa and US manufacturer of surfactants with one-third of its products containing renewable ingredients. In taking this step, IVL becomes the leading sustainable producer in the Americas.

A processing tomorrow
Since embarking on its sustainability journey over a decade ago, IVL has led by example in the industry its global PET recycling capacity has grown nearly a hundred-fold since 'Sustainability and responsible business are not just slogans to us,' says Founder and Group CEO Alokje Lohia. 'Sustainable manufacturing is critical if we are serious about protecting our planet and our people.'

And indeed they are, with IVL's ambitious green journey continuing to unfold the global ambitions. The firm's focus is that working towards the closed loop recycling of PET will have an eventual effect that doing so will drive a less wasteful and more sustainable world for the following generations.



PET recycling: No time to waste

IN A CIRCULAR ECONOMY, RECYCLABLE PLASTIC PACKAGING IS SOLUTION, NOT A PROBLEM, SAYS INDORAMA VENTURES

Littering, illegal dumping and mismanagement of waste are polluting our oceans. People are rightly demanding solutions, and nowhere is this more evident than in packaging. Better waste collection and recycling are within our grasp, and we have no time to waste.

The solution is the circular economy. An idea formulated in the late 1980s, the circular economy can be summed up as 'make-use-recycle.' Resources are managed responsibly to make products and packaging that can be remade and reused. Today, most of the world is still stuck in the linear economy of 'take-make-waste.' Our environment and future generations demand better.

Few have taken this challenge more seriously than Indorama Ventures of IVL. The Bangkok-based multinational is the leading global recycler of plastic beverage bottles.

Its founder and Group CEO Alokje Lohia, 'There is an answer, he says, and the material in all those bottles – PET, or Polyethylene Terephthalate – is actually part of it.'



ALOKJE LOHIA, Founder and Group CEO, Indorama Ventures



KRISTIN HUGHES, COP26 Director and Member of the Executive Committee at the World Economic Forum

"Sustainability and responsible business are not just slogans to us"

IVL's global presence, fully integrated model and decades of recycling know-how means they are uniquely placed to close the loop for PET plastic," said Ms. Kristin Hughes, COP26 Director and Member of the Executive Committee at the World Economic Forum. "Together we can drive high-potential solutions to improve collection, sorting and recycling – to ensure that plastic never ends up as waste."

Recognizing this, Indorama Ventures adopted a circular economy approach more than a decade ago. Since 2011, when it acquired its first recycling plant, the firm has recycled over 63 billion PET bottles. Few outsiders realize that PET bottles are commonly recycled and have a lower carbon footprint than alternative beverage packaging.



"Sustainability and responsible business are not just slogans to us"

IVL's global presence, fully integrated model and decades of recycling know-how means they are uniquely placed to close the loop for PET plastic," said Ms. Kristin Hughes, COP26 Director and Member of the Executive Committee at the World Economic Forum. "Together we can drive high-potential solutions to improve collection, sorting and recycling – to ensure that plastic never ends up as waste."

Recognizing this, Indorama Ventures adopted a circular economy approach more than a decade ago. Since 2011, when it acquired its first recycling plant, the firm has recycled over 63 billion PET bottles. Few outsiders realize that PET bottles are commonly recycled and have a lower carbon footprint than alternative beverage packaging.



Recycling PET bottles in the circular economy



materials such as glass or aluminum." Dealt with sustainably, PET fits perfectly into a circular economy.

Those 63 billion recycled bottles were just the start. IVL is investing \$1.5 billion to build and expand the recycling facilities needed for a circular economy for PET bottles. Today it has a global footprint of recycling facilities on four continents. These will help IVL reach its goal to recycle 50 billion PET bottles every single year by 2025.

Recycling benefits go beyond reducing waste. It also saves energy and water use, lowers greenhouse gas emissions and demand for finite resources. Those are essential for a circular, sustainable economy and the fight against climate change.

But recycling plants are just one slice of a circular economy. Collection rates must improve. In Asia, for instance, some governments have regulations that are barriers to recycling, stifling collection. The West is also struggling. Four out of 10 Americans have little or no access to recycling, according to Koffe Hanson, CEO, The Recycling Partnership. "Leveling up the U.S. residential recycling system requires \$17 billion over five years and collaboration from industry and government. This will deliver \$20 billion in economic benefits and nearly 200,000 new jobs within 10 years. A good return for the economy and the environment."

With the right laws, infrastructure, and behaviors in place, IVL is betting more than a billion dollars that recycling will be a growth industry.

"Sustainability won't just happen. As an industry, infrastructure is within our control. Building the infrastructure the world needs to deliver the circular economy for packaging is critical if we are serious about protecting our planet and our business," Lohia says. May the circle be unbroken.

*United Nations Environment Programme, 2020 'Single-Use Plastics Bottles and the Alternative – Recommendations from Life Cycle Assessment'

©Indorama Ventures PCL

INDORAMA VENTURES

INDORAMA VENTURES

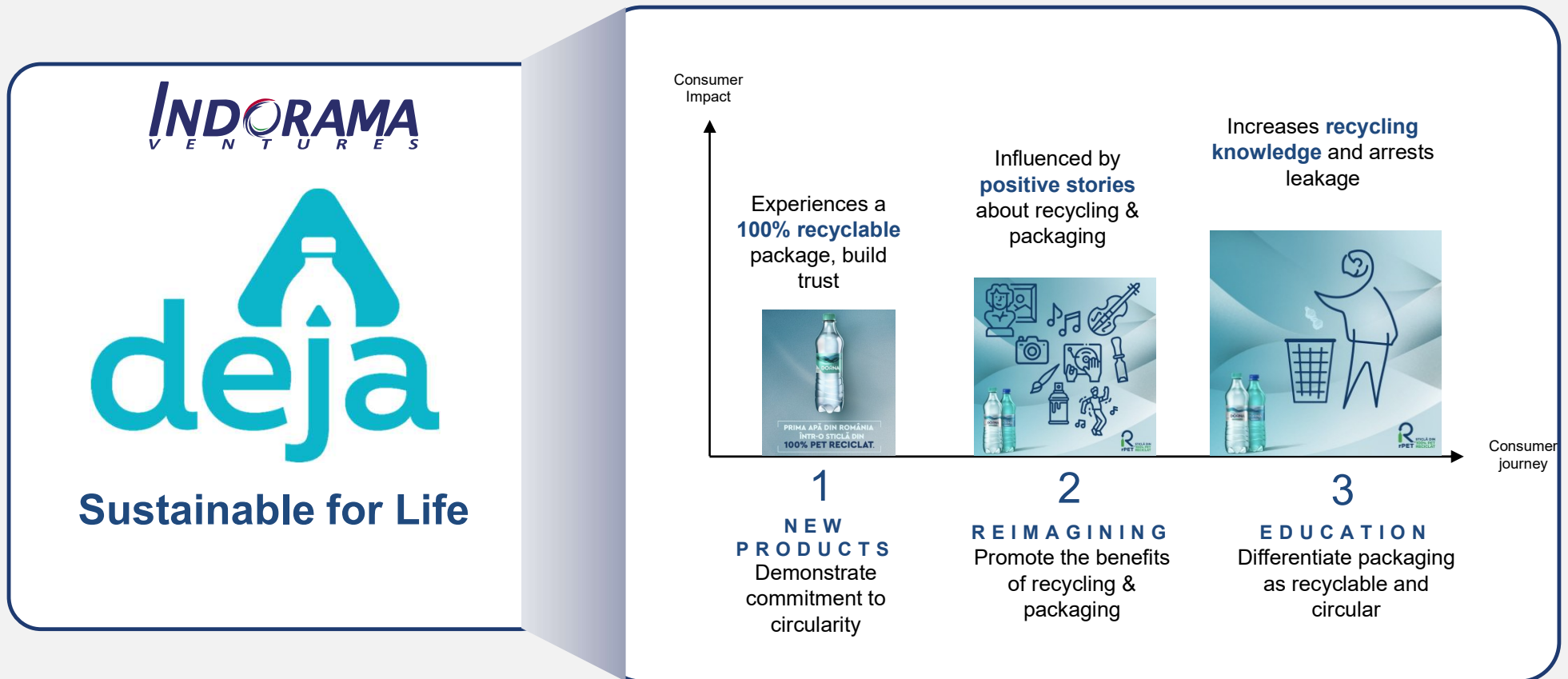


Target: COP 26

INDORAMA VENTURES

ma

Introducing Deja as a sustainable PET brand



Brand Architecture

(present and future proofing)

Closing the loop



Our 3 Pillars:



deja
Bio fiber
Biodegradable rPET fibers

deja
Bio waste



Biodegradable flake and fiber break down to leave no trace

deja
Social



Sourced with a social conscience

deja
C₂ Neutral



Produced with a Carbon Neutral footprint

deja
Bio filament
Biodegradable rPET filament yarns

deja
De Co+
EN EC



deja
Enhanced



Chemically recycled to optimise the PET that saved from waste

deja
HiLo
Staple fiber



Fiber produced from multiple polymer sources maximising the diversion of waste plastic from landfill

deja
Fibre
Staple fiber



Fiber produced with rPET, keeping PET in circulation helping to close the loop

deja
HiLo
Staple filament

deja
Filament
Filament yarns

deja
Flakes

deja
Resins



Recycling PET to prolong the lifecycle, it can be recycled again and again

deja
Pellets

deja
SPS



deja
CO₂ Neutral

The right choices today
for a **better tomorrow.**



