

PART 1

Business Operations

1. Policy and Overview of Business Operations

1.1 Vision, Mission, Objective and Strategy of the Company

Vision

To be a world-class chemical company making great products for society.

Mission

We commit to be a responsible industry leader leveraging on the excellence of our people, processes, and technologies to create value for our stakeholders.

Value /Objective

The customer is why we exist.

We measure ourselves by our customers' success. Through unparalleled innovation and attention to quality we aim to exceed their expectations.

Our people make the difference.

A company is its people and people provide the competitive advantage. We respect every voice and rely on one another to grow.

We see change as an opportunity.

The business landscape is constantly evolving. We embrace the challenges of change to be world-class and maintain our differentiation.

Diversity is our strength.

As a global company we value the variety of knowledge, perspectives and experiences in our organization, and draw strength from these to fuel our competitiveness.

We are responsible.

In our pursuit of business growth and profitability we do things the right way – economically, socially, and environmentally.

Group Strategy

Indorama Ventures Public Company Limited, listed in Thailand, is one of the world's leading petrochemicals producers, with a global manufacturing footprint across Africa, the Asia-Pacific, Europe and the Americas. Our portfolio comprises Integrated PET, Olefins, Fibers, Packaging and Specialty Chemicals. Indorama Ventures products serve major FMCG and automotive sectors, i.e. beverages, hygiene, personal care, tire and safety segments. Indorama Ventures has approximately 24,000 employees worldwide and consolidated revenue of USD 11.4 billion in 2019. We are listed in the Dow Jones Emerging Markets and World Sustainability Indices (DJSI).

IVL's vision is to be a world-class chemical company making great products for society. Through our clear strategy, we will succeed and continue to grow in any challenging environment by leveraging our unique differentiators – global scale, local presence, integration across the value chain, with a diversified source of earnings and M&A capabilities. Our enduring approach is to generate strong returns for our stakeholders through the ups and downs of the chemical cycle.

It is estimated that by 2030, the world's population will reach over 8.4 billion people (according to third party sources). This surge in population growth will present global challenges, but we see this as an opportunity for increased demand across all our markets. With the fast-paced evolution of technologies, innovation will also play a key role in the chemical industry creating a market that is sufficiently sustainable in balancing the environment, resources, climate, food and nutrition, and quality of life.

Strategic Priorities

Going forward, IVL will pursue five strategic themes:

- **Cost transformation** to accelerate performance through cost optimization
- **Full asset potential** to focus on commercial excellence, and grow revenues and margin
- **Adjacency growth** to pursue organic and bolt-on growth in attractive adjacencies.
- **Recycling leadership** to build a leading rPET business, setting a new bar for sustainability.
- **Leadership development** to invest in and develop the best management team in the industry.

Cost Transformation

Our cost transformation program, the Olympus program, can be divided into two areas, corporate-led and business segment-led initiatives:

- Corporate

We have three priority areas: Enterprise Resource Planning (ERP), global business solutions and digitalization. First, we will implement an integrated SAP ERP system which will help with cost-savings, improve efficiencies and make our business more agile. Second, our Global Business Solution (GBS) aims to improve efficiencies and reduce costs by consolidating several key support functions in finance, HR, procurement and IT. Third, our digital initiatives, which were piloted in 2019, are being scaled up to realize cost-efficiencies from 2020 onwards.

- Business Segments

Each of our business segments is implementing their specific cost transformation plans, covering Lean Six Sigma to improve asset reliability and consolidate procurement and supply chains.

The initiatives of the Combined PET segment – comprising Integrated PET, Packaging and Specialty Chemicals include:

1. Manufacturing excellence through plant automation and predictive maintenance tools

2. Procurement efficiency and supply chain optimization
3. Functional excellence by optimizing manpower headcount across all regions

For the Integrated Oxides and Derivatives (IOD) segment, cost synergies and operational excellence can be achieved through the integration of our existing facilities – IVOG and IVOL assets – and the recently acquired integrated oxides and derivatives businesses of Huntsman Corporation. The integration will focus on streamlining costs, restructuring the organization, enhancing reliability and leveraging benefits from ethylene integration through IVOL's gas cracker.

Cost transformation under the Fibers segment will target margin expansion, cost innovation and asset efficiency. We will improve operational efficiencies at each site and consolidate/integrate across multiple sites. Within each asset, we will improve the efficiency gains through: 1) manpower realization and automation; 2) cost innovation in operations, e.g. utilities, chemicals, additives and packing; and 3) yield improvements.

Full asset potential

We are maximizing the growth and margin potential in each of our business through the following activities:

- Combined PET (a grouping of Integrated PET, Packaging and Specialty Chemicals segments)
 - Enhancing the existing product portfolio to be better aligned with customers' needs
 - Expanding our packaging business in new geographies or segments
 - Building a leading recycling business
- Integrated Oxides and Derivatives
 - Integrating and growing the recently acquired integrated oxides and derivatives businesses of Huntsman Corporation
 - Capturing backward integration benefits from the IVOL gas cracker
 - Expanding into high value-added segments such as surfactants
- Fibers
 - Increasing market share in fast-growing segments
 - Strengthening collaborations and long-term agreements with key customers in mobility and hygiene
 - Investing in R&D to strengthen the HVA portfolio with high barriers to entry

Adjacency growth

We will monitor adjacent growth opportunities that could be value accretive to IVL's stakeholders. For the Integrated PET segment, we aim to expand applications of our resins in food and homecare,

substituting other rigid plastics. We also see that beverages, food, homecare and pharma are attractive markets for PET packaging. Within the integrated oxides and derivatives space, we aim to expand geographic adjacency to high-growing emerging markets and product adjacency in specialty surfactants. For Fibers, we identified new applications for polyester and nylon, and the potential to leverage our composite fibers innovations such as Enka TecTape in mobility fibers.

Recycling leadership

Growing concerns about plastic waste have led to legislation on several single-use plastic products. This creates opportunity for us as PET is 100 percent recyclable, making it a packaging material of choice. PET also has several environmental advantages. It is a lightweight material that allows for lower transport costs and reduces fuel emissions.

IVL developed a strategy to be the leader in recycled PET, leveraging our number one position in PET. We aim to serve the recycling needs of our customers by building a leading, differentiated and economically attractive recycling business. Our target is to scale up capacity to 750 kt, with an ROCE of around 12-14% by 2025.

We have five key areas of differentiation that underpin our ambitions. First, IVL's scale virgin PET business is a big advantage in the recycling business. It gives us both an extensive local footprint and distribution in many markets. Second, we have the ability to leverage the relationships and trust that we have developed with global brands. Third, we have acquired proprietary knowledge on mechanical recycling through our Wellman asset and are scaling up. Fourth, we have developed partnerships with innovative players to develop and test next-generation chemical recycling technologies. Lastly, we are proactively building the circular ecosystem for PET across technology owners, packaging players or converters, beverage companies and waste management players.

Leadership development

IVL recognizes the importance of leadership development and we are working towards putting in place a structured and formalized talent management system. We are focusing on three priorities: structure and succession, performance management, and leadership development. In 2019, we set up two councils – the Indorama Management Council (IMC) and Indorama Business Council (IBC). Both act as forums to discuss and deliberate on future opportunities and challenges for our company.

1.2 Changes and Important Developments

Company Overview

Formerly known as Beacon Global Limited, the company was established on February 21, 2003, and re-named Indorama Ventures Public Company Limited on March 19, 2009. Indorama Ventures Public Company Limited is a holding company with investments in companies operating in the intermediate petrochemicals industry in Thailand and globally.

Company Background

We commenced business operations in 1994 with the incorporation of Indorama Holdings Ltd., which was the first worsted wool yarn producer in Thailand.

Entry into the Integrated PET Business

This segment includes businesses in the aromatics and PET value chain, including PX, PTA and PET. Given PET's unique properties of 100% recyclability, reporting under this segment will also include IVL's recycling initiatives across the polyester value chain.

In 2003, we expanded our PET production footprint internationally in North America, with the acquisition of the StarPet facility, and in Europe in 2006, with the commencement of our Orion Global PET facility.

In the first half of 2011, IVL had completed major acquisitions of PET plants in China, Indonesia, Mexico, Poland and the US, which resulted in the company becoming the world's largest PET producer and the largest player in Europe.

We also expanded our PET production footprint in Africa with the opening of a new solid state polymerization SSP plant in Nigeria, which started commercial operations in 2012. In 2015, we entered the Middle East following the acquisition of a PET plant in Turkey. In 2018, we acquired a PET plant in Egypt, the largest in the Middle East and Africa, and a PET plant in Brazil in order to further extend our market position, and expand our global footprint in key markets with high growth potential. This strategic position allows us to deliver products to key customers in Brazil and elsewhere in South America in a cost-effective and efficient manner.

We entered the purified terephthalic acid (PTA) business in Europe with the acquisition of a PTA facility located in the Netherlands in 2008. In the same year, we also acquired two PTA facilities in Thailand – TPT Petrochemicals and Indorama Petrochem.

In 2016, we entered the paraxylene (PX) business in the US with the acquisition of BP Amoco Chemical Company (BP) which manufactures PTA and PX and provides raw materials to AlphaPET Inc., a co-located business operation and to external customers worldwide.

We entered the recycling space in 2011 with the acquisition of Wellman International in Europe. At the beginning of 2014, we extended the know-how we obtained from the Wellman International purchase and commenced production of our recycled PET and fiber facility in Nakhon Pathom, Thailand. We expect to further leverage Wellman's bottle to flake technology on a global scale. We also integrated three production sites in the US and Mexico with recycled PET, and our objective is to continue to increase the use of recycled PET in our operations. In 2018, we acquired Sorepla, a European non-integrated plastics recycler based in France which helped to enhance our recycling portfolio with food grade rPET.

In 2019, we acquired PET recycling facilities in the US states of Alabama and California, in-line with our commitment to long-term sustainability and also meeting the circular economy objectives of packaging and consumer product manufacturers.

Entry into the Integrated Oxides and Derivatives Business

We entered this segment by acquiring an MEG and PEO facility in the state of Texas in 2012. This facility is in the process of further enhancing its capacity as an ethylene cracker in the neighboring state of Louisiana will shortly commence production. This cracker will mainly support the captive EO-EG facility providing a unique integration advantage and the ability to capture the entire value chain margin.

In 2019, we invested in the Integrated EO and PO derivatives business of Huntsman Corporation, which is fully integrated downstream in surfactants (used in personal and home care) and in propylene oxides (used in insulation and foam materials).

Entry into the Fibers Business

This segment includes all of our offerings in the mobility (automotive and tires), personal hygiene and lifestyle domains. Each of these domains continue to grow at a rate of 6-7% annually offering the potential to become multi-billion dollar businesses individually. Growth in the Fibers business comes as a result of trends towards light-weighting, use of sustainable materials, increasing attention being paid to personal hygiene and changes in the choice of personal wear, especially by the younger generation.

The Group's Fibers business segment comprises the manufacture and sale of a variety of polyester and other types of fibers and yarns (which are also used in the Group's HVA products, particularly in personal care, automotive and industrial applications). Polyester is one of the most widely used synthetic fibers in the world and is a versatile material with wide-ranging textile and industrial applications. Our development in the polyester business has been achieved through the acquisition of distressed assets and organic growth through debottlenecking and asset optimization. We entered the polyester business in 1997 with the acquisition of Indo Poly, a polyester fiber plant in Thailand. In 2008, we acquired Tuntex Thailand, the country's largest polyester fiber producer. Both of our polyester facilities were acquired as distressed assets at a discount to their replacement cost and have been successfully turned around. In 2009, Indo Poly transferred all of its assets to, and all of its liabilities were assumed by Tuntex Thailand, which was subsequently re-named Indorama Polyester Industries. Further expansions subsequently took place at this site.

In the first half of 2011, we expanded our polyester production footprint internationally. We entered the US market with the acquisition of Invistra US. In November 2011, we acquired the polyester fibers recycling businesses of Wellman International in Europe, which is comprised of three production facilities in the Republic of Ireland, the Netherlands, and France.

In 2019, we completed the acquisition of an airbag yarns business in Germany and Mexico, which provides an opportunity for IVL to further expand its portfolio in the airbag sector and become an integrated manufacturer of airbag yarns and textiles globally.

We also completed the acquisition of Sinterama, a polyester staple fiber producer in Brazil which provides an opportunity to establish a global footprint in the Fibers business in South America's largest economy and its specialty fibers business in four countries: Italy, Brazil, China and Bulgaria. Sinterama

is vertically integrated from chips to yarns and offers a vast range of colored polyester yarns for automotive, furnishing, apparel and technical applications.

Entry into Specialty Chemicals Business

IVL entered this segment in 2011 with the acquisition of Auriga Polymers in South Carolina, which owns the Crystal Clear Oxygen Barrier Resin technology, OxyClear® and Polyshield®. We supplemented our presence in this segment in 2016 by acquiring the world's only NDC facility in Alabama and a PIA facility in Cadiz, Spain.

In 2018, IVL further grew this portfolio by expanding its PIA production in Spain and additionally converted a PTA line to PIA in Alabama, thereby becoming the world's second largest producer. In 2019, IVL completed the acquisition of Invista's assets in Germany resulting in IVL possessing the IP for the Polyshield® and Oxyclear® resins, together with Invista's barrier technology in all markets globally.

Entry into the Packaging Business

From 1996 onwards, we grew our packaging business by engaging in the downstream production of PET preforms, bottles and closures. IVL's first expansion globally was through the acquisition of Beverage Plastics in Northern Ireland (UK) in 2012. In 2013, we expanded into Africa with the acquisition of Aurus in Nigeria, in the belief that Nigeria has considerable potential for further growth. In 2018, we acquired Medco Plast for Packing and Packaging Systems S.A.E. This acquisition provided IVL with exposure to the East African PET packaging market, complementing our existing footprint in West Africa, where we have a presence in Nigeria and Ghana. In 2019, we acquired Bevpak, a facility in Nigeria, to further expand our global footprint.

Success in Raising Capital

Our Initial Public Offering

Indorama Ventures became a public company on September 25, 2009. In January, 2010, IVL completed an initial public offering of 400,000,000 ordinary shares at an offering price of THB 10.20 per ordinary share. The total amount raised in cash from the initial public offering of shares totaled THB 4,080 million. Simultaneously, the minority shareholders of Indorama Polymers Public Company Limited, a subsidiary of IVL listed on the Stock Exchange of Thailand were offered under an exchange offer, 582,727,137 ordinary shares of Indorama Ventures Public Company Limited. The ordinary shares of Indorama Ventures Public Company Limited were listed and commenced trading on the Stock Exchange of Thailand (SET) on February 5, 2010 under the ticker symbol IVL. The company soon became a member of the major indices, the SET 50 Index, FTSE SET Large Cap Index, and MSCI.

Rights Offering

In November, 2010, the Board of Directors passed a resolution to increase the authorized share capital from THB 4,334,271,047 to THB 4,815,856,719 and to reserve the increase in the authorized share capital of THB 481,585,672 for the exercise of Transferable Subscription Rights (TSRs). The Board approved a rights issue of TSRs to existing shareholders at a ratio of one TSR for every nine existing

ordinary shares held in IVL. The conversion ratio was 1:1, one TSR to one ordinary share and the exercise price of the TSR to ordinary shares was THB 36 per ordinary share. On December 17, 2010, at the extraordinary general meeting (EGM), shareholders approved the issue, allocation and the terms and conditions of the TSRs. On February 24, 2011, the subscription of TSRs was completed with 99.67% of TSRs being exercised into shares. A total of 479,986,198 new shares started trading on the SET on March 3, 2011. The total amount raised in cash from this rights issue totaled THB 17,280 million.

Tender Offer

Our PET business was listed on the SET as Indorama Polymers Public Company Limited (IRP) in 2005. On December 24, 2009, IVL offered to purchase up to 100% of IRP through a tender offer whereby IRP shareholders (other than IVL and its subsidiaries) were offered IVL shares in exchange for IRP shares. The said tender offer was completed on February 1, 2010 which resulted in IVL holding directly and indirectly (through its subsidiary Indorama Holdings [Thailand] Limited) around 99.08% of the issued and paid-up capital of IRP. IRP shares were delisted from the SET on February 5, 2010.

Warrants IVL-W1 Exercised

Upon conversion of IVL-W1 until the last exercise date which took place on 24 August 2017, the paid-up capital of the Company increased to THB 5,244,965,472 representing 5,244,965,472 ordinary shares.

Warrants IVL-W2 Exercised

Upon conversion of IVL-W2 until the last exercise date which took place on 24 August 2018, the paid-up capital of the Company increased to THB 5,614,551,908 representing 5,614,551,908 ordinary shares.

Changes and Important Developments

We completed a comprehensive assessment of our portfolio, identified areas of synergies and natural alignment, and report our new segments as follows:

Year	Event	Location	New Segments
1994	Incorporation of Indorama Holdings Ltd.	Thailand	Fibers
1995	Established of Indorama Polymers PCL's PET resin plant in Lopburi, Thailand.	Thailand	Integrated PET
1996	Established of Petform (Thailand) Ltd., a joint venture with Serm Suk PCL.	Thailand	Packaging
2002	Completed of various expansion projects leading to increased capacity in Thailand.	Thailand	Integrated PET & Fibers
2003	• Incorporation of Beacon Global Limited (subsequently re-named Indorama Ventures PCL in 2008).	Thailand	Integrated PET
	• First major international expansion with the acquisition of StarPet PET plant in Asheboro, North Carolina.	US	Integrated PET

Year	Event	Location	New Segments
2006	<ul style="list-style-type: none"> Acquired of a 94.57% interest in Indorama Holdings Ltd. from an entity controlled by Mr. Aloke Lohia. 	Thailand	Fibers
	<ul style="list-style-type: none"> Second major international expansion in Europe with the launch of the Orion Global PET plant in Klaipeda, Lithuania. 	Lithuania	Integrated PET
2007	Completed various expansion projects leading to increased capacity.	US / Thailand	Integrated PET & Fibers
March 2008	<ul style="list-style-type: none"> UAB Indorama Polymers Europe, IRP Rotterdam and IRP Workington acquired the net assets (property, plant and equipment, and working capital) and the operations of two PET production facilities located in the Netherlands and the United Kingdom, previously owned and operated by subsidiaries of Eastman Chemical Company. 	the Netherlands/ UK	Integrated PET
	<ul style="list-style-type: none"> UAB Indorama Holdings Ltd. Europe and IRH Rotterdam also acquired the net assets (property, plant and equipment, and working capital) and the operations of a PTA production facility located in the Netherlands, previously owned and operated by a subsidiary of Eastman Chemical Company. 	the Netherlands	Integrated PET
June 2008	Indorama Holdings Ltd. sold its shares representing 89.71% of Indo-Rama Chemicals (Thailand) Ltd., to an entity controlled by Mr. Aloke Lohia and his immediate family.	Thailand	Chemicals
August - October 2008	Acquired a 50.56% equity interest in TPT Petrochemicals PCL from various parties.	Thailand	Integrated PET
September 2008	<ul style="list-style-type: none"> Acquired a 65.81% equity interest in Tuntex (Thailand) pursuant to Tuntex (Thailand)'s bankruptcy rehabilitation plan. 	Thailand	Fibers
	<ul style="list-style-type: none"> Acquired an additional 44.38% of the outstanding shares of Indo Poly (Thailand) Ltd. from Indorama International Finance PCL. As a result of the acquisition, the Company increased its direct and indirect shareholdings of Indo Poly (Thailand) Ltd. to 98.85%. 	Thailand	Fibers
September - October 2008	Acquired a 100% equity interest in Indorama Petrochem Ltd. from various parties.	Thailand	Integrated PET
October 2008	Acquired an additional 3.94% of the outstanding shares of Indorama Polymers PCL from DEG, thereby increasing the direct and indirect holdings of Indorama Polymers PCL to 69.29%.	Thailand	Integrated PET
December 2008	Acquired an additional 31.20% of the outstanding shares of Tuntex (Thailand) PCL (re-named Indorama Polyester Industries PCL).	Thailand	Fibers
July 2009	<ul style="list-style-type: none"> Indo Poly (Thailand) Ltd. transferred all of its assets and businesses to Indorama Polyester Industries PCL. (In August 2009, Indo Poly [Thailand] Ltd. 	Thailand	Fibers

Year	Event	Location	New Segments
	commenced action to liquidate itself, a process which was completed in August 2011)		
	<ul style="list-style-type: none"> Acquired an additional 2.08% of the outstanding shares of TPT Petrochemicals PCL from International Finance PCL, thereby increasing the direct and indirect holdings of TPT Petrochemicals PCL to 52.64%. 	Thailand	Integrated PET
August 2009	Jointly made a tender offer with Indorama Holdings Ltd. to purchase all outstanding shares of Indorama Polyester Industries PCL that were not already owned. After the tender offer, the Company and Indorama Holdings Ltd. increased their shareholdings of Indorama Polyester Industries PCL to 99.55% and delisted Indorama Polyester Industries PCL from the SET effective November 9, 2009.	Thailand	Fibers
October 2009	Startup of the AlphaPet PET plant in Decatur, Alabama.	US	Integrated PET
November 2009	TPT Utilities Co., Ltd. transferred all of its assets to TPT Petrochemicals PCL and subsequently completed the liquidation on October 29, 2011.	Thailand	Others
December 2009	<ul style="list-style-type: none"> Acquired an additional 1.96% of the outstanding shares of TPT Petrochemicals PCL from International Finance PCL, thereby increasing the direct and indirect holdings of TPT Petrochemicals PCL to 54.60%. 	Thailand	Integrated PET
	<ul style="list-style-type: none"> Announced a tender offer on December 24, 2009 to purchase up to 100% of the shares of Indorama Polymers Public Company Limited (IRP) with an intention to delist the shares of IRP from the Stock Exchange of Thailand. A total of 424,480,300 shares of IRP were purchased through an exchange offer whereby IRP shareholders received IVL shares. 	Thailand	Integrated PET
February 2010	IVL shares were listed and began trading on the Stock Exchange of Thailand after completion of an initial public offering of 400 million new shares at THB 10.20 and completion of an exchange offer to minority shareholders of Indorama Polymers Public Company Limited (IRP). IRP shares were simultaneously delisted from the SET on the first day of trading of IVL.	Thailand	Corporate
July 2010	Acquired a 50% equity stake in a joint venture company, UAB Ottana Polimeri Europe, for the purpose of acquiring an integrated PTA and PET plant in Ottana, Italy from Equipolymers. The joint venture partner, PCH Holdings, is in the power and utilities business and holds the remaining 50% stake.	Italy	Integrated PET
August 2010	<ul style="list-style-type: none"> Announced the establishment of a greenfield project for PET polymers in Port Harcourt, Nigeria with an installed capacity of 75,000 tpa. 	Nigeria	Integrated PET

Year	Event	Location	New Segments
	<ul style="list-style-type: none"> Announced capacity expansion by 190,000 tpa for PET through a new production line at an existing site in Rotterdam, the Netherlands. Europe is a net importer of PET resins and the expansion has helped to reduce imports and growth in demand. In addition, the PET expansion will result in full captive consumption of PTA produced onsite and cost benefits from economies of scale. 	The Netherland	Integrated PET
October 2010	Acquired additional shares in TPT Petrochemicals PCL from Tuntex Taiwan and other shareholders to increase the Company's equity stake from 54.60% to 99.96%.	Thailand	Integrated PET
November 2010	<ul style="list-style-type: none"> Announced the approval of an acquisition to make PET resins and Polyester polymers for fibers and yarns in Kaiping City, Guangdong Province, China, from Guangdong Shinda UHMWPE Company Limited. The total installed capacity of the plant is 406,000 tpa. The acquisition allows the Company to expand its global footprint and to enter the high-growth market in China. The acquisition was completed in January, 2011. 	China	Integrated PET & Specialty Chemicals
	<ul style="list-style-type: none"> Announced the signing of a definitive agreement with INVISTA S.a.r.l. to acquire their PET resins and Polyester staple business located in Spartanburg, South Carolina and Queretaro, Mexico. The total installed capacity at the Spartanburg site is 470,000 tpa and 535,000 tpa at the Queretaro site. The acquisition will allow the Company to build on its expanding global platform making IVL the world's largest PET producer and providing access to new markets in Central and South America. The acquisitions were completed in March 2011. 	US / Mexico	Specialty Chemicals
	<ul style="list-style-type: none"> The Board of Directors Meeting No. 8/2010 on November 10, 2010 approved the issuance of 481,585,672 free Transferable Subscription Rights (TSRs) to the Company's existing shareholders with an allocation ratio of nine existing shares to one new TSR. The conversion ratio of one TSR entitled the TSR holder to purchase one newly issued share of the Company. The exercise price of the TSR into ordinary shares was determined prior to the extraordinary general meeting of shareholders to approve the rights issue 	Thailand	Corporate
December 2010	<ul style="list-style-type: none"> Announced the signing of a definitive agreement with SK Chemicals and SK Syntec to acquire their Polyester Filament yarns and PET resins business in Indonesia and PET resins business in Poland. The total installed capacity in Indonesia is 196,000 tpa and 140,000 tpa in Poland. The acquisition allowed the Company to expand its global platform and reinforce its focus on the polyester value chain, while providing important access to two growth markets. The acquisitions were completed in March 2011. 	Indonesia / Poland	Fibers & Integrated PET

Year	Event	Location	New Segments
	<ul style="list-style-type: none"> The Board of Directors Meeting No. 9/2010 on December 16, 2010 approved an exercise price of THB 36 per share to subscribe to newly issued shares by each TSR holder. 	Thailand	Corporate
	<ul style="list-style-type: none"> The Extraordinary General Meeting of Shareholders No. 1/2011 approved the resolution of a rights issue and allocated an issue of TSRs at a ratio of nine existing shares to one TSR to existing shareholders. 	Thailand	Corporate
March 2011	<ul style="list-style-type: none"> A total of 479,986,198 new IVL shares were listed and began trading on the Stock Exchange of Thailand after completion of the TSR subscription at an exercise price of THB 36 per share. 	Thailand	Corporate
	<ul style="list-style-type: none"> Announced a capacity expansion by 300,000 tpa for PET at an existing site in Purwakarta, Indonesia. 	Indonesia	Integrated PET
April 2011	Announced a brownfield expansion of PET polymers production with a capacity of 220,000 tpa at the existing site in Poland	Europe	Integrated PET
May 2011	Announced a brownfield expansion of PTA production at the Rotterdam plant, with a new production line with an annual PTA capacity of 250,000 tpa. This expansion enhanced the Company's business integration with a key raw material for production of PET polymers in Europe.	Europe	Integrated PET
June 2011	The IVL Board approved the acquisition of a 50% stake in PT Polyprima Karyesreska (PT Polyprima), a PTA producer located in Cilegon, West Java, which has an installed capacity of 465,000 tpa.	Indonesia	Integrated PET
July 2011	Acquired a 75% equity stake in a joint venture company, Trevira Holdings GmbH, for the purpose of acquiring a polyester fiber plant in Germany and Poland with a capacity of 120,000 tpa. The acquisition of Trevira GmbH facilitated IVL's entry into the branded specialist filament business and provided access to an outstanding research and development facility with the accompanying intellectual property.	Germany / Poland	Fibers
August 2011	The Board approved investments in a new recycling plant in Thailand (now complete) and a high technology business in Polyester fibers and yarns in Thailand and Indonesia. These projects have higher value addition and margins to leverage our existing assets.	Thailand / Indonesia	Fibers
November 2011	The Board approved the acquisition of a 100% equity stake in the recycling business of Wellman International in Europe from WIT Beteiligungs GmbH and Wellman International Trading which is a subsidiary of Aurelius AG. This business consists of three plants, a Polyester plant in Mullagh, Ireland with an installed capacity of over 80,000 tons, a recycling plant in Spijk, the Netherlands with an installed capacity of over 45,000 tons, and Verdun, France with an installed capacity of 28,000 tons.	Ireland / France / the Netherlands	Fibers

Year	Event	Location	New Segments
January 2012	The Board approved the acquisition of 100% of FiberVisions Holdings LLC, a global manufacturer of specialty mono and bi-component fibers based in Duluth, Georgia (US), with a total global capacity of 221,000 tpa of specialties, with 117,000 tpa capacity in the US, 90,000 tpa capacity in Europe and 14,000 tpa capacity in China.	US	Fibers
February 2012	<ul style="list-style-type: none"> The Board of Directors approved the acquisition of a 100% partnership interest in Old World Industries I Ltd., and Old World Transportation Ltd., (collectively called Old World), located in Clear Lake, Texas. Old World is the largest single EO/EG production facility in the US with a Crude EO capacity of 435,000 tpa (which is the equivalent to 550,000 tpa of equivalent MEG capacity). 	US	Integrated Oxides & Derivatives
	<ul style="list-style-type: none"> Acquired a 51% stake in a packaging business. Beacon Trading Limited acquired a 51% stake in Beverage Plastics (Holdings) Limited (BPL) in Northern Ireland, United Kingdom. 	UK	Packaging
March 2012	Acquired 100% of the PET resin assets of PT Polypet Karyapersada. The PET facility is located in Cilegon, with a production capacity of 100,800 tpa.	Indonesia	Integrated PET
April 2012	Acquired a 100% partnership interest in Old World Industries I, Ltd. and Old World Transportation, Ltd. in the US. Old World is involved in the production and sale of ethylene oxide (EO) and derivative products from ethylene oxide: purified ethylene oxide (PEO), mono ethylene glycol (MEG), diethylene glycol (DEG), and triethylene glycol (TEG).	US	Integrated Oxides & Derivatives
July 2012	Start-up of a Solid State Polymerization (SSP) plant in Nigeria at a capacity of 84,000 tpa. This is IVL's first PET investment in Africa and establishes its foothold in the estimated 450,000 ton PET market for the African continent which currently has only one other PET producer.	Nigeria	Integrated PET
August 2012	Completed the acquisition of the PET resin assets through wholly-owned subsidiary, PT Indorama Polypet Indonesia, with a capacity of 100,800 tpa in Cilegon.	Indonesia	Integrated PET
November 2012	<ul style="list-style-type: none"> Announced the greenfield expansion of PET production in North America with the establishment of a new plant with a capacity of 540,000 tpa. 	US	Integrated PET
	<ul style="list-style-type: none"> With respect to the announced PET expansion at its Polish site, the Board decided to carry out a significant debottlenecking instead of setting up a new line as it would be more value accretive. This has now been completed. 	Poland	Integrated PET

Year	Event	Location	New Segments
February 2013	<ul style="list-style-type: none"> Acquired a 100% stake in a packaging company, which produces PET preforms, in Nigeria. This acquisition will be a forward integration for the PET segment which set up a PET bottle resin manufacturing unit in Nigeria. All of the closing formalities were completed and the plant was taken charge of effective April 3, 2013. 	Nigeria	Packaging
May 2013	<ul style="list-style-type: none"> The Board of Directors approved the formation of a 50:50 joint venture company with a global producer of non-woven fibers to set up a 14,500 tpa Bicomponent Fiber Plant at IPI in Rayong, Thailand. The plant started operations in Q2 2015. 	Thailand	Fibers
	<ul style="list-style-type: none"> The Board also approved expanding the current Bicomponent Fiber capacity by 10,800 tons at the Covington, Georgia (US) unit of wholly-owned FiberVisions Manufacturing Company. 	US	Fibers
October 2013	<ul style="list-style-type: none"> Established Indorama Ventures Packaging (Philippines) Corporation to start a new packaging business in the Philippines. 	Philippines	Packaging
	<ul style="list-style-type: none"> The establishment of new subsidiaries: Indorama Ventures USA Holdings LP, Indorama Ventures AlphaPet Holdings, Inc., Indorama Ventures Europe B.V. The three holding companies were formed as part of a restructuring exercise. 	US US the Netherlands	Holding Company
November 2013	Announced the mothballing of our PET plant at Indorama Polymers Workington Ltd., in the UK, as part of our business improvement plan and restructuring strategy of our European businesses.	UK	Integrated PET
December 2013	<ul style="list-style-type: none"> Established a new subsidiary: Indorama Ventures Global Services Limited. 	Thailand	Corporate
	<ul style="list-style-type: none"> Signed a joint venture agreement for Aromatics production in Abu Dhabi and to develop the Tacaamol Aromatics Plant on the Madeenat ChemaWEyaat Al Gharbia's (MCAG) site in the Western Region of Abu Dhabi. The plant is expected to have an annual capacity of about 1.4 million tons of paraxylene and 0.5 million tons of benzene. 	United Arab Emirates	Integrated PET
February 2014	<ul style="list-style-type: none"> Acquired PHP Fibers GmbH and its subsidiaries (PHP), where IVL holds 80% of PHP while the remaining 20% is held by Toyobo Co., Ltd., a leading Japanese manufacturer of high function products, including among others, automotive products. The acquisition was completed on April 30, 2014. 	Germany / US / China	Fibers
	<ul style="list-style-type: none"> Established a new indirect subsidiary company in the Republic of Ghana 	Ghana	Packaging
March 2014	Established a new joint venture company in Thailand, 50% owned by Indorama Holdings Ltd., a subsidiary company of IVL, and 50% owned by JNC Fibers Corporation of Japan.	Thailand	Fibers

Year	Event	Location	New Segments
June 2014	Acquired 100% of Artenius TurkPET A.S. (Artenius) in Adana, Turkey. Artenius is a PET producer in Turkey with a capacity of 130,000 tpa. The acquisition was completed on June 2, 2014.	Turkey	Integrated PET
October 2014	Reorganized the Company's subsidiaries in the Netherlands and the US to improve operational and fiscal efficiencies, business workflows and to pool common resources, and some of the businesses of its subsidiaries.	the Netherlands / US	Corporate
November 2014	Established two new joint venture companies: <ul style="list-style-type: none"> Indorama Ventures EcoMex, S. de R. L de C.V. Indorama Ventures EcoMex Services, S. de R. L de C.V. 	Mexico	Integrated PET
December 2014	Announced the signing of a share purchase agreement to acquire a 100% equity stake in Performance Fibers Asia (PF Asia). PF Asia is a leading producer of premium polyester tire cord fabric in Asia. PF Asia's plants are located in Kaiping, Guangdong Province, China, with an annual capacity of 41,000 tons of Polyester Tire Cord Fabric and 48,000 tons of Polyester Tire Cord Yarn. All of the closing formalities were completed and the plants were taken charge of effective April 01, 2015.	China	Fibers
January 2015	Established a new indirect subsidiary company in Myanmar, Indorama Ventures Packaging (Myanmar) Limited, with a 100% investment by a wholly-owned subsidiary, IVL Singapore Pte. Ltd	Myanmar	Packaging
March 2015	<ul style="list-style-type: none"> Completed the acquisition of a 100% stake in Polyplex Resins San. ve Tic. A.S. Polyplex Turkey owns a newly set-up greenfield PET plant with a planned capacity of 252,000 tpa located in Corlu, close to Istanbul 	Turkey	Integrated PET
	<ul style="list-style-type: none"> Acquired a 100% stake in the PTA business of CEPESA Chimie Montréal s.e.c. in Montreal, Canada. CPESA is the largest and the only PTA manufacturing facility in Canada with a capacity of 600,000 tpa and is one of the three merchant PTA producers in North America. 	Canada	Integrated PET
May 2015	Completed the acquisition of a 94.91% stake in a PET business in Thailand, Bangkok Polyester PCL (BPC). BPC is a producer of PET polymers in Rayong, Thailand, with a capacity of 105,000 tpa. Further shares were also acquired from the minority shareholders, thereby taking the Company's total shareholding in BPC to 98.97%.	Thailand	Integrated PET
June 2015	Completed the acquisition of CEPESA Chimie Montréal s.e.c in Montreal, Canada, including all of the closing formalities. The plant was taken charge of effective June 1, 2015. IVL renamed the companies as Indorama Ventures Gestion, Inc., Indorama Ventures Northern Investments and Indorama Ventures PTA Montreal, respectively.	Canada	Integrated PET

Year	Event	Location	New Segments
September 2015	Established of three new subsidiaries: <ul style="list-style-type: none"> Indorama Ventures Dutch Investments B.V. Indorama Ventures Investments USA LLC Indorama Ventures Olefins LLC 	the Netherlands US US	Holding Company Holding Company Integrated Oxides & Derivatives
November 2015	<ul style="list-style-type: none"> Acquired 100% of CEPESA's business in Spain. CEPESA Spain is Europe's largest producer of PIA (isophthalic acid) and the second largest producer in the world, with a capacity of 220,000 tons of PIA, 175,000 tons of PET, and 325,000 tons of PTA. 	Spain	Integrated PET & Specialty Chemicals
	<ul style="list-style-type: none"> Established a new indirect subsidiary company in the US: Indorama Ventures Olefins Holding LLC 	US	Holding Company
December 2015	Completed the acquisition of a 100% stake in the Polyethylene Terephthalate (PET) business of MICRO POLYPET Private Limited (MicroPet) and its two subsidiaries, Sanchit Polymers Private Ltd., and Eternity Infrabuild Private Ltd. in India, effective December 23, 2015. MicroPet, located in Panipat district in the northern state of Haryana, has a PET capacity of 216,000 tpa and has virtual integration with a major refinery for its PTA and MEG feedstocks.	India	Integrated PET
January 2016	Acquired a 100% stake in BP Amoco Chemical Company (BP)'s chemical complex in Decatur, Alabama (US). BP's integrated facility is located adjacent to IVL's PET manufacturing subsidiary, AlphaPet, Inc. and has a combined capacity of approximately 1.8 million tons of which PX capacity is 720,000 tons, PTA capacity is 1,020,000 tons, and NDC (Naphthalene Dicarboxylate). (The acquisition was completed and effective as of March 31, 2016.)	US	Integrated PET & Specialty Chemicals
February 2016	Formed an equal joint venture in India with Dhunseri Petrochem Limited. IVL divested its 50% equity stake in its indirect, fully-owned PET manufacturing company - Micro Polypet Private Limited, India to Dhunseri Petrochem Limited. IVL also acquired a 50% equity stake in a newly carved-out entity from Dhunseri Petrochem Limited. The new entity owns the 480,000 ton PET manufacturing facility of Dhunseri Petrochem Limited located in the port city of Haldia in the eastern Indian state of West Bengal.	India	Integrated PET
March 2016	Established a new indirect subsidiary in India, Indorama Ventures Packaging (India) Private Limited.	India	Packaging
April 2016	Completed the acquisition of 100% of Compañía Española de Petróleos S.A.U. (CEPSA Spain)'s PIA, PET and PTA business in Guadarranque-San Roque, Cadiz, Spain. The operation was effective as of April 7, 2016 and the company was renamed Indorama Ventures Química S.L.U.	Spain	Integrated PET & Specialty Chemicals

Year	Event	Location	New Segments
July 2016	Established a subsidiary company and a joint venture company in China. The new indirect subsidiary: <ul style="list-style-type: none"> Performance Fibers (Kaiping) No. 3 Company Limited 	China	Fibers
	The new joint venture company: <ul style="list-style-type: none"> ES FiberVisions Shanghai Co., Ltd. 	China	Trading Business
August 2016	Changed the name of an 80% indirect subsidiary company in the US, Polyamide High Performance, Inc. to "PHP Fibers Inc."	US	Fibers
	Merged two indirect subsidiaries in Germany. PHP Overseas Investments GmbH, a non-operating entity, merged with PHP Fibers GmbH, an operating Fibers business entity. The newly merged entity is known as "PHP Fibers GmbH."	Germany	Fibers
September 2016	Completed the formation of an equal joint venture in India with Dhunseri, effective September 12, 2016. The name of the joint venture company in India was also changed from Dhunseri Petglobal Limited to "IVL Dhunseri Petrochem Industries Limited."	India	Integrated PET
	Established a new indirect subsidiary company in China: Performance Fibers (Kaiping) Trading Company Limited.	China	Fibers
December 2016	Established a new indirect subsidiary company in Mexico, Indorama Ventures Mexico Assets, S. de R.L. de C.V., which is 99.99% held by Grupo Indorama Ventures, S. de R.L. de C.V., a wholly-owned indirect subsidiary company of IVL.	Mexico	Service Company
May 2017	Acquired a 100% stake of Glanzstoff Group (Glanzstoff), a tire cord business in Luxembourg, Italy, the Czech Republic and China. The Glanzstoff acquisition provided a strategic fit to the automotive segment in the HVA portfolio with a capacity of 36,300 tpa.	Luxembourg / Italy / the Czech Republic / China	Fibers
	Acquisition of the remaining 25% stake in Trevira Holdings GmbH (Trevira) in Germany. With this acquisition, IVL holds 100% of Trevira, a leading brand of specialty polyester fibers globally.	Germany	Fibers
September 2017	Acquired a 100% stake of DuraFiber Technologies México Operations, S.A. DE C.V. (DuraFiber), a tire cord business with a capacity of 22,400 tpa.	Mexico	Fibers
October 2017	Acquired a 100% stake of DuraFiber Longlaville, France, a tire cord business with a capacity of 35,000 tpa.	France	Fibers
November 2017	Acquired the PTA assets of Artlant PTA S.A. and the adjacent utility assets of Artelia Ambiente, S.A. in Portugal.	Portugal	Integrated PET
March 2018	Acquired a 100% stake of M&G Polimeros Brazil S.A. in Ipojuca, the largest PET facility in the country with a capacity of 550,000 tpa. (Completed all closing formalities and took charge of the operations effective May 24, 2018).	Brazil	Fibers

Year	Event	Location	New Segments
March 2018	Formed an equal joint venture company, namely Corpus Christi Polymers LLC (CC Polymers), with Alpek and Far Eastern and entered into an asset purchase agreement with M&G USA Corp. and its affiliated debtors (M&G) to acquire the integrated PTA-PET plant currently under construction in Corpus Christi, Texas. The plant is expected to be the largest single line vertically integrated PTA-PET production facility in the world and the largest PTA plant in the Americas with a capacity of 1.1 million tpa of PET and 1.3 million tpa of PTA.	US	Integrated PET
May 2018	Acquired a 65.72% equity stake in Avgol Industries 1953 Ltd., with a capacity of 203,000 tpa. Avgol Industries is a global manufacturer of non-woven fabric and hygiene products with six sites located in Israel, the US, Russia, China and India. (Completed all closing formalities of the transaction on July 25, 2018.)	Israel / US / Russia / China / India	Fibers
June 2018	<ul style="list-style-type: none"> Formed a joint venture in Egypt with Dhunseri Petrochem Limited, namely Egyptian Indian Polyester Company S.A.E. (EIPET) with a capacity of 540,000 tpa. EIPET is one of the largest PET producers in the Middle East and Africa. 	Egypt	Integrated PET
	<ul style="list-style-type: none"> Formed a 50:50 joint venture limited liability company in the US with Huvis Global Corporation called Huvis Indorama Advanced Materials, LLC. (HIAM) with a capacity of 60,000 tpa. HIAM is a manufacturer of low melting fiber (LMF) used as a binder fiber in core-sheath constructions to produce HVA applications for automotive and industrial composites. 	US	Fibers
	<ul style="list-style-type: none"> Acquired an equity stake of 100% of KORDÁRNA Plus a.s. (Kordarna) in the Czech Republic with a capacity of 57,000 tpa. Kordarna is the largest producer of tire cord fabrics in Europe, with a production site in the Czech Republic and a second in the Slovak Republic. (Completed all closing formalities and took charge of the operations effective October 30, 2018.) 	the Czech Republic / the Slovak Republic	Fibers
July 2018	<ul style="list-style-type: none"> Acquired 74% of the share capital of Medco Plast for Packing and Packaging Systems S.A.E., Egypt (MEDCO) with a production capacity of 70,000 tpa of PET preforms. MEDCO is the largest PET convertor in Egypt with a market share of approximately 25%. (Completed all closing formalities of the transaction on November 13, 2018.) 	Egypt	Packaging
	<ul style="list-style-type: none"> Acquired 100% of the share capital of Sorepla Technologie S.A. and its subsidiary, Société de Recyclage de Matières Plastiques (Sorepla Industrie) S.A., in France (Sorepla). Sorepla is one of the largest plastics recyclers in Europe with a capacity of 52,000 tpa. 	France	Integrated PET
September 2018	Agreed to form a 50:50 joint venture limited liability company in the US with Loop Innovations, LLC called Indorama Loop Technologies, LLC. (ILT).	US	Fibers

Year	Event	Location	New Segments
October 2018	<ul style="list-style-type: none"> Acquired a 100% equity stake in Schoeller Group in Europe, with operating plants in Austria, the Czech Republic and Germany. Schoeller Group is a leading European producer of pure wool and wool blend worsted yarns, with a dyeing facility in Austria and a spinning facility in the Czech Republic, with a total production capacity of 3,600 tpa. (Completed all closing formalities of the transaction on November 23, 2018.). 	Austria / Czech Republic / Germany	Fibers
	<ul style="list-style-type: none"> Established a new indirect subsidiary company and merged indirect subsidiaries in Mexico. Set up of a new indirect subsidiary: Glanzstoff Industries Mexico, S. de R.L. de C.V. 	Mexico	Fibers
	<ul style="list-style-type: none"> Merged indirect subsidiaries: Indorama Ventures Mexico Assets, S. de R.L. de C.V. (IVMA) 	Mexico	Service Business
November 2018	<ul style="list-style-type: none"> Acquired a 100% equity stake in M&G Fibras Brasil S.A. in Brazil. The site produces polyester staple fibers, with a capacity of 75,000 tpa. 	Brazil	Fibers
December 2018	<ul style="list-style-type: none"> Acquired a 100% equity stake in UTT Beteiligungsgesellschaft mbH (UTT), one of the leading suppliers of airbag fabrics and other highly specialized solutions in the field of technical textiles, with two manufacturing sites located in Germany and Mexico and a capacity of approximately 12,000 tpa. 	Germany / Mexico	Fibers
	<ul style="list-style-type: none"> Acquired a 100% equity stake in the PET business of INVISTA Resins & Fibers GmbH, Germany (IRFG); and certain intellectual property rights of INVISTA Textiles (UK) Limited with regards to its barrier technology. PolyShield® PET and OxyClear® Barrier PET are well-known brands in oxygen barrier packaging. The IRFG plant is located in Gersthofen, Germany and manufactures high value-added PET with a combined capacity of 282,000 tpa. 	Germany	Specialty Chemicals
	<ul style="list-style-type: none"> Signed a definitive Asset Purchase Agreement with Custom Polymers PET, LLC, to acquire their PET recycling facility in Alabama. The facility consists of two production lines: rPET flakes and food-grade rPET pellets, with a combined capacity of 31,000 tpa. 	US	Integrated PET
	<ul style="list-style-type: none"> An integrated PTA-PET asset at the Corpus Christi joint venture received all regulatory clearances required from the United States Federal Trade Commission for the proposed acquisition on December 21, 2018. (Completed the acquisition on December 28, 2018.) 	US	Integrated PET
	<ul style="list-style-type: none"> Began commercial production at Indorama Ventures Xylenes & PTA, LLC's PIA plant in Decatur, Alabama on December 23, 2018. This plant complements IVL's existing PIA plant at IVL Quimica in Spain. The two PIA plants have a combined name plate capacity of 440,000 tpa. 	US	Specialty Chemicals

Year	Event	Location	New Segments
January 2019	<ul style="list-style-type: none"> The Board of IVL resolved to approve the purchase by its indirect subsidiary Indorama Netherlands B.V. ("INBV") through 83,000,000 newly issued shares in Indo Rama Synthetics (India) Limited ("IRSL"), equaling to approximately 31.79% of IRSL's enlarged share capital, at the price of INR 36 per share, equaling to the total investment amount of INR 2,988.00 or equivalent to approximately Baht 1,442.31 million baht. IRSL is a listed company on the National Stock Exchanges of India Limited (NSE) and the Bombay Stock Exchange Limited (BSE) and is the leading manufacturer of a wide range of polyester products in India. The Share Purchase formalities has been completed on April 3, 2019. 	India	Fibers
	<ul style="list-style-type: none"> Completed the acquisition of a PET Recycling facility in Alabama, USA from Custom Polymers PET, LLC. The acquisition has been completed on January 15, 2019. 	US	Integrated PET
February 2019	<ul style="list-style-type: none"> Acquired a 100% equity stake in the Packaging business of Bevpak (Nigeria). Located in Ibadan, Bevpak is one of the largest manufacturers of PET preforms in West Africa and is located in Ibadan, Nigeria, with a production capacity of 18,000 mts per annum. The acquisition has been completed on October 2, 2019. 	Nigeria	Packaging
	<ul style="list-style-type: none"> Completed the acquisition of a 100% stake in M&G Fibras Brasil Ltda. located in Cabo de Santo Agostinho, Brazil from M&G Fibras Holding S.A., M&G Fibras Participações Ltda., and M&G Fibras e Resinas Ltda. The acquisition has been completed on February 22, 2019. 	Brazil	Fibers
March 2019	<ul style="list-style-type: none"> Completed the acquisition of a 100% stake in UTT Beteiligungsgesellschaft mbH ("UTT"), Germany. The acquisition has been completed on February 28, 2019. 	Germany / Mexico	Fibers
	<ul style="list-style-type: none"> Completed the acquisition of a 100% stake in the PET business of INVISTA Resins & Fibers GmbH, Germany ("IRFG"); and certain Intellectual Property Rights of INVISTA Textiles (U.K.) Limited with regards to its barrier technology. The acquisition has been completed on March 4, 2019. 	Germany	Specialty Chemicals
July 2019	Acquired a 100% equity stake of in Sinterama S.p.A. and its subsidiaries ("Sinterama"). The acquisition of Sinterama comprises of five production sites in four countries: Italy, Brazil, China and Bulgaria, with a combined capacity of approximately 30,000 tpa. Sinterama is vertically integrated from chips to yarns and offers a vast range of colored polyester yarns for the automotive, furnishing, apparel and technical applications. The acquisition has been completed on November 19, 2019.	Italy / Brazil / China and Bulgaria	Fibers
August 2019	The Board of IVL has passed a resolution to approve the acquisition of certain Integrated Oxides and Derivatives businesses/assets from Huntsman	US / Australia and India	Integrated Oxides & Derivatives

Year	Event	Location	New Segments
	Corporation, a listed entity on the New York Stock Exchange and/or its wholly owned subsidiary(ies) (whether directly or indirectly) located in Texas, US / New South Wales, Australia and Ankleshwar, India which manufacture the following key products: Ethylene Oxide (EO), Propylene Oxide (PO), Glycols, Ethanolamines (EOA), Surfactants, Linear Alkylbenzene (LAB) and Methyl Tertiary-butyl Ether (MTBE), including certain R&D Centerscenters, patents and technology.		
December 2019	Acquired a 100% equity stake in Green Fiber International Inc. ("GFI"), which operates a plastics recycling facility in Fontana, California. The facility primarily produces primarily Recycled Polyethylene Terephthalate (rPET) Flakes with a combined capacity of 40,000 tpa. This acquisition is strategically in-line with the IVL's long-term sustainability objectives and part of the company's stated plan to invest significantly in recycling over the next five years. This transaction was completed as December 3, 2019.	US	Integrated PET

In August 2014, IVL's Board of Directors passed a resolution to increase the Company's share capital and issue warrants through a rights issue to existing shareholders. Furthermore, the Extraordinary General Meeting of Shareholders No. 1/2014 held on August 6, 2014 considered and approved the rights issue of warrants to existing shareholders, the terms of the warrants, and the increase in registered share capital and allocation of share capital for the exercise of the warrants.

The key terms of the issued warrants were:

Warrant	IVL W1	IVL W2
Term	3 Years	4 Years
Exercise Ratio	1 unit of warrant for 1 share	1 unit of warrant for 1 share
Exercise Price	THB 36 per share	THB 43 per share
Issue Date	25 August 2014	25 August 2014
Expiry Date	24 August 2017 3 years from the issue date	24 August 2018 4 years from the issue date
Warrant Issue Price	THB 0 (at no cost)	THB 0 (at no cost)
Allocation	To existing shareholders at a ratio of 10 IVL existing shares to 1 IVL-W1	To existing shareholders at a ratio of 13 IVL existing shares to 1 IVL-W2
Exercise Period	Last business day of each month for every 3 months starting from 31 October 2014. The last exercise date is the third anniversary from the issue date.	Last business day of each month for every 3 months starting from 31 October 2017. The last exercise date is the fourth anniversary from the issue date.

As of August 31, 2014, IVL increased its registered share capital from THB 4,815,856,719 to THB 5,666,010,449 in ordinary shares with a par value of THB 1 per share. The increase in registered share

capital by THB 850,153,730 was reserved for the exercise of IVL-W1 and IVL-W2 warrants into ordinary IVL shares. As per the terms of the issue, if all warrants were exercised by the warrant holders into ordinary shares, IVL would raise, with the exercise of all IVL-W2, up to THB 15.9 billion by September 2018.

In October 2014, IVL successfully completed the offering of Subordinated Perpetual Debentures No. 1/2557 for THB 15 billion. The Perpetual Debentures carry a fixed rate coupon of 7.0% per annum for the first five years, after which the coupon will be adjusted every five years as per the stated terms and conditions. The issuance strengthened IVL's capital structure, and improved its liquidity and flexibility.

In October 2015, IVL successfully issued its first overseas Senior Unsecured Bond in the amount of SGD 195 million to institutional investors in Singapore through its wholly-owned subsidiary, IVL Singapore PTE Ltd. The Bond was rated AA (Stable) by Standard and Poor's with a tenure of 10-years at an interest rate of 3.73 percent per annum, and is guaranteed by the Credit Guarantee & Investment Facility (CGIF), a trust fund of the Asian Development Bank and listed on the SGX-ST.

In 2017, the total number of IVL-W1 exercised from October 2014 until the last exercise date on 24 August 2017 was 430,708,227 warrants, representing 89.47% of the total warrants issued. The unexercised (IVL-W1) warrants expired and were delisted on August 25, 2017. The Company is using this inflow of funds to reduce its debt and pursue future growth opportunities.

In 2018, the total number of IVL-W2 exercised from October 2017 until the last exercise date on August 24, 2018 was 369,586,436 warrants, representing 99.80% of the total warrants issued. The unexercised (IVL-W2) warrants expired and were delisted on August 25, 2018. IVL is using this inflow of funds to reduce its debt and pursue future growth opportunities.

In October 2018, TRIS Ratings (a strategic partner of S&P Global) ascribed the Company's rating at "AA-". They also upgraded IVL's outlook to "AA-" from "A+" reflecting the Company's successful strategy and future potential.

In November 2019, IVL issued and offered Subordinated Perpetual Debentures of Indorama Ventures Public Company Limited No. 1/2019 for THB 15 billion. The debentures carry a coupon of 5.0% per annum for the first five years, after which the coupon will be adjusted every five years as per the stated terms and conditions. The debentures were assigned a credit rating of "A" with a "Stable" outlook in accordance with the report published on September 26, 2019 by TRIS Rating Company Limited.

In September 2019, TRIS Rating affirmed the company's rating at "AA-" with a "stable" outlook. This rating reflects IVL's leading position in the polyester value chain. IVL has a competitive edge stemming from its vertical integration of production, and diversification of production locations and customers across Asia, North America, South America, Europe, and Africa.

2. Nature of the Business

Revenue Structure

The details of the reportable segment of our sales revenue structure applicable up to 2018, according to our consolidated financial statements for the year ended December 31, 2017 to 2019, are as follows:

Details	Year Ended December 31,					
	2017		2018		2019	
	(Bt million)	%	(Bt million)	%	(Bt million)	%
Revenue breakdown by Business Segments						
PET	145,760	51	182,415	53	196,047	56
Fibers	81,065	28	99,207	29	107,059	30
Feedstock	115,161	40	147,296	42	132,911	38
Elimination	(55,654)	(19)	(81,747)	(24)	(83,325)	(24)
Consolidated revenue from sale of goods	286,332	100	347,171	100	352,692	100

The details of the reportable segment of our sales revenue structure applicable from 2019 onwards according to our consolidated financial statements for the year ended December 31, 2019 are as follows:

Details	Year Ended December 31,	
	2019	
	(Bt million)	%
Revenue breakdown by 5 Segments		
Integrated PET	236,358	67
Fibers	97,890	28
Packaging	10,404	3
Integrated Oxides and Derivatives	9,099	3
Specialty Chemicals	29,804	8
Elimination	(30,863)	(9)
Consolidated revenue from sale of goods	352,692	100

Source: The Company's consolidated financial statements.

Business Overview

Indorama Ventures (SET: IVL) is a major global intermediate and downstream petrochemicals producer with 109 sites in 32 countries around the world (as of December 31, 2019) providing value-added and differentiated products and services to several diversified consumer goods industries which serve common consumer needs in hygiene, improved lifestyles and safety.

IVL has integrated businesses which are aligned to create a sustainable value proposition. Our customer orientation, global reach and scale allow us to benchmark ourselves globally to enhance operational excellence, while our industry leading ESG initiatives make us a sustainable global producer.

Additional factors that help us in providing a broader portfolio of products for our customers are innovation, high value-added products and recycling, which enhance earnings growth and the

sustainability of the business. Ongoing investments in research and development provide customers with new products and services that improve our offerings and complete our positioning as a one-stop center for their global requirements.

Business Description

The term polyester can be broken into poly, meaning many, and ester, a basic organic chemical compound. The principle ingredients used in the manufacture of polyester are purified terephthalate acid, derived from paraxylene, a part of the aromatics chain leading backwards to crude oil, and monoethylene glycol, part of the olefins chain that leads backward to crude oil or natural gas. The chemical process that produces the finished polyester is polymerization. IVL is one of the world's foremost-integrated producers in the polyester industry and the largest producer of PET.

We act as a bridge connecting the oil and gas industry with consumer goods producers. There is constant demand growth from downstream customers, as they are mostly consumption-oriented FMCG companies, and this demand grows at a higher rate than global GDP.

The industry norm is to have long-term volume contracts with customers, normally one to three years in certain geographies like the US and Europe. However, the pricing is adjusted monthly as per benchmark prices in the industry and according to an agreed mechanism. The system indicates IVL's ability to pass through price movements to end customers (not always contractually).

This mechanism implies that crude oil and its derivative raw materials used to produce PET and fibers have a low-impact on the business except in the event there is a sharp rise or fall in the price of such materials within a short period, entailing an adjustment in the cost of inventory to reflect market prices. This mark-to-market effect is termed "inventory gains" or "inventory losses".

However, there could be volatilities in the spread when there is an oversupply or tight supplies in the industry in the short-term.

Portfolio Development

We continue to consolidate and gain leadership in our existing businesses while continuing to diversify our portfolio in adjacent business opportunities in a disciplined manner. Fundamental shifts in the portfolio, both in its existing shape and form, and, as it evolves over the medium-term, necessitate the need to review the way we analyze and report our segments.

To this extent, we have completed a comprehensive assessment of our portfolio, identified areas of synergies and natural alignment, and recalibrated our future capital deployment strategies. All of this is in-line with our imperatives towards becoming a world-class, well-diversified, growth-oriented, sustainable global chemical company.

Going forward, each of our segments necessitates differentiated investment and growth strategies depending on the role they play in our existing portfolio. Each segment is either already delivering or is capable of delivering double-digit ROCE through its business cycles. These segments, described below, are also poised for healthy growth momentum and thereby support IVL's overall growth strategy. These new segments are as follows:

1. Integrated PET

This segment includes businesses in the aromatics and PET value chain, including PX, PTA and PET. Given PET's unique properties of 100% recyclability, reporting under this segment also includes IVL's recycling initiatives across the polyester value chain.

PX Business Overview

Paraxylene (PX) is used in the polyester chain, mainly in the production of fiber, film and polyethylene terephthalate (PET) bottle resins, via an intermediate product – purified terephthalic acid (PTA). A small amount of PX is used as a solvent and to produce di-paraxylene and herbicides. The PX.

PTA Business Overview

Terephthalic acid is an organic compound and a colorless solid. It is a commodity chemical, used principally as a precursor to polyester PET, which in turn, is used to make clothing and plastic bottles.

IVL entered the PTA business in 2008 with a strategy to develop raw material integration ensuring an uninterrupted supply of raw materials and better integration in the polyester value chain. This provides a cost competitive edge in the PET and Fiber businesses. Our PTA assets are strategically co-located with downstream facilities in many countries including Thailand, Indonesia, Spain, the United States and the Netherlands. As of December 31, 2019, we were a globally integrated PET producer with a total PTA capacity of around five million tons per annum.

PET Business Overview

Our PET business is part of our core polyester value chain business and comprised 43% of our production volumes in 2019. Beginning with one manufacturing plant, we have continued to expand and now have operations across five continents – North America, South America, Europe, Africa, and Asia, and our PET business includes the production and sale of PET resin. As of December 31, 2019, we were the largest PET resin producer in the world with an aggregate installed production capacity of around six million tons per annum (including our India joint ventures where IVL owns a 50% equity interest).

Recycling Business Overview

In response to the needs of customers and tackling the global challenges of resource scarcity and waste, IVL began to explore the recycling business as part of our corporate sustainability program and to also meet growing demand from our customers. Our decision to execute the recycling project was based on the growth of PET used in a number of industries, the opportunities available in recycling PET and the increased attention being paid to developing a circular materials economy. We started producing PET flakes from discarded PET bottles in 2011 following our acquisition of Wellman Group, with flake processing facilities in Spijk, the Netherlands and Verdun, France. These two bottle recovery plants process discarded PET bottles to produce recycled PET flakes to serve the facility in Ireland. Recycled PET flakes are then converted into both food-grade and fiber-grade materials.

This PET recycling project complements IVL's existing capabilities and serves as a way to gain access to new markets and product lines. Over the past several years, we continued to expand our PET

recycling facilities in Thailand, the United States, Mexico and France. These expansions have strengthened our business and reflect our desire to continue to build a more sustainable business while enhancing our ESG priorities.

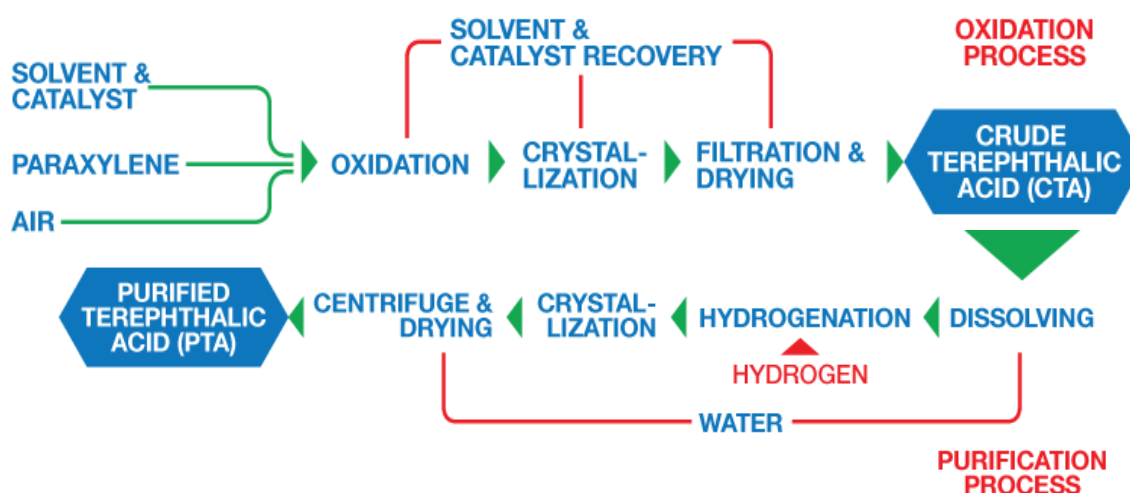
Integrated PET Production Process

PTA production process

Terephthalic acid (TA) is the result of the oxidation of paraxylene (PX). The commercial process utilizes acetic acid as a solvent together with a catalyst composed of cobalt and manganese salts, with a bromide promoter.

A radical chain reaction occurs in a series of intermediates, starting with the oxidation of paraxylene and finally to terephthalic acid. It is then further purified to make PTA.

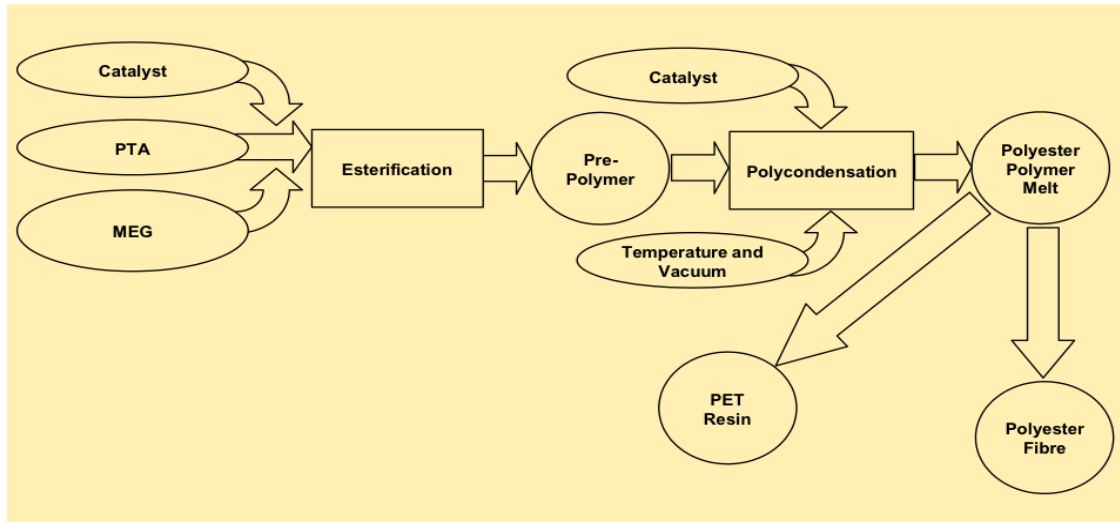
The chart below shows the PTA production process.



PET production process

PET resin comes from polyester polymer melt. The melt is converted into PET resin, either through a conventional solid-state process or through a newer technology melt-to-resin process. Under the conventional solid-state polycondensation process, the melt is extruded into strands, which are quickly cooled down by water. After solidification, the strands are cut into small pellets, dried and further crystallized by being heated in a reactor under a specific temperature and pressure conditions under a nitrogen flow. Under the melt-to-resin process, the polycondensation process is completed during the melt phase, resulting in the formation of pellets without going through the solidification process. We have plants that use both of these technologies.

The chart below summarizes the PET production process.



Integrated PET Products and Markets

We have sales and marketing teams in each of the regions where we operate, which are overseen strategically by our sales and marketing head office in Thailand. Our marketing activities include regular meetings with our customers to understand their requirements, maintain good relationships as well as provide first-rate customer service.

Most of our PX production is used for internal consumption to produce PTA at our plant in Alabama, in the United States. Our main customers for PTA are PET resin and polyester producers. Our downstream PET and polyester production facilities use a significant proportion of our PTA production. We sell the remaining PTA that we do not use within the group to third-party customers. In 2017, 2018, and 2019, 53%, 62%, and 70% respectively, of our PTA was sold to the group.

We classify our PET customers into four main groups:

- Well-known brand name beverage companies with their own conversion plants to produce PET bottles;
- Well-known brand name beverage companies who subcontract the production of PET bottles to converters using PET resin purchased by such beverage companies;
- PET resin traders; and
- PET converters who use PET resin to manufacture preforms, bottles, sheets and other PET packaging to service the needs of end users.

We sell our PET resin primarily through direct sales to end-use customers. A small proportion of our sales take place through agents and traders.

Integrated PET Competition

IVL is the world's largest PET producer with a number one or number two position at over 90% of our manufacturing locations. We have a strong presence in the Americas and Europe, the Middle East, and Africa (EMEA), and a high level of feedstock integration (PTA to PET in key markets and PX integration in North America), all of which position us as the global leader in this 100% recyclable business.

We are an integrated PET producer, where we manufacture and use PX and PTA for our own captive consumption partially or fully. Currently in China, there are many new plants, especially PTA plants, using the latest technology and having lower conversion costs than previously. However, there are other competitors in Europe and North America. For PET competitors, Equipolymers and Neo Group are the main competitors in the European market; Alpek (DAK Americas LLC) and the Far Eastern Group are the principal competitors in the US market; while Thai Shinkong Industry Corp. and Thai PET Resin Co., Ltd. are the main competitors in the Thai market. Although PET technology is available through commercial licenses, we believe the capital investment required to achieve profitability through economies of scale may inhibit new entrants to the market.

Integrated PET Production Facilities

The following table sets out the key figures for our integrated PET production facilities as of December 31, 2019:

Production Facilities/Location	Nameplate Capacity⁽¹⁾ (‘000 tons per annum)
PTA	
Europe	1,735
Indonesia ⁽²⁾	508
Americas	1,365
Thailand	1,373
PET	
China	440
Europe	1,384
Indonesia	203
Middle East and Africa	675
Americas	1,569
India	699
Thailand	436
Recycling facilities	202
Total	10,590

(1) The capacity of plants has been re-rated to reflect the de-bottlenecking projects taken-up by the various plants from time-to-time. However, the capacity does not include a non-operating site: Ottana Polimeri S.R.L., IRP Workington, Ottana Polimeri S.R.L. and Adana Turket.

(2) From October 1, 2018, Polyprima was fully consolidated due to a revision in terms with the JV partner.

2. Integrated Oxides and Derivatives

IVL began in this segment by acquiring a MEG and PEO facility in the US state of Texas in 2012. We further enhanced our presence by commencing production at our ethylene cracker in Louisiana on January 31, 2020. This cracker will mainly support the captive EO-EG facility providing a unique integration advantage and the ability to capture the entire value chain margin.

In 2019, we invested in the integrated ethylene oxide (EO) and propylene oxide (PO) derivatives business of Huntsman Corporation which is fully integrated downstream in surfactants (used in personal and home care) and in propylene oxides (used in insulation and foam materials) where global demand is increasing at around over 4% pa.

With the acquisition of these leading downstream businesses, consisting of both EO and PO platforms, we are now well on our way to making this our core platform for continuous growth in selective upstream & downstream integration over the next five to 10 years while benefiting from cheap gas based feedstock in the US.

Ethylene Oxide Business Overview

Monoethylene Glycol (MEG)

The other major feedstock produced by Indorama Ventures is monoethylene glycol (MEG), which is an organic compound. In its pure form, it is an odorless, colorless, syrupy, sweet-tasting liquid.

MEG comes from ethylene via intermediate ethylene oxide. Ethylene oxide reacts with water to produce ethylene glycol.

The major end uses of ethylene glycol are in the polyester industry and in anti-freeze for automobile radiators. Besides automobiles, MEG is a medium in liquid-cooled computers, chilled water air-conditioning systems and geothermal heating/cooling systems.

Purified Ethylene Oxide (PEO)

Purified ethylene oxide (PEO) comes from the direct oxidation of ethylene in the presence of a silver catalyst.

PEO is used in the production of detergents, thickeners, solvents, plastics and various organic chemicals such as ethylene glycol, ethanolamines, simple and complex glycols, polyglycol ethers and other compounds. PEO is a disinfectant that is widely used in hospitals and the medical equipment industry to replace steam in the sterilization of heat-sensitive tools and equipment, such as disposable plastic syringes.

PEO derivatives are used to manufacture various products such as soaps, detergents, brake fluids, weed killer and urethane foam.

EO is one of the most important raw materials used in large-scale chemical production. Most EO is used for the synthesis of ethylene glycols, including diethylene glycol and triethylene glycol which

accounts for up to 75% of global consumption. Other important products include ethylene glycol ethers, ethanolamines and ethoxylates. Among glycols, ethylene glycol is used as antifreeze, in the production of polyester and PET, liquid coolants and solvents. Polyethylene glycols are used in perfumes, cosmetics, pharmaceuticals, lubricants, paint thinners and plasticizers. Ethylene glycol ethers are used in brake fluids, detergents, solvents, lacquers and paints. Other products of EO include ethanolamines, which are used in the manufacture of soaps and detergents and for the purification of natural gas. Ethoxylates are reaction products of EO with higher alcohols, acids or amines. They are used in the manufacture of detergents, surfactants, emulsifiers and dispersants.

Diethylene Glycol (DEG) and Triethylene Glycol (TEG)

Diethylene glycol (DEG) is a by-product made together with MEG through the processing of EO. DEG has broad applications and is used to manufacture polyester polyols, unsaturated polyester resins, buffet heaters, morpholine production, paints and coatings, plasticizers, liquid laundry detergents, cement grinding and as an intermediate for polyethylene glycol.

Triethylene glycol (TEG) is a by-product made by processing EO and is mainly used for natural gas dehydration. The other applications are air sterilizers, resin for windshield plate glass and as an intermediate for polyethylene glycol. It is used as a plasticizer for vinyl as well as in air sanitizer products. When aerosolized, it acts as a disinfectant. It is an additive for hydraulic fluids and brake fluids and is used as a base for “smoke machine” fluid in the entertainment industry.

Propylene Oxide Business Overview

Propylene Oxide is a synthetic, highly-flammable, volatile, colorless liquid that is soluble in water and miscible with many organic solvents. Propylene oxide is used primarily as a chemical intermediate in the production of polyether polyols for use in making polyurethane plastics and propylene glycol. Other major products are polypropylene glycol, propylene glycol ethers, and propylene carbonate.

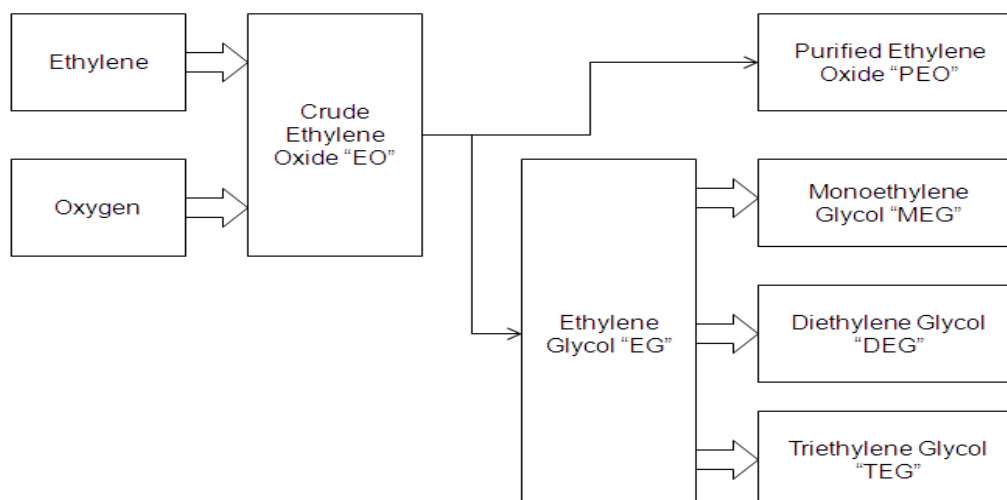
Tertiary butyl alcohol (TBA) is produced as a co-product of propylene oxide in dedicated plants. TBA is dehydrated into isobutylene to produce Methyl Tertiary-Butyl ether (MTBE). It can also be sold directly as an octane-enhancing component for gasoline.

US Olefin Cracker Business Overview

IVL acquired an old and mothballed ethylene cracker located in Lake Charles, Louisiana, through its subsidiary, Indorama Ventures Olefins LLC. The refurbishment and restart process is ongoing, and the plant started operations in January 2020. Post-completion, our integration has expanded in the US, as we are currently a buyer of ethylene, which will be the end product of our US cracker.

Oxide and Glycol Production Process

The chart below summarizes the EO/EG production process.



Oxide and Glycol Products and Markets

IVL acquired its first EO/EG plant in April 2012, which has 100% of its sales in North America. Sales and Marketing for Indorama Ventures (Oxide & Glycols), or IVOG, is overseen by the sales and marketing head office in Thailand and implemented by the US sales team. Sales of our products are broken into two main categories:

Purified ethylene oxide (PEO) is sold exclusively in the US merchant market. PEO is used as a chemical intermediate in the manufacturing of PEO derivatives such as ethanolamines, polyols, ethers and surfactants which are in turn, used in the manufacture of agricultural chemicals, rigid and flexible foams, cleaning solvents and the personal care and beauty care industries, respectively.

There are currently many pure merchant consumers of PEO in the United States and IVOG supplies many of these companies, a testimonial to our reliability and service excellence. IVOG has approximately 30% of the US merchant market share of PEO sales.

In addition to PEO, the plant manufactures monoethylene glycol (MEG), diethylene glycol (DEG) and triethylene glycol (TEG) products through a distillation process. The majority of the yield is MEG.

- IVL's acquisition of the Clear Lake, Texas plant accompanied a MEG supply agreement with the former owner who consumes MEG for the engine coolant market principally in the US.
- IVL's US polyester and PET plants consume MEG as a raw material for their products, and have consumptive MEG capacity in excess of the Clear Lake, Texas plant's production capabilities, giving IVL the option to merchant MEG in the US and global markets or consume the MEG on a captive basis.

In 2017, 2018, and 2019, 33%, 37%, and 33% respectively of our EO/EG was sold to the group and 67%, 63%, and 67% respectively of our EO/EG was sold to third-party customers.

Oxide and Glycol Competition

PEO Competition – Due to the hazardous nature of PEO, there are no imports or exports of PEO as a product. PEO derivatives, however, are open to import-export. IVOG competes in the US PEO market with global competitors, all of whom primarily produce PEO to support internal production of PEO derivatives and sell the balance of their capacity to the merchant market. Unlike all of our competitors, IVOG does not produce any PEO derivatives, which competes with our merchant customers businesses.

Glycols Competition – The global market for MEG is highly competitive, involving a large number of producers located throughout the world. MEG is easy to transport and store. The shale gas revolution in the US has given its producers advantaged ethylene as a feedstock material ensuring the US is a low-cost region for MEG production. IVL's integration into MEG adds value to the US PET and polyester margin chain. The largest competitors in North America include Shell Chemical, MEGlobal, Equistar and Sabic, along with Pemex in Mexico. The US is a largely mature consumer of MEG with demand growth driven by new PET capacity and an opportunistic export arbitrage platform based on the advantaged North American ethylene costs associated with shale gas.

Integrated Oxides and Derivatives Production Facilities

The following table sets out the key figures for our olefins production facilities as of December 31, 2019 (excluding the US gas cracker as it was completed in January 2020):

Production Facility/Location	Nameplate Capacity (‘000 tons per annum)
EO/EG Facility - United States	550

3. Fibers Business

This segment includes all our offerings in the mobility (automotive and tires), personal hygiene and lifestyle domains. Each of these domains continue to grow at a rate of over 4% annually, offering the potential to become multi-billion dollar businesses individually. Growth in the fiber business comes as a result of trends towards light-weighting, use of sustainable materials, increasing attention being paid to personal hygiene and changes in the choice of personal wear, specifically by the younger generation.

Polyester Fibers and Yarns Business Overview

Polyester was discovered in the 1940s and has been manufactured on an industrial scale since 1947. Polyester fibers are the first choice for apparel and are used in trousers, skirts, dresses, suits, jackets, blouses and outdoor clothing.

Polyester fibers are produced by the melt spinning process. Raw materials are heated to a spinning mass, which is then pressed through spinnerets (similar to a sieve). Manufacturing techniques have developed to the point where they can produce round, oval or angular profiles, making them firm to the touch.

Polyester fibers are particularly resistant to light and weather, can withstand climatic effects, being as light or as fine as the weather demands, and have good moisture transport and dry quickly.

Polyester Fibers and Yarns Products

Polyester fibers are most commonly used for apparel, from sportswear to high fashion; home textiles, such as bedding and carpets; non-woven materials including surgical gowns; technical textiles such as filters, and automotive uses including carpets and insulation.

With the acquisition of Performance Fibers in China in 2015, IVL can now produce polyester yarns and polyester fabrics that are used in tires and supplied to various world-class tire companies. With the growth in demand, IVL is in the process of expanding production capacity by around 40% in China.

The acquisition of Glanzstoff in 2017 enhanced the offering of fibers in the automotive space with rayon fiber. Glanzstoff also makes composite fibers for the automotive sector. This acquisition enhances our strategic position in automotive fibers as we can now offer a suite of products to the same or similar group of customers.

DuraFibers in France and Mexico expanded the footprint of Performance Fibers in China as they produce similar products in the automotive fibers space.

Furthermore, we completed the acquisition of Polyester Staple Fiber in Brazil which will provide an opportunity to establish its global footprint in the Fibers business in South America's largest economy and the speciality fibers business of Sinterama in four countries: Italy, Brazil, China and Bulgaria. Sinterama is vertically integrated from chips to yarns and offers a vast range of colored polyester yarns for automotive, furnishing, apparel and technical applications.

Polyolefin Fibers Business Overview

The fiber forming substance is any long-chain synthetic polymer composed of a weight of at least 85% of ethylene, propylene, or other olefin unit in these manufactured fibers. Italy began production of olefin fibers in 1957, followed by the United States in 1960. The first commercial producer of olefin fibers in the United States was Hercules, Inc., now known as FiberVisions and wholly-owned by IVL.

Polymer granules are usually fed into an extruder that melts the polymer which is then pumped through a spinneret. The filaments are cooled in an air stream before being wound on a package or collected in cans. Because the fibers are difficult to dye, colored pigments are often added to the polymer stream before extrusion to produce colored fibers.

Propylene, when polymerized, creates a crystalline polypropylene polymer. The fibers made with these polymers can be used in furnishings, apparel and industrial products. Olefin fibers provide warmth without much weight. Olefin is resistant to abrasions, stains, sunlight, fire and chemicals. It does not dye well, but has the advantage of being colorfast since pigments are added in the fibers. Since olefin fibers have a low melting point, they can be thermally bonded. One of the most important properties of olefin fibers is its strength, which can be tailored for different applications. It keeps its strength in wet or dry conditions. Olefin fibers can be multi or monofilament and staple, tow, or film yarns. The cross-section is usually round, but can be modified for different end uses.

Polyolefin Fibers Products

Uses include nonwoven fabrics for diapers, feminine care and adult incontinence products (as top sheets, back sheets, leg cuffs, elastic waistbands, and transfer layers); in spun laced nonwoven products such as medical disposable textiles, filtration products or in air-laid nonwoven structures as absorbent cores, and wet wipes.

In terms of apparel, olefin fibers are used in sports and active wear, socks, thermal underwear and as lining fabrics, while in the home they are often used independently or in blends for indoor and outdoor carpets, carpet tiles and carpet backing. The fiber can also be used in upholstery, draperies, wall coverings, slipcovers, and floor coverings as well as heat-sealable paper for use in cases such as tea and coffee-bags.

In heavier applications, the fibers are often used for interior fabrics, sun visors, arm rests, door and side panels, and trunk and parcel shelves, while olefins can be created into carpets, ropes, and geo-textiles that are in contact with the soil, filter fabrics, bagging and concrete reinforcements.

Bicomponent Fibers Business Overview

Bicomponent fibers may be defined as “extruding two polymers from the same spinneret with both polymers contained within the same filament.” A close relative is “co-spun fiber,” which is a group of filaments of different polymers, but with a single component per filament spun from the same spinneret. The term “conjugate fibers” is often used, particularly in Asia, as synonymous with bicomponent fibers. The main objective of producing bicomponent fibers is to exploit capabilities not existing in either polymer alone. Bicomponent fibers are commonly classified by their fiber cross-section structures as side-by-side, sheath-core, islands-in-the-sea and citrus fibers or segmented-pie cross-section types. Bicomponent fibers made of polyethylene sheath and polypropylene core are important fibers for the nonwoven fabric market.

Worsted Wool Yarns Business Overview

The term worsted is derived from Worsted, a village in the English county of Norfolk. Worsted wool fabric is typically used in the making of tailored garments such as suits, as opposed to woolen wool, which is used for knitted items such as sweaters. The essential feature of worsted yarn is its straight, parallel fibers. Worsteds differ from woolens, in that the natural crimp of the wool fiber is removed in the process of spinning the yarn. IVL produces wool from Merino sheep. These sheep are sought after for their coats, which are said to produce the finest, softest wool available.

While many forms of wool require that the fiber undergo a spinning process, the production of worsted wool follows a slightly different path. Rather than going directly into a spinning process, the wool is first combed in a carding process. This is where the fibers are separated and prepared for spinning to remove any short and brittle fibers from the wool, leaving only the longer strands of fiber to undergo the spinning process, producing a smooth yarn that possesses a higher durability.

Owing to the strength of worsted wool, the fibers can be woven into a finer material that is more crease resistant than many other fabric choices making it an ideal choice for garments that need to hold their shape. Worsted wool has been a popular choice for men's trousers, pleated skirts for women, and both men's suits and sports jackets. Because worsted wool is so durable, it wears very well and drapes easily, making it an ideal fabric for all sorts of garments.

Worsted Wool Yarns Products

Worsted wool produced by Indorama Ventures is used in high-end suiting for both men and women.

Nylon 6.6 Tire Cord Yarns Business Overview

With the acquisition of PHP Fibers GmbH and its subsidiaries ("PHP"), IVL holds 80% of PHP while the remaining 20% is held by Toyobo Co., Ltd., a leading Japanese manufacturer of high function products, including among others, automotive products.

PHP is a globally recognized manufacturer of branded high-tenacity polyamide nylon 6.6 yarns and is one of the leading suppliers in Europe for the automotive safety supply chain. PHP Group's production facilities are located in the United States, Europe and China.

The acquisition of PHP significantly enhances our High Value-Added (HVA) product portfolio with the addition of high performance automotive and industrial products.

Nylon 6.6 Tire Cord Yarns Products

These yarns are extensively used in air bags and tire cords in the automotive sector.

Fibers Products and Markets

Our main customers for fiber and yarn products are companies producing textiles for apparel, fast moving consumer goods companies in hygiene, companies producing home textiles and industrial companies such as automotive companies and packaging film producers.

Fibers Competition

Competition in the global fibers and yarns industry is characterized by the presence of large diversified industrial companies, as well as a large number of relatively small niche players with a capacity of sometimes less than 10,000 tons per annum. Larger fiber producers usually focus on high-volume standard fibers for sale in domestic markets where the level of competition is high and predominantly based on price and, to a lesser degree, on consistency of product quality. The larger polyester producers of commodity polyester products continue to focus on increasing their production of non-commodity products. They comprise approximately half of our total output. China dominates polyester production and has many companies involved in this business, while there are a few companies in Korea, China, Turkey, and in western markets which compete with our specialized fibers and yarns.

Fibers Production Facilities

The following table describes our fibers and yarns production facilities as of December 31, 2019:

Production Facilities/Location	Nameplate Capacity ⁽¹⁾ ('000 tons per annum)
China	122
Europe	465
Indonesia	406
Middle East and Africa	35
Americas	342
India	433
Thailand	293
Total	2,096

(1) The capacity of plants has been re-rated to reflect the de-bottlenecking projects taken-up by various plants from time-to-time. However, the capacity does not include a non-operating site: IVL Karawang.

4. Specialty Chemicals

Specialty Chemicals Business Overview

IVL entered this segment in 2011 with the acquisition of South Carolina-based Auriga Polymers, which owns the technology for the Crystal Clear Oxygen Barrier Resin, OxyClear® and Polyshield®. We supplemented our presence in this segment in 2016 by acquiring the world's only naphthalene dicarboxylate (NDC) facility in Alabama, and a PIA facility in Cadiz, Spain.

In 2018, we grew this portfolio by expanding our PIA production in Spain and additionally converted a PTA line to PIA in Alabama, thereby becoming the world's second largest producer.

In 2019, we completed the acquisition of Invista's assets in Germany resulting in IVL possessing the intellectual property for Polyshield® and Oxyclear® resins, together with Invista's barrier technology in all markets globally.

Specialty Chemicals Products and Markets

Our main customers for specialty PET resins are manufacturers of medical applications, premium bottles, and film and textile specialties. IVL continues to innovate our products in order to maximize differentiation, increase customer loyalty and enter new markets. We are moving closer to customers, offering both customer-tailored products and customer-specific service arrangements. Increasing consumer preference for eco-friendly substitutes also benefits us as we are the leading global solutions provider of barrier resins, which come from renewable feedstocks and offer a minimal carbon footprint. For PIA, we manufacture and mostly sale to third party customers. In 2019, we sold 71% of PIA sales to outside customers who manufacture PET resins as well as paints and coatings.

We sell NDC to outside customers who manufacture new-generation polyesters and resins to make items such as LCD flat panel displays and ultra-thin data storage tapes. We have sales and marketing teams in each of the regions where we operate, which are overseen strategically by our sales and marketing head office in Thailand.

Specialty Chemicals Competition

IVL is the only commercial producer of NDC in the world. Since there are no other commercial producers, there is no direct competition, however, products made from NDC monomers do have competition from products such as modified PET, PI, and PC. NDC is used in markets such as films for optical displays, insulation for motors, flexible circuits for harnesses, industrial and pharmaceutical packaging containers, industrial fibers, and tire cords, among others.

Close to 40% of PIA demand is concentrated in domestic markets in Europe (where we are the only producer) and North America. Global PIA demand is close to 1.1 million tons with China being the largest consumer as PET is the main application for PIA. Apart from PET, the main applications are coatings and unsaturated polyester resins (UPRs). We are the second largest producer of PIA worldwide and our main competitors are Lotte, FCFC, Ineos and MGC. In 2019, IVL converted one of its PTA lines into IPA and expanded IPA's capacity.

Specialty Chemical Production Facilities

The following table describes our specialty chemical production facilities as of December 31, 2019:

Production Facilities/Location	Nameplate Capacity⁽¹⁾ ('000 tons per annum)
Specialty PET - various sites	627
PIA – Spain and the US	440
Total	1,067

⁽¹⁾ The capacity of plants has been re-rated to reflect the de-bottlenecking projects taken-up by various plants from time-to-time.

5. Packaging

Packaging Business Overview

IVL has been involved in this business for the past two decades, first through a joint venture with Sermasuk PCL in Thailand and thereafter expanding our facilities to PET under penetrated but high growth countries in Southeast Asian and African markets including the Philippines, Nigeria, Myanmar and Ghana. The current portfolio consists of plastic polymer resins primarily used for beverage and food packaging, and packaging of pharmaceutical and household products. Currently, our main products are preforms, bottles and closures at 15 production facilities in seven countries. An aggregate production quantity of 0.2 MMt makes this IVL's smallest business segment.

Our focus is on developing a sustainable packaging business, and not competing with PET, by broadening the production footprint around the world through M&A and a greenfield expansion led growth strategy.

In the fourth quarter of 2019, we acquired Bevpak, a facility in Nigeria, to expand our global footprint.

The overall global packaging industry is valued at around USD 1 trillion and is growing at 5% per annum. This is a high growth segment, especially in olefins-based sustainable packaging materials, that serves the key needs of the FMCG and pharmaceutical industries.

This downstream business provides tremendous scope for reducing earnings volatility, margin enhancements through segment integration into the olefins chain, and increased diversification.

Packaging Products and Markets

Our main customers are reputable global beverage and FMCG companies such as L'Oréal, Pepsi, Coca Cola, and P&G. We can produce clear and colored preforms, bottles, and closures. We have been regularly working on lightweighting as per the requirements of our customers. Through superior engineering, technology, plus reliable customer service and delivery, we provide our customers with packaging solutions that help them build the value and volume of their brands. Similar to other segments, we have sales and marketing teams in each of the regions where we operate, which are overseen strategically by our sales and marketing head office in Thailand.

Packaging Competition

The global beverage packaging market is extremely competitive due to the presence of many vendors involved in the packaging of soft drinks. Though many new vendors are regularly emerging in the market, it is difficult for them to compete with international vendors, including IVL, in terms of features, functions, and services. The key players in the global market are Alpla, Ball Corporation, Crown Holdings, and Amcor.

In response to the increasing needs of our customers, we have also invested in high speed bottling lines. In the near future, we plan to expand our product portfolio to pharmaceutical healthcare, personal care and home care packaging products with enhanced functionality and sustainable materials.

Packaging Production Facilities

The following table describes our packaging production facilities as of December 31, 2019:

Production Facilities/Location	Nameplate Capacity (‘000 tons per annum)
Packaging – various sites	294

3. Indorama Ventures Potential Risk Factors

Risk monitoring and control mechanism at IVL:

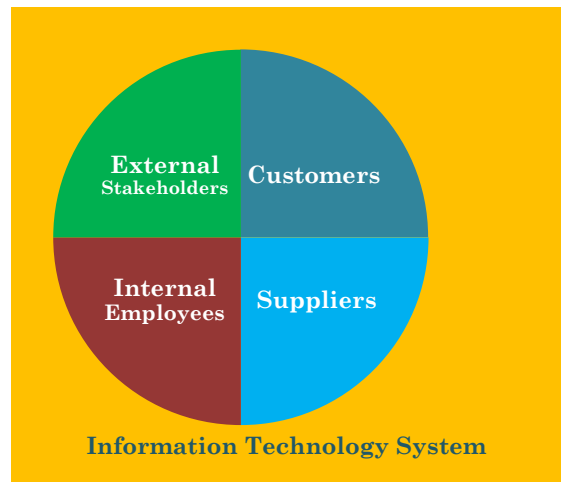
The Enterprise Risk Management framework uses top-down and bottom-up approaches to identify and manage business risks at corporate and subsidiary levels around the world to identify and mitigate business risks at every level. This is led by the Board, the Committee and senior management. This covers the assessment and review of internal and external risks, including global risks and factors that may affect the Company's operations. Business heads in the Sustainability and Risk Management Committee, as well as the Business Risk Management Committees, monitor key risks and ensure adequate preventive measures and mitigation controls. All significant risks identified are analyzed, recorded and reported. The risk management report and mitigation plan are reviewed quarterly by the committees at business segment and plant level. In addition, the Sustainability and Risk Management Committee reviews a sensitivity analysis of the business plan, Greenfield and M&A projects, to ensure sustainability especially with regards to the environmental and social impacts to business operations.

3.1 Emerging Business Risks

3.1.1 The evolving sophistication of emerging cyber threats could have the adverse impact on our business financially and reputational

We rely extensively on information technology systems ("IT Systems"), including some which are managed, hosted, provided and/or used by third parties and their vendors, in order to conduct our business. Our uses of these systems include, but are not limited to:

- communicating within our company and with other parties, including our customers;
- ordering and managing materials from suppliers;
- converting materials to finished products;
- receiving and processing orders from and shipping products to our customers;
- marketing products to customers;
- collecting and storing customer, employee, investor and other stakeholder information and personal data;
- processing transactions, including but not limited to employee payroll, employee benefits and payments to customers and vendors;
- hosting, processing and sharing confidential and proprietary research, business plans and financial information;
- complying with legal, regulatory and tax requirements;
- providing data security;
- handling other processes involved in managing our business.



Although we have a broad array of information security measures in place, our IT Systems, including those of third-party service providers with whom we have contracted, have been, and will likely continue to be, subject to computer viruses or other malicious codes, unauthorized access attempts, phishing and other cyber-attacks.

In general, cyber-attacks and other cyber incidents are occurring more frequently; are constantly evolving in nature; are becoming more sophisticated, and are being made by groups and individuals with a wide range of expertise and motives.

Such cyber-attacks and cyber incidents can take many forms, including cyber extortion, password theft or introduction of viruses or malware, such as ransomware through phishing emails. We cannot guarantee that our security efforts will prevent breaches or breakdowns of our, or our third-party service providers', IT Systems since the techniques used in these attacks change frequently and may be difficult to detect for periods of time. In addition, although we have policies and procedures in place to ensure that all personal information collected by us or our third-party service providers is securely maintained, data breaches due to human error or intentional or unintentional conduct have occurred and will likely continue to occur.

Although we have seen no material impact on our business operations from the cyber-security attacks and data breaches we have experienced to date, we may suffer a loss or disclosure of confidential business or stakeholder information as a result of a breach of our IT Systems, including those of third-party service providers with whom we have contracted. Moreover, we may suffer reputational, competitive and/or business harm; incur significant costs, and be subject to government investigations, litigation, fines and/or damages, which may adversely impact our business, results of operations, cash flows and financial condition.

Furthermore, while we have disaster recovery and business continuity plans in place, if our IT Systems are damaged, breached or cease to function properly for any reason, including the poor performance of, failure of or cyber-attack on third-party service providers, catastrophic events, power outages, cyber-security breaches, network outages, failed upgrades or other similar events, and if the disaster recovery

and business continuity plans do not effectively resolve such issues on a timely basis, we may suffer interruptions in our ability to manage or conduct business.

Risk Mitigation Action:

- Our systems are protected with advanced Firewalls, Antivirus, Antimalware, latest system patch application, and Advance Threat protection to strengthen our system's security.
- Adopting emerging and modern AI based protection technologies such as EDR (End point detection and response)
- Network segmentation is planned to keep users, servers, applications on different network segment and pass inter-segment traffic through firewall.
- We do have a guideline of user awareness, to educate our users on risks of cyber security and train them for safe system usage.
- We do have a backup policy to protect our system and data, such that in case of cyberattack, systems can be recovered from backup.
- We have the capability to reduce the impact and proliferation of an event; to identify and classify applications, databases, systems, and information. We can minimize insider risks by keeping a closer watch on user activities, analysing user behaviour, and regularly assessing risks to proactively spot weaknesses and improve their security position.
- By enhancing security and privacy capabilities across the company, we establish stricter control over user IT activities in order to keep sensitive information secure and prevent insider breaches.
- The ongoing assessment of security threats, balanced against the existence and adequacy of security controls, is to ensure that security controls and countermeasures in place are commensurate with potential risks.

3.1.2 Disruptive innovation/technology potentially leading to vulnerabilities such as Alternatives for PET

It is difficult to anticipate the nature of disruptive innovations or new technologies, which might outpace the company's ability to remain competitive. Resistance to change may restrict the company from making necessary adjustment to the business model and core operations.

In particular, the trend of eco-friendly substitutes for disposable plastic water bottles is increasing. While good for raising environmental awareness, this might be misunderstood to include recyclable PET, thus affecting the future use of PET. Advanced technology to invent alternatives for PET as such biodegradable plastic might make vulnerable our business position as one of the leading companies in the market.

Customers increasingly expect more personalized products and services. Sudden development might alter customer expectations and change the core business model. Innovation can be restrained by the organization's core business assumptions or structural limitations. The needs of customers may have evolved; new technologies and solutions may have become available, and/or regulation has changed. Together these can create discontinuities, potentially changing the structure of an industry.

Risk Mitigation Actions:

- IVL revisits its approach to corporate strategy development toward introducing more agility, adaptability, and responsiveness to emerging threats. We must continuously monitor changes in the environment to determine which, if any, could be truly disruptive.
- We see the strategic importance of Research & Development, choosing the appropriate level of investment while also effectively measuring return on those investments, which has meaningful impacts on our future positioning.
- We work closely with brand owners to promote campaigns on recycling and provide education to differentiate PET from other plastics. We observe the trend and thus strategically increase investment in recycling plants; arrange more recycling factory visits and encourage recycling and end-use of rPET.
- IVL has committed to increase rPET capacity from 160,000 tons per annum at end of 2019 to more than 750,000 tons per annum by 2025. At the same time, we have partnered with Ionika and Loop Industries to develop the next generation technology for recycling.

Embracing possible reward under disruptive trend is also opportunity

With business expertise, disruptive innovation can present opportunity for a company's growth. Disruptive drift may become business-as-usual, to which a firm needs to be flexible in embracing the trend and using it to its competitive advantage.

Combining artificial intelligence (AI) and sustainability matters can aid society and environmental issues. AI provides additional tools alongside physical models, economic models, and decision makers operating in complex constrained frameworks, deploying data science as a means to address climate change information or leverage machine-learning techniques to support management of sustainable clean water and energy production.

The environmental impact of PET is lower in comparison to glass, aluminum and other recyclable container materials. Being lightweight, PET saves resources and also cuts costs and environmental impacts during transportation. PET also reduces carbon footprints by using less energy, creates fewer GHG emissions, and generates less solid waste. PET has become the top choice in the packaging sector.

IVL invests in research and development, fostering innovation and encouraging our people to be proactive and develop capability to adapt and transform threats into opportunities. This aids the company in disrupting the market by producing innovative, game-changing products and ideas that fundamentally change the way people live and work.

We work closely with our customers globally, providing them with innovative and specialized solutions to meet their evolving needs. Our business is exceptional in producing innovative and High-Value Added (HVA) products.

Leveraging IVL's strong foundation in the PET market and geographic reach, we see vast opportunities to grow the POLYSHIELD® PET and OXYCLEAR® Barrier PET brands to their full potential by reaching out to both existing and new customers around the world.

Please visit Sustainability and Corporate Social Responsibility section in Annual Report 2019 and Sustainability Report 2019 for more information

3.1.3 The failure to address anti-plastic campaign may adversely impact the industry's growth potential.

Consumers are viewing plastic pollution as the issue second only to climate change. There is a significant rise in the anti-plastic campaigns demanding to stop producing single-use plastic. Consumer products companies are emerging as new targets for global activism, with green groups blaming them for fouling the ocean with plastic and activists urging governments to regulate them. Governments are being pressured to take meaningful steps towards reducing single-use plastic waste and help preserve the environment. Brand owners are also reacting, as they make bold commitments targeted at managing waste from packaging. A failure to address this challenge presents risks to the industry's growth potential and license to operate.

Risk Mitigation Actions:

IVL has established key strategic priorities to steer the business through the plastic waste challenge and beyond.

- We are increasing our investments in recycling plants. We have committed USD 1.5 billion to build the recycling infrastructure needed globally to close the loop, encouraging the end-use of recycled PET and delivering a circular economy for beverage packaging.
- We are working with several industry partners to achieve a circular economy for sustainable plastics. We intend to play a leading role by bringing customers of recycled products into the value chain and developing ways to include recyclability in all of our products.
- We encourage doing more with less through sustainable consumption and production in addition to educating consumers on the need to recycle and adopt a lifestyle focused on sustainability. Our global recycling education programs promote recycling and waste separation among children, communities, and consumers, and aims to increase their awareness and involvement in protecting the environment for a better future.
- We have acquired proprietary knowledge of mechanical recycling, which we are scaling up. We have also developed partnerships with innovative players to develop and test next-generation chemical recycling technologies. For example, we collaborated with Ioniqa to create the first-ever PET bottle made from marine plastic waste.

3.1.4 Water crises might result in disruption of business operations and economic activity

Water crises as significant decline in the available quality and quantity of fresh water has emerged consistently in many areas globally which is interconnected environment-related risks with extreme weather events and climate change. Those risks lie in the higher-impact and the higher-likelihood

across past several years. Continuing availability of water underpins action on food security, energy security, poverty reduction, economic growth, conflict reduction, climate change adaptation and biodiversity loss, while increasing global mistreatment of water resources across the world has led to significant degradation of ecosystems and the goods the industry provides.

As businesses, seek to secure long-term prosperity, to maintain competitive advantage and differentiation, and to secure stability and optimal in supply chains, increasing water scarcity can be challenge and uncertainty as physical, financial, regulatory and reputational risks. More severe climate change also lead to drought and flood which might impact the company in several entities as we operate in geographical locations. The company will come under greater pressure to reduce water use and increase efficiency.

Risk Mitigation Actions:

- The risk management committees of plants and business segments regularly monitors regulatory and potentials change and evaluate water risks and opportunities by conducting the Scenario analysis with those changes.
- We communicate on an ongoing basis and also work with local authorities to check ground water levels and levels in reservoirs in order to ensure the water supply and avoid the conflict with stakeholders nearby. The business continuity plans of our entities include water as one of the elements in their plans.
- We conduct a water sensitivity analysis using the AQUEDUCT Water Risk tool developed by World Resources Institute (WRI) to identify water stress locations. The tool helps us to evaluate change in water demand, water supply, risk from stakeholder and change in regulation based upon current and future condition. Given the tool enable us to foresee the changes to water risk forecasting on 2020, 2030 and 2040, these results had been analysed and discussed during meeting of risk assessment committee to identify necessary mitigation measures or any initiatives on quarterly basis, where the plants locating in high risk water stress or locating under significant risks to water usage.
- We evaluate the possibilities and options to reduce water consumption, increase the recycle and reuse of wastewater, make water harvesting, to achieve our goal of zero liquid discharge as many as sites, and establish targets at the entity and group level.
- IVL commits to sustainable water management (including water withdrawal and discharge) by complying with all applicable environmental laws, international standards, and regulations in the countries where we have operations, and will be proactive in demonstrating leadership and responsibility in-line with our values.

Please visit Sustainability and Corporate Social Responsibility section in Annual Report 2019 and Sustainability Report 2019 for more information

3.2 Business Risks

3.2.1 Increasing Business and International Operations naturally exposes us to various challenges such as macro-economic, geopolitical, environmental, and regulatory risks

IVL's business operations have been rapidly increasing globally year on year, presenting new challenges and risks. These include: political instability; the safety and security of employees; tangible and intangible property due to increased terrorist attacks in new countries; anti-national or communal activities; unanticipated economic developments, and rapid changes in legislation, regulations, standards, or pandemic diseases.

We may also have to comply with inconsistent or unexpected changes in foreign laws; currency controls, tax regulations, and changes in international tax treaties; the imposition of duties on imports; anti-dumping duties; environmental and regulatory requirements, or import and export controls.

Many of these could be beyond our control and could have an adverse impact on the Company.

Risk Mitigation Actions:

IVL has considered the likelihood and potential business impact of each risk and has undertaken the following mitigation actions:

- Long-term and short-term sensitivity analyses of the Company's business plans, and correlation of various risks to the business.
- Stringent due diligence process to benefit from opportunities and mitigate business risks including, but not limited to, an environmental and geopolitical risk analysis of every business opportunity before a decision is taken by the management and the Board.
- Close and continuous monitoring of political, economic and legislative conditions of each country, including threats from anti-national and terrorist activities; safety and security of employees, and the assets of the Company.

3.2.2 Climate Change Risk

Climate change is inevitable and is going to have potentially serious implications for businesses. Post-COP21, IVL anticipates more environmental, social, political, and economic repercussions. The Company has carried out Climate Change Risk and Opportunity analyses.

The following are some of the Climate Change related Risks:

- **Regulatory:** Increased operational costs due to direct climate change legislation (e.g. cost of carbon) and indirect legislation (renewable energy targets, efficiency upgrades, etc.) may affect the Company's operations.

As of December 31, 2019, IVL has 113 operating sites in 32 countries. Depending on the scope of any carbon levy, IVL could be directly and/or indirectly affected either through increased production costs and/or through impacts from the supply chain and downstream customers.

There would be financial implications as the Company would be required to produce more energy efficient, less carbon intensive products for climate protection in the long-term.

- **Physical:** Extreme weather events, increasing frequency and severity of floods, droughts, cyclones, etc., may impact the Company's operations and supply chain.
- **Changing Consumer Preferences:** Changing consumption patterns towards increasing demand for environmentally-friendly products and technologies will most probably result in a declining demand for established or GHG-intensive products, particularly in Europe. A company that is lagging in this area could face the risk of being outmanoeuvred by companies that have positioned themselves more favourably with eco-friendly or green products/services.
- **Reputational:** This is another important risk as laggards on climate action risk may face damage to their reputation and brand image.

The management has nominated a one senior executive at the corporate level to closely monitor both climate change risks and opportunities, who will report to all concerned, including the Sustainability and Risk management Committee (SRMC) that in turn, reports to the Board.

Risk Mitigation Actions:

IVL has increased its focus on efficiency improvements; adherence to GHG reduction goals and targets as defined and disclosed in its [Sustainability Reports](#) and on our [website](#).

The Company has also participated in the assessment of Dow Jones Sustainability Indices, CDP's Climate Change and Supply Chain, FTSE and other external sustainability assessments in 2019. These assessments are helping the company to:

- Identify financial savings
- Prepare for changes in regulations
- Improve risk awareness and long-term resilience
- Enhance reputation and shareholder confidence
- Continue our focus on accelerating innovation, recycling and developing a circular economy
- Increase focus on renewable energy
- Reduce our Carbon footprint in all our operations through life cycle assessment and management, greenhouse gasses accounting, energy and environment management
- Produce low carbon products, improve operational eco-efficiency within IVL operations and in value chain, lowering product toxicity
- Carry out water risk assessment globally in all our operations and initiate water management
- Light weighting of our products
- Strategically move to be in closer proximity to our customers and suppliers to avoid supply chain risks
- Explore opportunities for more post-consumer recycling of our products and increase usage of bio-based raw materials

Climate Change is an opportunity

At the same time, climate change is perceived as an opportunity as changes in regulations will drive the Company towards using more renewable energy. Increasing innovation and production of low-carbon products will lead the Company to become one of the customers' and consumers' preferred companies, which also brings financial gain through lowering overall cost of production. Possible climate change opportunities include:

- Tax incentives for increased use of renewable energy
- Tax incentives for increased recycling of PET waste; carbon credits for lowering emissions through recycling and reusing as compared to virgin PET
- Savings from global carbon and emission trading schemes due to reductions in carbon emissions
- An enhanced reputation for being an environmentally-friendly company by recycling more and more
- Becoming the preferred company to our consumers

3.2.3 We operate in highly competitive industries and the actions of our competitors could impact on our profitability and market share

- The industries in which we operate are characterized by price and other competition.
- The majority of our products are commodities – necessities – with a growing number of high value-added (HVA) products, and it may be difficult to have product differentiation and pass on increased costs to customers.
- Other competitive factors include product quality, specifications or product performance; continuity and reliability of supplies to customers, and sustainable long-term customer relationships.
- We often compete with large multinational companies as well as regional and/or specialized producers in the markets for our polyester fiber products. Margin pressure could arise from, for instance, limited demand growth and overcapacity in a market.

Risk Mitigation Actions:

- Greater integration and diversification of our manufacturing facilities across geographies, product innovation, product diversification, cost reductions and other operational excellence measures.

3.2.4 How continuous demand growth in PTA, Oxide and Glycols, PET resins, Polyester and Non-Polyester fiber and yarn industries could result in overcapacity

- Our operating results reflect the historically cyclical pattern of the PTA, MEG, PET resin, Polyester and Non-Polyester fiber and yarn industries, with periodic overcapacity and the resulting pressure on pricing.
- This cyclical nature arises, in part, from investments made at the top of the cycle (when margins are high and funds are available), thereby creating a demand-supply imbalance.
- The industry has experienced periods of overcapacity, when new plants become operational, and there can be no assurance that this will not recur in the future.
- In the absence of sufficient economic growth to generate increased demand, or the closure of facilities to mitigate the effect, new capacity causes a period of regional or global overcapacity might leading to downward pressure on profit margins.

Risk Mitigation Actions:

- Diversification of customer portfolio, adding high value added product portfolio, recycled products etc. to create customer loyalty and differentiation

3.2.5 Crude oil and commodity price volatility affect the valuation of inventories and the capital employed, distorting the reported performance to an extent

- Volatility of crude oil prices brings the risk of markdowns or mark-ups of inventories that we carry at any point in time and can impact our performance adversely or positively.
- Our reported capital employed might also be affected as working capital requirements change with movements in our products or raw materials prices.
- Natural gas price volatility affects cash conversion costs in countries where we operate. As we consume natural gas at certain locations the volatility of natural gas prices can benefit or hinder our performance

Risk Mitigation Actions: The losses or gains due to marking-to-market fluctuation in our inventories are largely mitigated by respective cash inflows, in our net working capital. The natural gas hedging tool is used to keep a check on price volatility by a partial fixed price contract of natural gas.

3.2.6 With the external factor our cost might be impacted from market conditions or uncontrollable factors

- Cost of our products may increase due to various external factors such as an increase in labor costs due to inflation, changes in minimum wage regulations; unplanned or prolonged shutdowns; raw material shortages; natural disasters; strikes; technical failures and regulatory rulings for environmental non-compliance.
- In such events we may not be able to fulfil our product delivery obligations and could therefore be exposed to claims for damages, suffering loss of reputation.

Risk Mitigation Actions: Insurance coverage including, but not limited to, loss from business interruption caused by accidents, natural disasters, damage to property, plant and machinery breakdowns, etc. Geographical diversification of business operations to minimize the risk of disruption from natural disasters or unexpected events.

3.2.7 We may not be able to protect our intellectual property rights and we could be adversely impacted should we infringe on the intellectual property rights of others

- We operate in many industries where our competitors have substantial intellectual property portfolios. The continued success of this business depends on our ability not only to protect our own technologies and trade secrets, but also to develop and sell new products that do not infringe on existing patents or threaten existing customer relationships.
- Intellectual property litigation can be very costly and could result in substantial expense and diversions of resources, both of which could adversely affect our businesses, financial conditions and results.
- There may be no effective legal recourse against infringement of our intellectual property by third parties, whether due to limitations on enforcement of rights in foreign jurisdictions or as a result of other factors.
- An unfavourable outcome in any intellectual property litigation could have a materially adverse effect on our financial condition.

Risk Mitigation Actions: We take measures like patent and trademark registrations to protect our intellectual property (IP) rights. Moreover, we conduct FTO studies wherever appropriate to ensure that we do not infringe on the intellectual property (IP) rights of others.

3.3 Operational Risks

3.3.1 Our operations are dependent on the availability and costs of raw materials

- Our operations are fundamentally dependent on the availability and costs of our primary raw materials. We procure PTA and MEG for our PET and fibers businesses; also PX for our PTA business; Ethylene for our Oxide and Glycols business; other types of raw materials for our Non-Polyester fibers business and recyclable bottles and flakes for our recycling business.
- Our financial conditions and operational results are thereby influenced by the market prices of these items, which are then subject to supply and demand, as well as other factors beyond our control.
- The markets and prices for petroleum products may be influenced by aggregate demand for such products (which can fluctuate with changes in economic conditions and cycles, seasons and weather patterns), the level of domestic and regional production, the prices and availability of imports, the prices and availability of substitute fuels and the extent and nature of government regulations and taxation.
- Any increase in raw material costs without a corresponding increase in the sale price would reduce our operating results. Our ability to pass on raw material price increases is dependent upon market conditions and our relative cost position compared to competitors.
- There may be periods of time in which we may not be able to fully recover increases in the cost of raw materials due to contractual arrangements or weaknesses in demand for, or oversupply of, our products.

Risk Mitigation Actions: Entering into long-term purchase agreements with suppliers where possible, and hedge raw material prices when it makes economic sense.

3.3.2 Our production facilities are subject to operational risks that may adversely affect our operations

- We are dependent on the continued operation of our production facilities, which are subject to hazards associated with the manufacturing, handling, storage and transportation of chemical materials and products. These include pipeline leaks and ruptures; explosions, fires, inclement weather and natural disasters; mechanical failure, unscheduled downtime, labour difficulties, transportation interruptions, remediation complications, chemical spills, discharges or releases of toxic or hazardous substances or gases, storage tank leaks and other environmental risks.
- These hazards can cause personal injury and loss of life, severe damage to, or destruction of, property and equipment, environmental damage, fines and liabilities.

Risk Mitigation Actions:

- We ensure readiness by having emergency evacuation procedures and mock drills for catastrophes internally and Emergency Response Teams.
- Regular reviews of safety equipment on site and annual training programs on safe work practices are carried out for the awareness of all concerned.
- All new employees, contractors and visitors are given mandatory safety training before they are allowed to enter the factory premises.
- At the production facilities, we do regular inspections, preventive maintenance and replacement of obsolete parts or equipment to avoid breakdown incidences.
- We closely monitor plant stocks as per inventory norms thus planning to ensure continuous availability of required materials.

3.3.3 Our business could be affected by an information technology system failure.

- We rely on information technology (IT) systems to handle our businesses. Any systemic failure for whatever reason could disrupt our operations and prevent us from being able to process transactions with our customers, operate our manufacturing facilities, prepare internal MIS reports and properly report those transactions in a timely manner.
- A significant, protracted IT system failure may result in a materially adverse effect on our financial condition, operational results, or cash flow.

Risk Mitigation Actions:

- Adopting IT policies, processes and procedures to manage and protect IT risks. These policies and procedures are implemented as guidelines for the IT team and users. All policies and processes are reviewed and revised, as and when appropriate.
- IT Infrastructure and IT Applications are provided to ensure adequate resource allocation and optimal system function that supports the strategies and goals of the company.
- Adopting cloud servers to quickly rebuild servers

- IT assessment by external as well as internal auditors. Moreover, we conduct internal IT assessment of all sites in accordance with IT general controls (ITGC) and report to senior management and SRMC.

3.4 Management Risks

3.4.1 The costs and difficulties of integrating future acquired businesses and technologies could impede our future growth and adversely affect our competitiveness

- As part of our strategy, we may seek further growth through acquisitions of manufacturing facilities producing PTA, PET, Fibers, Oxides and Glycols or other products in our product chain in order to maintain a competitive position within the industries in which we operate and to enhance our position in our core areas of operation.
- Unidentified or unanticipated liabilities or risks in the operations of the companies which we may acquire;
- Potential failure to achieve the economies of scale, synergies or other benefits sought;
- Greater than expected costs, time and effort spent by management in completing and integrating the acquisitions;
- Inability to successfully integrate the services, products and personnel of the acquisitions into our operations or the inability to realize any expected cost savings or other synergies from the acquisitions;
- Inability to retain employees, customer or supplier relationships;
- Lack of return on our investment.

We may not be able to identify attractive acquisition opportunities or make acquisitions on attractive terms, or obtain the financing necessary to complete and achieve such acquisitions. Regulations on mergers and acquisitions by the European Union, the United States, Thailand or other national regulators may also limit our ability to make future acquisitions or mergers.

Risk Mitigation Actions: We do detailed due diligence for acquisitions, and seek appropriate production in the acquisition agreement.

3.4.2 The Indorama name is used by other companies that we do not control.

The 'Indorama' trade-name belongs to Lohia Global Holdings Limited. IVL has a non-exclusive license for its use pursuant to a License Agreement with Lohia Global Holdings Limited and pays a royalty fee to Lohia Global Holdings Limited for the use of the 'Indorama' trade-name.

The business groups of other Lohia family members use the 'Indorama' wordmark. We do not control the usage of the trade-name by such business groups nor any adverse impact due to their actions on our reputation associated with the Indorama trade-name

Risk Mitigation Actions: IVL differentiates itself by presenting the Company as Indorama Ventures Pcl; listed and headquartered in Thailand.

3.4.3 The risk of a shareholder group that holds the majority of outstanding shares

The Lohia family holds around 64.76% of outstanding shares and may affect voting results on significant agenda items.

Risk Mitigation Actions: All agenda items put to the Shareholder's meetings are always discussed and approved at the board meeting, having an equal representation of independent and non-Independent directors including representation from the major shareholders. Notice of the shareholder's meeting together with the Board opinion is well circulated to the shareholders prior to the meeting.

3.5 Financial Risks

3.5.1 Significant capital investments including the future development of new facilities have been, and may in the future continue to be, necessary to achieve our growth plans, which carry project risks and other risks

Our growth plans have required, and may continue to require, significant capital investments to expand, renovate, convert or upgrade existing facilities, develop new facilities or make major acquisitions or investments

- Failure to complete a project within the outlined project timetable and/or within budget
- Failure of the project to perform according to prescribed operating specifications following its completion
- Any significant increase in costs that were unforeseen in the project plan, and any inability to sell the products produced at volumes and/or price levels envisaged in the project plan could affect the success of our projects
- Due to the significant amount of capital required and the long time period between the planning and completion of such projects, project delays could have an effect on our business and future prospects
- Acquired businesses may not achieve the required level of revenue, profit, cash flow or other financial benchmarks.
- Acquisitions may involve risks associated with potential assumption of unanticipated liabilities and contingencies; difficulties in integrating acquired businesses, and achieving planned operational synergies.
- While our strategy is to acquire businesses that will improve our competitiveness and profitability, acquisitions may not be successful or accretive to earnings.

Risk Mitigation Actions: Project Cell works on each project with experienced individuals having technical, commercial, legal and requisite skills. They may use the resources of external consultants for strengthening the planning and execution of each project.

3.5.2 Exchange rate and/or interest rate fluctuations may have a significant adverse impact on our business, financial condition, prospects and operational results

- As a result of the global nature of our business, changes in foreign currency rates could have an adverse impact on our business; financial condition, prospects and operational

results. Currency fluctuations affect us because of mismatches between the currencies in which operating costs are incurred and those in which revenues are received. We sell products that are typically priced by reference to prices in US dollars or euros, while a portion of operating costs are incurred in local currencies.

- The floating interest rates are impacted by macro-economic conditions and the monetary policy of each region. Interest rate risk is the risk that future movements in market interest rates will affect the results of the Company's operations and its cash flows.
- Credit risk is the potential financial loss resulting from the failure of a customer or counterparty to settle its financial and contractual obligations to the Company as and when they fall due.
- Our reported earnings may also be affected by fluctuations between the baht, which is our reporting currency, and the non-baht currencies in which some of our overseas subsidiaries report their results.

Risk Mitigation Actions:

Currency risk:

- IVL primarily utilizes forward exchange contracts with maturities of less than one year to hedge certain financial assets and liabilities determined by foreign currencies.
- Our operating subsidiaries instigate loans in their principle currencies. Generally, long-term loans are borrowed on floating interest rates and are linked to the benchmark interest rates for each currency.

Interest rate risk

- IVL has mitigated the interest rate risk by using derivative financial instruments. Principally, interest rate swaps, contracting a fixed interest rate, and the issuance of debentures including Perpetual Debentures in the Thai Bond market, are used to manage exposure to fluctuations in interest rates on borrowings.
- There is a natural hedge to a large extent where foreign currency liabilities are supported by same currency assets wherever possible.

Credit risk

- IVL has a credit policy in place and the exposure to credit risk is monitored on an ongoing basis.
- Credit evaluations are performed on all customers requiring credit over a certain amount.
- The Company does take credit insurance in specific regions to cover credit risk. Our exposure to credit risk is represented by the carrying amount of the receivables in the Statement of Financial Position.

Liquidity risk

- The Company monitors and maintains a level of cash, and cash equivalents, deemed adequate by management to finance the Group's/Company's operations, and to mitigate the effects of fluctuations in cash flows.

3.5.3 The Company is a holding company and is dependent on the receipt of dividends to make dividend payments on our shares

- As a holding company, the Company is dependent on the receipt of dividends from its subsidiaries and associated companies, for which payment will depend on their future financial performance. This, in turn, depends on successfully implementing their strategies as well as on financial, competitive, regulatory, technical and other factors; general economic conditions, demand and selling prices for their products, and other factors specific to their respective industries or specific projects, many of which are beyond our control.
- The subsidiaries have dividend policies to not pay over 80% of net profit after tax and legal reserves. However, the board of those subsidiaries will approve dividends paid from time to time by considering some factors i.e.; cash reserved for loan repayment; expansion investment, or to support the cash flow of the Company in case of impact by changes in market conditions.
- The ability of our direct and indirect subsidiaries to pay dividends to their shareholders, including the Company, is subject to applicable laws.
- Although we intend to pay dividends with respect to shares, our ability to pay dividends in the future will depend on a decision of the Board of Directors and/or the approval of the shareholders at a general meeting; results of operations; as well as cash flows; financial conditions; contractual restrictions and restrictions imposed by applicable laws and other factors which the Board of Directors deems relevant.

Risk Mitigation Actions:

- IVL received dividend income of 10.11 billion THB in the year 2019 from its direct and indirect subsidiaries while it paid dividends of 7.86 billion THB to its shareholders. The dividend received is 1.29 times the dividend paid. At the end of the year 2018, the retained earnings have increased to 16.63 billion THB from 14.72 billion THB.
- Annual planning is done for receipt of interim and final dividends from direct and indirect subsidiaries. The respective CFO/ Financial Controllers plan for required corporate approvals and take their cashflow plan into consideration for payment of dividends.

3.5.4 Risk that the Company cannot comply with debt covenants

IVL and its subsidiaries has total outstanding debts of THB 146.95 billion at the end of 2019. The total outstanding debt includes bank overdrafts, short term loans, long term loans, debentures/bonds and financial leases. The net debt-equity ratio at the end of 2019 is around 0.99 times, compared to what is required under financial covenants of equal to or less than 2.00 times.

The financial position has strengthened over the years with a larger equity base and increase in cash flow from operations. The total shareholders' equity at the end of 2019 is 138.17 billion THB (including perpetual debentures of 14.22 billion THB). In addition, syndicated bank loans at regional level and subsidiaries have standalone financing which are required to meet financial obligations and comply with financial covenants.

In October 2019, the domestic credit rating of IVL was re-affirmed at AA- by TRIS. IVL would like to maintain a business profile and financial profile which maintains or enhances its credit rating profile.

Risk Mitigation Actions:

Financial policy is to maintain a net debt-equity ratio of around 1.00 and Board guidance, is not to exceed 1.50 times.

- Diversified sources of financing through long term loans, debentures, short term loans, working capital financing solutions and others in multiple currencies such as Thai Baht, US Dollars, Euros and others.
- Surplus unutilized credit lines from the banks/institutions to have surplus liquidity.
- Monitoring of financial position, cashflows and covenants on a monthly/quarterly basis.

3.6 Compliance & Legal Risks

3.6.1 Environmental regulations may cause us to incur costs and liabilities

- Our operations are subject to environmental laws and regulations by central and local authorities in the countries in which we operate. These requirements are complex, subject to frequent changes and have tended to become more stringent over time.
- We have incurred, and will continue to incur, costs and capital expenditures in complying with these laws and regulations and in obtaining and maintaining all necessary permits.

Risk Mitigation Actions: We have procedures in place to enable us to comply with environmental laws and regulations; however, there can be no assurance that we will at all times be in compliance with all of our obligations in the future or that we will be able to obtain or renew all licenses, consents or other permits necessary to allow us to continue to operate our businesses. Any failure by us to comply with such laws and regulations could subject us to fines, penalties and other liabilities.

4. Business Assets

Property, Plant and Equipment

Indorama Ventures PCL had fixed assets as stated in consolidated financial statement are property, plant and equipment of subsidiaries. As of December 31, 2018 and December 31, 2019, we had net book value of plant and equipment of subsidiaries used in our operation after deducting of accumulated depreciation and other impairment as stated in our consolidated financial statement equal to Baht 205,182 million and Baht 212,423 million or 54.1% and 55.8% of total assets. Details are as follows:

Unit: Baht million

Type	Net Book Value after Accumulated Depreciation	
	December 31, 2018	December 31, 2019
Land and land improvements	9,651	11,112
Buildings and building improvements	19,958	21,904
Machinery and equipment	133,359	132,862
Office furniture, fixtures, and equipment	713	815
Transportation equipment	261	280
Spare parts	1,001	1,041
Construction in progress	40,239	44,409
Total Net Book Value	205,182	212,423

Remark: As of December 31, 2019, mortgaged with financial institutions for Baht 49,485 millions.

On-going Investment Projects

Major announcement & ongoing projects as on 31st December 2019 are as follows:

- Acquisition of integrated Oxides and Derivatives businesses/assets located in Texas, USA / New South Wales, Australia and Ankleshwar, India (Huntsman)
- Acquisition of Integrated PTA-PET plant in USA (Corpus Christi)
- Expansion of recycled PET
- Olympus Cost Transformation Program
- Other minor expansions and debottlenecks at various locations

Intangible Assets

Indorama Ventures PCL had net book value of intangible assets as of December 31, 2018 and December 31, 2019 equal to Baht 25,139 million and Baht 24,165 million or 6.6% and 6.3% of total assets, respectively. Details are as follows:

Unit: Baht million

Type	Net Book Value	
	December 31, 2018	December 31, 2019
Right Acquired	142	132
Supplier Contract and relationships	5,632	4,517
Software Licenses	239	215
Technology License and Knowhow	8,340	8,401
Customer Contracts and Relationships	7,113	7,488
Trade Name and Trademarks	2,737	2,550
Chemical Exchange Contract	209	179
Capitalised development expenditure	727	683
Total Book Value of Intangible Assets	25,139	24,165

Investments

Indorama Ventures PCL operates as a holding company; therefore our main assets are the investments. As of December 31, 2018 and December 31, 2019, we had net book value of our investments in subsidiaries as stated in our separate financial statement under the cost method equal to Baht 66,582 million and Baht 66,579 million or 42.7% and 42.6% of total assets in our separate financial statement, respectively. Details are as follows:

Unit: Baht million

Subsidiaries ¹	Ownership Interest ² (Direct) (%)	Net Book Value of Investment as of	
		December 31, 2018	December 31, 2019
Indorama Petrochem Ltd.	99.99	7,944	7,944
Indorama Holdings Ltd.	99.81	2,001	2,001
Indorama Polymers PCL	72.60	7,220	7,220
Indorama Polyesters Industries PCL	64.94	1,474	1,474
TPT Petrochemicals PCL	99.97	5,182	5,182
IVL Belgium N.V.	99.99	-	-
Indo Polymers Mauritius Limited	100.00	2	-
Indorama Ventures Global Services Limited	99.99	42,758	42,758
Total Book Value		66,582	66,579

Remarks: ¹ Only companies which are held directly by Indorama Ventures PCL





² As at December 31, 2019

Trademarks in connection with our business

The Company, subsidiaries and affiliates use a number of trademarks, trade names and service marks in connection with the business. We market our products under various brand names, which are registered in various countries.

The Indorama wordmark does not belong to us. We are a part of an informal Indorama Group, which consists of three independently managed associate groups, namely ourselves, the Sri Prakash Lohia Group in Indonesia and the Om Prakash Lohia Group in India. The Indorama Group was founded by late Mr. Mohan Lal Lohia in 1976 in Indonesia, and each of the groups is currently managed by one of Mr. Mohan Lal Lohia's sons. We have a non-exclusive license for its use pursuant to a License Agreement with Lohia Global Holdings Limited, a company owned by Ms. Shruti Lohia, a daughter of Mr. Sri Prakash Lohia. The Sri Prakash Lohia Group and the Om Prakash Lohia Group also use the Indorama wordmark.

As of 31st December 2019, the Company, subsidiaries and affiliates have approximately 161 trademarks registered with the national/regional trademark office in the countries where IVL invested and/or have businesses. Out of the 161 trademarks, 21 marks, i.e. "INDORAMA VENTURES", "RAMAPET", etc., are managed by the head office of the Company in Thailand. Some of the key trademarks of the Company are as below:

	RAMAPET	TREVIRA
DIOLEN		
FiberVisions		Glanzstoff
BIO RAMAPET	PLYTEC	INOV

Patent

As of 31st December 2019, the Company, subsidiaries and affiliates have approximately 539 patents registered with the national/regional patent office worldwide. Below is the information of Patents as of 31st December 2019.

Businesses	Number of Patents
Integrated PET Business	66
Fibers Business	471
Wool Business	2
Total	539

Long Term Lease Agreements

As at 31st December 2019, the Company has entered into certain lease agreements for a period over 3 years for business purposes. The following summarizes the long-term lease agreements:

Lessee	Details of Lease Assets	Purpose of Lease	Lessor	Expiration
Petform (Thailand) Ltd.	3,850 square meters	Packaging Facility	<i>Industrial Estate Authority of Thailand</i>	8 October 2042
Indorama Ventures Packaging (Myanmar) Limited	15,124 square meters	Packaging Facility	<i>Myanmar Japan Thilawa development Ltd.</i>	4 June 2064
AlphaPet, Inc.	161,874.26 square meters	PET Facility	<i>BP Amoco Chemical Company</i>	31 August 2027
Indorama Ventures Polymers Mexico S.de R.L de C.V	361,683.09 square meters	PET Facility	<i>Indorama Ventures Polycom S.de R.L de C.V</i>	Upon the termination of agreement
Indorama Ventures EcoMEX, S. de R.L. De C.V.	46,538 square meters	PET Facility	<i>IVL Holding, S.de R.L. de C.V.</i>	3 February 2022
UAB Orion Global Pet	61,351 square meters	PET Facility	<i>Klaipeda Free Economic Zone Management Company UAB</i>	8 June 2098
Indorama Ventures Europe B.V.	478,640 square meters	PET & PTA Facility	<i>Port of Rotterdam</i>	28 February 2093
Indorama Ventures Poland Sp.z.o.o.	79,093 square meters	PET Facility	<i>Ministry of Treasury, the Government of Poland</i>	4 December 2089
Guangdong IVL PET Polymer Co., Ltd.	136,782.60 square meters	PET Facility	<i>Government of the People's Republic of China</i>	6 February 2057
	12,529.10 square meters			28 November 2052
	4,828.38 square meters			18 September 2061
Indorama PET (Nigeria) Ltd.	15,000 square meters	PET Facility	<i>Eleme Petrochemicals Co., Ltd.</i>	31 December 2025
Indorama Ventures Packaging (Nigeria) Ltd.	10,000 square meters	Packaging Facility	<i>Eleme Petrochemicals Co., Ltd.</i>	31 December 2025
Indorama Ventures Packaging (Ghana) Ltd.	2,388 square meters	Packaging Facility	<i>Davenport Developers Ltd.</i>	31 March 2024
	1,190 square meters			31 July 2026
Indorama Ventures Packaging (Philippines) Corporation	4,335 square meters	Packaging Facility	<i>Southern Luzon Int'l Business Park Corp.</i>	31 August 2023
	4,099 square meters			31 March 2023
PT.Indorama Polypet Indonesia	47,580 square meters	PET Facility	<i>Government of the Republic of Indonesia</i>	13 June 2034
	5,690 square meters			21 September 2034
	10,100 square meters			13 June 2034
	165 square meters			31 January 2034

Lessee	Details of Lease Assets	Purpose of Lease	Lessor	Expiration
	10,440 square meters			24 September 2026
	1,720 square meters			24 September 2026
	1,630 square meters			24 September 2026
	910 square meters			24 September 2026
Indorama Ventures Adana PET Sanayi Anonim Sirketi	33,255 square meters	PET Facility	<i>Advansa Sasa Polyester Sanayi A.S.</i>	30 September 2055
IVL Dhunseri Petrochem Industries Private Ltd.	140,911.54 square meters	PET Facility	<i>Haldia Development Authority</i>	13 May 2088
	170,939.21 square meters			18 August 2101
	1,092.65 square meters			11 February 2099
	10,845.57 square meters		<i>Haldia Riverside Estates Limited</i>	9 February 2098
	10,845.57 square meters			27 August 2045
Indorama Ventures Polimeros S.A.	853,389 square meters	PET Facility	<i>Suape-Complexo Industrial</i>	5 March 2055
Indorama Ventures Polymers Germany GmbH	47,955 square meters	PET Facility	MVV	31 December 2093
Bevpak (Nigeria) Limited	5,382.32 square meters	Packaging Facility	<i>Frigoglass West Africa Limited</i>	31 March 2029
Indorama Polyester Industries Pcl.	283,794 square meters	Polyester & Yarn Facility	<i>Industrial Estate Authority of Thailand</i>	12 May 2038
ES FiberVision (Thailand) Co.,Ltd.	32,356 square meters	Polyester & Yarn Facility	<i>Industrial Estate Authority of Thailand</i>	14 December 2044
PT.Indorama Polychem Indonesia	83,164 square meters	Polyester & Yarn Facility	<i>Government of the Republic of Indonesia</i>	18 December 2043
	20,160 square meters			18 December 2043
	3,394 square meters			2 October 2043
	4,480 square meters			2 October 2043
	98,380 square meters			2 October 2043
	14,816 square meters		<i>PT Indorama Synthetics TBK (PT IRS)</i>	2 October 2043
	39,000 square meters			December 2026
PT.Indorama Ventures Indonesia	8,206 square meters	Polyester & Yarn Facility	<i>Government of the Republic of Indonesia</i>	7 April 2028
	240,051 square meters			4 October 2033
	26,575 square meters			7 April 2028
	1,913 square meters			13 November 2042
PT.Indorama Polyester Industries Indonesia	40,840 square meters	Polyester & Yarn Facility	<i>Government of the Republic of Indonesia</i>	25 May 2025
FiberVisions Manufacturing Company	598.11 square meters	Polyester & Yarn Facility	<i>GCC Partners, LLC</i>	30 November 2020

Lessee	Details of Lease Assets	Purpose of Lease	Lessor	Expiration
FiberVisions (China) Textile Products Ltd.	44,946.86 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	17 January 2045
FiberVisions Products, Inc.	69,589.74 square meters	Polyester & Yarn Facility	Athen-Clarke County Industrial Development Authority	1 December 2020
ES FiberVisions (Suzhou) Co.,Ltd.	16,000 square meters	Polyester & Yarn Facility	FiberVisions (China) Textile Products Ltd.	30 April 2033
Wellman International Ltd.	5,187 square meters	Polyester & Yarn Facility	MJR Recycling B.V.	31 December 2020
	2,197 square meters		Swanenberg Beheer B.V.	30 October 2020
PHP Fibers GmbH	192 square meters	Polyester & Yarn Facility	Mainsite GmbH & Co.KG	Upon the termination of agreement
	118,570 square meters			
Safe Tweave Inc.	13,935.46 square meters	Polyester & Yarn Facility	PHP Fibers Inc.	Upon the termination of agreement
Performance Fibers (Kaiping) Co., Ltd.	98,157 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	30 October 2046
Performance Fibers (Kaiping) No.2 Co., Ltd.	44,422 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	11 November 2060
Performance Fibers (Kaiping) No.3 Co., Ltd.	35,482.40 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	11 June 2066
Shenma-PHP (Pingdingshan) Air Bag Yarn Manufacturing Co.,	53,328 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	26 January 2061
Glanzstoff Industries (Qingdao) Co.,Ltd	7,668 square meters	Polyester & Yarn Facility	Qingdao Ruishengyuan Machinery Co.,Ltd	29 November 2026
Società Industriale Cremonese SICREM s.p.a.	72,000 square meters	Polyester & Yarn Facility	Hypo Vorarlberg Leasing SPA	6 December 2029
Glanzstoff-Bohemia s.r.o.	26,410 square meters	Polyester & Yarn Facility	ZEVYP - pozemky s.r.o. Konečný Zdeněk, Brassica odbytové družstvo	Upon the termination of agreement 30 May 2020
	1,123 square meters 2,077 square meters			
Textilcord Steinfort S.A.	1,428.30 square meters	Polyester & Yarn Facility	City of Steinfort	30 September 2096
Glanzstoff Longlville S.A.S	301,814.55 square meters	Polyester & Yarn Facility	Glanzstoff Services S.A.S	Upon the termination of agreement

Lessee	Details of Lease Assets	Purpose of Lease	Lessor	Expiration
Hubei Gold Dragon Nonwoven Fabrics Co.,Ltd	33,229.99 square meters	Polyester & Yarn Facility	Government of the People's Republic of China	14 July 2024
	21,303.99 square meters		Jingmen High-Tech Industrial Development Co.,Ltd.	5 June 2068
Avgol India Private Limited	21,329 square meters	Polyester & Yarn Facility	P & G	14 February 2027
Avgol Ltd.	180 square meters	Office	Avraham Rubinstein & Co. Contracting Company Ltd.	14 February 2020
	1,312 square meters	Office	Union Property Ltd.	10 April 2028
Indo Rama Synthetics (India) Limited	293,764 square meters	Polyester & Yarn Facility	Maharashtra Industrial Development Corporation	30 June 2087
	404,850 square meters			28 February 2089
	139,772.40 square meters			30 June 2090
	16,327.50 square meters			28 February 2089
	34,237.50 square meters			31 May 2089
Sinterama Yarns (Dongguan) Co., Ltd.	6,320 square meters	Polyester & Yarn Facility	Mr. Wang Ruihong	14 August 2022
Sinterama Bulgaria EOOD	52,000 square meters	Polyester & Yarn Facility	Miroglia Bulgaria EOOD	4 June 2024
Sinterama S.p.A	27,700 square meters	Polyester & Yarn Facility	Miroglia Textiles S.r.l.	30 April 2024
Glanzstoff Industries Mexico, S. de R.L. de C.V.	2,341 square meters	Polyester & Yarn Facility	PF Mexico	30 June 2024
Indorama Ventures Fibras Brasil Ltda.	183.40 square meters	Office	3 Rios Fibras e Resinas Ltda.	27 July 2023
TPT Petrochemicals PCL	240,000 square meters	PTA Facility	Industrial Estate Authority of Thailand	6 February 2022
	59,566 square meters			10 November 2039
Indorama Petrochem Limited		Piping System	Eastern Fluid Transport Co., Ltd.	8 January 2021
		PX and acetic acid Storage	Thai Tank Terminal Limited	7 December 2018
PT.Indorama Petrochemicals	76,090 square meters	PTA Facility	Government of Indonesia	13 June 2034
	19,850 square meters			18 August 2034
	15,710 square meters			21 September 2034
	47,090 square meters			13 June 2034
	1,720 square meters			24 September 2026
	75,000 square meters		PT.Pelindo	18 October 2038
Indorama Ventures (Oxide & Glycols) LLC U.S.(D.E.)	3,900,562.56 square meters	EG/EO Facility	Celanese Ltd.	5 December 2098

Lessee	Details of Lease Assets	Purpose of Lease	Lessor	Expiration
Indorama Ventures Xylenes & PTA LLC	13,826.63 square meters	Warehouse	<i>Trinity Warehousing and Distribution</i>	Upon the termination of agreement
	1,046.83 square meters	Warehouse	<i>Johnson Bates & Legg, Inc.</i>	
Indorama Ventures Portugal PTA-Unipessoal LDA.	146,849 square meters	PTA Facility	<i>IAPMEI</i>	6 August 2027
Beverage Plastic (Holding) Limited	18,967 square meters	Warehouse & Office	<i>Silverwood Business Park Limited</i>	20 March 2031
TTI GmbH	1,568 square meters	Technical Center	Immomeile	Upon the termination of agreement
	1,193 square meters	Laboratory	Immomeile	
	860 square meters	Storage	Immomeile	
	110 square meters	Storage	Immomeile	
	600 square meters	Storage	Buenger	
Indorama Ventures Portugal Utility, Unipessoal Lda.	21,500 square meters	thermoelectric plant	<i>IAPMEI</i>	6 August 2027
Tereftailicos Industries Quimicas Ltda.	99,007.40 square meters	Factory	<i>M&G Fibras e Resinas Ltda.</i>	Upon the termination of agreement
Schoeller Sussen GmbH	1,282.85 square meters	Office	<i>Schoeller Verwaltungs GmbH (Albers & Co AG)</i>	Upon the termination of agreement
Autofil Yarns Limited.	989 square meters	Office	<i>Orchard (Nunn Brook) Limited</i>	28 May 2028

Thai Board of Investment Tax Incentives

Under the Industrial Investment Promotion Act B.E. 2520, the Company and certain subsidiaries incorporated in Thailand have been Granted privileges by the Board of Investment at various times relating to manufacturing of worsted wool yarn, wool top, polyester fiber, PTA, PET resin, PET preforms and closures, amorphous resin and the operation of the TPT Petrochemicals cogeneration plant (the “promoted operations”). The privileges Granted, subject to compliance with the terms and conditions prescribed in the relevant promotional certificates, include:

- (a) exemption from payment of import duty on machinery approved by the Board of Investment;

- (b) exemption from payment of income tax on net profit from promoted operations for a period of eight years from the date on which income is deemed to be first derived from such operations;
- (c) a 50% reduction in the normal income tax rate on the net profit derived from promoted operations for a period of five years, commencing from the expiry date in (b) above;
- (d) a five-year carry forward period for losses for tax purposes from promoted operations during the period in (b) above;
- (e) income exclusions and additional deductions in computing the taxable income for promoted operations during the period in (b) above;
- (f) exemption from income tax on dividend paid to the shareholders from the profit of the promoted operations during the corporate income tax exemption period; and
- (g) double deduction of the cost of transportation, electricity and water supply for corporate income tax purposes for a period of ten years, from the date on which income is deemed to be first derived from the promoted operations.

Moreover, other non Thai subsidiaries of the Company operating in various jurisdictions may have their own incentives from the local Government.

The table below summarizes the expiry dates of our BOI tax incentives got by the subsidiary as of 31st December 2019.

Subsidiary	Year of Expiry for Full Exemption from Tax	Year of Expiry for 50% Reduction in Tax
Asia Pet (Thailand) Ltd. (BOI Certificate No. 5089(2)/2556)	2021	-
Indorama Polymers PCL (BOI Certificate No. 5090(2)/2556)	2021	-
Indorama Petrochem Ltd. (BOI Certificate No. 1123(2)/2547)	2014	2019
Indorama Petrochem Ltd. (BOI Certificate No. 60-0436-0-00-0-2)	-	-
Indorama Petrochem Ltd. (BOI Certificate No. 61-0867-1-00-1-0)	2024	-
TPT Petrochemical PCL (BOI Certificate No. 1121(2)/2549)	2014	2019
TPT Petrochemical PCL (BOI Certificate No. 1965/Or.Or./2552)	-	-
Indorama Polyester Industries PCL (BOI Certificate No. 1271(2)/2552)	2017	2022
Indorama Polyester Industries PCL (BOI Certificate No. 1969(2)/2554)	2021	2026
Petform Thailand Ltd (BOI Certificate No. 1764 (2)/2546)	2012	-
Petform Thailand Ltd (BOI Certificate No. 1766 (2)/2548)	2014	-

Subsidiary	Year of Expiry for Full Exemption from Tax	Year of Expiry for 50% Reduction in Tax
Petform Thailand Ltd (BOI Certificate No. 1971 (2)/2548)	2014	-
Petform Thailand Ltd (BOI Certificate No. 2170 (2)/2548)	2014	-
Petform Thailand Ltd (BOI Certificate No. 1853 (2)/2550)	2016	-
Petform Thailand Ltd (BOI Certificate No. 1334 (2)/2550)	2015	-
Petform Thailand Ltd (BOI Certificate No. 1095 (2)/2554)	2020	-
Petform Thailand Ltd (BOI Certificate No. 1057 (2)/2553)	2018	-
Petform Thailand Ltd (BOI Certificate No. 1812 (2)/2552)	2017	-
Petform Thailand Ltd (BOI Certificate No. 1414 (2)/2553)	2018	-
Petform Thailand Ltd (BOI Certificate No. 1811 (2)/2552)	2018	-
Petform Thailand Ltd (BOI Certificate No. 2556 (2)/2554)	2020	-
Petform Thailand Ltd (BOI Certificate No. 1213 (2)/2555)	2020	2025
Petform Thailand Ltd (BOI Certificate No. 2142 (2)/2555)	2020	2025
Petform Thailand Ltd (BOI Certificate No. 5137(2)/2556)	2021	-
Petform Thailand Ltd (BOI Certificate No. 5138(2)/2556)	2021	-
Petform Thailand Ltd (BOI Certificate No. 5139(2)/2556)	2021	-
Petform Thailand Ltd (BOI Certificate No. 2094(2)/2556)	2021	2026
Petform Thailand Ltd (BOI Certificate No. 1199(2)/2557)	2022	-
Petform Thailand Ltd (BOI Certificate No. 2453(2)/2557)	2023	-
Petform Thailand Ltd (BOI Certificate No. 2435(2)/2557)	2023	-
Petform Thailand Ltd (BOI Certificate No. 2587(2)/2557)	2025	-
Petform Thailand Ltd (BOI Certificate No. 2588(2)/2557)	2026	-
Indorama Ventures Global Services Ltd (BOI Certificate No. 1236/2557)	-	-

Subsidiary	Year of Expiry for Full Exemption from Tax	Year of Expiry for 50% Reduction in Tax
Indorama Ventures Global Services Ltd (BOI Certificate No. 59-0783-1-00-0-0)	-	-
ES FiberVisions (Thailand) Ltd (BOI Certificate No. 2412(2)/2557)	2024	2029
Indorama Holdings Ltd (BOI Certificate No. 2111 (1)/2553)	2019	2024
Indorama Holdings Ltd (BOI Certificate No. 1289 (2)/2555)	2020	-

Policy on Investment in Subsidiaries and Associated Companies and Policy on Management of Subsidiaries and Associated Companies

The Company will have investments in subsidiaries and associated companies aggregating not less than 75 percent of the Company's total investment in securities. In case, if the Company wishes to make any material change to the policy or scope of investments, such as lowering the proportion of investment in subsidiaries and associated companies in relation to the Company's total investments in securities to less than 75 percent, the Company will obtain prior approval from the shareholders meeting.

The Company has a policy on investment in subsidiaries and associated companies of the Company that the Company will invest in business with a high potential of growth and long-term profitability. Moreover, the Company will send at least one of its representative to be a director of such subsidiaries and associated companies; such representative might be the Chairman of the Board of Directors, Chief Executive Officer, Managing Director, directors, the high level managers of the Company or any third person who has the qualifications and experience suitable for such business with no conflict of interest directly with the business of those subsidiaries. Such representative shall manage and administer the business of such subsidiaries according to the regulations and procedures provided in the Articles of Association of the Company and of such subsidiaries and relevant laws and recommendation of the IVL parent company.

5. Legal Disputes

As of 31st December 2019, there is no material litigation against the Company or its subsidiaries which could have a negative effect on our assets exceeding 5% of shareholder's equity. In addition, there is no lawsuit, which could have a significant effect on our business.

6. General Information and Other Information

General Information

Name	:	Indorama Ventures Public Company Limited
Symbol	:	IVL
Head Office	:	75/102 Ocean Tower 2, 37 th Floor, Soi Sukhumvit 19 (Wattana) Asoke Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand Tel: 0-2-661-6661 Fax: 0-2-661-6664-5 www.indoramaventures.com
Type of Business	:	Holding Company
Company Registration No.	:	0107552000201
Registered Capital	:	Baht 5,666,010,449 divided into 5,666,010,449 common shares of par value at Baht 1
Paid-Up Capital	:	Baht 5,614,551,908 divided into 5,614,551,908 common shares of par value at Baht 1

References

Share Registrar	:	Thailand Securities Depository Company Limited 93 Ratchadapisek Road, Dindaeng, Dindaeng, Bangkok 10400, Thailand Tel: 0-2-009-9999 Fax: 0-2-009-9991
Debenture Registrar	:	Bangkok Bank Public Company Limited 333 Silom Road, Silom, Bangrak, Bangkok 10500, Thailand Tel: 0-2-230-1136 Fax: 0-2-626-4545-6
Debenture Registrar (For IVL Debenture No. 1/2015 Tranche 1 & 2)	:	Siam Commercial Bank Public Company Limited 1060 SCB Chidlom Tower 2, 3 rd Floor, New Petchburi Road, Makkasan, Ratchathewi, Bangkok 10400, Thailand Tel: 0-2-256-2339 Fax: 0-2-256-2406

Debtenture Registrar (For IVL Debtenture No. 2/2015)	:	Krungthai Bank Public Company Limited 35 Sukhumvit Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand Tel: 0-2-298-0830 Fax: 0-2-298-0835
Debtenture Holders' Representative	:	Bank of Ayudhya Public Company Limited 1222 Rama III Road, Bang Phongphang, Yannawa, Bangkok 10120, Thailand Tel: 0-2-296-3582 Fax: 0-2-296-2202
Debtenture Holders' Representative (For Subordinated Perpetual Debtentures of Indorama Ventures Public Company Limited No.1/2019)	:	Bangkok Bank Public Company Limited 333 Silom Road, Silom, Bangrak, Bangkok 10500, Thailand Tel: 0-2-230-1136 Fax: 0-2-626-4545-6
Auditor	:	KPMG Phoomchai Audit Limited 195 Empire Tower, 50 th – 51 st Floor, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120, Thailand Tel: 0-2-677-2000 Fax: 0-2-677-2222
Legal Advisor	:	The Capital Law Office Limited 44 Smooth Life Tower, 18 th Floor, North Sathorn Road, Silom, Bangrak, Bangkok, 10500, Thailand Tel: 0-2-633-9088 Fax: 0-2-633-9089

Investments of the Company

As of 31st December 2019

EG&EO Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures (Oxide & Glycols) LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 847 943 3100 Fax: +1 847 943 3196	USA	(Membership Interest)	-	99.99%

Ethylene Cracker Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Olefins LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 337 502 4678 Fax: N/A	USA	(Membership Interest)	-	90.40%

PTA Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	TPT Petrochemicals Public Company Limited 75/116-117, Ocean Tower 2, 41 st Floor, Soi Sukhumvit 19 (Wattana), Sukhumvit Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: +66 2 661 6661 Fax: +66 2 661 6664 – 5	Thailand	Common Share	492,500,000	99.97%
2	PT. Indorama Petrochemicals Graha Irama, 16th Floor, Jalan H R Rasuna Said, Blok X-1, Kav. 1-2, Kuningan Timur, Setiabudi, Jakarta Selatan 12950, Indonesia Tel: +62 21 526 1555 Fax: +62 21 526 4436	Indonesia	Common Share Class A Class B Class C Class D Class E Class F	2,514,400 1,833,743 166,257 50,000 200,000 250,000 14,400	99.99%
3	Indorama Ventures PTA Montreal LP. 10200 rue Sherbrooke E., Montreal-Est, Quebec H1B 1B4, Canada Tel: +1 514 645 7887(229) Fax: +1 514 645 9115	Canada	(Partnership Interest)	290,000,000	99.99%
4	Indorama Ventures Portugal PTA - Unipessoal, LDA. ZILS Zona 2, Lote 2E1, Monte Feio, 7520-064 Sines, Portugal Tel: +351 269 189 000 Fax: +351 269 189 099	Portugal	Quota	1	99.99%

PTA & PET Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Europe B.V. Markweg 201, 3198NB Europoort Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405	Netherlands	Common Share	100	99.99%

2	Indorama Petrochem Limited 75/93, Ocean Tower 2, 35 th Floor, Soi Sukhumvit 19 (Wattana), Sukhumvit Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: +66 2 661 6661 Fax: +66 2 661 6664 – 5	Thailand	Common Share	1,014,616,651	99.99%
3	Corpus Christi Polymers LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: N/A Fax: N/A	USA	(Membership Interest)	-	33.33%
PTA & PET & Purified Isophthalic Acid Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Quimica S.L.U. Poligono Industrial Guadarranque, 0 S/N, 11360 San Roque, Cadiz, Spain Tel: +34 956 671 000 Fax: +34 956 671 127	Spain	Common Share	6,000	99.99%
PTA & Paraxylene & NDC Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Xylenes & PTA LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 302 636-5401 Fax: +1 302 636-5454	USA	(Membership Interest)	-	99.99%
PET Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Polymers Public Company Limited 75/102, 103 Ocean Tower 2, 37 th Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: +66 2 661 6661 Fax: +66 2 661 6664 – 5	Thailand	Common Share	1,382,197,870	99.91%
2	Asia Pet (Thailand) Limited 75/102 Ocean Tower 2, 37 th Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: +66 2 661 6661 Fax: +66 2 661 6664 – 5	Thailand	Common Share	45,000,000	99.90%
3	Guangdong IVL PET Polymer Co., Ltd. No.1 Meihua Road, Shuikou Town, Kaiping City, Guangdong, People's Republic of China Tel: +86 750 220 9680 Fax: N/A	China	(Capital Contribution)	-	99.91%
4	UAB Orion Global pet Metalog.16, Klaipeda, Republic of Lithuania, LT-94102 Tel: +370 46 300749 Fax: +370 46 314323	Lithuania	Common Share	776,880	99.91%

5	Indorama PET (Nigeria) Limited East West Expressway, Eleme, Port Harcourt, Rivers State, Nigeria Tel: +234 (1) 2793841 Fax: +234 (1) 2793842	Nigeria	Common Share	450,000,000	89.92%
6	PT. Indorama Polypet Indonesia JL. Raya Anyar Km.121, Kel. Kepuh, Kec. Ciwandan, Cilegon 42445 (Banten), Indonesia Tel: +62 254 602300 Fax: +62 254 602940	Indonesia	Common Share	3,500	99.99%
7	Indorama Ventures Corlu PET Sanayi Anonim Sirketi Karamahmet Mahallesi, Avrupa Serbest Bölgesi, 3. Sokak No: 2 Ergene/Tekirdag - 59860, Turkey Tel: +90 282 691 1100 / 207 Fax: +90 282 691 1008	Turkey	Common Share	16,217,649	99.99%
8	Indorama Ventures Poland Sp. z o.o. ul. Krzywa Gora 19, 87-805 Wloclawek, Poland Tel: +4854 416 6442 Fax: +4854 416 6449	Poland	Common Share	993,988	99.99%
9	Indorama Ventures Ecomex, S. de R.L. de C.V. Carretera Libre a Colotlan 6800. Colonia Extramuros. Zapopan, Jalisco, Mexico Tel: +5233 1561 3732 Fax: N/A	Mexico	Equity Quota Class I	2	51.00%
10	Indorama Ventures Polymers Mexico, S. de R.L. de C.V. Avenida Prolongación Paseo de la Reforma 1015, Torre A piso 2, Colonia Santa Fe Cuajimalpa, CP 05348, Delegación Cuajimalpa de Morelos, Ciudad de México, México Tel: +52 55 9177 5700 Fax: +52 55 5292 4919	Mexico	Equity Quota Class I	2	99.99%
11	Alphapet, Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 256 308 1180 Fax: +1 256 341 5926	USA	Common Share	4,400	99.99%
12	Auriga Polymers Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1-877-738-7527 Fax: +1-980-233-6602	USA	Common Share	5,000	99.99%
13	Starpet Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1-336-672-0101 Fax: +1-336-672-0904	USA	Common Share	5,000	99.99%

14	IVL Dhunseri Petrochem Industries Private Limited Dhunseri House, 4A, Woodburn Park, Kolkata- 700020, P.S. Bhawanipur, India Tel: +91 33 2283 6128 – 33 Fax: +91 33 2283 6056	India	Common Share	42,500,000	50.00%
15	Indorama Ventures Polimeros S.A. Rod. PE-60, Km 10, s/nº - Engenho Massangana, TDR - Sul. Complexo Industrial Portuário Suape. 'CEP: 55590-000 - Ipojuca – PE, Brazil Tel: +91 33 2283 6128 – 33 Fax: +91 33 2283 6056	Brazil	Common Share	1,578,454,842	99.99%
16	IVL Dhunseri Polyester Company S.A.E. 10 Nehru St., 5th Floor, Flat no.18, Behind Merryland Park, Heliopolis Cairo - 11341, Egypt. Tel: +202 225 88 991 Fax: +202 225 88 945	Egypt	Common Share	570,000	49.99%
17	Wellman Neufchateau Recyclage S.A. Chemin de Gretty 88300 Rebeuville, France Tel: N/A Fax: N/A	France	Common Share	320,866	99.99%
18	Indorama Loop Technologies, LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA. Tel: N/A Fax: N/A	USA	(Membership Interest)	-	50.00%
19	Indorama Ventures Sustainable Solutions Fontana, Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA. Tel: N/A Fax: N/A	USA	Common Share	1,000	99.99%
20	Indorama Ventures Sustainable Solutions LLC 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: 256-308-1180 Fax: 256-341-5926	USA	(Membership Interest)	-	99.99%
21	Indorama Ventures Polymers Germany GmbH Philipp-Reis-Straße 2, 65795 Hattersheim am Main, Federal Republic of Germany Tel: +49 69 305 6025 Fax: N/A	Germany	(Capital Contribution)	-	99.99%

Packaging Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Petform (Thailand) Limited 85 Moo 11, Bangnga-Thaklong Road, Khao Samorkorn Sub-district, Thawung District, Lopburi Province, 15180 Thailand Tel: +66 36 489 116 Fax: +66 36 489 115,117	Thailand	Common Share	7,500,000	59.94 %

2	Beverage Plastics Limited Silverwood Business Park, 70 Silverwood Road, Lurgan, Craigavon, County Armagh, BT66 6LN, Northern Ireland Tel: +44 283 831 1800 Fax: +44 283 831 1888	Northern Ireland	Common Share	600,000	75.36%
3	Indorama Ventures Packaging (Nigeria) Limited Eleme Petrochemicals Complex, East-West Expressway, Eleme, Rivers State, Nigeria Tel : +234 (1) 2793841 Fax: +234 (1) 2793842	Nigeria	Common Share	150,000,000	99.99%
4	Indorama Ventures Packaging (Ghana) Limited Plot 234 Meridian Rd. COMM.2 Accra, Greater Accra, BOX CO PMB 350 TEMA GA/R, Ghana Tel: +233 266082249 Fax: N/A	Republic of Ghana	Common Share	4,649,215	99.99%
5	Indorama Ventures Packaging (Philippines) Corporation Building 1, Southern Luzon Complex, Barangay Batino, Calamba City, Laguna, Philippines Tel: +63 495 303 592 / +63 495 340 036 Fax: N/A	Philippines	Common Share	1,075,005	99.99%
6	Indorama Ventures Packaging (Myanmar) Limited Lot No. A11-1, Thilawa Special Economic Zone A, Yangon Region, Myanmar Tel: +95-12309022 Fax: N/A	Myanmar	Common Share	3,516,322	99.91%
7	Medco Plast Co. for Packing & Packaging systems (S.A.E.) 6 October City Blots No. 189-190-191 at the Second Industrial Zone, Egypt Tel: +202 37481730 Fax: +202 37499685	Egypt	Common Share	4,950,000	73.99%
8	Bevpak (Nigeria) Limited Km 3, Ibadan-Lagos Expressway Sanyo Ibadan Oyo State Nigeria Tel: +234 - 8151100040 Fax: N/A	Nigeria	Common Share	10,000,000	99.99%

Fibers Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Polyester Industries Public Company Limited 75/92, Ocean Tower 2, 35 th Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel : +66 2 661 6661 Fax : +66 2 661 6664 – 5	Thailand	Common Share	2,202,850,000	99.49%

2	ES Fibervisions (Thailand) Company Limited 75/64, 65 Ocean Tower 2, 28 th Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel : +66 2 661 6661 Fax : +66 2 661 6664 – 5	Thailand	Common Share	41,000,000	50.00%
3	PT. Indorama Polychem Indonesia JL. Desa Kembang Kuning, Kecamatan Jatiluhur, Purwakarta (Jawa Barat), Indonesia Tel : +62 264 207727 Fax : +62 264 211260	Indonesia	Common Share	70,000	99.99%
4	PT. Indorama Ventures Indonesia Desa Cihuni, RT/RW 002/004, Cihuni, Pagedangan, Tangerang, Banten, 15820 Indonesia Tel : +62 215 371111 Fax : +62 215 378811	Indonesia	Series A Shares Series B Shares	80,000 2,812,500	99.99%
5	PT. Indorama Polyester Industries Indonesia JL. Surya Lestari Kav. 1-16A, Kawasan Industry Surya Cipta, Desa Kutamekar, Kec Ciampel, Karawang, 41361, Jawa Barat, Indonesia Tel : +0267-440501 Fax: +0267-440764	Indonesia	Common Share	20,000	99.98%
6	Trevira GmbH Max-Fischer-Strasse 11, 86399 Bobingen, Federal Republic of Germany Tel : +49 8234 9688 2100 Fax: +49 8234 9688 5355	Germany	Common Share	25,300	99.99%
7	PHP Fibers GmbH Industrie Center Obernburg, 63784 Obernburg, Federal Republic of Germany Tel: +49 6022 81 2552 Fax: +49 6022 81 31 2552	Germany	Common Share	25,001	79.99%
8	Shenma-PHP (Pingdingshan) Air Bag Yarn Manufacturing Co., Ltd. Pingdingshan City, Henan Province, People's Republic of China Tel: +49 6022 81 2552 Fax: +49 6022 81 31 2552	China	(Capital Contribution)	-	39.20%
9	PHP Fibers Inc. 300 Serrano Way, Scottsboro, AL 35769 , USA Tel: +1-256-218-4000 Fax: +1-256-218-4062	USA	Common Share	1,000	79.99%
10	SafeTweave, Inc. 302 Serrano Way, Scottsboro, AL 35769, USA Tel: +1-256-218-4000 Fax: +1-256-218-4062	USA	Common Share	1,000	79.99%

11	FiberVisions A/S Engdraget 22, Varde Denmark, DK-6800, Denmark Tel: +45 7994 2200 Fax: +45 7994 2201	Denmark	Class A Class B	122,949,441 29,117,600	99.99%
12	FiberVisions (China) Textile Products Limited No. 29 Heng Shan Rd., New District, Suzhou, People's Republic of China Tel: +86 512 6823 1099 Fax: +86 512 6823 0021	China	(Capital Contribution)	-	99.99%
13	ES FiberVisions (Suzhou) Co., Ltd. No. 29 Hengshan Rd. Suzhou New District 215011, People's Republic of China Tel: +86 512 6823 1099 Fax: +86 512 6823 0021	China	(Capital Contribution)	-	50.00%
14	FiberVisions Manufacturing Company Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 302 658-7581 Fax: +1 302 655-2480	USA	Common Share	100	99.99%
15	FiberVisions Products, Inc. Corporation Service Company, 40 Technology Pkw South, #300, Norcross, GA 30092 USA Tel: +1 800 241 8922 Fax: +1 404 888 7795	USA	Common Share	25,000	99.99%
16	Wellman France Recyclage S.A.S. Zone Industrielle de Regret 55100 Verdun, France Tel: +33 (0) 971 002 005 Fax: +33 (0) 329 843 104	France	Common Share	500	99.99%
17	Wellman International Limited Mullagh, Kells, Co.Meath, A82 NN93, Ireland Tel: +353 46 9280200 Fax: +353 46 9280300	Ireland	Common Share	1,100,850	99.99%
18	Performance Fibers (Kaiping) Company Limited 3 Hongqiao Road, Changsha, Kaiping, Guangdong Province, People's Republic of China Tel: +86 750 2278000 Fax: +86 750 2218093	China	(Capital Contribution)	-	99.99%
19	Performance Fibers (Kaiping) No.2 Company Limited 1 Huan Cui Road West, Cuishan Lake New Region, Kaiping, Guangdong Province, People's Republic of China Tel: +86 750 2278000 Fax: +86 750 2218093	China	(Capital Contribution)	-	99.99%

20	Performance Fibers (Kaiping) No.3 Company Limited Land Lot JCR2016-57(Kaiping 14)B, west of Die Cui Da Road , north of Huan Cui West Road, Cuishanhu New District, Kaiping, Guangdong, People's Republic of China Tel: + (86) 750-2201707 Fax: + (86) 750-2218093	China	(Capital Contribution)	-	99.99%
21	Glanzstoff Industries (Qingdao) Co., Ltd. <ul style="list-style-type: none"> No.1735 Maoshan Road, Sino-German Ecopark, Huangdao District, Qingdao, Shandong Province, People's Republic of China Room 299, No.2877 Tuanjie Road, Huangdao District, Qingdao City, Shandong Province, People's Republic of China Tel: +86 532 80987237 Fax: +86 532 80983559	China	(Capital Contribution)	-	99.99%
22	Glanzstoff Longlaville S.A.S. Pôle Européen de Développement, 54810 Longlaville, France Tel: +33 3 82 44 80 00 Fax: +33 3 82 44 56 82	France	Common Share	3,037,323	99.99%
23	Società Industriale Cremonese SICREM s.p.a. Pizzighettone, Via G.B. Pirelli, 56, Italy Tel: +39 0372 738011 Fax: +39 0372 730001	Italy	Common Share	9,180,000	99.99%
24	Textilcord Steinfort S.A. Rue Schwarzenhof, 34 L-8452 Steinfort – GD, Luxembourg Tel: +352 399 8811 Fax: +352 399 881 213	Luxembourg	Common Share	1,000	99.99%
25	Glanzstoff - Bohemia s.r.o. Terežinská 60, 41002 Lovosice, Czech Republic Tel: +420 416 575 111 Fax: +420 416 575 107	Czech Republic	Common Share	750	99.99%
26	Winnsboro Fibres LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: + (256) 218-4006 Fax: +(256) 218-4017	USA	(Membership Interest)	-	99.99%
27	Performance Fibers Operations Mexico, S. de R.L. de C.V. Av. de la Luz 77 Zona Industrial Benito Juárez, CP 76120, Querétaro, Qro., México Tel: +52 442 211 3000 Fax: N/A	Mexico	Equity Quota Class I	50,000	99.99%
28	Huvis Indorama Advanced Materials, LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: N/A Fax: N/A	USA	(Membership Interest)	-	50.00%

29	Hubei Gold Dragon Nonwoven Fabrics Co., Ltd. 236 Xinlong Road, High-Tech Industrial Development Zone, Jingmen, Hubei, 448000, People's Republic of China Tel: 86 724 650 3034 Fax: N/A	China	(Capital Contribution)	-	65.30%
30	Avgol India Private Limited Plot No. 184, Part of Plot No. 183 & 185, Sector - A, Mandideep Industrial Area, Mandideep, Dist. - Raisen – 462046, Madhya Pradesh, India Tel: 91 748 066 6602 Fax: N/A	India	Common Share	2,746,449	65.96%
31	“Avgol” Limited Liability Company Building 1 Druzhby Street, town of Uzlovaya, Tula Region, 301605, Russian Federation Tel: 74 872 710 653 Fax: N/A	Russia	(Membership Interest)	-	65.96%
32	Avgol America Inc. 178 Avgol Drive Mocksville, NC, 27028-2558, USA Tel: +1 336 936 2503 Fax: N/A	USA	Common Share	150,000	65.96%
33	Avgol Distribution Company Inc. 178 Avgol Drive Mocksville, NC, 27028-2558, USA Tel: +1 336 936 2503 Fax: N/A	USA	Common Share	3,000	65.96%
34	Avgol Ltd. 20 Lincoln st., Rubinstien House, Tel Aviv, 67134-12, Israel Tel: 972-3-906-1555 Fax: 972-3-936-4376	Israel	Common Share	82,941,411	65.96%
35	KORDANA Plus a.s. No. 890, 696 74 Velká nad Velickou, Czech Republic Tel: N/A Fax: N/A	Czech Republic	Common Share	248,409,200	99.99%
36	Glanzstoff Industries Mexico, S. de R.L. de C.V. Av. de la Luz 77 Zona Industrial Benito Juárez, CP 76120, Querétaro, Qro. Mexico Tel: +52 442 211 3000 Fax: N/A	Mexico	Equity Quota Class I	50,000	99.99%
37	UTT Technische Textilien GmbH & Co. KG Robert-Steiger-Straße 111, 86381 Krumbach, Federal Republic of Germany Tel: +49 (0) 82 82 – 8 97-0 Fax: +49 (0) 82 82 – 8 97-100	Germany	(Partnership Interest)	-	79.99%

38	UTT de México Technical Textiles, S.A. de C.V. Circuito Esteban de Antuñano N° 12 MANZANA 3 Parque Industrial Ciudad Textil Huejotzingo, Puebla C.P. 74160, Mexico Tel: +52 (0) 222 454 3660 Fax: N/A	Mexico	Equity Quota Series A	100	79.99%
39	Indorama Ventures Fibras Brasil Ltda. Rodovia BR 101 Sul, no. 2426, Distrito Industrial, Cabo de Santo Agostinho-PE, 54500-000 Brazil Tel: +55 11 2111-1388 Fax: +55 11 2111-1470	Brazil	Common Share	218,393,287	99.99%
40	Indo Rama Synthetics (India) Limited A-31, MIDC Industrial Area, Butibori, Nagpur - 441122, Maharashtra, India Tel: 07104 - 663000 / 01 Fax: 07104 - 663200	India	Common Share	100,696,588	38.56%
41	Sinterama Yarns (Dongguan) Co., Ltd. East Jinsha Avenue, Shajiao Village, Shipai County, Dongguan City 523348, Guangdong Province, People's Republic of China Tel: +86 769 8136 0800 Fax: +86 769 8136 0900	China	(Capital Contribution)	-	99.99%
42	Sinterama Bulgaria EOOD Nova Zagora 8900, Industrial zone, Bulgaria Tel: +35944612800 Fax: +35945762850	Bulgaria	Common Share	750,000	99.99%
43	Sinterama S.p.A. Sandigliano, Via Gramsci 5, 13876, Italy Tel: +39 015 24951 Fax: +39 015 2495301	Italy	Common Share	86,937,487	99.99%
44	Sinterama do Brasil Ltda. Av. Alberto Vieira Romao, 1650 CEP 37135-516 - Distrito Industrial, Alfenas, Minas Gerais, Brazil Tel: +55 353 299 1950 Fax: N/A	Brazil	Common Share	1,630,277,567	99.99%
45	Indorama Yarns Private Limited A-31, MIDC Industrial Area, Butibori, Nagpur - 441122, Maharashtra, India Tel: 07104 - 663000 / 01 Fax: 07104 - 663200	India	Common Share	1,000,000	38.56%

Wool Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Holdings Limited 75/64, 65 Ocean Tower 2, 28 th Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: +66 2 661 6661 Fax: +66 2 661 6664 - 5	Thailand	Common Share	77,446,800	99.81%

2	Schoeller GmbH & Co KG Politischer Gemeinde Hard, Austria Tel: 0043 5574 609 0 Fax: N/A	Austria	(Capital Contribution)	-	99.99%
3	Schoeller Kresice s.r.o. Prazska 98, 41148 Kresice, Czech Republic Tel: N/A Fax: N/A	Czech Republic	(Capital Contribution)	-	99.99%
Holding Company Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Netherlands Cooperatief U.A. Markweg 201, 3198NB Europoort, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405	Netherlands	(Ownership Interest)	-	99.99%
2	Indorama Netherlands B.V. Markweg 201, 3198NB Europoort, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405	Netherlands	Common Share	18,000	99.99%
3	Beacon Trading (UK) Limited 23 Northiam, Woodside Park, N12 7ET, London, United Kingdom Tel: N/A Fax: N/A	United Kingdom	Common Share	320,000	99.81%
4	Beverage Plastics (Holdings) Limited Silverwood Business Park, 70 Silverwood Road, Lurgan Craigavon, County Armagh, BT 66 6 LN, Northern Ireland Tel: +44 2838311800 Fax: +44 2838311888	Northern Ireland	Common Share Class A Class C	10,000 7,550 2,450	75.36%
5	KP Equity Partners Inc. Lot 2&3, Level 3, Wisma Lazenda, Jalan, Kemajuan, 87000 F.T. Labuan, Malaysia Tel: +087 414 073 Fax: +087 413 281	Malaysia	Common Share	10,000	99.99%
6	Indorama Germany GmbH Max-Fischer-Strasse 11, 86399 Bobingen, Federal Republic of Germany Tel: N/A Fax: N/A	Germany	Common Share	25,000	99.99%
7	Indorama Ventures Recycling Netherlands B.V. Markweg 201, 3198 NB Europoort, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: N/A	Netherlands	Common Share	18,000	99.99%
8	Indorama Ventures Holdings LP Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1-847-943-3100 Fax: +1-847-943-3196	USA	(Partnership Interest)	-	99.99%

9	Indorama Ventures USA Holdings LP Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1-847-943-3100 Fax: +1-847-943-3196	USA	(Partnership Interest)	-	99.99%
10	Indorama Ventures Performance Fibers Holdings USA LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 302 636-5401 Fax: +1 302 636-5454	USA	(Membership Interest)	-	99.99%
11	FiberVisions Corporation Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 678 578 7240 Fax: +1 678 578 7276	USA	Common Share	1,000	99.99%
12	FiberVisions (China) A/S Engdragnet 22, Varde Denmark, DK-6800, Denmark Tel: +45 7994 2200 Fax: +45 7994 2201	Denmark	Common Share	100,000	99.99%
13	ES FiberVisions Holdings ApS Engdragnet 22, Varde Denmark, DK- 6800, Denmark Tel: +45 7994 2200 Fax: +45 7994 2201	Denmark	Common Share	48,500	50.00%
14	Indorama Ventures OGL Holdings LP Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1-847-943-3100 Fax: +1-847-943-3196	USA	(Partnership Interest)	-	99.99%
15	FiberVisions, L.P. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 302 658-7581 Fax: +1 302 655-2480	USA	(Partnership Interest)	-	99.99%
16	ES FiberVisions, Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 302 636 5401 Fax: +1 302 636 5454	USA	Common Share	100	50.00%
17	IVL Holding, S. de R.L. de C.V. Avenida Prolongación Paseo de la Reforma 1015, Torre A piso 2, Colonia Santa Fe Cuajimalpa CP 05348, Delegación Cuajimalpa de Morelos, Ciudad de México, México Tel: +52 55 91775700 Fax: +52 55 52924919	Mexico	Equity Quota Series A	2	99.99%
18	Grupo Indorama Ventures, S.de R.L. de C.V. Avenida Prolongación Paseo de la Reforma	Mexico	Equity Quota Class I	2	99.99%

	1015, Torre A piso 2, Colonia Santa Fe Cuajimalpa CP 05348, Delegación Cuajimalpa de Morelos, Ciudad de México, México Tel: +52 55 91775700 Fax: +52 55 52924919				
19	Indorama Ventures Polyholding LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 256 308 1180 Fax: +1 256 341 5926	USA	(Membership Interest)	-	99.99%
20	Indorama Polymers (USA) LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 256 308 1180 Fax: +1 256 341 5926	USA	(Membership Interest)	-	99.99%
21	Indorama Ventures USA LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 256 308 1180 Fax: +1 256 341 5926	USA	(Membership Interest)	-	99.99%
22	IVL Belgium N.V. Jules Bordetlaan 160, 1140 Evere, Belgium Tel: N/A Fax: N/A	Belgium	Common Share	30,615	99.99%
23	Performance Fibers Holdings Finance, Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 678 578 7240 Fax: +1 678 578 7276	USA	Common Share	1,000	99.99%
24	Performance Fibers Asia Holdings, LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 678 578 7240 Fax: +1 678 578 7276	USA	(Membership Interest)	-	99.99%
25	Performance Fibers Asia, LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 678 578 7240 Fax: +1 678 578 7276	USA	(Membership Interest)	-	99.99%
26	Indorama Ventures Northern Investments Inc. 10200 rue Sherbrooke E., Montreal-Est, Quebec H1B 1B4, Canada Tel: +1 514 645 7887 Fax: +1 514 645 9115	Canada	Class A Class B Class C	10,401 149,889,750 256,766,500	99.99%
27	Indorama Ventures Gestion Inc. 10200 rue Sherbrooke E., Montreal-Est, Quebec H1B 1B4, Canada Tel: +1 514 645 7887 Fax: +1 514 645 9115	Canada	Common Share	100	99.99%
28	Indorama Ventures Dutch Investments B.V.	Netherlands	Common Share	8,914,320	51.00%

	Markweg 201, 3198NB Europoort, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405				
29	Indorama Ventures Investments USA LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 302 636 5401 Fax: +1 302 636 5454	USA	(Membership Interest)	-	51.00%
30	Indorama Ventures Olefins Holding LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1 302 636 5401 Fax: +1 302 636 5454	USA	(Membership Interest)	-	99.99%
31	Glanzstoff Holding (Hong Kong) Limited Unit 1301, 13/F. Chung Nam Building, 1 Lockhart Road, Wanchai, Hong Kong Tel: + 852 2153 9718 Fax: + 852 2117 1879	Hong Kong- China	Common Share	100	99.99%
32	Glanzstoff Industries S.r.l. Pizzighettone, Via G.B. Pirelli, 56, Italy Tel: +39 0372 738011 Fax: +39 0372 730001	Italy	Quota	10,000	99.99%
33	Indorama Ventures Spain S.L. Poligono Industrial Guadarranque, S/N, 11360 San Roque, Cadiz, Spain Tel: N/A Fax: N/A	Spain	Common Share	10,000	99.99%
34	Indorama Ventures Corpus Christi Holding LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: N/A Fax: N/A	USA	(Membership Interest)	-	99.99%
35	Avgol Industries 1953 Ltd. 20 Lincoln st., Rubinstien House, Tel Aviv, 67134- 12, Israel Tel: 972-3-9061555 Fax: 972-3-9364376	Israel	Common Share	304,221,602	65.96%
36	Indorama Austria GmbH Politischer Gemeinde Wien, Austria Tel: N/A Fax: N/A	Austria	(Capital Contribution)	-	99.99%
37	AE BG AlphaOmega Holding GmbH Politischer Gemeinde Wien, Austria Tel: N/A Fax: N/A	Austria	(Capital Contribution)	-	99.99%
38	UTT Beteiligungsgesellschaft mbH Robert-Steiger-Straße 111, 86381 Krumbach, Federal Republic of Germany Tel: +49 (0) 82 82 – 8 97-0 Fax: +49 (0) 82 82 – 8 97-100	Germany	Common Share	100,000	79.99%

39	UTT Technische Textilien Geschäftsführung GmbH Robert-Steiger-Straße 111, 86381 Krumbach, Federal Republic of Germany Tel: +49 (0) 82 82 – 8 97-0 Fax: +49 (0) 82 82 – 8 97-100	Germany	Common Share	50,000	79.99%
40	Indorama Ventures Holdings PTY Ltd 61 Market Road, Brooklyn, Victoria, 3012 Australia Tel: N/A Fax: N/A	Australia	Common Share	10	99.99%
41	Autofil Holdings Limited Unit 3, Orchard Court, Nunn Brook Road, Sutton- in-Ashfield, Nottinghamshire, United Kingdom, NG17 2HU Tel: +44 (0) 1623 426 100 Fax: +44 (0) 1623 426 101	United Kingdom	Common Share	594,090	99.99%
42	Autofil Yarns Limited Unit 3, Orchard Court, Nunn Brook Road, Sutton- in-Ashfield, Nottinghamshire, United Kingdom, NG17 2HU Tel: +44 (0) 1623 426 100 Fax: +44 (0) 1623 426 101	United Kingdom	Common Share	1	99.99%
43	Indorama Ventures Oxides LLC 251 Little Falls Drive, Wilmington, New Castle Country, Delaware 19808, USA Tel: N/A Fax: N/A	USA	(Membership Interest)	-	99.99%

International Headquarter Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Global Services Limited 75/80-81 Ocean Tower 2, 32 nd Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer, Wattana, Bangkok 10110, Thailand Tel: + 66 2 661 6661 Fax: + 66 2 661 6664 – 5	Thailand	Common Share	4,275,791,662	99.99%

Trading & Services Business

No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	IVL Singapore Pte. Ltd. 9 Raffles Place, #27-00 Republic Plaza, Singapore 048619 Tel: N/A Fax: N/A	Singapore	Common Share	19,000,000	99.91%
2	UAB Indorama Polymers Europe Metalog.16, LT-94102 Klaipeda, Republic of Lithuania Tel: + 370 46 300 749 Fax: + 31 181 285 405	Lithuania	Common Share	725,088	99.91%

3	UAB Indorama Holdings Europe Metalo G.16, LT-94102 Klaipeda, Republic of Lithuania Tel: + 370 46 300749 Fax: +370 46 314323	Lithuania	Common Share	1,173,952	99.81%
4	Indorama Trading (UK) Limited 23 Northiam, Woodside Park, N12 7ET, London, United Kingdom Tel: N/A Fax: N/A	United Kingdom	Common Share	10,000	99.81%
5	Indorama Trading AG c/o RA Mauro Locarnini, Anwaltsbüro Locarnini, Talstrasse 39, CH-8001 Zürich, Switzerland Tel: N/A Fax: N/A	Switzerland	Common Share	100	99.81%
6	PHP-Shenma Air Bag Yarn Marketing (Shanghai) Co., Ltd. China Merchants Plaza, East Building, Room 1107, No. 333 Cheng Du Road (North), Shanghai 200041, People's Republic Of China Tel: +49 6022 81 2552 Fax: +49 6022 81 31 2552	China	(Capital Contribution)	-	40.80%
7	ES FiberVisions Shanghai Co., Ltd. Room 2401-B, Manpo Plaza, 500 Yan An West Road, Shanghai, People's Republic Of China Tel: +86-(0)21-6212-5877 Fax: +86-(0)21-6226-8829	China	(Capital Contribution)	-	50.00%
8	Performance Fibers (Kaiping) Trading Company Limited No.3 Hongqiao Road Kaiping, Guangdong Province, People's Republic of China Tel: +86 750 2201707 Fax : +86 750 2218093	China	(Capital Contribution)	-	99.99%
9	TTI GmbH Kasinostr. 19 – 21, 42103 Wuppertal, Federal Republic of Germany Tel: +49 6022 81 2552 Fax: +49 6022 81 31 2552	Germany	Common Share	25,100	40.00%
10	Trevira North America, LLC 5206 Leonardslee CT, Charlotte, Mecklenburg County, North Carolina, 28226, USA Tel: +1-704-910-0970 Fax: +1-704-496-2157	USA	(Membership Interest)	-	99.99%
11	ES FiberVisions Co., Ltd. 3-3-23 Nakanoshima, Kita-Ku, Osaka 530-0005, Japan Tel: +81 6 6441 3307 Fax: +81 6 6441 3347	Japan	Common Share	200	50.00%
12	ES Fiber Visions Limited Partnership Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +706 357 5100 Fax: +706 966 4247	USA	(Partnership Interest)	-	50.00%

13	Indorama Ventures Alphapet Holdings, Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808 USA Tel: +1 256 308 1180 Fax: +1 256 341 5926	USA	Common Share	100	99.99%
14	ES FiberVisions ApS Engdraget 22, Varde Denmark, DK- 6800 Tel: +45 7994 2200 Fax: +45 7994 2201	Denmark	Common Share	10,000	50.00%
15	Indorama Ventures Ecomex Services, S. de R.L. de C.V. Carretera Libre a Colotlan 6800. Colonia Extramuros, C.P. 45200, Zapopan, Jalisco, Mexico Tel: +52 33 1561-3732 Fax: N/A	Mexico	Equity Quota Class I	2	51.00%
16	Indorama Ventures Polycor, S. de R.L. de C.V. Avenida Prolongación Paseo De La Reforma 1015 , Torre A piso 2, Colonia Santa Fe Cuajimalpa CP 05348, Delegación Cuajimalpa de Morelos, Ciudad de México, México Tel: +52 55 91775700 Fax: +52 55 52924919	Mexico	Equity Quota Class I	2	99.99%
17	Indorama Ventures Servicios Corporativos, S. de R.L. de C.V. Avenida Prolongación Paseo de la Reforma 1015, Torre A piso 2, Colonia Santa Fe Cuajimalpa CP 05348, Delegación Cuajimalpa de Morelos, Ciudad de México, México Tel: +52 55 91775700 Fax: +52 55 52924919	Mexico	Equity Quota Class I	2	99.99%
18	Performance Fibers (Hongkong) Limited Room 3B, 22nd Floor, 148 Electric Road, North Point, Hong Kong Tel: + 852 2566-1918 Fax: + 852 2110 0033	Hong Kong-China	Common Share	1,000	99.99%
19	ES FiberVisions Hong Kong Limited Unit No. 2810. 28/F, The Metropolis Tower, 10 Metropolis Drive, Hung Hom, Kowloon, Hong Kong Tel: +852 2970 5555 Fax: +852 2970 5678	Hong Kong-China	Common Share	616,010	50.00%
20	4200144 Canada Inc. 3400 First Canadian Centre, 350 - 7th Avenue SW, Calgary, Alberta T2P 3N9, Canada Tel: +1 (514) 645 7887 (229) Fax: +1 (514) 645 9115	Canada	Class A	100	99.99%
21	Indorama Ventures Exporter Inc. Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: + 1-864-579-5750 Fax: +1-964-579-5166	USA	Common Share	2,500	99.99%

22	Glanzstoff Services S.A.S. Pôle Européen de Développement, 54810 Longlaville, France Tel: +33 3 82 44 80 00 Fax: +33 3 82 44 56 82	France	Common Share	82,195	99.99%
23	Glanzstoff Industries A.G. Rue Schwarzenhof, 34 L-8452 Steinfort - GD Luxembourg Tel: +352 399 881 1 Fax: +352 399 881 213	Luxembourg	Common Share	960,000	99.99%
24	Glanzstoff Management GmbH Technologiezentrum, Haus C, Technopark 1, 3430 Tulln, Austria Tel: N/A Fax: N/A	Austria	Common Share	500	99.99%
25	Indorama Ventures Portugal Utility - Unipessoal, LDA. ZILS Zona 2, Lote 2E1, Monte Feio, 7520-064 Sines, Portugal Tel: +351 269 189 000 Fax: +351 269 189 099	Portugal	Quota	1	99.99%
26	Performance Fibers Services, S. de R.L. de C.V. Av. de la Luz 77 Zona Industrial Benito Juárez, CP 76120, Querétaro, Qro., México Tel: +52 442 211 3000 Fax: N/A	Mexico	Equity Quota Class 1	50,000	99.99%
27	Schoeller Süssen GmbH Bühlstrasse 14, 73079 Süssen, Federal Republic of Germany Tel: 0049 7162 930 5015 Fax: N/A	Germany	(Capital Contribution)	-	99.99%
28	KORDPLAST s.r.o. No. 897, 696 74 Velká nad Velickou, Czech Republic Tel: N/A Fax: N/A	Czech Republic	Common Share	200,000	99.99%
29	Indorama Ventures Global Shared Services Private Limited The Metropolitan, 6th Floor, C-26/27, Bandra Kurla Complex, Bandra East, MUMBAI, Mumbai City, Maharashtra, 400051, India Tel: 022-26571234 Fax: N/A	India	Common Share	10,000	99.98%
30	Sinterama Trading (Shanghai) Co., Ltd. 1804 Zheng Da Cube Edifice, 58 Changliu Road, Rudong New Area, Shanghai 200 135, People's Republic of China Tel: +86 21 6854 4230 Fax: +86 21 6854 4230	China	(Capital Contribution)	-	99.99%

31	Sinterama Asia Limited Unit B 5/F, Max Share Centre, 373 King's Road, North Point, Hong Kong Tel: +86 21 6854 4232 Fax: +86 21 6854 4230	HongKong- China	Common Share	14,286	99.99%
Logistic Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Logistics LLC Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808, USA Tel: +1-847-943-3100 Fax: +1-847-943-3196	USA	(Membership Interest)	-	99.99%
Surfactants Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Ventures Oxides Ankleshwar Private Limited The Metropolitan, 6th Floor, C-26/27, Bandra Kurla Complex, Bandra East, MUMBAI, Mumbai City, Maharashtra, 400051, India, Tel: 022-26571234 Fax: N/A	India	Common Share	10,000	99.98%
Non-Operating Business					
No.	Company Name/Address	Country	Type of Shares	Shares Issued	Shareholding
1	Indorama Polymers Rotterdam B.V. Markweg 201, 3198 NB, Europoort, Harbour No.6347, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405	Netherlands	Common Share	18,002	99.91%
2	Indorama Holdings Rotterdam B.V. Markweg 201, 3198 NB, Europoort, Rotterdam, The Netherlands Tel: +31 181 285 400 Fax: +31 181 285 405	Netherlands	Common Share	18,002	99.81%
3	MJR Recycling B.V. Tengnagelwaard 5, NL-6917 AE Spijk(Gld), The Netherlands Tel: +31 656 6250 Fax: +31 656 6251	Netherlands	Common Share	18,100	99.99%
4	FiberVisions Vermögensverwaltungsgesellschaft mbH Local Court of Dusseldorf, Werdener Straße 1, 40227 Düsseldorf, Federal Republic of Germany Tel: +49 211 8306-0 Fax: +49 211 87565 116-0	Germany	Common Share	3,000,000	99.99%
5	Indorama Ventures Adana PET Sanayi Anonim Sirketi Karamahmet Mahallesi, Avrupa Serbest Bolgesi, 3. Sokak No:2 Ergene/Tekirdag – 59860, Turkey Tel: +322 441 0253-226 Fax: +322 441 0110	Turkey	Common Share	5,489,505,865	99.99%

6	Indo Polymers Mauritius Limited Les Cascades, Edith Cavell Street, Port Louis, Republic of Mauritius Tel: N/A Fax: N/A	Mauritius	Common Share	58,827	100.00%
7	Indorama Polymers Workington Limited Finsgate, 5-7 Cranwood Street, London, EC1V 9EE, England Tel: +31 181 285 440 Fax: +31 181 285 400	United Kingdom	Common Share	1	99.91%
8	Tereftálicos Indústrias Químicas Ltda. Fazenda São Francisco, s/nº, CEP: 13140-971 - Paulínia - São Paulo - SP/ Brazil Tel: +55 11 2111 1388 Fax: +55 11 2111 1470	Brazil	Common Share	37,573,293	51.00%
9	Avgol Cyprus Ltd. Arch. Makariou III, 284 FORTUNA COURT, BLOCK B, 2nd floor P.C. 3105, Limassol, Cyprus Tel: N/A Fax: N/A	Cyprus	Common Share	1,000	65.96%
10	PT. Indorama Glycol Indonesia Gedung Graha Irama Building, 7th Floor, JL. HR. Rasuna Said Blok X-1, Kav 1-2, Kuningan Timur, Setiabudi, Jakarta Selatan, Indonesia Tel: (62) 21 526 1155 Fax: (62) 21 526 1577	Indonesia	Common Share	500	99.99%
11	Autofil Properties Limited Unit 3, Orchard Court, Nunn Brook Road, Sutton- in-Ashfield, Nottinghamshire, United Kingdom, NG17 2HU Tel: +44 (0) 1623 426 100 Fax: +44 (0) 1623 426 101	United Kingdom	Common Share	2	99.99%
12	Autofil Worldwide Limited Unit 3, Orchard Court, Nunn Brook Road, Sutton- in-Ashfield, Nottinghamshire, United Kingdom, NG17 2HU Tel: +44 (0) 1623 426 100 Fax: +44 (0) 1623 426 101	United Kingdom	Common Share	250,002	99.99%