



# Indorama Ventures **Sustainability Report**

# 2016



**TO BE A WORLD-CLASS  
CHEMICAL COMPANY  
MAKING GREAT PRODUCTS  
FOR SOCIETY.**



**In memoriam of our beloved monarch  
His Majesty King Bhumibol Adulyadej  
Who has ascended to heaven but remains in  
the hearts and minds of the Thai people**



**With deepest respect  
The management and staff of Indorama Ventures Public Company Limited**

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# GROUP CEO Message

This is the seventh Sustainability Report and third in accordance with the GRI's G4 Sustainability Reporting Guidelines. I am pleased to report that 2016 was a successful year in terms of our financial performance, which improved due to our strategic investments and important acquisitions which were made in line with our long-term development through smart growth. In parallel, we have made considerable progress in the past few years in regards to our sustainability and focus on climate change. Indorama Ventures PCL. (IVL) is taking a proactive approach as evident in this report and recognition we have received from external stakeholders.

Our endeavors in this area remain an ongoing effort and everyone, across the organization remains committed to doing their part in making further progress on sustainability. Our success is not only in our people, but through our approach. IVL has set out a clear vision that embeds environmental preservation and sustainability into our business culture, day-to-day operations and long-term business strategy. At the apex level, the Sustainability and Risk Management Committee is tasked with driving sustainability into IVL's current initiatives, long-term strategic planning and risk management framework. As a means to monitor and improve our operations, we are using the Dow Jones Sustainability Index (DJSI) as a benchmark by which we can measure our performance.

## Committed to a Better Future

As a major global intermediate petrochemicals producer and one of the largest vertically integrated polyester value chain producers in the world, IVL's business strategy is to strengthen our position as a market leader in terms of scale, integration and differentiation as well as profitability and return on investment, supported by a focus on delivering long-term, superior shareholder value.

With the evolution of technologies, innovation will also play a key role in chemical industry to create market that is sufficiently sustainable to balance the environment, resources, climate and quality of life.

We firmly believe that IVL will succeed by embedding sustainability in all that we do. We also believe that an increase in our ability to use recycled materials and integrating such materials within our manufacturing process will allow us to cater to changing customer preferences and proactively address environmental issues. In addition to recycling, we continue to promote our sustainability initiatives. We intend to further focus on our impact on the environment.

The Materiality Assessment is vital in identifying and prioritizing the issues that matter most to the business and stakeholders. IVL places a strong focus on engaging with our internal and external stakeholders to get feedback on how we can improve. Their views and expectations on all issues, including sustainability, are identified through numerous engagement mechanisms which are incorporated into our operations.

## New Vision, Mission and Values of the Company

Important progress has been made by IVL to improve every aspect of our sustainability, beginning with a new vision, mission and values

statement which was formulated in early 2016 and launched globally in July of that year. With our sensible investments into the value chain, including high-value added products, over the years, we aspire *"to be a world-class chemical company making great products for society."* This encapsulates our aspiration to be a world leader with a focus on our business to have high positive and low negative impact on environment and society.

The challenge facing all of us is to deliver on the commitments we have made. We are paying much more attention to critical areas such as diversity, innovation including product stewardship, climate change, human capital and corporate governance as I feel these will contribute to the long-term success of the Company.

Strategically, we are cementing our relationship with our stakeholders such as suppliers, customers, local communities in which we live and work on our sustainability efforts. Economic, environmental and social impacts caused, or contributed to, by the value chain are being monitored and mitigated through improved policies and best practices.

With climate change a reality and an increasing global concern, we are looking at how to strengthen the circular economy through continual operational eco efficiency, recycling, renewable resources consumption including renewable energy that makes us more sustainable. We have been recycling for many years but our incremental investments in the recycling business as well as renewable energy and renewable resources are all being evaluated and we are drawing important lessons on how best to improve our environmental and operational efficiencies. But growth in recycling is a priority and the 2011-2016 period showed substantial increase in IVL's recycling business capacity.

## Recognitions on climate action

IVL is fully aligned with the global imperatives agreed at the Paris Climate Conference (COP 21) in finding pathways towards developing strong low-carbon strategies. The company has proactively established its targets as indicated in its Climate Strategy 2020 Plan which is available on its website. It has expanded the scope of its environmental stewardship and is taking a more unified approach in addressing social issues and integrating its CSR activities with the business goals.

While this work remains ongoing, IVL was pleased with recognitions from 2016 which is a testament to the focus and dedication of our employees. Among the ratings were:

	<h1>Bloomberg</h1>	
<p>Bronze Class: RobecoSAM's Sustainability Yearbook 2017</p>	<p>Leading in SET Index: Bloomberg ESG Disclosure Scores</p>	
 <p>FTSE4Good</p>	 <p>DRIVING SUSTAINABLE ECONOMIES</p>	
<p>A constituent of:</p> <ul style="list-style-type: none"> <li>• FTSE4Good ASEAN5 Index and</li> <li>• FTSE4Good Emerging Index</li> </ul>	<p>Climate Change 'B' Rating</p>	<p>#1 Thai MNC: Transparency in Corporate Reporting</p>

### Strict adherence to Environmental, Social and Governance (ESG) criteria

We are aware that we are responsible for our products and methods and are therefore going for life cycle assessment of our products to put into place a roadmap with the integration of ESG and product stewardship criteria into our product development.

### Renewable Resources

We strongly believe in maximizing the use of renewable resources and have already put into place solar energy as well as biomass and other energy sources at some of our plants.

Our strategic priorities going forward are to lower our carbon footprint in the long-term; create more diversity across the group in the medium to long-term and improve our understanding of the life cycle of our products.

### Growing stronger through diversity

IVL recognizes its talented and diverse workforce as a key competitive advantage. We are an equal opportunity employer and our desire is to encourage increasing diversity in the Company. The diverse capabilities that reside within our workforce position the Company to anticipate and fulfill the needs of our diverse customers providing high quality products and services.

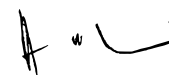
From a governance perspective, our goals over the next few years are to pursue a level of transparency that is positive for all stakeholders and to find ways to further lower our carbon footprint and the impact of our products on the environment and society. Our targets will be measurable and will be reported in our Sustainability Reports going forward.

Change is a constant. Despite our many achievements in 2016, we remain committed to raising the bar in all aspects of sustainability, transparency and governance for 2017. Going forward, we will also continue to work towards increasing cost savings, having a positive impact and a better future.

I hope you will find our sustainability report of value and I encourage you to provide your feedback and suggestions to our Sustainability team.

On behalf of the Board and management team, I would like to express my sincerest gratitude to our entire IVL family for their hard work and dedication in fulfilling the sustainability needs of our customers and the communities in which we live and work.

I also would like to thank all our stakeholders, business partners and associates who wholeheartedly support us to achieve success and to reach higher altitudes.



Aloke Lohia  
Group Chief Executive Officer





# BUSINESS OVERVIEW

IVL is one of the world's leading petrochemicals producers. In 2016, we had 67 operating sites in 21 countries on four continents – Asia, Europe, North America and Africa. The Company's portfolio is comprised of necessities (commodity products that are a necessary part of daily life) and high value-added (HVA) categories of Polymers, Fibers and Packaging. Our products serve major players in consumer products, i.e. beverages, hygiene, industrial and automotive verticals. We have over 14,000 employees worldwide and had consolidated revenue of USD 7.2 billion in 2016.

Further information about IVL group's organizational structure and sustainability and risk management structure can be found on our website: [www.indoramaventures.com](http://www.indoramaventures.com).

Our recycled yarn under the brand Ecorama® is made of post-consumer resins – from used PET bottles. The product is suitable for sports and work wear, home fabrics, and textiles for the automotive, industrial, military and medical sectors.

# LOCATION OF OPERATING SITES



# 67 Operating Sites

# 21 Countries

# 4 Continents

## China

- Guangdong IVL PET Polymer<sup>3</sup> ■
- FiberVisions (China) Textile Products ■
- ES FiberVisions (Suzhou)<sup>5</sup> ■
- ShenMa-PHP (Pingdingshan) Air Bag Yarn Manufacturing ■
- Performance Fibers<sup>5</sup> ■ ■

## Thailand

- IPI Rayong<sup>2,6</sup> ■ ■
- Indorama Petrochem ■
- TPT Petrochemicals ■
- IPI Nakhon Pathom<sup>2,6</sup> ■ ■ ♻️
- AsiaPet / Indorama Polymers ■
- Petform ■ ■ ■ ■
- Indorama Holdings ■
- Indorama Ventures Polymers (Rayong) ■
- ES Fiber Visions (Thailand)<sup>5</sup> ■

## Philippines

- Indorama Ventures Packaging (Philippines) ■ ■ ■ ■

## Indonesia

- PT Indorama Polypet Indonesia ■
- PT Indorama Petrochemicals ■
- PT Indorama Ventures Indonesia ■ ■
- PT Indorama Polyester Industries Indonesia ■ ■
- PT Indorama Polychem Indonesia ■

## Myanmar

- Indorama Ventures Packaging (Myanmar) ■

## India

- Micro Polypet ■
- IVL Dhunseri Petrochem Industries ■

As of December 31, 2016

■ PET ■ Fibers ▲ Ethylene ▲ Paraxylene ■ PTA ■ EO/EG ■ NDC ■ IPA ■ Packaging ♻️ Bottle Flakes

1) Recycled PET Resins  
2) Recycled Fiber  
3) Bio-PET

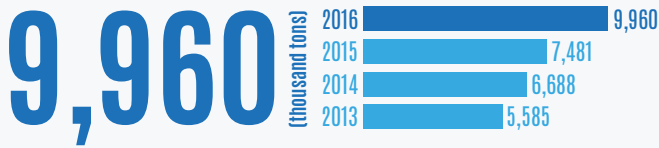
4) Biodegradable Polymers  
5) Bi-co Fibers Technology  
6) R&D Center

\* Currently non-operational.

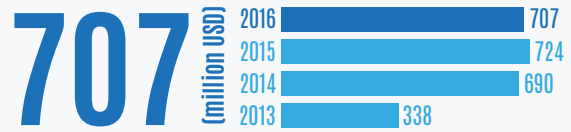
# KEY HIGHLIGHTS 2016

## ECONOMIC PERFORMANCE

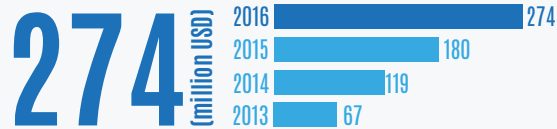
### TOTAL PRODUCTION\*



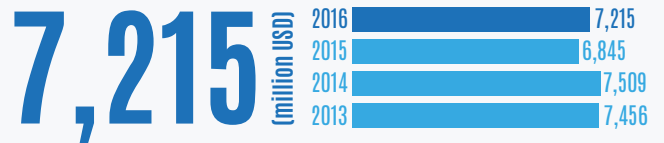
### OPERATING CASH FLOW



### CORE NET PROFIT



### NET SALES



\* Included Joint Ventures

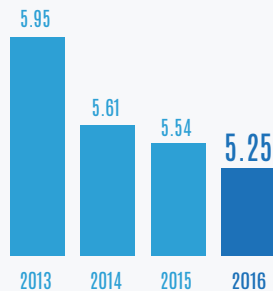
## ENVIRONMENTAL PERFORMANCE

### ENERGY

INCREASED ENERGY EFFICIENCY

**5.25**

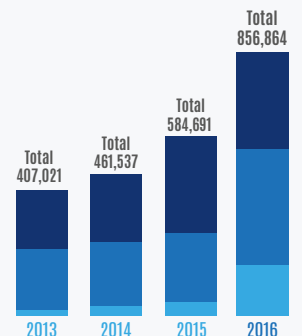
(GJ/Ton of Production)



RENEWABLE ENERGY AT IVL

**857** '000 GJ

Electricity Biomass Biogas

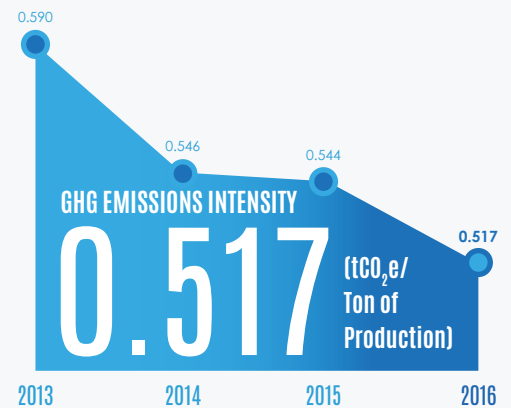
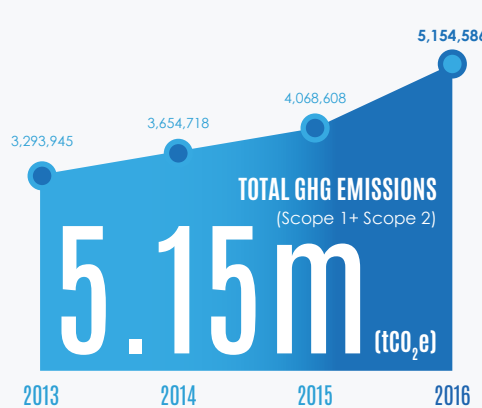


### GHG EMISSIONS

Target for 2020

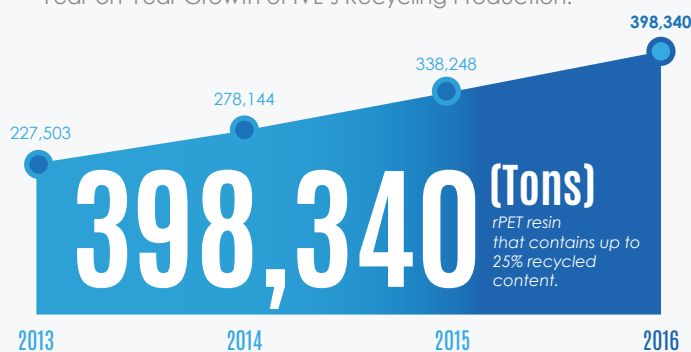
**6%**

reduction of combined scopes 1 & 2 GHG emissions intensity from the 2013 base year

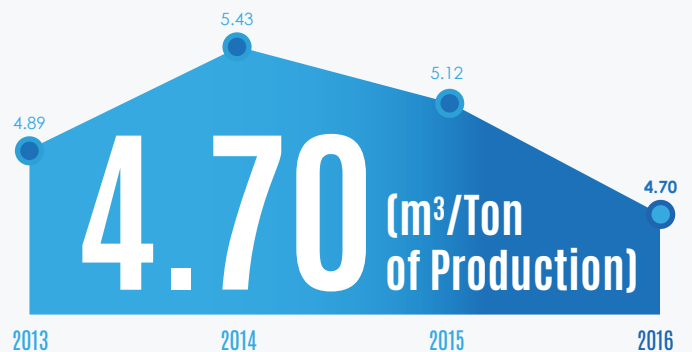


### RECYCLING BUSINESS

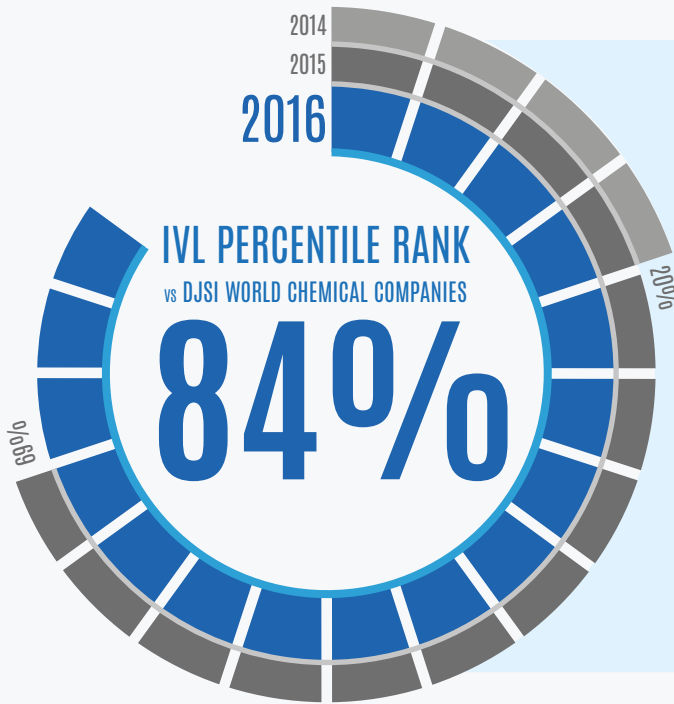
Year-on-Year Growth of IVL's Recycling Production.



### WATER INTENSITY



# ACHIEVEMENTS & GOALS



**ROBECOSAM**  
Sustainability Award  
Bronze Class 2017



**Bloomberg**



FTSE4Good



100% \*scope 3 emissions  
disclosure

\*Selected criteria

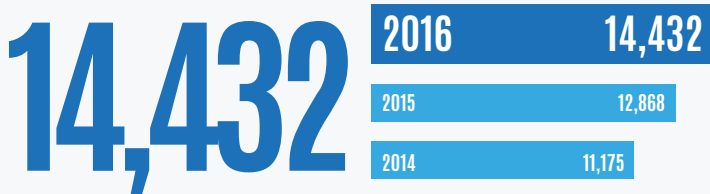


Life Cycle Assessment (LCA)

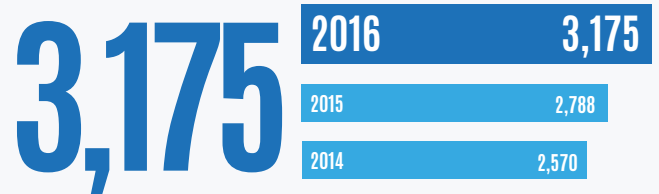
95-100% Coverage of  
all products

# SOCIAL PERFORMANCE

TOTAL WORKFORCE (FTE EMPLOYEES)



TOTAL FEMALE WORKFORCE (FTE EMPLOYEES)





# SUSTAINABILITY

at Indorama Ventures

Sustainability at IVL means ‘business growth with positive environmental and societal continuity;’ and managing the Triple Bottom Line of Profits, Planet and People. This includes Economic, Environmental and Social risks, obligations and opportunities. Additional information on our sustainability related strategies and commitments are available on our website [www.Indoramaventures.com](http://www.Indoramaventures.com) under [Sustainability](#). The Codes of Conduct for [employees](#) and [directors](#) also provides the basis for professional work in all our operations.

Indorama Ventures values being a good corporate citizen and takes an active role in environmental and social responsibilities. We give high priority to environment protection and aim to gear all our business activities toward protecting and conserving the environment everywhere we conduct business. Today, we own Thailand’s largest solar roof for self consumption of electricity.

The Company's Sustainability Initiatives fully support the new vision of becoming a world-class chemical company making great products for society. An increased focus on sustainable operations in environmental and social dimensions, especially in innovation management, product stewardship, occupational health and safety, will help in achieving this vision.

We measure our success not just by economic gains but by our achievements in preserving the environment, thereby benefiting society. We endeavor to maintain a culture of corporate citizenship with strict adherence to environmental, health and safety standards, corporate governance, and anti-corruption regulations. Our goal is to ensure economic prosperity and sustainability to all our stakeholders. IVL management has adopted an aggressive focus on sustainability and is committed to several long-term sustainability targets and commitments including environmental protection.

In order to achieve environmental efficiencies, our management provides the structures and processes that help embed environmental efficiency into our organization's culture and mitigate risks. Furthermore, management encourages all of our plants to obtain and achieve strong environmental and energy management standards as exemplified under ISO 14001, ISO 50001 and other industry or country specific standards. Through these processes, we are committed to surpassing environmental laws and regulations pertaining to each business and region, with periodic analysis and third-party inspections conducted at each plant.

## Our Approach and Sustainability Programs

We have a deep commitment to sustainability that serves as the foundation of our overall business strategy.

### Approach to Managing Sustainability

IVL strongly believes in the importance of Sustainability and Risk Management functions, which enables the Company to anticipate and manage current and future economic, environmental and social risk and opportunities arising from the Company's business activities.

### Sustainability Governance

The Board of Directors (the 'Board') is the highest governing body at IVL and is responsible for the strategic direction of the organization and the effective monitoring of performance. The Board meets regularly to discuss business performance and other significant issues that have strong impacts on the Company, its operations and future.

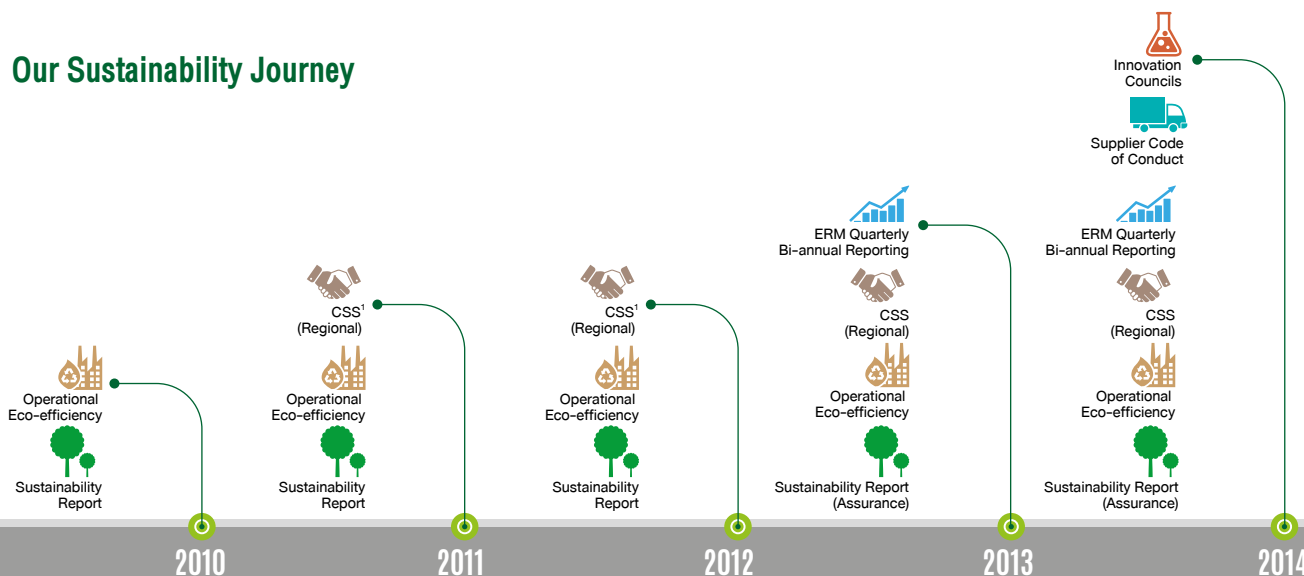
The Board has been embedding sustainability into the Company's overall long-term business strategy, corporate culture and day-to-day operations through its subcommittee, the Sustainability and Risk Management Committee (the 'SRM Committee').

### Sustainability and Risk Management Committee

The Board has appointed members of the SRM Committee, each of whom possess in-depth knowledge and vast expertise in sustainability and risk management. The SRM Committee is the second highest authority in the Company pertaining to sustainability.

Currently, the SRM Committee comprises six members of the Board, including three Independent Directors.

## Our Sustainability Journey





## Sustainability and Risk Management Committee

**Mr. Alope Lohia**  
Chairman



**Mr. Maris Samaram**  
Member



**Mr. Dilip Kumar Agarwal**  
Member



**Mr. Rathian Srimongkol**  
Member



**Mr. Russell Leighton Kekuewa**  
Member



**Mr. Udey Paul Singh Gill**  
Member



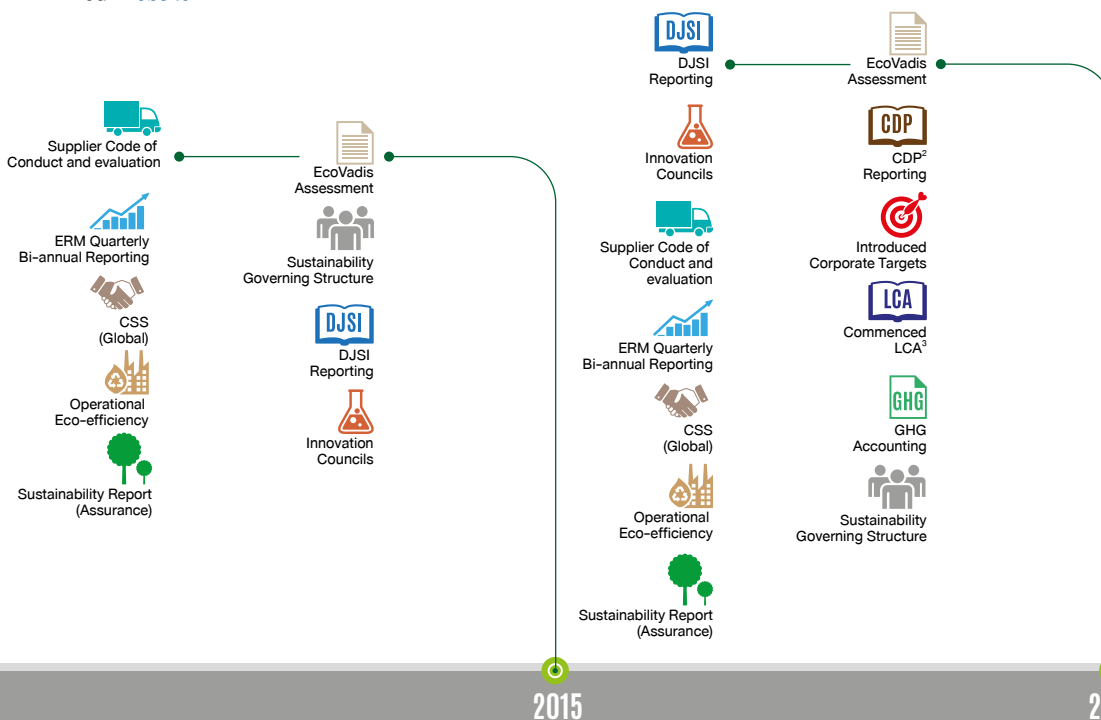
More details on the composition of SRM Committee as described below are available on our [website](#).

The SRM Committee, since its inception has been driving IVL's efforts to integrate sustainability into its current activities, long-term strategic planning process and risk management framework. The SRM Committee, headed by Mr. Alope Lohia, Group CEO has been actively overseeing the development and implementation of IVL's strategy and policies on sustainability and risk management. The SRM Committee meets semi-annually to monitor sustainability performance, assess the risks associated with aspects on sustainable development, review feedback from stakeholders, sustainability trends and issues, and the sustainability reporting framework.

### Sustainability Steering Committee

The SRM Committee is supported by the Sustainability Steering Committee with members having diverse experiences across different functions and businesses. The Sustainability Steering Committee advances the objectives of sustainability and implements the sustainability practices across all IVL entities under the guidance of the SRM Committee and the Group CEO.

The Report of the SRM Committee for 2016 for shareholders of the Company is published in our Annual Report which is available on our [website](#).



<sup>1</sup> Customer Satisfaction Survey  
<sup>2</sup> Carbon Disclosure Project  
<sup>3</sup> Life Cycle Assessment

# SUSTAINABILITY AWARDS AND RECOGNITIONS

In 2016, the Company has received the following Sustainability Awards and Recognitions:

IVL was recognized in RobecoSAM's Sustainability Yearbook 2017, receiving RobecoSAM's Bronze Class 2017 recognition in the Chemicals Industry sector. The Bronze Class recognition illustrates IVL's great success in becoming one of the top sustainable companies in the world with a score within 10% of the best-performing companies in this industry. More details on the award are available in our press release on our [website](#). Additional information on RobecoSAM's Sustainability Yearbook is available at: <https://yearbook.robecosam.com>



IVL participated in CDP's Climate Change Assessment for the first time in 2016 and achieved a 'B' Rating.



IVL has been independently assessed according to the FTSE Russell criteria and become a constituent of the FTSE4Good ASEAN 5 Index and FTSE4Good Emerging Index.



The FTSE4Good Index Series is designed to measure the performance of companies that demonstrate strong Environmental, Social and Governance (ESG) practices. The Index covers over 20 emerging countries globally. Indorama Ventures stood out as one of the leading Thai companies. More details on the award is available in our press release on our [website](#). Additional information on the FTSE4Good Index is available at: <http://www.ftse.com/products/indices/ftse4good>

In recent years, an increasingly extensive and detailed collection of Environmental, Social and Governance (ESG) information has become available on Bloomberg terminals.



Based on this ESG information collected from the public domain, Bloomberg analysts have evaluated and rated IVL with an ESG disclosure score of 62.40%, and ranked number one among SET50 Index Companies in Thailand.



MSCI is an independent provider of research-based indices and analytics. The research is conducted in order to facilitate the world's leading institutional investors to better manage their portfolios. IVL has achieved a 'B' ESG Rating in 2016.



#### EcoVadis Gold Recognition

In 2016, IVL participated in the EcoVadis evaluation/accreditation platform which covers 21 sustainability criteria in its assessment under four main themes:

Environment

Labor Practices and Human Rights

Fair Business Practices

Sustainable Procurement

IVL has achieved a Gold Recognition in 2016 ranking in the top 5% of performers and most preferred supplier.



#### Transparency International Rating

IVL was rated top among Thai companies and ranked 20th out of 100 multinational corporations from 15 emerging markets that were evaluated.

Transparency International assesses the reporting practices of the companies in three areas:

Reporting on Anti-Corruption programs

Organizational Transparency

Country-by-Country Reporting



IVL received the Sustainability Reports Award 2016 from the Stock Exchange of Thailand, accepted on behalf of IVL by Mr. Harsha V. Reddy, Assistant Vice President-Sustainability. This award is granted to eligible companies that meet the criteria of the Ceres-ACCA Sustainability Report Awards.



IVL was rated among the top companies in the ESG100 by the Thaipat Institute in 2016. Among the 621 listed companies, ESG100 represents the top 100 companies with outstanding operations covering environmental, social and governance (ESG) issues.

# Our STAKEHOLDERS

## **Stakeholder engagement:**

As part of our business ethics and commitment to best business practices, we regularly engage with both internal and external stakeholders to maintain excellent working relationships and to understand, prioritize and incorporate their expectations, interests and concerns into our business operations.

**Stakeholders:** The Company defines its stakeholders as any individual or group that stands to gain or lose economically, socially or environmentally through the actions of the Company. Stakeholders' views and expectations are identified through numerous forms of dialogue and we maintain regular interactions with all of our stakeholders through the various engagement mechanisms.

Indorama Ventures aims to develop innovative products that meet the needs of our users. We provide a variety of materials serving the automotive sector. We are an important manufacturer of nylon 6.6 yarns with a strong market position. Today, one in four airbags is made from IVL yarns. We are also reputed as a supplier of polyester tire-cord fabrics (TCF) for passenger cars and light trucks (PCLT).





**Stakeholders and engagement channels:**

Stakeholders	Engagement Mechanism	Frequency	
Internal Stakeholders	<ul style="list-style-type: none"> <li>• Employees</li> </ul>	<ul style="list-style-type: none"> <li>• Employee Engagement Survey</li> <li>• Annual Performance Review</li> <li>• New Employee Orientation and Training</li> <li>• Corporate Grievance Mechanism</li> <li>• Town Hall Meetings</li> <li>• Staff and Team Meetings, Trainings and Workshops</li> <li>• Annual Report</li> <li>• Sustainability Report</li> <li>• Company Magazine</li> <li>• Company Website</li> <li>• Email Communications</li> <li>• Social Media</li> </ul>	<ul style="list-style-type: none"> <li>Annually</li> <li>Annually</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Annually</li> <li>Annually</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> </ul>
External Stakeholders	<ul style="list-style-type: none"> <li>• Shareholders</li> <li>• Customers</li> <li>• Suppliers including Contractors</li> <li>• Investors</li> <li>• Bankers</li> <li>• Government and Industry Groups</li> <li>• Media</li> <li>• Communities</li> </ul>	<ul style="list-style-type: none"> <li>• Annual General Meeting</li> <li>• Opportunity Day</li> <li>• Annual Report and Sustainability Report</li> <li>• Company Website</li> <li>• Analyst Meetings, Conference Calls</li> <li>• Briefings and Presentations</li> <li>• One-on-one Meetings</li> <li>• Shareholder and Community Visits to Plants</li> <li>• Shareholder Survey</li> <li>• Company Magazine</li> <li>• Press Releases</li> <li>• Corporate Grievance Mechanism</li> <li>• Local and Overseas Road shows</li> <li>• Corporate Grievance Mechanism</li> <li>• Investor Fact Sheet</li> <li>• Email Subscription</li> <li>• Social Media</li> <li>• Customer Satisfaction Survey</li> <li>• Customer Visits</li> <li>• Product and other relevant information on website</li> <li>• Marketing Materials</li> <li>• Tradeshows, Conferences, Seminars</li> <li>• Business Partners and Competitor Policy</li> <li>• Supplier Management System</li> <li>• Joint or Collaborative Events with Communities, Customers, Suppliers</li> <li>• Membership with Industry Bodies</li> <li>• CSR activities</li> <li>• Community Visit Programs</li> <li>• Open House Programs with Communities and Local Authorities</li> </ul>	<ul style="list-style-type: none"> <li>Annually</li> <li>Quarterly</li> <li>Annually</li> <li>Ongoing</li> <li>Quarterly</li> <li>Ongoing</li> <li>Quarterly</li> <li>Quarterly</li> <li>Bi-Triennially</li> <li>Annually</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Quarterly</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Continuous</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> <li>As required</li> <li>Ongoing as required</li> <li>Ongoing</li> <li>Ongoing</li> <li>Ongoing</li> </ul>

## Stakeholder Feedback

Stakeholder engagement provides a multi-faceted approach where we can drive innovation, mitigate risks, explore opportunities and build relationships based on trust with the communities where we live and work.

The aim of our engagement is to understand and develop leading sustainability strategies and solutions in collaboration with our stakeholders to effectively respond to their feedback.

## Internal Stakeholder Feedback

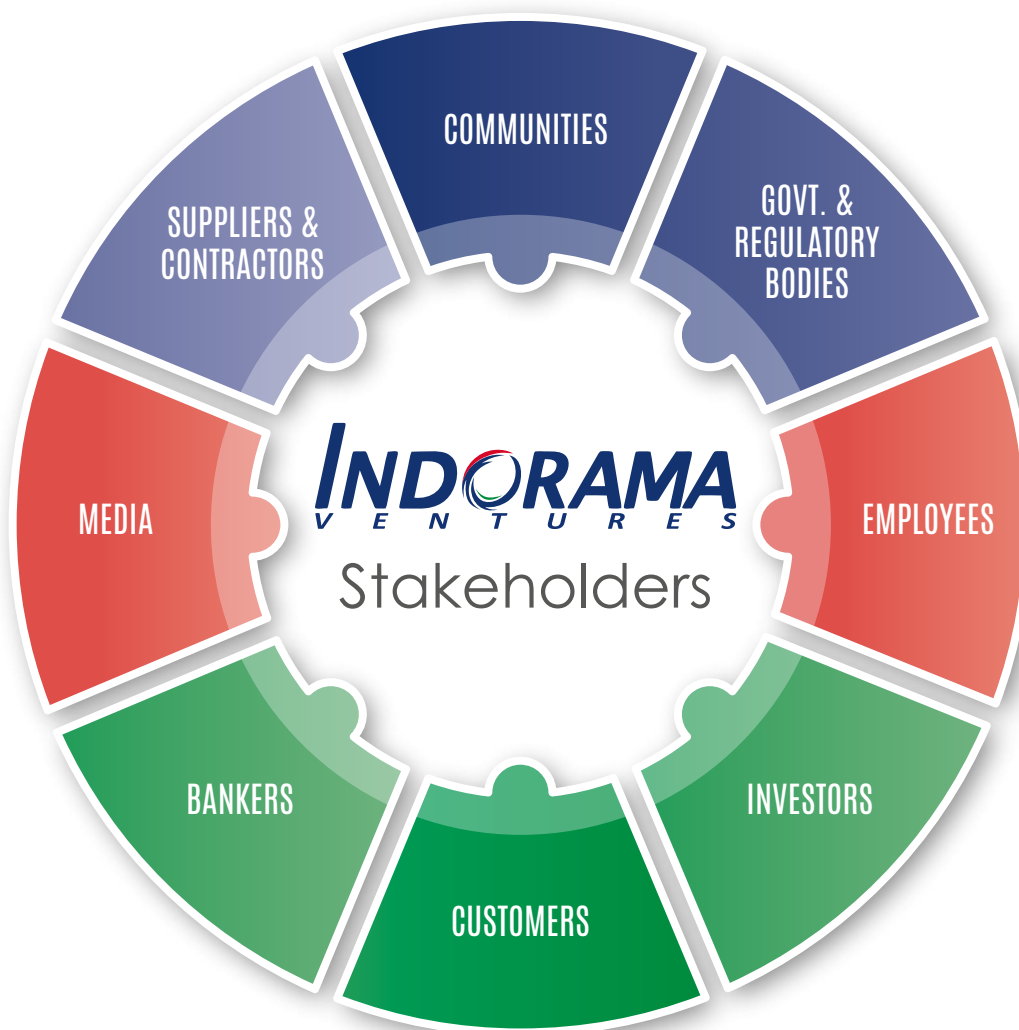
As a global chemical company, our employees are critical to our success. Throughout 2016, we gathered important feedback from our employees through the following relevant channels:

- Annual Employee Engagement Survey
- Feedback during Performance Appraisal
- Materiality Assessment Survey
- Business Strategy Meets

## External Stakeholder Feedback

This year, IVL has engaged with an increasing number of external stakeholders including customers, suppliers, bankers, investors, government, industry groups, communities, shareholders, and the media as part of our annual Materiality Assessment. These activities supplemented a range of other ongoing engagement mechanisms used to determine our sustainability issues.

Important highlights featured throughout the report provide further practical examples of how we addressed important issues to our stakeholders.







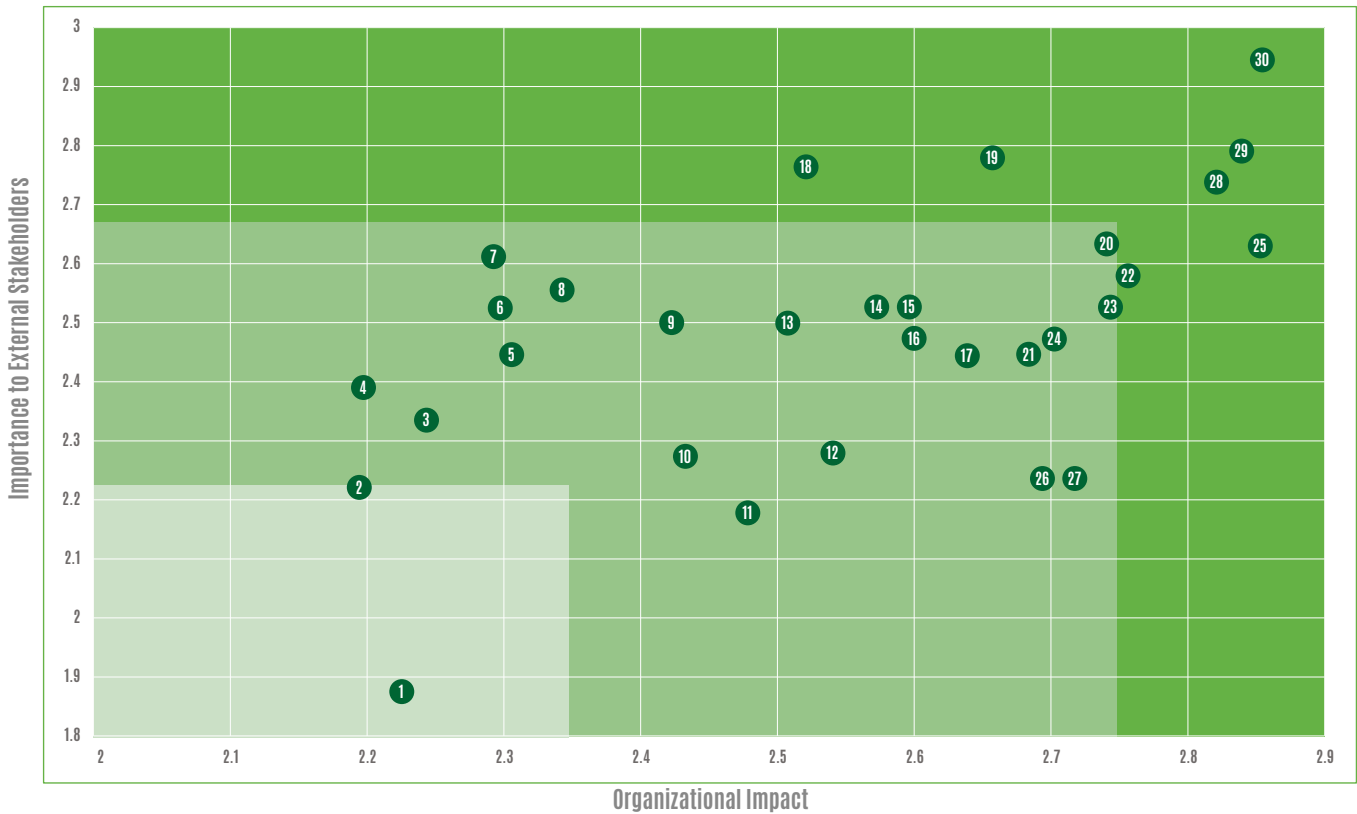
# MATERIALITY ASSESSMENT

Each year, IVL conducts a formal materiality assessment in accordance with the GRI G4 Guidelines to identify and prioritize primary sustainability issues, as well as associated key performance indicators (KPIs) and targets for improvement. To support the management to enhance its focus on material issues that are important to the Company and its stakeholders, getting insights from the stakeholders through 'Materiality Assessment' is one of the best means. Materiality Assessment helps identify and prioritize the issues that matter most to the business and stakeholders as well as guiding the content of the 2016 Sustainability Report.

IVL considered many issues that were raised by internal and external stakeholders during the assessment process. Some of these topics overlapped with others, and their importance varied within stakeholder groups. After evaluating these issues, we identified those of the highest importance to IVL and our stakeholders, and these form our material issues. These issues are located in the top right quadrant of the matrix below. Based on our assessment, the most important material issues for IVL and our stakeholders are consistent with previous years. However, a number of these have been refined to reflect our progress and plans for 2017 and forward. We will measure our performance against these goals in next year's report.

Indorama Ventures owns a PET packaging business. Our product is material for food and beverage containers as well as other consumer products including PET film for the screen of electronic equipment.

# Materiality Matrix 2016



- 1. Non-raw Materials
- 2. Biodiversity
- 3. Water Management
- 4. Climate Change
- 5. Product Stewardship
- 6. Corporate Social Responsibility
- 7. Product Toxicity
- 8. Waste Management
- 9. Waste Water Management
- 10. Technology and Product Obsolescence
- 11. Tax
- 12. Energy Consumption Management
- 13. Emissions (GHG, SOx, NOx, VOCs)
- 14. Environmental Management
- 15. Supply Chain Management
- 16. Innovation
- 17. Customer Relationship Management
- 18. Human Rights
- 19. Transparency
- 20. Corporate Governance
- 21. Human Capital Development
- 22. Risk and Crisis Management
- 23. Reliability and Asset Integrity
- 24. Raw Materials
- 25. Environmental Compliance
- 26. Talent Attraction
- 27. Talent Retention
- 28. Occupational, Health and Safety
- 29. Ethics and Integrity
- 30. Regulatory Compliance

## Materiality Assessment

*Enhancing Risk Reduction and maximizing Opportunity through Materiality Assessment*

Materiality Assessment helped the Company to identify the key material issues. The process helped to develop risk mitigating actions and to explore the opportunities.

Ranking the material issues through materiality assessment in terms of risk and opportunity for both the business and the broader stakeholders helped us think in a more integrated way about sustainability and to further expand our business strategy.

Materiality Assessments provides us with a tool for prioritising and making sense of the sustainability landscape as well as powerful mandate for focusing and acting on those issues that are highest priority for the business and stakeholders. Materiality Assessment process provides the following benefits to us:

- Focusing efforts to better allocate limited resources
- Integrating sustainability issues into the core business strategy
- Satisfying stakeholder & investor demands
- Anticipating emerging risks and opportunities
- Meeting sustainability reporting expectations
- Improving transparency and strengthening sustainability communications
- Providing a basis for development of performance measures
- Establishing number of targets, key performance indicators focused on environmental and social performance, in addition to economic performance, in our operations
- Integrating material issues into business strategy, sustainability management, risk impact reduction and opportunity optimization.

Material issues are found to be effective, addresses within business functions and seen as critical to the company's viability. Integration of material issues into business strategy in true sense enables companies to understand internally and communicate externally, how they create value and to better manage performance on critical issues.

In 2016 IVL has undertaken a materiality assessment after explaining the materiality assessment process, the relevance of identification of material issues through workshops conducted covering all concerned globally. The materiality is done in line with business strategy, the strategic environmental and social priorities of the Company and in



alignment with the GRI G4 Guidelines. The materiality assessment sets out the material issues for 2017 and the content of this report. We used key elements of the GRI G4 to identify and prioritize the issues that matter most to the business and stakeholders.

topics were ranked. All topics shown in the matrix are relevant both for our stakeholders and for IVL.

Stakeholders including customers suppliers, bankers, media and employees provided information on 30 topics potentially relevant for IVL. The participants rated them in terms of their current and future relevance for IVL. The materiality matrix shows how these sustainability

We used key elements of the GRI G4 to identify and prioritize the issues that matter most to the business and stakeholders.

More details on the key material issues are provided in the next chapters in this Sustainability Report.



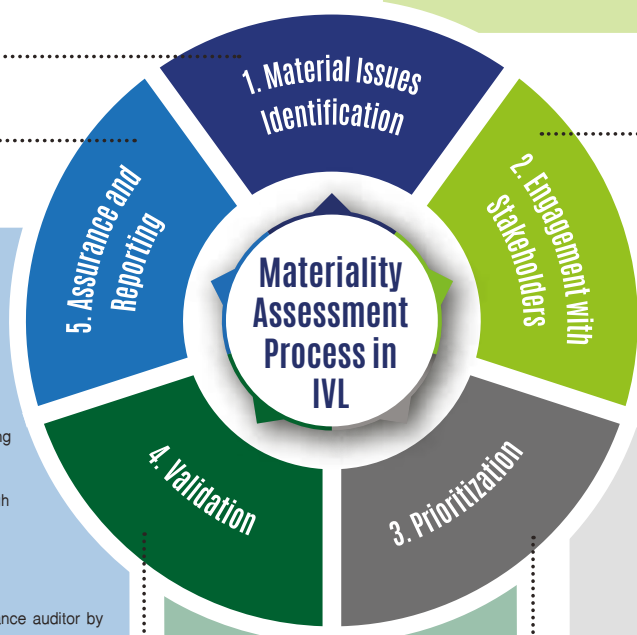
# MATERIALITY ASSESSMENT PROCESS IN IVL

## 1. Material Issues Identification

- Identifying what materiality means to IVL and the objectives of the materiality assessment.
- Identifying major economic, environmental and social sustainability indicators across the value chain having an impact on the business operations of the Company, its stakeholders, environment and societies around the world.
- Identifying and prioritizing our stakeholders. Stakeholders include both internal stakeholders such as employees at all levels globally, and external stakeholders such as customers, suppliers, investors, analysts, bankers, government and regulatory bodies, community and industry groups, the media and others.

## 2. Engagement with Stakeholders

- Engaging with all stakeholders, both internal and external, through the materiality survey and collecting their feedback.
- Creating awareness of the materiality assessment through workshops.
- Engagement annually, quarterly or on a regular/periodic basis.
- Annual engagement:
  - Materiality survey
  - Customer satisfaction survey
  - Employee engagement survey
  - Business strategy meeting
- Quarterly Engagement:
  - Investors meets
  - Analysts meets
  - Capital Markets Day
  - Opportunity Day in Stock Exchange of Thailand
  - Investor Road shows
- Regular or periodic engagement: ongoing meetings with:
  - Customers
  - Suppliers
  - Regulatory bodies
  - Communities



## 5. Assurance and Reporting

- Integrating key material aspects in the company's strategy, governance and operations.
- Developing the strategy, both long term and short term, for all key material aspects identified through assessment of:
  - Likelihood and probability
  - Risks and Opportunities
- Assurance by an external assurance auditor by verifying materiality assessment process, stakeholder engagement process, data collection and evaluation, especially environmental, health and safety performance indicators to ensure the completeness, accuracy, reliability and transparency.
- Reporting the material aspects in the 2016 Sustainability Report.

## 4. Validation

- Senior management validates the material issues and their respective boundaries based on the ratings, importance to business success, and stakeholders.
- Grouping the key material aspects into the three dimensions: economic, environmental and social.

## 3. Prioritization

- Collecting and aggregating the feedback from all stakeholders.
- Analyzing material aspects feedback in detail to understand the significance, probability of occurrence, and impact to the business, company and stakeholders. Developing scoring methodology to weigh the inputs from various sources and stakeholders.
- Ranking the material issues in terms of risk and opportunity for both the business and the broader stakeholders.
- Prioritizing and clustering material issues based on scores into economic, environmental and social dimensions.
- Preparing the materiality matrix based on the scores from the ratings of the stakeholders
- For each of the material issues, IVL defined the boundary of the impact, whether inside or outside our Company and where the impact ends.

## Material Issues

Based on the materiality assessment process ten key materiality issues have been identified.

Focusing our efforts on the Issues that matter most to the Company



In addition to the above key material issues, the Company is also focusing on Climate Change which is an emerging risk and a material issue.

This year the materiality analysis process has been extended to more external stakeholders such as customers, suppliers, bankers, investors and media. The feedback was incorporated in defining the key material aspects of the Company.

## Risks and Opportunities

### Planning, Enhancing Risk Reduction and Maximizing Opportunity through the materiality assessment




IVL engages in activities which produce various products and incidental services that interact with the physical environment which affects or impacts the environment locally, regionally, or even globally in a positive, neutral or negative way.









At IVL, we use the process of the Materiality Assessment and the identification of material aspects for planning, enhancing risk reduction and maximizing opportunities in ways that can benefit the Company, the environment and society.

IVL also determines the aspects of the business that significantly affect the environment, and prioritize them as mentioned in detail under respective material aspects.

As a precautionary approach, the organization has identified the probable risk related to economic aspects, climate change and social opportunities and risks arising from the company's business activities.

## Material Sustainability Issues

	IVL Material Issues	Corresponding GRI Aspects	Key Stakeholders and Impact Boundary		Sustainability Development Goals	Ongoing IVL Commitments and Targets for the years 2017-2020
			Within the Organisation	Outside the Organisation		
Material Economic Issues	Corporate Governance	<ul style="list-style-type: none"> <li>Governance</li> <li>Code of Conduct</li> <li>Anti-corruption</li> </ul>	<ul style="list-style-type: none"> <li>All Managerial Control</li> <li>Employees</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Regulators, Government</li> </ul>		<ul style="list-style-type: none"> <li>To be recognized globally for good corporate governance standards and practices.</li> <li>To embed an organizational culture of zero corruption, transparent business ethics and conduct, compliance with laws and regulations.</li> </ul>
	Innovation Management	<ul style="list-style-type: none"> <li>Emissions Products and Services</li> <li>Economic Performance</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing Operations</li> <li>Employees</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Community</li> </ul>	  	<ul style="list-style-type: none"> <li>Retain or improve the Vitality Index of 2016</li> <li>Integration of ESG aspects in innovation processes</li> </ul>
	Regulatory Compliance	<ul style="list-style-type: none"> <li>Compliance</li> <li>Anti-corruption</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing Operations</li> <li>License to Operate</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Community</li> </ul>		<ul style="list-style-type: none"> <li>Zero non-compliances.</li> <li>Publicly reporting any non-compliance.</li> </ul>
	Business Ethics and Integrity	<ul style="list-style-type: none"> <li>Governance</li> <li>Code of Conduct</li> <li>Anti-corruption</li> </ul>	<ul style="list-style-type: none"> <li>Employees</li> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Regulators, Government</li> </ul>		<ul style="list-style-type: none"> <li>Business conduct and ethics training and creation of awareness to every employee of the Company by 2020.</li> </ul>
Material Environmental Issues	Product Stewardship	<ul style="list-style-type: none"> <li>Customer Health and Safety Emissions</li> <li>Product and Services</li> <li>Economic Performance</li> </ul>	<ul style="list-style-type: none"> <li>Employees</li> <li>Contractors</li> <li>Manufacturing Operations</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Regulators, Government</li> </ul>	   	<ul style="list-style-type: none"> <li>Product toxicity reduction</li> <li>Eco Product classification</li> <li>Increase revenue from eco-products</li> <li>Continue to look for additional clean energy opportunities</li> </ul>
	Environmental Management	<ul style="list-style-type: none"> <li>Materials Energy (Emissions)</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing Operations</li> <li>Energy Management</li> <li>Environmental Compliance</li> <li>Air Emissions</li> <li>Effluents and Waste</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Community</li> <li>Regulators, Government</li> </ul>	       	<ul style="list-style-type: none"> <li>Reduction of combined GHG Scope 1 &amp; 2 emissions by 6% over 2013 base year</li> <li>Reduction of waste including hazardous waste per metric ton of production over 2013 base year or previous year</li> <li>Increase in recycling and reuse of materials over 2013 base year or previous year</li> </ul>
	Environmental Compliance	<ul style="list-style-type: none"> <li>Compliance</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing Operations</li> <li>Environmental Compliance</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Community</li> <li>Regulators, Government</li> </ul>	  	<ul style="list-style-type: none"> <li>Maintain or improve all applicable environmental compliances</li> <li>Zero non-compliances</li> <li>Publicly reporting any non-compliances</li> </ul>

	IVL Material Issues	Corresponding GRI Aspects	Key Stakeholders and Impact Boundary		Sustainability Development Goals	Ongoing IVL Commitments and Targets for the years 2017-2020
			Within the Organisation	Outside the Organisation		
Material Social Issues	<b>Health and Safety</b>	<ul style="list-style-type: none"> <li>Occupational Health and Safety (Training and Education)</li> <li>Supplier Self-Assessment for Labor Practices Grievance Mechanisms, Asset Integrity and Process Safety</li> </ul>	<ul style="list-style-type: none"> <li>Occupational Health and Safety</li> <li>Asset Integrity and Process Safety</li> <li>Emergency Preparedness</li> </ul>	<ul style="list-style-type: none"> <li>Suppliers, Contractors</li> <li>Community</li> </ul>	  	<ul style="list-style-type: none"> <li>Zero fatalities</li> <li>Reduction of injury (LTIFR and TRIR) frequency year-on-year</li> </ul>
	<b>Human Rights</b>	<ul style="list-style-type: none"> <li>Non-discrimination</li> <li>Freedom of association and collective bargaining</li> <li>Supplier Human Rights Assessment</li> <li>Child Labor (Forced or Compulsory Labor)</li> <li>Security Practices</li> <li>Human Rights Grievance Mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Entire IVL workforce</li> </ul>	<ul style="list-style-type: none"> <li>Suppliers</li> <li>Contractors</li> <li>Community</li> </ul>	   	<ul style="list-style-type: none"> <li>Ensuring compliance with the fundamental rights of its workforce, as per UN Guiding Principles and ILO standards</li> <li>Zero Human Rights violations</li> <li>Embedding Human Rights into our merger and acquisitions</li> </ul>
	<b>Human Capital Development</b>	<ul style="list-style-type: none"> <li>Employment</li> <li>Training and Education (Capability Development)</li> <li>Talent Attraction and Retention</li> </ul>	<ul style="list-style-type: none"> <li>Entire IVL workforce</li> </ul>	<ul style="list-style-type: none"> <li>Business Partners</li> <li>Community</li> </ul>	  	<ul style="list-style-type: none"> <li>Unlocking internal leadership potential and develop leaders to deliver and drive the organisation towards its new vision</li> <li>Building and shaping the world class talent systems and culture</li> </ul>

\* Business partners include suppliers, contractors, customers, shareholders, creditors, financial institutions etc.

## Sustainable Development Goals



At the United Nations Sustainable Development Summit in September 2015, world leaders adopted the 2030 Agenda for Sustainable Development, which included a set of 17 action oriented Sustainable Development Goals (SDGs), accepted by all countries and applicable to all. Countries are now mobilizing their efforts to promote prosperity while protecting the world over the next 13 years.

The 17 SDGs and 169 targets seek to eradicate poverty, strengthen human rights, and promote gender equality and the empowerment of women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: The economic, social and environmental. The goals and targets will stimulate action in areas of critical importance for humanity and the planet.

IVL responded by aligning its Group wide strategy on corporate citizenship and philanthropic contributions with the SDGs in 2016. IVL is committed to supporting its activities in the communities where it has operations to support the plan of action for people, planet and prosperity to achieve sustainable development. As part of this alignment, IVL adopted its policy on Good Health and Well-being, Quality Education and Decent Work and Economic Growth.

IVL also aligned its material issues with the SDGs, and will use any relevant corporate information to prioritize its contribution to sustainable development through the SDGs in 2017.





# OUR MATERIAL ISSUES

IVL believes in shared sustainable growth for all our stakeholders in addition to the economic and environmental prosperity of the countries in which we operate. We assess our financial performance not only based on our profits and returns to shareholders, but also in terms of transparency, which encompasses the economic contributions we make through tax payments, domestic procurement, sales, and employment opportunities for local communities.

Indorama Ventures is the leading global manufacturer of PET material for a wide range of container for food and beverage. Today, one in five PET bottles is made from IVL's resins. The company offers different grades to support a variety of customers' requirement and collaborates with them to develop product innovations.

# MATERIAL ECONOMIC ISSUES

## Corporate Governance

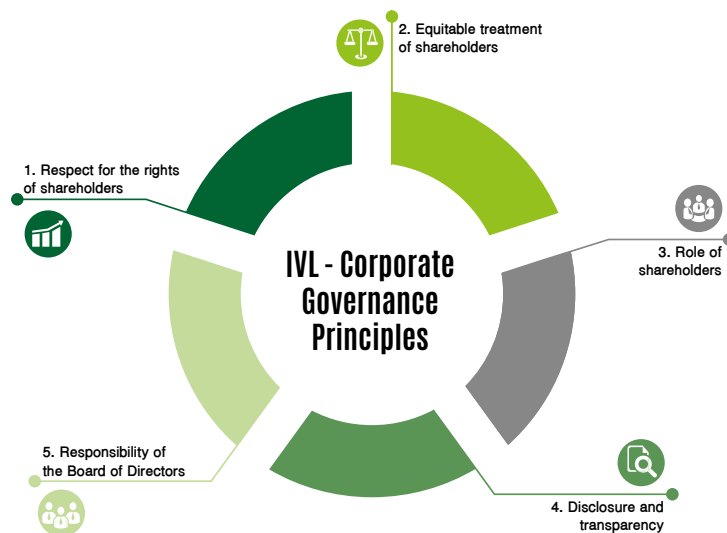
Indorama Ventures aspires to the highest corporate standards, striking a balance between economic, environmental and social goals. For IVL, corporate governance presents a measure of integrity and enables sustainable business growth and long-term value for our stakeholders. Both the board and management are committed to its implementation and practice globally and we do this in the most transparent and ethical manner possible.

With a rapidly growing business, expansion into new territories and with new IVL products being added to the portfolio every year, we are continuously entering into different regulatory environments, and dealing with new challenges and compliance requirements. To ensure that we can adapt quickly, we have established [corporate governance policies](#) and a broad range of governance, risk and compliance initiatives across the organization.

IVL believes that, in order to have good corporate governance in place, it must start at the top. As the leadership of the Company, the senior-most executives must not only ensure that all corporate governance policies are strictly followed and risks carefully considered and managed; they also have to be role models of good governance. Environmental, social and governance indicators are therefore

commonly identified as our senior management's variable pay metrics along with economic performance (EBITDA, ROCE, etc.).

IVL held a training session for the Board of Directors and senior management on the 'Corporate Governance Code and Interpretation for International Corporates' on November 11, 2016, to keep them abreast of corporate governance trends. Invited speaker included Mr. Rapee Sucharitakul, Secretary-General of the Securities and Exchange Commission (SEC), Thailand, who provided updates on the Thai Corporate Governance Code and Directors' Duties.



To drive good governance, processes include the preparation and communication of corporate controls, key policies, enterprise risk management, and regulatory and compliance management. Continuous monitoring is achieved through the risk management and audit committee. An effective and transparent corporate governance and enterprise risk management structure ensures ethical conduct and regulatory compliance.

The above is IVL's Corporate Governance Policy Principles as explained in the Company's Corporate Governance Policy available on our [website](#). As per the policy, IVL is committed to conducting its operations in accordance with the principles of good corporate governance and considers it as the major factor in enhancing its overall success as a responsible member of society.

IVL has not had any material issues or paid penalties for material non-compliance with corporate governance regulations in 2016. We maintain strict processes to manage corporate governance and have not been involved in any regulatory infringement since our listing in Thailand in 2010.

#### 2016:

- IVL did not pay any fines, penalties or settlements due to anti-trust, anti-corruption breaches throughout the year and is not involved in any ongoing antitrust allegations.
- There were no legal actions brought against the organization or its employees for anti-competitive behavior, anti-trust, anti-corruption and monopoly practices and their outcomes.
- No staff member has been disciplined or dismissed due to non-compliance with anti-corruption policies or the laws of respective countries.

The Codes of Conduct for Directors, Employees, Suppliers and the Anti-trust policy have been developed at the group level and endorsed by the Board of Directors for directors, employees, suppliers and others who are working directly or indirectly for the Company. Mechanisms are in place across all levels of management to ensure the effective implementation of policies, and Codes of Conduct. In 2016, all of our new employees received mandatory training on company policies and Codes of Conduct. We have informed suppliers, including contractors, suppliers of non-raw materials, utilities, and services about IVL's supplier Code of Conduct. We received an acknowledgement of receipt of the Code of Conduct from all raw material suppliers and critical non-raw material suppliers and this remains an ongoing process.

**2016 Target:** No material non-compliance of regulations. Company has set a target to publicly report any material non-compliance.

**2016 Result:** No material non-compliance.

**FY 2017 Target:** No material non-compliance.

#### 2017-2020 Targets

- To be a role model in corporate governance through continuous improvement.
- To be recognized globally for good corporate governance standards and practices.
- Every IVL employee is to be aware of their duties and to comply with the laws, regulations, principles of corporate governance, and the company's Code of Conduct.
- To embed zero corruption, transparent business ethics and conduct, and compliance with laws, regulations, and principles of corporate governance in IVL's organizational culture.

## Skill Matrix of the Board of Directors

A skills matrix of the Board of Directors was created to ensure optimum Board composition by identifying the current skills, knowledge, diversity, experience and capabilities desired of a board to enable it to meet both the current and future challenges of the Company. The matrix also provides an opportunity to evaluate the board's composition and consider its future composition in alignment with the strategic objectives of the Company.

The board nomination process takes into account the actual and potential conflicts of interest of any board member in-line with good corporate governance.

IVL recognizes the importance of a variety of perspectives, backgrounds, and experiences of the board for the success of the Company. Diversity and gender equality are important for IVL and the Company is aiming to increase the percentage of women on the board.

The Board has determined that it will target 20% or more female directors by 2025 should there be places and suitably qualified female candidates are available.

In addition to demographic diversity, IVL also pays close attention to expertise of our directors which is valuable to our strategy. The company ensures that the majority of our directors have these key expertise, namely industry (Chemical Business), risk management, accounting/finance, strategic planning, marketing, international experience, operational expertise, sustainability oversight, economics and entrepreneurial experience

## Anti-Corruption

As part of the regular risk management process, all plants periodically evaluate any risks pertaining to the potential for corruption. To date, no plant has identified any significant risk. Furthermore, as a preventive measure and as part of good corporate governance, all existing and new employees have received training on anti-corruption rules, regulations and policies in 2016.

## Innovation Management

Innovation Management (IM) plays an important role in our organization's success. By being creative, pioneering and imaginative, we can carve out a new niche and remain ahead of our competitors. At IVL, our focus is on product and process innovations that integrate environmental and social considerations. IM includes the evaluation of existing systems, practices, and incremental improvements to existing products and processes. The focus is constant and extends to every operation as we encourage creativity to further advance and realize new ideas.

Our business is constantly evolving and continues to face many challenges, and we need new ways of responding in order to remain successful. Innovation allows us to retain an edge and a competitive advantage. To keep pace with rapidly shifting market trends and global challenges, we choose to leverage our strength in innovation. Innovation in development focuses on new products that meet social and environmental needs; the improvement of existing products, processes and their efficiency; discovering opportunities that are likely to emerge in the future; reducing waste and increasing profits; and gaining new customers by diversifying the product range and their applicability.

The Board of Directors of the Company places the highest importance on Innovation Management and Product Stewardship. Innovation adds economic value but more importantly, in the case of IVL, also helps the Company to protect the environment by limiting or reducing emissions in its manufacturing processes and in helping to reduce product toxicity.

IVL aims to offer better value to our customers by responding to their current requirements, and anticipating their future needs by rapidly and effectively developing innovative products.

The key business process in IM is the Stage-Gate system. The basic concept is outlined below. We are globalizing the principles of the Stage-Gate system to better manage R&D programs. Apart from the well-known benefits of the disciplined Stage-Gate process, there is also a benefit in its integration with Product Stewardship, through a formal assessment of a variety of environmental and social impacts.

We are committed to rapidly developing profitable and sustainable products, solve complex technical problems, and provide innovative solutions to our customers.

Constantly innovating and improving business practices also helps attract competent employees while retaining existing staff which is crucial to the long-term health and performance of the Company.

IVL's Fibers Business achieved a vitality index\* of 22.2% in 2016, as against 21.6% in 2015, in line with 22% target for 2016 mentioned in last year's report.

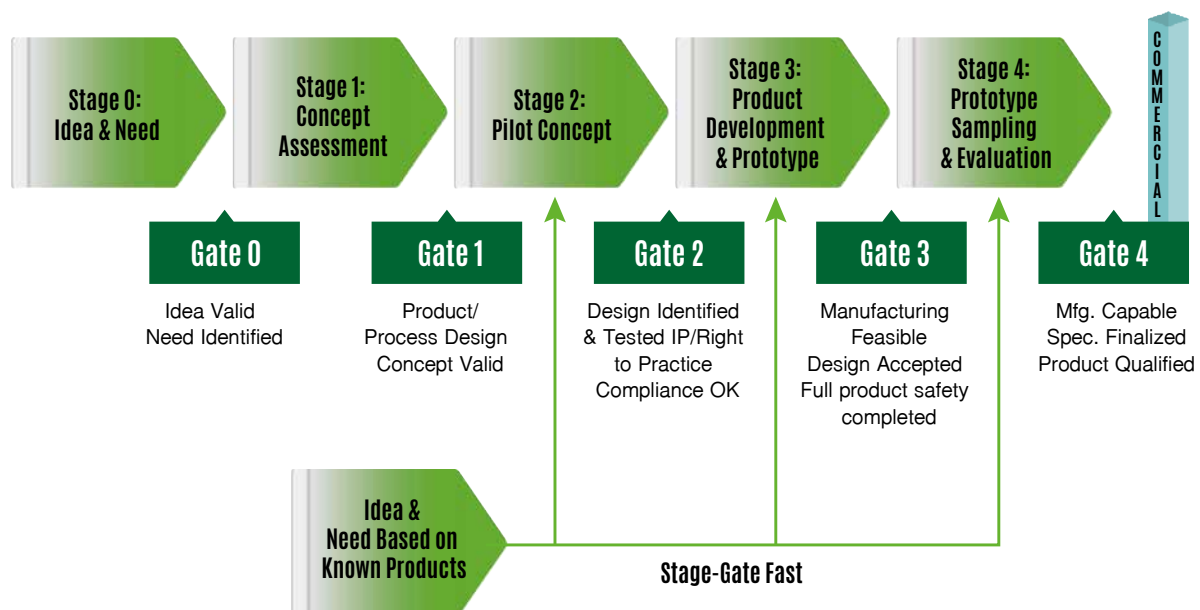
For 2017, we aim to keep vitality index at 20% or above. However, our goal is to maintain or improve up on 2016 result. Set slightly a lower target for 2017 due to expansion of the business in the recent past and some key products developed are moving out of the index.

\* Vitality Index: Revenue generated from sale of products developed during last five years.

### a. Product Innovation

Sustainable and differentiated products can emerge through the development of technology platforms. We have set up checks and balances to ensure that new product ideas are examined for their relevance and commercial and market potential by the relevant Innovation Council before being given final approval for production.

### Schematic overview of the Stage-Gate process to assess R&D programs:



The success of our product innovation can be determined by the number of innovative products we have in our pipeline, patents registered and/or applied for registration, in addition to our vitality index. We are working on programs that build on these ideas to make next generation products with reduced environmental impacts a reality. We continually evaluate the use of more sustainable raw materials to meet the range of performance, economic and compliance requirements.

There were 12 product innovations in 2016 out of which more than 60% are environmental product innovations deriving more than 90% revenues of total revenues from product innovations.

### b. Process Innovation

Apart from raw material changes and new products, IVL also actively pursues projects, **Process Developments with Eco-impact**, directed towards process improvements through process innovation with the objective of achieving one or more of the following goals:

- Increase quality yield (*reducing waste and off-grading*)
- Reduce the cost of production (*reducing energy costs*)
- Increase product consistency (*reducing costs in the value chain*)
- Reduce energy consumption
- Reduce effluents (*into air or water*)
- Meet compliance requirements
- Improve working conditions (*noise reduction*)

There were over 96 process innovations in 2016 out of which more than 60% are environmental process innovations deriving more than 30% revenues of total revenues from process innovations.

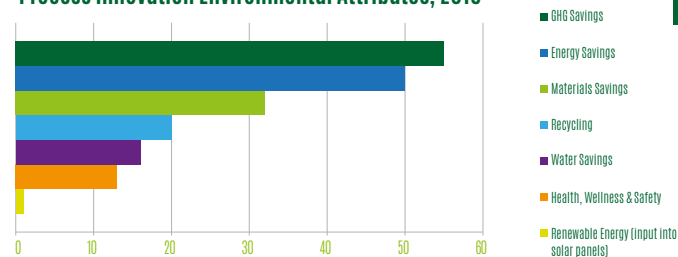


### c. Environmental Innovation

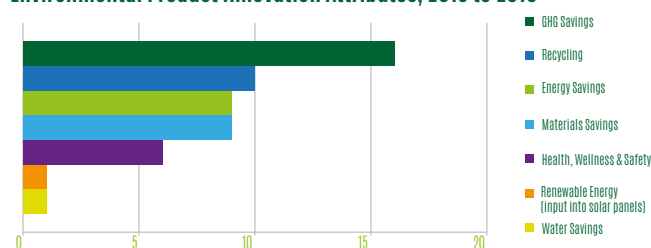
Sustainability is now front and center in the wake of an increased global understanding on the impacts of climate change and that economic development, environmental health and human well-being are all interconnected. Our achievements in sustainable development demonstrate our leadership role in understanding and promoting sustainability throughout the entire value chain. Our Guiding Principles for Environmental Stewardship and Sustainability focus on compliance,

conservation, responsibility, and in promoting the three R's: reduce-reuse-recycle, ensuring environmental stewardship for present and future generations as a fundamental cornerstone of a safe, modern, and sustainable business.

#### Process Innovation Environmental Attributes, 2016



#### Environmental Product Innovation Attributes, 2013 to 2016



### d. Open Innovation

Open innovation provides significant business opportunities as it can reduce costs, accelerate time to market, increase differentiation, increase efficiency and effectiveness of innovation processes, and create new revenue streams for the company. IVL recognizes the importance of open innovation and engages with technology providers, customers, and suppliers to develop new products and processes to create customer value.

In July 2016, as part of open innovation and in collaboration with one of our largest customers, IVL launched containers with handles using PolyClear® EBM PET 5507 that are fully recyclable with clear PET with recognition from the Association of Plastic Recyclers (APR). We are developing these fully recyclable EBM PET resins to convert all containers with handles used in beverage and household applications to PET that can be fully recycled with the clear PET stream replacing either HDPE multilayers or PETG resins, which cannot be recycled.

Since 2011, IVL has collaborated with various technology providers, who have been developing and refining a technology for recycling colored PET waste into “virgin” PET raw materials. In 2016, IVL evaluated some key chemical recycling technologies in cooperation with brand owners with the objective of increasing the recycled content in the virgin resin and further reducing the carbon footprint of PET resin.

## e. The Circular Economy

IVL has the opportunity to play a leading role in bringing customers of recycled products into the product value chain cycle and to develop ways to include recyclability into all products. This is a very important priority for the Company and is included in IVL's climate change strategy. Our participation in Project MainStream, to accelerate business-driven innovation and help scale recycling as part of the circular economy, is one of the approaches we are employing to achieve this strategy.

## f. Research and Development

Our Research & Development (R&D) centers increased to 11 in 2016 worldwide from nine in 2015 as part of our innovation plan. To retain an edge and competitive advantage in our business, IVL leverages innovation to drive efficiencies and effectiveness through improvements in systems and processes.

For the PET segment, R&D is focused on specialty polymer developments in the United States. For the Fibers and Yarns segments, research is conducted in Asia, Europe and United States, with a focus in each region on the industry segments of importance to the sites in the regions using a Centers of Excellence model. As of December 31, 2016, we have more than 250 product patents that are applicable in the regions where our major operating sites are based.

### Our R&D Vision:

We are committed to rapidly developing profitable and sustainable products, solving complex technical problems, and providing innovative solutions for our customers.

## Product Innovation & Business Development



## Regulatory Compliance

IVL recognizes the importance of regulatory compliance for the Company's sustainability. Having operations in multiple countries and jurisdictions increases the risk of non-compliance which is an increasingly major concern. IVL and its entities (subsidiaries including joint venture partners) are required to adhere to the applicable laws, regulations, guidelines, and specifications relevant to its business, local or international, and which cover a vast array of compliance issues. Violations of regulatory compliance can very often result in severe legal punishments, including fines, withdrawal of the product from the marketplace, or plant closures.

The regulatory compliance system at IVL gives confidence to the board, management, customers, investors and other stakeholders as it:



- Delivers better and more strategic information to the board and management, enabling them to identify and manage a growing list of organizational risks.
- Guides the management through the regulatory hurdles of global expansion.
- Plays a key role in addressing the risk of fraud and corruption within the business operations, supply chains and procurement processes.

## Regulatory Compliance System in IVL:

IVL embraces compliance as an enabler of business performance and has integrated the same as a component of the organization's risk management program. Regulatory compliance is monitored through various means:

1. **Compliance Checklist and Compliance Certificate:** Each IVL plant has a compliance checklist and is required to closely monitor the compliance requirements. The plant manager, in general, is responsible for ensuring that the plant is in full compliance and submits the 'Compliance Certificate' on a quarterly basis.
2. **Compliance Monitoring by Business Core Committees on Risk Management:** The business core committees monitor the compliance status of respective business segments and advise the plants as needed.
3. **Compliance monitoring by the Sustainability and Risk Management Committee (SRMC):** Business Core Committees update the status of regulatory compliance to the SRMC highlighting the key regulatory compliance issues on an as-needed basis.
4. **Internal Control System and Internal Audit:** Internal control systems at every stage of business operations help to ensure the required compliance. Furthermore, the in-house internal audit department examines the compliance status as part of their audit and reports the status to the Company's Audit Committee.
5. **Monitoring by the Audit Committee:** In addition to the SRMC, the Audit Committee also monitors regulatory compliance including any litigation by or against the Company or its subsidiaries and associate companies. The Internal Audit department submits its findings at its quarterly meetings.

In addition to the above, through a top-down approach, the SRMC, the Audit Committee and senior management continue to advise all concerned on emerging risks and compliance requirements.

Further, there are no grievances about impacts on society during the reporting period.

As of 31 December 2016, 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.

The Company aims to continue with this approach in the years to come. The teams relating to compliance functions will work together to leverage information and communications technology in order to steadily strengthen our regulatory compliance system, and ensure that the Company not only meets legal requirements, but also acts with the highest ethical standards.

## Business Ethics and Integrity:

At IVL, we value business growth and profitability in the right manner. We are committed to conducting operations to the highest standards of business ethics, principles, integrity and, in many cases, beyond compliance with all applicable laws, rules and regulations. Our Code of Business Conduct and other policies, such as the Code of Conduct for Directors, Employees, Suppliers, Anti-Corruption Policy, UK Bribery Act, Policy on Information Control and Inside Information, Business Partners and Competitors Policy, Policies on the treatment of customers, shareholders, and others, are an integral part of our guiding principles and ethical standards which drives the way we do business around the world. IVL's codes of conduct and our policies are available on our website, [www.indoramaventures.com](http://www.indoramaventures.com) under 'Corporate Governance.' Currently, we have translations in 14 languages to ensure the clear understanding of all our employees.

Upon joining the Company, all new employees are required to undergo mandatory and other supplementary training programs depending on the nature of their work. This can include training on international anti-corruption and anti-bribery regulations, the UK Bribery Act, insider trading, practical ethics and regulatory requirements. Our local human resources teams, with support from the Corporate Governance Section, develop local methods to test the levels of understanding of employees about our policies and codes of conduct.

We also developed guidelines to prevent potentially corrupt behavior. Although the majority of our business deals are not directly related to government, we strongly recommend that our employees be cautious when involved with government personnel and political activities. Donations by the Company and subsidiaries shall strictly follow a policy outlined by the CSR Committee and must be able to prove a positive impact from the donation. More information on our CSR activities can be found in the CSR Section.

While the Company respects employees' rights in participating in political activities, IVL itself does not take any particular political position. No political donations or contributions, directly or indirectly, were made by IVL or its subsidiaries in 2016.

IVL strongly believes in respecting all human rights. We are committed to protecting our employees and other stakeholders from all forms of discrimination and harassment based on their ideological views, race, color, religion, gender, sexual orientation, national origin, age, disability, or any status regarded as a human right. The Company

works to ensure that we provide a friendly and supportive working environment for all employees. This includes protecting our employees from sexual harassment and providing open career advancement opportunities for all. IVL is increasing efforts to deeply ingrain diversity into our culture. Additional information is provided in the 'Human Rights' section in this Sustainability Report.

## Protection of Children's Rights

IVL recognizes and will actively protect the rights of children. The Company declared its commitment to integrate child rights into business practices and accepted the Children's Rights and Business Principles (CRBP). In addition to embracing child rights within the Company and its subsidiaries, IVL requires all of our suppliers, contractors, agents, service providers and commercial partners to hold the same standard.

### Training to Suppliers

A Supplier Seminar was taken place in 2016 to communicate contents of IVL Supplier Code of Conduct and supplier compliances, standards expected from our suppliers, contractors and business partners. The issues included human rights and children rights protection, environmental protection, and anti-corruption practices as well as Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) Program.



## Whistleblower Mechanism

The Company has a whistleblower policy in place. All employees and stakeholders have an opportunity to report any corruption or unethical practices to the Whistleblower Committee without necessarily informing their line managers and without disclosing their identity. The following reporting channels available:

- Line Manager
- Whistleblower Committee, [ethics@indorama.net](mailto:ethics@indorama.net)
- Independent Directors, [independentdirectors@indorama.net](mailto:independentdirectors@indorama.net), to report on a member or members of the Whistleblower Committee
- A written disclosure may be sent to:  
*The Whistleblower Committee, c/o Mr. Richard Jones, Head of Investor Relations and Corporate Communications, Indorama Ventures Pcl, 75/102 Ocean Tower 2, 28<sup>th</sup> Floor, Soi Sukhumvit*

19, Asoke Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand

The Whistleblower Committee will investigate the matter. The committee guarantees the protection of the whistleblower's identity under all circumstances and no action will ever be taken against a whistleblower who comes forward for any reason.

In 2016, two issues were reported to the Whistleblower Committee and both were investigated and resolved. The results of the investigations and the actions taken were reported to the Nomination, Compensation and Corporate Governance (NCCG) Committee and the Board of Directors. There were no pending cases at the end of the year. With advancements in technology, the Company will continue to increase the security of our whistleblower mechanism in order to increase trust in the system.

### Implementation and Training of IVL's Code of Conduct

Training is a continuous and integral process at IVL. Our employees have received instructions and training on our Codes of Conduct, business ethics, corporate governance, anti-corruption, anti-bribery, and risk management.

Upon joining the Company, all new employees are required to undergo mandatory and other supplementary training programs depending on the nature of their work. This can include training on international anti-corruption and anti-bribery regulations, the UK Bribery Act, insider trading, practical ethics and regulatory requirements.

To maintain and develop our proactive standards to ensure that our commitment and practices are implemented in the spirit in which they were created, training sessions have been conducted for employees including the Company's subsidiaries through live seminars and online self-learning courses. Over 9,000 employees are covered by our training courses, both executed by our Corporate Governance Section and local Human Resources teams in 2016. The Corporate Governance Section also developed in-house training videos on several issues, such as conflicts of interest and use of inside information for dissemination to overseas subsidiaries which were posted on the corporate YouTube channel.

- The Codes of Conduct, anti-corruption and bribery policy and other policies, available on the Company's website, [www.indoramaventures.com](http://www.indoramaventures.com), are applicable to all IVL employees, its subsidiaries, associates, joint ventures, suppliers and contractors who are working directly or indirectly for the Company.
- There were no material non-compliances in 2016, and the Company is targeting the same outcome for 2017.
- During 2016 reporting period, there were no cases or incidents of corruption or bribery, no employee, contractor or supplier was dismissed, and no contract with any business partner was terminated on allegations of corruption.
- No legal cases involving corruption have been brought against the Company or its employees during the reporting period.



## Customer Relationship Management

IVL is a market leader in the polyester value chain. In order to maintain this position and drive consistent, sustainable growth, we believe that good Customer Relationship Management (CRM) is an integral part of our long-term sustainability.

Our key strength in collaborating with our customers is to engage with them, listen to their advice and better understand their needs. There are various communication channels available in order to collaborate and meet our customers' needs. The channels include regular interactions through meetings, tele-conferences by respective executives, senior management, including our CEOs and Group CEO, and our Annual Customer Satisfaction Survey.

### Customer Satisfaction and Customer Retention

The Customer Satisfaction Survey enables us to understand our customers' needs and their satisfaction with our products. This, in turn, helps us to foresee our customers' future plans. Our innovation teams include customer needs in their R&D planning to achieve increasingly high customer retention. This then drives our product and service innovation approach, which converge to ensure that we move closer to one of our values, *'The customer is why we exist'*.

Overall average scores of the Customer Satisfaction Index (CSI):

Business Segment	2015 CSI Result	2016 CSI target	2016 CSI Result	2017 CSI Index Target
Fibers Business Segment	80%	Equal to or better than 2015 Satisfaction Index	83%	Equal to or better than 2016 Satisfaction Index
PET Business Segment	85%		85%	
Feedstock Business Segment	86%		88%	
Wool Business Segment	78%		86%	
Packaging Business Segment*	85%		80%	
IVL Overall CSI	86%		86%	

\* In 2016 Packaging Business has increased the scope of the survey to its global operations from Thailand alone in 2015 and the same are not comparable.

Overall average scores of the Customer Retention Rate (CRR) by percentage of total revenues:

Business Segment	2015 CRR Result	2016 CRR Target	2016 CRR Result	2017 CRR Target
Fibers Business Segment	71%	Equal to or better than 2015 retention rate	72%	≥73%
PET Business Segment	94%		97%	≥94%
Feedstock Business Segment	76%		97%	≥80%
Wool Business Segment	84%		90%	≥85%
Packaging Business Segment	95%		95%	≥95%
IVL Overall CRR	82%		93%	≥85%

\* CRR by Revenue



In 2016, the Customer Satisfaction Survey process was standardized globally to bring in uniformity, add business value through improving efficiency in the process, and uniformity in benchmarking.

In a business largely driven by market pricing, customer satisfaction may also be measured by repetitive orders over the long-term. As plant utilization rates continued to remain high in 2016 and are expected to rise even further in 2017, repeat or larger orders are seen as reflection of the satisfaction of the client with our goods and services.

The Customer Satisfaction Survey process was standardized globally in 2016

In 2016, there were no incidents of significant non-compliance with regulations or voluntary codes concerning the health and safety impacts of our products. In addition, there were no complaints regarding any breach of customer privacy or loss of customer data.

## Supply Chain Management:

### Enhancing the due diligence process across our supply chain

The supply chain carries an intrinsic risk that can have a significant impact on the Company and our stakeholders. IVL recognizes the importance of efficient supply chain risk management relating to ESG factors. To minimize this, we have been focusing on positively influencing and collaborating with supply chain partners to promote best practices in the areas of human rights, health and safety, and compliance with environmental, labor and other applicable regulations.

### Supplier Evaluation Process:

The supplier evaluation process, initiated in 2014 and extended to 100% of raw material suppliers and critical non-raw material suppliers in 2015, has been continuing in 2016. This process is applicable to all new raw material and critical non-raw material suppliers. The process involves a systematic and harmonized approach, requesting that suppliers respond to a self-assessment questionnaire that will assist in assessing ESG risks and opportunities, risks relating to human rights, child and forced labor, governance (regulatory compliance) and improving a sustainable supply chain.

IVL believes in efficient eco-logistics management. In 2016, we continued to invest in supply chain initiatives to improve our operational efficiency, for instance directly reducing raw material transportation costs and reducing greenhouse gases indirectly at several sites.

In 2016, IVL participated in the EcoVadis evaluation/accreditation platform which assesses 21 CSR criteria under four main themes:

- Environment
- Labor Practices and Human Rights
- Fair Business Practices
- Sustainable Procurement

IVL achieved a Gold Recognition ranking in the top 5% of performers

### Case study: Improving efficiency in the supply chain

PTA plants in Thailand started to export their products by train, whereby the empty and loaded containers are moved by train from Map Ta Phut to Laem Chabang Port. Movement from plant site to Map T Phut continues to be by truck.

In this new business model, 60 containers move between the station and port at a time. This brings down diesel consumption by almost 76% (34.5 l/trip by road vs. 8.26 l/trip by train) and thereby reduces carbon emissions. Estimated reduction in energy consumption is 19,715 GJ/year and its equivalent reduction in GHG emission is 1,388 tons of CO<sub>2</sub>/year. Furthermore, there is a significant reduction in truck movement on the road. The approximate annual saving is USD 150,000, which will further increase once the PET and Polyester businesses join the project.

This project is in line with IVL's commitment to support, innovative sustainable and an environmentally-friendly supply-chain through the support of our suppliers and partners.



# MATERIAL ENVIRONMENTAL ISSUES

The aim of our [Corporate Values](#) and [Environmental Policy](#) is to protect and enhance the environment around us. We aim to reduce the impact of our operations on the environment and minimize potential impacts on our business. Year after year, we are working towards this objective by achieving improved resource efficiencies through process and environmental innovations, and by keeping our production as environmentally-friendly as possible. Energy represents a large portion of our total costs. We aim to conserve energy where possible as it directly translates into cost savings. We are increasing the use of renewable energy across the business as natural resources are finite and we recognize the need to lower our dependency on carbon-based energy production.

Reducing greenhouse gas emissions and efficient waste management will ensure that we retain our license to operate in each of the countries where we have our operations. Efficiency is the key to lowering costs that go towards improving our bottom line. Being a raw materials producer for the world's leading consumer goods companies, we are fully aware that the recycling of all products seems like an inevitable challenge that we must meet. IVL recognizes this as an important opportunity for a better future. For this reason, we have expanded our recycling business globally positioning ourselves to positively contribute to a circular economy.

As a company, we recognize the need to continue improving our environmental performance by increasing operational efficiencies, and conforming to environmental laws, regulations, and standards to achieve zero material non-compliance issues. We are aware that legislation may be introduced that can negatively impact our business if we are not proactively taking the lead in protecting the environment. Communities rely on us for employment, but also expect that we continue to be a responsible corporate citizen. We want to ensure that we have no negative impact in the communities where we operate.

## Product Stewardship

While polyester itself is not harmful, we are always seeking ways to lower the environmental impact and toxicity in our raw materials and other chemicals through our commitment to the advancement of society. As such, product stewardship plays an important role in our operations in reducing the risk of the adverse environmental, health and safety impacts of our products.

Innovation Management and Product Stewardship include an inter-related set of business activities, policies & procedures, and organizational design. While Innovation Management is sharply focused on product development, it is necessary to include a range of Product Stewardship goals in the processes.

Product Stewardship encompasses three sets of procedures — product safety, process toxicity, and eco-impact (e.g. Life Cycle impact). The Product Stewardship function focuses on chemicals used during our manufacturing processes.

**Shared Responsibility:** IVL shares the responsibility in ensuring that the products we supply, manufacture, distribute, use, dispose/recycle or regulate are managed safely throughout their life cycle. As a manufacturer, we do not have control over the actions of our customers throughout the product's life cycle. For instance, IVL makes fibers for a very large number of different applications, many of which are not revealed by our customers. Converting processes used by our customers also tend to be varied and are sometimes confidential. Therefore, conducting a cradle-to-grave life cycle impact has not been possible. Consequently, IVL has adopted a dual eco-impact strategy: (a) understanding and lowering, where possible, cradle-to-factory gate eco-impact and, (b) focusing on lowering eco-impact in use. The latter approach has been successful in a number of cases in having a far greater impact than what could be achieved emphasizing cradle-to-factory gate eco-impact.



## Product toxicity

IVL continues its efforts in lowering product toxicity by:

- Ensuring compliance of products as used by customers or end consumers
- Lowering toxicity impacts during the manufacturing process

Though toxicity is not a concern for IVL, we stringently monitor our raw materials. We have evaluated chemicals for exposure to our employees and the environment, and eliminated volatile products that may present a risk. We are taking a proactive approach, actively engaging in assessments and ensuring that we meet the European Union's REACH regulation and other compliance requirements. Any potential issue that is discovered with regards to registration is actively replaced with known, registered materials or with alternatives that are safe based on their chemistry. The key areas where IVL Fibers has changed raw materials are finishes, pigment master batches, and catalyst systems for third party supplied polymers.

## Sustainability and R&D

The following are the three key focus areas for sustainability across R&D functions:

- Product development programs with a focus on sustainability.
- With a goal of delivering improved internal processes, we are deploying the Stage-Gate system for improved innovation processes. A key goal is to take a more proactive approach to the pre-market assessment of bio-derived polymers.
- IVL's vision is to be a leader in the chemical industry. In working towards this objective, we have set up a Product Stewardship

Working Group with subject matter experts from different subsidiaries to share practices and assist one other in improving the product safety assessment of our products. We are also engaging in a comprehensive Life Cycle Assessment (LCA) of our products and will develop processes using the LCA results to define future development programs.

## Life Cycle Assessment

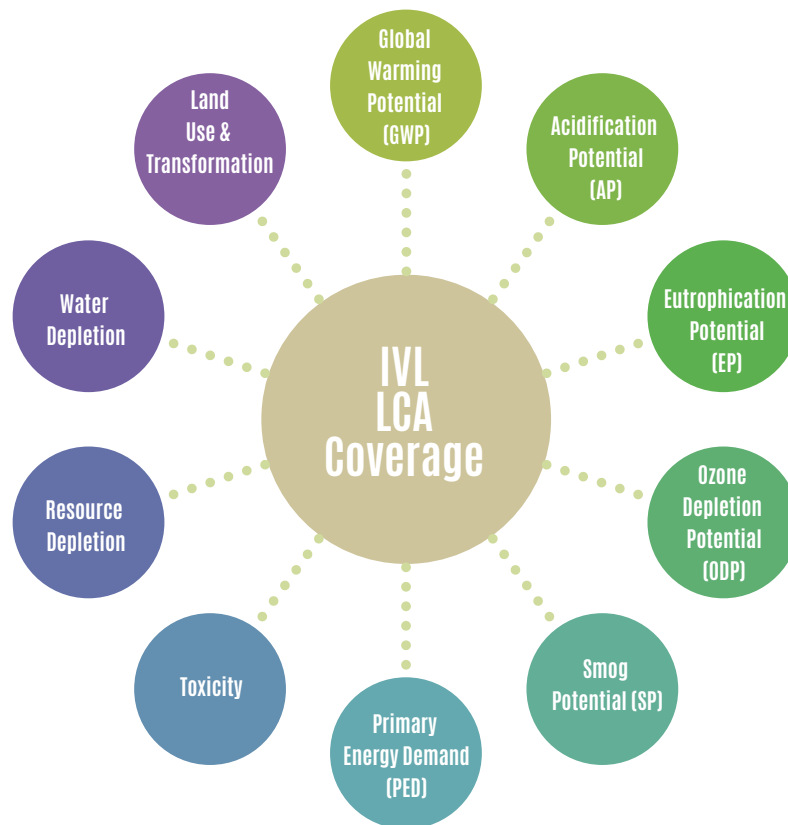
Life cycle considerations are an important part of successful innovation processes at IVL. In-line with our end customers and society, we remain focused on the life cycle impacts of our final products throughout their manufacture, use and disposal. We can make substantial progress by reducing the life cycle impacts of final products, even though the metrics in our internal processes may increase.

In 2016, IVL expanded the coverage of life cycle assessments in accordance with ISO 14044/44 as LCAs provide an important framework and methods for identifying and evaluating environmental impacts associated with the complete life cycle of our products, i.e. from raw material extraction to product disposal. LCAs also help the Company in differentiating its products from those of our competitors.

In 2016, LCA process has been initiated for all plants in Asia and some plants in North America covering 55% of overall global production. We aim to extend LCA to the rest of our operations in 2017-18 by working with an external consultant utilizing GaBi's life cycle assessment software.

Upon completion of ongoing LCAs, over 70% of IVL's total production will be covered and we are targeting over 95% coverage by 2020.

Our LCA study includes the following criteria:



### Value beyond IVL: Investing for a global impact

We see a significant opportunity in making a contribution beyond the operational boundaries of our business by helping accelerate the development of the green power market and supporting carbon offsetting and the development of sustainable communities.

### Beyond Compliance

IVL aims to stay ahead of the curve by going beyond conventional compliance requirements. Our commitments to lowering our overall environmental impact include a target of 100% Energy and Environmental Management Systems in all our operations by 2020, and achieving 100% compliance of the European Union's REACH regulation by 2018.

### Renewable Resources

Increased production of biofuels depends on sufficient food security and attaining the right balance between food production and industrial needs. The sustainability imperative also applies to concepts of renewable resources for IVL.

The use of renewable resources, such as solar, wind, biomass, bio-based raw materials, which include Poly Lactic Acid (PLA), and Bio-MEG, have been increasing at IVL year-on-year. Over 26,000 tons of PLA has been produced in the last five years, reducing our carbon footprint by over 40,000 tons.

### **Environmentally friendly, customized and efficient: Fibers from polyester and PLA for nonwoven applications**

The growing demand for “green” products is causing manufacturers, especially in Europe, to increase their efforts in finding ways of improving the sustainability of their products and their manufacturing processes. Along with optimizing existing products, they are also looking at replacing fossil fuels with primary materials that are renewable.

An increased focus on biofuels has shown that a balance must be struck between food production and industrial needs, in order to safeguard food security. This is not a zero sum game, as companies can play a beneficial role by continuing to innovate in their production and operations processes leading to more positive outcomes.

The sustainability imperative also applies to concepts of renewable resources. Man-made fibers offer solutions that are unattainable with natural fibers alone. A total of 40% of the global provision of textiles is covered by products made from 0.8% of the total consumption of crude oil — man-made fibers are manufactured from this quantity. These can be recycled, however, the current focus remains geared to recycling PET bottles, and less on reprocessing used textiles and returning them into circulation.

Trevira is a leading manufacturer of fibers for bicomponent applications in nonwovens and is basing its sustainability concept on three areas - optimizing existing products in the PES fiber program, extending the use of renewable raw material fibers (PLA), and developing a concept for recycling Trevira products.

**New development with bicomponent fibers:** Trevira is currently working on a PET/PE fiber with a low melting point, which saves energy during processing and/or makes a higher operational throughput possible. It also involves a reduction in the thermal loading on the basic raw material. A further development, one that is already available, is a modified PET/PE fiber that reduces the production of dust during the manufacturing process of nonwovens. This improves the bonding of the matrix fibers, making it possible to lower the proportion of bonding fibers used. The applications include all kinds of hygiene nonwovens, as well as other technical end uses.

### **PLA fiber developments for an ecological future**

Since 2010, Trevira has been employing renewable raw materials in its fiber production in partnership with NatureWorks and as a supplier of the material (PLA/Ingeo™). Of the plant biopolymers, polylactide presents the greatest opportunities in technical terms, since it combines high functionality with preferred degradation properties. Like polyester, PLA fibers are recyclable, but are also up to 100% bio-degradable (industrially compostable). They constitute a sustainable alternative to fibers with a crude oil base, in that it is possible to produce more intelligent materials.

## **Product Design Criteria**

Our product design criteria also includes environmental impacts associated with the procurement of raw materials, product manufacturing, product use and product maintenance as well as a reduction in hazardous materials, use of recycled components and support for our customers initiatives in weight reduction.

Light weighting of end products has become a strategic lever to provide multiple benefits including cost and life cycle impact. For example, there is clear recognition between fuel economy of a vehicle and its weight. To meet the demanding fuel efficiency standards set for 2020 implementation, automotive companies are pursuing multiple approaches including light weighting. In tire application, the benefit in fuel economy comes from reduction in rolling resistance with

lighter tires. Performance Fibers has developed ECOTEC™ tire cord fabrics that allow for reduction in weight of a tire by up to 350 grams, corresponding to reduction in rolling resistance by up to 2.5%.

## **Reducing our cost to purchase energy**

Efficiency and cost reduction are important components of our energy strategy. Our strategy includes increased use of green power wherever possible and available. Green power provides both an economic and an environmental return and supports our mission to lower the carbon intensity in our operations. Orion Global PET, our wholly-owned subsidiary in Lithuania, is using 100% green energy. Several other entities are using green energy such as solar, wind power, and biomass.

**CASE STUDY: Showing the way to a sustainable future***Trevira (Germany)*

As a manufacturer of man-made fibers, Trevira takes responsibility for the environment and society and is committed to the Responsible Care initiative of the Association of the Chemical Industry - Verband der Chemischen Industrie (VCI). The aim of the Responsible Care program is to achieve ongoing improvements in protection of the environment, plant safety and in safeguarding the health of consumers and employees — independently of the requirements of the law. This fundamental concept is reflected in the company's policy: New products are sustainable when they are more environmentally friendly, or "greener," than traditional products — from manufacture through the consumption stage to disposal/recycling.

Trevira reviews the necessity of using toxic and intensively migrating substances in its manufacturing processes to ensure that where at all possible, the use of such substances is avoided. This includes reducing the number and volume of chemicals required to a minimum during storage and in actual use; and replacing dangerous chemicals, wherever possible, by less hazardous products and ones that are more environmentally friendly. As part of addressing toxicity in the value chain, the Company is working with suppliers to declare environmental compatibility for dyestuffs that are employed and in compliance with the EU's REACH regulation.

In efforts to use renewable raw materials, Trevira introduced fibers made from Poly Lactic Acid (PLA) (based on Ingeo™) into its product range in 2010. This raw material is made from 100% renewable plant resources. In PLA production, up to 85% less greenhouse gases are emitted, and up to 69% less energy is required for its manufacture into resin when compared to traditional polymers. After use, products made from these fibers are recyclable and can be industrially composted or degraded into lactic acid, its basic raw material, in a down cycling process.

Trevira continuously invests in environmental techniques to further optimize the use of its resources, to conserve energy and cut emissions. The Company's strategic goal is to reduce specific energy input by a further 10% by 2020 compared to 2012 levels. Savings in energy and CO<sub>2</sub> emissions are achieved by optimizing production processes i.e. the polymerization process is directly followed in part by fiber spinning, thus avoiding the production of intermediate products (chips) and by reducing energy use by ensuring total insulation of its production units. In addition, Trevira has installed solar rooftop systems at its plants helping to increase the share of renewable energy in total energy production.

**Case Study: Optimizing the production process, reducing environmental pollution***Performance Fibers (China)*

IVL fully supports China's policy of reducing emissions and increasing energy efficiency while promoting technological progress, which is also integral to IVL's sustainability mission. IVL's objectives in achieving its sustainability goals are part and parcel to achieving the Company's stated vision: To be a world-class chemical company, making great products for society.

At our Performance Fibers entity in China, has focused on resource efficiency and reducing chemical waste. The chemical waste from producing tire cords is of a complex structure, does not biodegrade easily and carries high treatment costs. In 2016, the entity has initiated a project to reduce the chemical consumption in production work. This project has achieved a 6% reduction of chemical consumption for some special recipes. The plant has also set a higher goal in 2017.

**IVL's Growing Recycling Business:**

IVL's recycling business, which is growing year-on-year, provides environmental, social and economic benefits. Recycling production has grown from just 4,000 tons in 2011 to 398,000 tons in 2016.

**Social Benefits:**

- Over 0.5 million tons of PET waste saved from landfill from 2011 to 2016.
- Assuming 5% of total PET waste going for landfilling, our recycling business yielded financial benefit worth over 1.8 million euros in landfill disposal costs from the recycling (based on a European average landfill disposal cost).
- Those in low-income bracket generate additional earnings by being part of the collection and distribution of PET bottles for recycling.
- Employment (direct and indirect) from Recycling: As per the [United Nations Development Program \(UNDP\)](#), although recycling more generally is often viewed primarily as an environmental concern, it can provide important employment and income-generating opportunities. The recycling of 1,000 tons of PET generates estimated 10-15 additional jobs in the waste management sector. Based on this estimation, IVL creates 4,000 — 6,000 direct and indirect additional jobs from recycling 398,000 tons of PET.



## Environmental Benefits:

- Over 156,000 tons of CO2 reduction by recycling 0.5 million tons of PET bottles from 2011 to 2016.
- Contribution to the Circular Economy:

Wellman, a wholly owned subsidiary and IVL's recycling business strategy fits perfectly with, and supports many of the key objectives of the Circular Economy including:

- > The strategy on plastics in the circular economy, addressing issues of recyclability, biodegradability, the presence of hazardous substances in plastics, and the Sustainable Development Goals (SDGs) target to significantly reduce marine litter.
- > A common European Union target for each member state to recycle 65% of municipal waste.
- > A common European Union target for each member state to recycle 75% of packaging waste by 2020.
- > A binding target to reduce landfill to a maximum of 10% of all waste by 2030 for each member state.
- > Promotion of economic instruments to discourage landfills.
- > Promotion of re-use and stimulating industrial symbiosis - turning one industry's by-product into another's raw material.
- > Economic incentives for producers of green products and supporting recovery and recycling schemes.

## Economic Benefits to the Company:

The recycling business has been generating regular increased revenue for the Company.

## Year-on-Year Growth of Recycling Production



\* rPET resin contains "up to 25% recycled content"

\*\* CAGR: Compounded Annual Growth Rate

## Environmental Compliance

At IVL, we have a consistent and organized environmental compliance management system in place and are proactive throughout the year in ensuring that our operations are in accordance with all applicable environmental laws, regulations, standards and other requirements. In the last few years, environmental reporting has gone beyond simply demonstrating compliance with environmental and other applicable regulations. IVL aims to go further in terms of compliance including adhering to 'Responsible Care,' a voluntary commitment by the global chemical industry to drive continuous improvement and

achieve excellence in environmental, health and safety and security performance.

Environmental compliance benefits the Company by saving on costs but also creates value by offering numerous protections - to our employees, the health of our contractors, corporate assets, communities surrounding our plants, and most importantly, the reputation of the Company.

Environmental compliance management keeps hazardous air emissions, spills, and waste from our operations within regulated limits. In adopting stringent environmental compliance management, IVL ensures there are no cases of environmental non-compliance while improving public health, economic productivity, and the environment. In alignment with our sustainability objectives and to support our commitment of having no major environmental non-compliance, we have performance-based incentive schemes for senior management, heads of plants and concerned EHS managers.



FiberVisions, Varde, Denmark

### 2016 Target:

No major case of environmental non-compliance

### Achievement:

- No major cases of non-compliance across all of our operations
- Zero fatalities

IVL recognizes that both the environment and economy are closely-linked and that environmental sustainability is the key to the Company's future success.

## Committed to protecting the environment

- IVL is embedding environmental performance and sustainability principles within all of our operations, management systems and practices
- IVL is efficiently utilizing its resources, and has adopted the practice of reducing, reusing, and recycling in addition to promoting workplace health and safety at all of its operations.



- The Company has a continuous target of having no significant cases of non-compliance with regards to environmental regulations, which it will achieve through effective environmental compliance management.
- We have a system of informing and updating the board level committee on the status of the Company's overall compliance on a quarterly basis.

We continuously monitor the impacts of all our products on the health and safety of our customers and embed the results for improvements. This is a continuous and ongoing process though there is no impact currently from any of our products.

There were no incidents of significant non-compliance with regulations during the reporting period except in the following two cases:

- One of our entities in the United States was served with a notice of an environmental violation in 2016. It is yet to be finalized.
- There was an HTM leak from the piping during the commissioning of a new HTM heater at one of our entities in Thailand. The situation was brought under control immediately and there was no effect on the soil, water and surrounding community. The incident was reported to the Stock Exchange of Thailand on 30 September 2016. A copy of the report is available on our website.

### IVL's Environmental Compliance System:

IVL monitors environmental compliance through various means:

1. Compliance Checklist and Compliance Certificate
2. Compliance monitoring by Sustainability and Risk Management's Business Core Committees
3. Compliance monitoring by the Sustainability and Risk Management Committee
4. Internal Control System and Internal Audit
5. Monitoring by the Audit Committee

Further details on our compliance system are available in the Regulatory Compliance section in this report.

In 2016, no significant fines were paid for non-compliance with any environmental laws or regulations concerning the provision and use of our products, and there were no monetary or non-monetary sanctions against IVL.

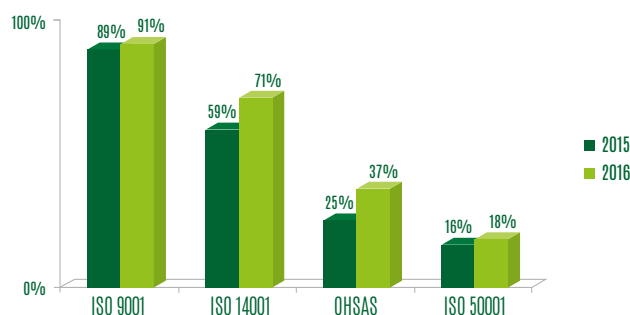
Further, there were no grievances filed about environmental impacts.

## Environmental Management

For IVL, the Environmental Management System (EMS) is an important tool to manage the impacts of our activities on the environment. It provides a structured approach to planning and implementing environmental protection measures and enables us to achieve the following benefits:

- Setting up and reviewing environmental goals and targets
- Improving environmental performance through operational eco-efficiency and resource conservation
- Establishing programs and processes to meet the set goals and targets
- Identifying opportunities for improvement
- Monitoring and measuring progress in achieving the objectives
- Ensuring environmental compliance and reducing the risk of non-compliance
- Reviewing progress of the EMS and making improvements
- Improving the health and safety practices for employees and the communities around our operations
- Addressing energy conservation, operational control and environmental stewardship
- Developing new customers/markets
- Enhancing employee morale, and our image with the public, regulators, lenders, and investors
- Increasing employee awareness of environmental issues and responsibilities
- Enhancing compliance and preventing pollution
- Increasing efficiency/reducing costs

More than 70% of our operations have ISO 14001 Environmental Management certification and more than 18% of our operations have ISO 50001 Energy Management certification. [IVL's ISO Certification status](#) is available on our website.



IVL ISO Certification status: 2015 vs 2016

IVL's management developed the environmental policy, which is available on our website, to demonstrate their commitment to implementing environmental improvements in the Company's operations.

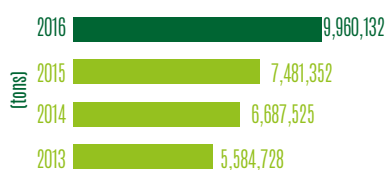
## Carbon Footprint

In 2016, IVL calculated direct and indirect emissions (GHG Scope 1 and 2) for all of its operations globally in accordance with GHG Accounting Protocols - Greenhouse Gas Protocol on Corporate Accounting and Reporting by the World Resource Institute (WRI)/ World Business Council for Sustainable Development (WBCSD) and ISO 14064-1:2006.

We also aim to calculate Scope 3 emissions globally for selected criteria in 2017. In 2016, overall GHG intensity was reduced in-line with our 2020 target of a 6% reduction from 2013 levels.

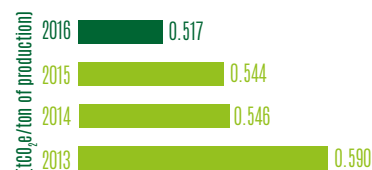
## Total Production in Tons

**9.96**  
million



## Total GHG Emissions Intensity

**0.517**



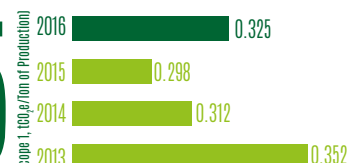
## Direct GHG Emissions

**3.23**  
million



## Direct GHG Emissions Intensity

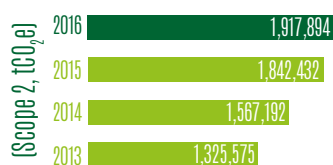
**0.325**



In 2016 the total direct emissions have increased with the addition of two new coal based power plants including acquisition of new plants in Feedstock and PET business segments.

## Indirect GHG Emissions

**1.91**  
million



## Indirect GHG Emissions Intensity

**0.192**



In 2016 the total indirect emissions have increased marginally with the acquisition of new plants in Feedstock and PET business segments due to lower electricity purchase because of self generation of power. However overall GHG emissions / ton has reduced.

### IVL's Targets relating to the Company's Carbon Footprint

#### 2020 Targets

- IVL has a corporate target of a 6% carbon intensity reduction from 2013 levels.
- Disclosure of 100% of Scope 1 emissions, 90% of Scope 2 emissions and selected scope 3 criteria for 100% of all plants.
- 100% reporting assurance on plant coverage.
- ISO 9001, ISO 14001, ISO 50001 and OHSAS 18001 (or its equivalent) for 100% of operations under IVL operational control.

(\*applicable to IVL Group sites which have been in operation in IVL Group for at least two-years)

#### 2016 Achievements:

- 4.96% reduction of combined Scope 1 and 2 emissions over 2015.
- 100% disclosure of Scope 1 and 2 GHG emissions
- Over 50% reporting assurance on plant coverage for selected indicators and 100% assurance for Scope 1 and 2 GHG emissions
- ISO 9001 Certification for 91% of operations, ISO 14001 for 71% of operations, ISO 50001 for 18% of operations, and OHSAS 18001 (or its equivalent) for 37% of operations

### GHG Scope 1 and 2 emissions verification by external assurance:

For the first time, TÜV Nord Cert GmbH verified and provided reasonable assurance of IVL's direct and indirect CO<sub>2</sub> (GHG Scope 1 and 2) emissions for all IVL sites in accordance with ISO 14064-3.

**Case Study: Light weighting and being close to the customer is a win-win strategy**

IVL has enhanced both its business practices and its results on environmental sustainability through a business innovation strategy of improving on its geographic representation and reducing the weight of its bottles.

Previously, our products (PET, preforms, bottles, etc.) were supplied or shipped to the plants for use by its customers including soft drinks or bottled water manufacturers resulting in both economic and environmental costs. IVL raised the bar to its advantage by co-locating in its suppliers plants, resulting in a huge reduction in transportation and logistics expenses. Taken a step further, some products were previously exported to countries such as India, Turkey, Canada, Philippines, Myanmar and Nigeria, whereas IVL now has operations in these countries, resulting in tremendous cost and energy savings.

**Passing on Environmental and Economic benefits to customers:**

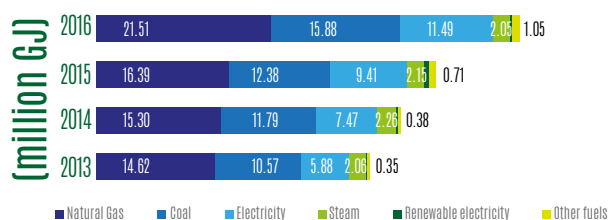
The innovation extends to the actual product. In addition to moving close to suppliers and customers, by reducing the weight of the preforms and bottles, but preserving its quality, build and reliability, reductions in plastic use are positive economic and environmental outcomes for both IVL and its customers. One example involves light weighting of bottles, preforms and reduction in transshipments. As a result of light weighting of bottles and preforms, the PET and HDPE reduction (inclusive of bottles, water closures and preforms) increased more than five-fold from approximately 651 tons in 2014 to 3,796 tons in 2016. IVL also saved a total of 1,027 container trips in 2016 in the Philippines, Ghana and Myanmar alone, up from 267 trips in 2014, an almost fourfold increase. At 15 tons per container, this is a massive reduction in the Company's transportation costs and carbon footprint 1,440 tons approximately.

Through this example, IVL is taking concrete steps on its sustainability roadmap by seizing disruptive opportunities through its environmentally focused innovation and also remaining adaptable by choosing to be close to its customers.

**Energy**

IVL's focus on energy efficiency has been continuously increasing as this further helps the Company's competitiveness by reducing energy costs and dealing with climate change. The Company has been undertaking several energy saving initiatives concurrently. IVL reduced its energy intensity from 5.54 GJ per ton of production in 2015 to 5.25 GJ per ton of production in 2016.

**Total Energy Consumption**

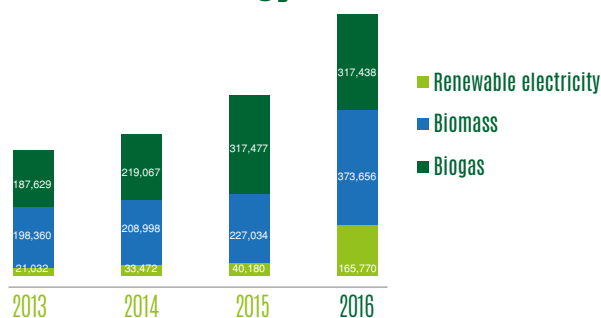


**Renewable Energy**

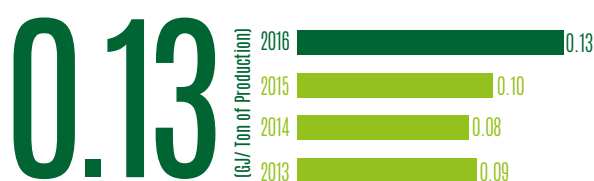
Some of our plants, namely Orion Global Pet, Lithuania; Trevira in Bobingen and Guben in Germany and Indorama Holdings in Lopburi, Thailand, have installed solar power plants to generate green renewable energy for captive consumption. The OGP Lithuania plant has gone green by purchasing electricity from clean energy sources (solar, wind, hydro) to further reduce their carbon footprint. OGP could reduce their GHG emissions by 62% as compared to year 2015.

New biomass heaters have been installed at OGP, Lithuania and Indorama Ventures Polymers Rayong, Thailand, to reduce fossil fuel use and increase renewable energy consumption. Our other plants, namely Indorama Ventures PTA (Montreal), TPT Petrochemical, Indorama Petrochem, Thailand, Indorama Ventures Xylenes and PTA have invested in infrastructure to use biogas produced from wastewater treatment plants to also reduce their fossil fuel consumption. Additionally, the Performance Fibers (Kaiping) site uses biofuels to reduce their energy footprint. Overall renewable energy consumption has increased from 407,021 GJ in 2013 to 856,864 GJ in 2016.

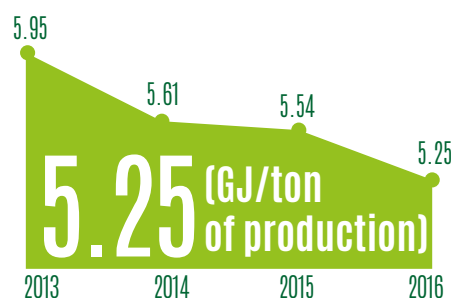
**Renewable Energy 2013-2016 (GJ)**



**Renewable Energy Intensity**



**Energy Intensity**



## Energy Return on Investment (EROI)

We are committed to the management of our environmental footprint. Every year, we invest in initiatives having a positive environmental impact as well as cost savings to IVL. All of our investments go through a feasibility and financial analysis to ensure that each of our projects is sustainable. Through our Management Information System (MIS), we track our capital expenditures, operating expenditures, cost savings and environmental impacts for all our projects. We are continually improving our MIS and therefore improving its coverage of our plants as well as our projects.



The following are some of the major energy saving capex projects completed in 2016 that were undertaken as part of IVL's operational excellence and to reduce GHG emissions:

- Installation of a new steam turbine at an Indorama Ventures Spain plant to process and convert steam into power.
- Installation of a higher capacity RTO unit at Indorama Ventures Rotterdam Plant as part of a PTA plant expansion. The existing CATOX unit will be removed as the RTO unit will reduce operating costs and VOCs, which in turn, will lead to improved air quality.
- Installation of a hot chip conveyor system by Performance Fibers China to obtain raw materials from Guangdong IVL China, which will reduce operating costs and energy savings.
- Installation of high efficiency chillers at the Auriga plant which use an environmentally friendly refrigerant and reduce power consumption.
- Installation of a vapor absorption chiller that operates with steam generated from coal-fired heaters which reduces operational costs and the reduced use of refrigerants.

We also had several non-energy savings related projects such as water savings, reducing raw materials, chemicals, and feedstock consumption (e.g. acetic acid, para xylene), reducing wastewater sludge disposal, and a reduction in other waste in our processes which helped in reducing the air emissions.

- Retrofitting of Thermic Fluid Heater to convert Pet Coke instead of thermal coal
- Scrubber units for the dip vacuum exhaust system, waste solid drying unit at Performance Fibers, China

## Environmental Project Expenditures

	2013	2014	2015	2016
Cost of CAPEX (mn USD)	15.16	4.69	20.02	25.3
Cost - Annual OPEX (mn USD)	0.00	0.00	0.00	1.96
Annual Cost Savings (mn USD)	6.55	7.85	6.67	4.94
Coverage of Data Globally (% of total production)	85%	85%	85%	100%

### Notes:

**2014:** Low CAPEX in 2014 was to the result of limited investments. Our cost savings mostly occurred from projects that did not require investment, e.g. tweaking of existing equipment to optimize their performance.

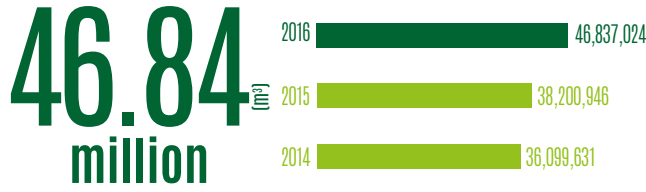
**2015:** Low savings in 2015 was to the result of CAPEX on two new projects, the returns of which will be generated on or after 2016. These projects include a USD 8.4 million investment in a biomass heater at the Orion Global PET plant in Lithuania and a USD 900,000 investment in a biomass heater at Indorama Ventures Polymers (Rayong) plant in Thailand. The expected annual savings from these two projects in 2016 onwards is estimated to be USD 1.4 million and USD 200,000 respectively.

**2016:** The savings shown in the above table are lower as some of the projects were commissioned in the third or fourth quarter of the year onwards. Further, in 2016 Indorama Ventures Europe BV in Rotterdam has undertaken an environmental project with a CAPEX of 10 million USD with low pay back to improve the quality of air emissions from the current and post expansion operations.

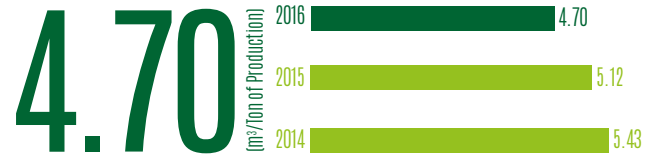
IVL is committed to continuously improving its operational efficiency to achieve no accidents, no injuries and no harm to its employees and the environment as a result of its operations.

In 2016 the total water consumption increased by 22.6% and the overall production increased by 33% over 2015, with the acquisition of new plants. However, water intensity decreased from 5.12 to 4.70 m<sup>3</sup> / ton of production because of our water management efficiency.

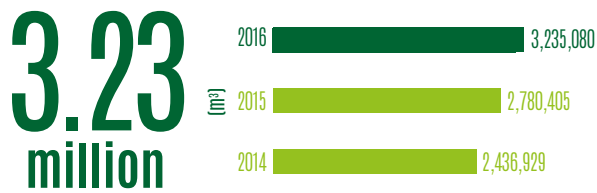
### Total Water Intake



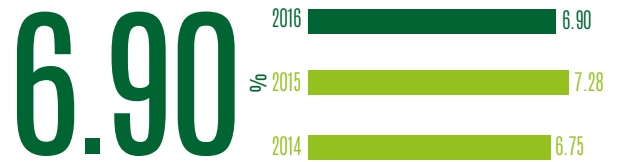
### Water Intensity



### Total Recycled / Reused water



### Percentage Water Recycled / Reused water



# MATERIAL SOCIAL ISSUES

IVL's investment strategy embeds socially responsible investments in activities that have a positive social impact on our employees and the communities where we live and work. This, in addition to providing environmental and social impacts, also promotes the idea of sustainability performance and engagement, helping the Company to compete and succeed over the long-term.

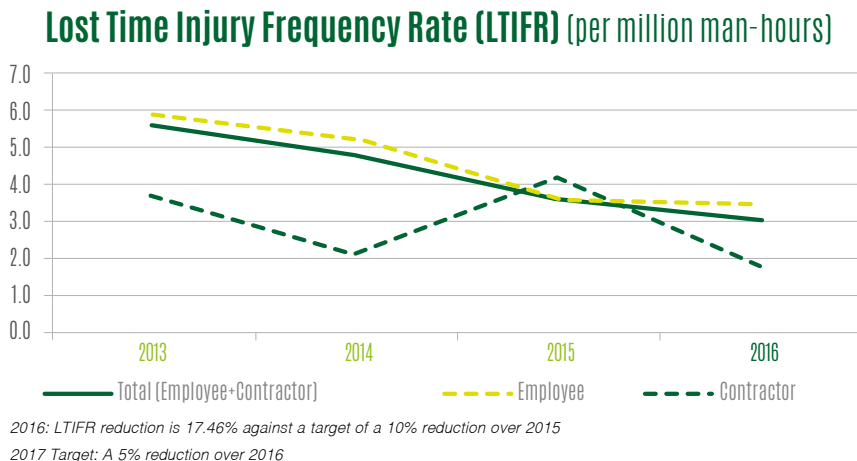
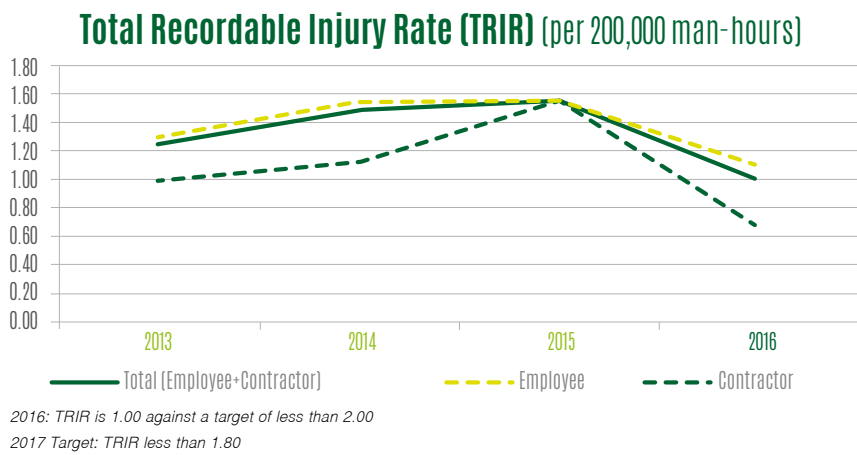
## Health and Safety

At Indorama Ventures, we place health and safety (H&S) at the forefront of our activities. We believe that the ongoing health and safety of everyone involved in and impacted by our work, including our employees, contractors, communities and the public is essential for our license to operate. Providing a safe and healthy workplace not only boosts employee morale but also reduces lost work hours, minimizes illness and injury lost, and reduces costs.

In 2016, we continued to invest in occupational health and safety training for all our employees. This investment has resulted in a reduction in the Loss Time Injury Frequency Rate (LTIFR). In 2016, LTIFR was reduced to 3.03 from 3.67 in 2015, while the Total Recordable Injury Rate (TRIR) was reduced to 1.00 in 2016 from 1.57 in 2015. We achieved our target set in 2015 of keeping TRIR below 1.80.

IVL reduced the number of total recordable injuries to 164 in 2016 from 214 in 2015 and loss time injuries to 99 in 2016 from 100 in 2015. Total costs include wages paid to injured workers for absences not covered by workers' compensation, overtime costs necessitated by the injury, training costs for a replacement worker, lost productivity related to work rescheduling, new employee learning curves, repair, and replacement costs of damaged material, machinery, and property.

- No fatalities at IVL's entire operations from 2012 to 2016
- Zero recordable injuries at 28 plants in 2016 representing 45% of total entities of the Company as against 29% of total entities in 2015



### Behavioral Based Safety Training for P.O.W.E.R. Indorama Ventures Xylenes and PTA, USA

Indorama Ventures Xylenes and PTA formally implemented a Behavioral Based Safety (BBS) program. This program emphasizes identifying and having personal conversations about potential risky safety behaviors and conditions. Employees voluntarily complete a BBS Card (with specific details) when they identify a possible safety issue. A BBS Steering Committee consisting of individuals from the operations, maintenance and leadership teams was formed and meets monthly to analyze the data that creates trends and offers predictability with respect to the type of incident that could occur. Understanding these trends helps to the Company to stay focused on specific issues and avoid potential accidents. The BBS program was reviewed and subsequently upgraded to better align with behavioral science and classical BBS systems. The program is known as P.O.W.E.R. which stands for **Positive Observations with Excellent Results**.

The success of the BBS program is based on five principles: it's anonymous for the employee submitting the observation, it's discipline free, has a positive focus on safe behaviors, it's short and simple, and it provides immediate feedback. The BBS program benefits the Company and its employees by improving safety performance. Fewer injuries increase efficiencies by lowering costs, reducing workers' compensation and reducing overtime that may be needed for employees that may be off work due to work related injuries. To ensure the ongoing engagement of staff in the program, the team holds discussions each month and applies strategies to maximize participation without sacrificing quality.

Behavioral based safety is a voluntary program with which 21% of the workforce (employees and contractors) have been trained to date since its commencement.



### Case Study: Safety 360: “Big hitting” hazards

#### Wellman International

In 2016, Wellman International (WIL) completed a Six Sigma Green Belt project on the analysis of workplace injury incidents with the objective of reducing the occurrence of injuries onsite and facilitating a more cost-effective risk control and incident management program.

The project involved a six-month deep dive root cause analysis of injury incidents including injury type, location, job task and all associated cost factors for which a range of Six Sigma tools were used throughout the project. The analysis allowed WIL to highlight its “big hitting” hazards and plant items and equipment most closely linked to its injury incidents. The analysis also highlighted the risk profile within each area of the plant which was in turn visualized using a site Risk Profile Map allowing employees, contractors and visitors to easily understand the site risk profile.

The project's benefits included a lost time injury rate decrease of over 18% in 2016 (compared to 2015), improved employee participation in health and safety related projects and the establishment of an ongoing employee review system for assessing “big hitting” hazards and implementation of suitable risk control strategies. Apart from the significant benefits to employee safety, health and well-being, it is estimated that the 30% reduction in lost time injuries achieved in 2016 resulted in a financial benefit of roughly USD 26,500.

In building on this project, WIL will continue to invest in several initiatives in the coming years. As part of its monitoring plan, “big hitting” hazards and items of plant and equipment relating to our incident performance will now be tracked and analyzed each year. This will enable WIL to continuously update the new site risk profile map, and to identify any particular hazards or items of plant/equipment in need of particular control. The Risk Profile Map will be updated on a regular basis to ensure its ongoing effectiveness in communicating risk awareness across the site.

To ensure improved risk control, plans are also in progress at WIL to complete risk review workshops annually with employees from relevant areas of the plant. These workshops, which are hosted by its HSE Department, will examine the hazards in each area of the plant and any related incidents that have occurred with employees. Employees will make recommendations regarding possible risk controls that may improve health and safety performance. Suggested controls from these risk control workshops will be evaluated and many will then be integrated into the OHSAS 18001 safety objectives program for the upcoming year. This risk review plan will be termed “Safety 360” with a focus on assessing health and safety from every angle, with input and ownership from all employees.

## Health and Safety Management System and Risk Assessments

Health and Safety Management Systems are in place at each operation around the world. Each facility is mandated to implement a safety program to provide and maintain a safe and healthy work environment and to provide adequate control of the health and safety risks in the workplace.

A total of 24 of our operations representing 37% of total operations have the OHSAS 18001 occupational health and safety management system certifications in place. This represents an increase from 14 operations representing 25% of operations in 2015. We have set a target for IVL to achieve certification for 98% of operations by 2020.

As part of risk management, the Sustainability and Risk Management Committee, Business Risk Management Committees and senior management regularly monitor health and safety risks of all plants globally. The health and safety systems are also regularly assessed and the risk assessment results assist the Company in improving safety procedures and ensure adequate levels of hygiene, safety, and wellbeing. The results of the risk assessments are reported to the Business Risk Management Committee and Sustainability Department.

## Workplace Health Programs for a Healthy Work-Life Balance for Employees

Healthy employees contribute to a stronger company and are also much less likely to get sick. According to market research, companies that gain a reputation for encouraging work-life balance have become very attractive to employees and will draw a valuable pool of candidates

for new job openings. These companies also tend to enjoy higher employee retention rates, which results in less time-consuming training, more loyalty, and a higher degree of in-house expertise.

IVL cares about the health of its employees and makes every effort to create a healthy work-life balance. Since exercise among employees not only leads to a fall in the number of short-term absentees, but also has an effect on long-term absenteeism, IVL is promoting fitness in the workplace for the improved health and wellbeing of its workforce globally.

IVL and its entities are promoting work-life balance in its workplace without compromising on productivity or efficiency. Some of the programs include the following:

- **Access to Fitness Centers:** IVL and its entities globally provide access to gyms and health clubs to its employees.
- **Sports Clubs:** Several sports clubs are formed globally for IVL employees including football, cycling, running, yoga, and badminton clubs.
- **Participation in charity fitness challenges:** Every year, several employees participate in charity fitness challenges globally such as marathons, yoga and vertical climbing.
- Company Outings
- Community Engagement Opportunities
- Team-Building Exercises

Employees at every IVL workplace are encouraged to join the above clubs and activities to improve their fitness, relieve stress, and remain active. Friendly football and other matches are organized with the employees of our customers and suppliers.



## Human Rights

IVL believes that showing respect for and ensuring human rights demonstrates good environmental, social, business and corporate governance practices; provides a competitive advantage over competitors; enhances the trust of stakeholders and the Company's reputation; helps business growth and attracts investment; and attracts a younger and talented generation who want to work for companies that are responsible, and care about the environment and society. It also helps in combating human trafficking and building a sustainable supply chain.

IVL strongly believes in respecting all human rights and abides by the United Nations Universal Declaration of Human Rights and the International Labor Organization's Declaration on Fundamental Principles and Rights at Work. IVL published its Human Rights Policy in 2013 which was subsequently revised in 2016 to reflect the rights of all stakeholders. The Company's [human rights](#) and other policies are available on our [website](#).

These policies are applicable to the Board of Directors, management, employees, trainees, contractors and persons who are not employees but authorized to act on behalf of, or represent IVL, including those employed by its subsidiaries, joint ventures and associated companies.

We have clear guidelines and measures for our employees, partners and our suppliers to avoid any elements contributing to adverse human rights impacts as a result of business actions, and to address such impacts when they occur.

IVL's approach to human rights is based on the compliance with the Business Code of Conduct for employees, suppliers and contractors, training programs and annual assessments. Our teams are guided by a series of policies, procedures and documents, at the head of which are Indorama Ventures business principles and the IVL Code of Business Conduct. Individual documents address specific human rights and compliance-related issues, including labor rights, child labour, working conditions, privacy, and bribery and corruption.

IVL has dedicated communication channels, and training sessions on Ethics and Human Rights for employees and managers. Awareness-raising sessions for external stakeholders are also available in some contexts for specific issues, such as responsible security.

IVL has zero tolerance for any human rights violations in its entire operations and value chain

### Human Rights protections in IVL's business value chain

IVL respects human rights in its entire value chain. In implementing this policy, we are focusing our efforts on issues and relationships in which we have greater degrees of control and influence, as outlined below.

## A. Employees

IVL respects the human rights of all its employees, subsidiaries, joint ventures and associates. We also ensure compliance with all applicable national laws where we have our operations. Our commitment is manifested in our Human Rights Policy, Board Non-Discrimination Policy, Diversity Policy, HIV Aids Policy, among others. To ensure remediation of potential abuses, we have a whistle blower mechanism which is applicable across the entire Company. Any employee with concerns regarding the human rights impacts of IVL's activities may communicate with the whistle blower committee and through other means as mentioned in this report.



IVL Head Office arranged a training program on anti-sexual harassment for employees

### Workplace Human Rights Assessment (WHRA)

With the endorsement of the United Nations Guiding Principles by the Human Rights Council in 2011, it was firmly established that businesses have a responsibility to respect human rights, including identifying, avoiding, mitigating and remediating the human rights impacts with which they are involved.

At the beginning of 2016, conducted a high level review of IVL's current operations in order to identify potential human rights issues and risks. The assessment identified a number of areas where additional human rights due diligence is required in order to ensure that relevant risks are managed and human rights are appropriately protected.

At the end of 2016, we conducted additional human rights due diligence. The review was guided by IVL's Human Rights Policy and the United Nations Framework and Guiding Principles on Business and Human Rights. This human rights risk assessment is developed as one part of on-going management process in corporate responsibility to protect human rights under the United Nations "Protect Respect and Remedy" Framework.

The human rights assessment enables IVL to:

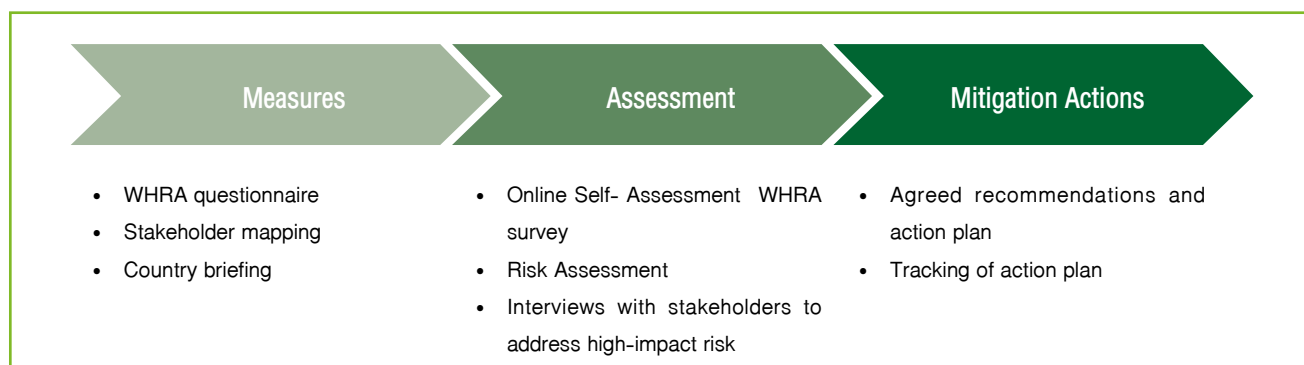
- Identify potential human rights risks and address them before they occur in the value chain.
- Understand how IVL can have a positive impact or contribute to sustainable development by advancing respect for the human rights of its workers and communities touched by their value chains.

- Determine measures to address any adverse human rights impacts identified through prevention, mitigation and remediation.
- Enhance the accountability of businesses by documenting the impacts that have been identified and the actions taken.
- Build partnerships between businesses and other stakeholders to address human rights impacts, including developing joint actions to address cumulative impacts or legacy issues.

IVL has identified few issues that span our value chain. For 2016 our assessments identified human rights issues at small, non-critical

suppliers in supply chain, security, health and safety. In the following section, we examine each of these issues in more detail.

The WHRA that was carried out covered all of IVL’s work locations across 21 countries. The purpose of this assessment was to ensure the protection of human rights under the United Nations “Protect, Respect and Remedy” Framework and to identify potential workplace human rights-related risks as a result of plant/business unit activities. The WHRA typically goes through a three-step process as presented below:



The risk assessment is conducted globally through a desk-top research at the country, sector, and operational level in which operates across the world and staff survey. It is an enterprise level risk assessment where the impact and likelihood are assessed from a human rights perspective. Additional assessment is done at some locations as part of SA 8000 certification.

## Outcome

Based on the aggregate risk impact assessment and analysis of the assessment interviews, the following areas of improvement and remedial actions were identified:

Areas of improvement identified		Remedial Actions	
		Plant/Business Unit Level	Corporate Level
Safety & Security	Human rights principles integration with security providers	Human Rights principles and training have been included in contracts with security agencies.	Security standards to be integrated with Human Rights principles.
	Selection of private security firms	Selection of private security firms should be based on their professional abilities, level of staff training, quality of equipment, any past involvement in human rights abuses, and links with political factions.	
	Training for security personnel	The assessment has identified a lack of reference to human rights policy, and to the use of force in particular, in contracts between IVL and its security providers. In certain countries, specific human rights training for security forces was missing or inadequate. In terms of remediation, specific training on human rights has been made mandatory for all security personnel. Some countries have now included human rights principles (such as the use of force) into renewed contracts with security providers. Some countries initiated specific human rights training to security personnel.	A rights standards training curriculum to be developed.
Freedom of Association	Addressing employee grievances	Forming a Unit Redressal Committee (URC) responsible for hearing, settling disciplinary cases and employee grievances.	A set of employee grievance redressal guidelines are being developed which would be part of the code of conduct for employees.
Workplace Environment	Basic needs at overnight stay facilities	The URC will be entrusted with performing due diligence of overnight stay facilities and the report will be shared with the Head of Global Human Resources and also reported to the Risk Management Committees.	Periodical review by the respective Business Risk Management Committees and the SRMC.

## B. Suppliers

IVL works with suppliers and business partners to ensure that human rights are respected in the supply chain by assessing and identifying any potential and actual human rights issues and concerns. Our engagement is manifested through our Sustainability Commitment and managed through the Company's [Supplier Code of Conduct](#), [Supplier Self-Assessment](#), [Human Rights Policy](#) and applicable national laws. As appropriate, IVL assesses human rights risks and impacts to identify actual and potential human rights issues in the supply chain. Actions to manage and address any human rights risks and impacts in the supply chain are guided and carried out through dialogue and collaboration with relevant suppliers, including contractors.

### **Supplier Evaluation Process:**

The supplier evaluation process, initiated in 2014 and extended to 100% of raw material suppliers and critical non-raw material suppliers in 2015, is ongoing. In 2016, this process was applied to all new raw material and critical non-raw material suppliers.

The process involves a systematic and harmonized approach requesting that suppliers:

- Acknowledge the Supplier Code of Conduct
- Respond to a self-assessment questionnaire

This process enables IVL to:

- Assess ESG (Environment, Social and Governance) risks and identify opportunities
- Assess risks relating to human rights including child and forced labor
- Classify suppliers into high, medium and low risk and collaborate with them to address the findings of assessments, thereby improving efficiency in the supply chain
- Ensure suppliers adhere to the Company's Human Rights Policy

The risk management committees of respective businesses review supply chain risks on a quarterly basis and appropriate risk mitigation actions are initiated as needed. We are targeting having a systematic supplier audit by 2020.

## C. Customers, business partners and competitors

IVL seeks to respect the human rights of its customers, business partners, including shareholders, competitors, and creditors in all of the countries where we have operations and largely control outcomes. This also extends to human rights impacts connected to products and services through networks of business relationships. This often means creating and using leverage in those relationships by collaborating to drive positive change and bring greater respect for human rights.

We respect the privacy of our customers and other business partners as mentioned in our [Stakeholders Policies \(Policy on Treatment of Shareholders, Policy on Treatment of Customers, Business Partners and Competitors Policy, and Trading Partners and Creditor Policy\)](#).

Any customer, business partner or other party with concerns regarding the human rights impacts of IVL's activities may utilize the channels

established in accordance with the [Whistle Blower Policy](#) available on our website.

## Implementation

IVL is committed to ensuring respect for human rights in its entire value chain and across all of its operations. The same is reflected in the Company's policies and procedures. In order to integrate human rights considerations into the management of our business, due diligence of human rights is embedded into our risk assessment.

IVL evaluates human rights related risks and conducts human rights impact assessments. Risk and impact assessments are used to identify actual and potential human rights impacts from our business activities. In addition, IVL promotes respect for human rights through our policies which are available to the public, as well as through stakeholder dialogues, advocacy, collaborations and trainings.

In 2016, IVL conducted a Workplace Human Rights Assessment covering all of its operations to identify actual and potential human rights issues. The next assessment is scheduled to be done at the end of 2017. Investigate further to strengthen appropriate management measures, including trainings, are in place for IVL's security personnel. Remedial measures are ongoing and shall be monitored periodically by the URCs, Business Risk Management Committees and the SRMC.

Furthermore, human rights risks in the supply chain are assessed through a two-step compliance mechanism, supplier code of conduct, and supplier self-evaluation. This is a continuous and ongoing process. The same has been ensured for all of IVL's existing raw material and critical non-raw material suppliers. All of our new suppliers are subject to acknowledging the supplier code of conduct and in addition to the supplier self-evaluation. IVL has a stringent zero tolerance for violations relating to child labor and forced labor in any form in its entire value chain. Actions in the past year include signing MoU on Children Rights with UNICEF, specific training programs and supplier evaluation. Any other non-compliance is addressed through dialogue and collaboration with relevant suppliers, including contractors.

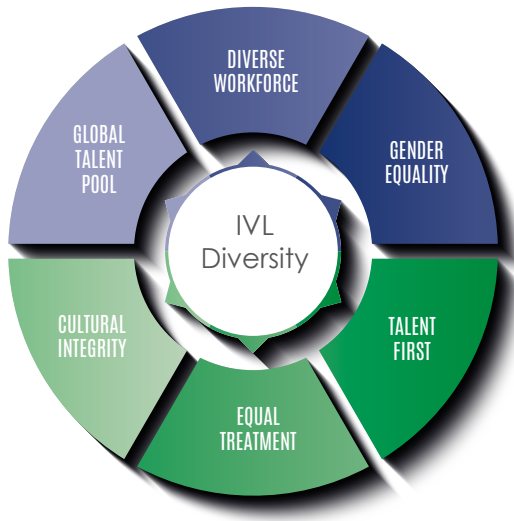
### **Case Study: Advancing Human Rights, Engaging our business FiberVisions, China**

IVL is committed to running its operations responsibly and is interested in exploring how its value chains can be more inclusive. IVL recognizes that its own employment practices should protect human rights as they are increasingly relevant to its operations.

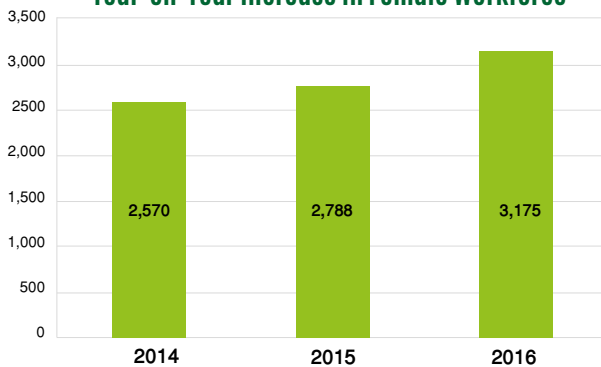
In 2016, FiberVisions, China (FV China) focused on developing awareness within the Company about human rights challenges and to use human rights risk assessments to evaluate issues along the entire value chain and how they can impact IVL's operations. As part of the effort to create a better understanding, FV China developed a three-day training program respectively on human rights for office employees encompassing legislation and codes of practice, staff training, working hours, child labor and disciplinary issues. As a result, 28 employees learned in detail about the concepts of human rights, for which FV China will be in compliance in its daily work operations going forward.

## Diversity

IVL adopted its Diversity Policy recognizing its talented and diverse workforce as a key competitive advantage. IVL firmly believes in treating all people with dignity and respect and that greater diversity will bring about higher returns. Further, IVL accepts and support gender equality; both men and women are given the same treatment, compensation, benefits and opportunities, based on their skills.



### Year-on-Year Increase in Female Workforce



## Human Capital Development

“People first” is a hallmark at IVL. As we expand our global footprint encompassing employees from 63 nationalities, we believe that investing in our employees and unleashing their potential translates into a pipeline of new ideas and innovation that further drives performance. With a comprehensive career framework, we continue to develop leadership programs to enhance the leadership pipeline that will sustain IVL’s long-term success. IVL’s achievements are based on the expertise and entrepreneurial spirit of its employees. Employee training and development is given a high priority with an aim of developing tomorrow’s leaders, and focusing on promoting internal candidates.

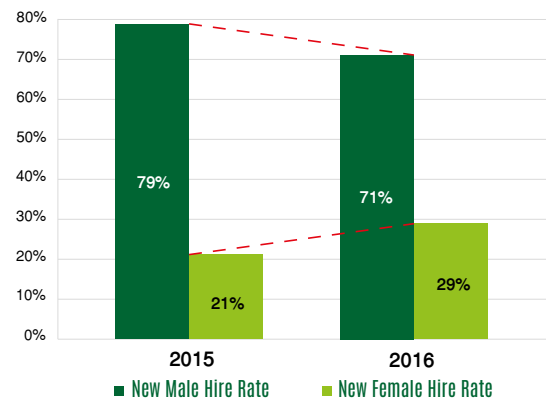
## Management Development

IVL develops its workforce for senior leadership and management positions through various leadership development programs which are specially designed and customized to meet the specific needs of the Company.

IVL also attaches great importance to the professional development of its employees at the middle-management level. Global and regional staff development programs not only convey know-how and skills, but also motivate employees by inspiring a strong sense of identity, which strongly reflects IVL’s corporate values and principles. In the year under review, over 71 employees attended courses held as part of IVL leadership development program. In 2016, some 40 staff members were nominated for the global leadership program, which extends over a period of 24 months.

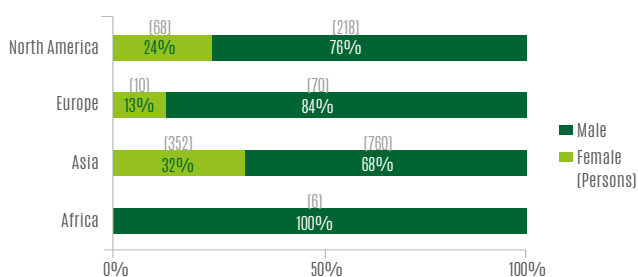
## Talent Attraction Focused on Women

In 2016, we hired 1,484 employees across 19 countries. Women comprised 29% of our new hires (as opposed to 21% in 2015) of which 13.7% of female candidates were hired in managerial positions compared to 10.1% in 2015. We are increasing our focus on hiring women and providing developmental opportunities aimed at further supporting gender equality. Development training includes key management processes, such as succession planning, training and development programs and a mentoring program, which will be launched in 2017.



In Myanmar, we carried out Young Interns program in partnership with the Office of the Vocational Education Commission (OVEC, Thailand) and Bangkok Bank. Together with OVEC, we also initiated an internship with eight technical institutes in Thailand. We have begun dialogues with top universities in Thailand to have internships for Engineering and Management graduates for our Asian Operations. The internship programs help IVL identify potential talent while also helping young students in the community to enhance their skills — a win-win strategy for both interns and the Company. Similar internship programs have also been started by business units in Europe and Asia (Thailand, Indonesia) to address the skills gap in technical know-how and functions.

## Recruitment



## Institutionalizing Global Talent

With the increasing volume of growth and rising global mix of our workforce, IVL realizes the need for having a structured process for Talent and Performance Management at the corporate level.

From 2017 onwards, IVL will institutionalize the MD&A (Management Discussion and Analysis) and the IDP (Individual Development Planning) process for senior leaders in the Company. The MD&A process will be the integral part of the business review and the performance management process.

The IDP process will ensure that IVL has a uniform approach on supporting the development of senior leaders. The Company has piloted a 360 degree feedback process connected to the IVL leadership competencies in 2016 and is rolling this out companywide in 2017. The 360 degree feedback, plus the development discussions with supervisors and peers, will enable the individual to create a personalized development plan with agreed actions to close any potential performance gaps in the short-term and to realize long-term career development.

## Global Performance Appraisal

Over 90% of employees are covered under the performance evaluation process which is linked to the Training and Career Development Plan. Regular talent reviews and a robust succession management process for the key roles ensure that we understand the distribution of our talent globally. This will provide an objective way to look at talent and ensure that we build fit for purpose bench strength.

## Educated, Aligned and Growing

We continued to invest in our people by providing access to a modern workplace, training and development opportunities and to inspire colleagues. In 2016, the Company invested USD 292.07 per employee in training and development. The average training hours per employee was 19.7 hours.

The emphasis in the years ahead is to systematically implement and institutionalize these interventions to enable the organization to grow and to secure continued success. We are institutionalizing the

70:20:10 rule (70% learning on the job, 20% from coaching, mentoring and observing others and 10% from formal training interventions).

As part of our formal human capital development training, some of our flagship training programs are:

- Indorama Ventures Leadership Development Program:** The state-of-the-art Indorama Ventures Leadership Development Program (IVLDP) for leadership positions has been designed and rolled out in two waves. Wave I, with 60 key employees, was rolled out across three continents in 2015 and was followed by Wave II with 71 employees across three continents in 2016. The primary focus is to develop future executive leadership positions.
- i-Lead** A company can have a lot of great ideas, but to take it to the next level, it needs a pipeline of strong leaders to harness that potential and align it with the vision. Talent development is critical to any company's future success, which is why it is a top priority at IVL.

The i-lead program is designed to develop the next-generation leaders who can work with world-class teams and inspire them to be the best in what they do.

By preparing our leaders to thrive in a changing world and focus on customer needs and market opportunities, we will strive to achieve sustainable and successful business results.

The inaugural i-Lead is an intensive program that encourages 27 members across three regions (North America, EMEA and Asia) to strengthen their leadership skills through a series of engagements and dialogue, individual development planning, site visits, group work, action learning, and presentations to the apex level. Members selected for the program come from diverse cultural and functional backgrounds and have been selected based on several performance and potential-related parameters.

The program aims to help sharpen focus on capabilities, mindsets and actions that can help propel IVL to a higher level of success. The i-Lead program moves IVL leadership development from limited, time-based events to a continuous journey over the next 12 months with clearly identified and agreed deliverables.

The Group CEO sets the tone by leading from the front. He will remain actively engaged throughout the program and has hand-picked senior executives to play the role of regional mentors.

The mentor's role is that of a guide and a sounding board to help members think laterally and ideate. The mentor provides a sense of direction and encourages critical thinking. Mentors are not expected to be problem solvers but rather encourage the team members to be creative and problem solvers themselves.
- Business Excellence through Six Sigma:** Breakthrough improvements using Six Sigma remained a key training theme in 2016. A total of 567 employees were trained under Business Excellence through Six Sigma initiatives, with 74 new projects undertaken with a cost savings of USD 4.4 million after completion of some of these projects.

## A Sustainable Workplace

### FiberVisions, China

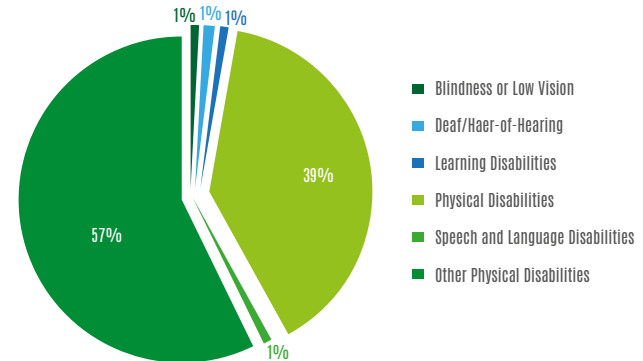
We are committed to the internal appointment of our leaders. To deliver on our commitment of career development for all and an accelerated progression for our most talented staff, we look closely at how we manage succession. Increasingly, we are actively managing the career development of a number of our people so that, by the time they are needed, they possess the right mix of skills and experience to fulfill their potential as senior leaders in the respective business segments.

In 2016, FiberVisions China established a program to identify both successors in key positions and to improve potential talent management and working skills. In the first year of the program, six high potential candidates were selected at FV China and completed the training in 2016. The 12-month program involved residential sessions in Suzhou, planning proposals, developing action plans, improving management skills, leadership and control, and organizational strategies. On completion of the program, candidates applied what they learned in employee trainings, cost control, product process improvements, new product research and development and safety management.

As with all of the other elements of its career development and talent management framework, FiberVisions carefully monitors the program's effectiveness to ensure that it meets its commitment to internal progression, diversity, inclusion and fulfilling the individual's potential.

workforce is comprised of 63 nationalities which enhance our ability to understand the different cultures and languages of our customers and consumers.

## 2016 Diversity – Disability



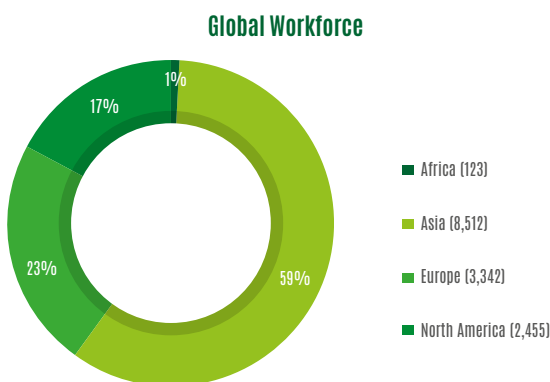
- 63 Nationalities
- 83 Disabled Employees

## Human Resources

Our success depends on our people performing at their best and for this they need to feel motivated, inspired and valued. By making sure we continue to invest in our people and providing access to professional opportunities and personal growth, we promote a culture of personal responsibility, diversity and innovation making IVL a great place to work.

As of 31 December 2016, the distribution of our workforce is as follows:

## 2016 Global Workforce



Our operations are deeply interwoven in a multicultural world. Having a workforce as diverse as the people we serve, cultural integration and equal opportunity is naturally an important focus. We undertake to include and respect every individual, regardless of age, gender, disability, ethnicity, nationality or sexual orientation. Our multinational

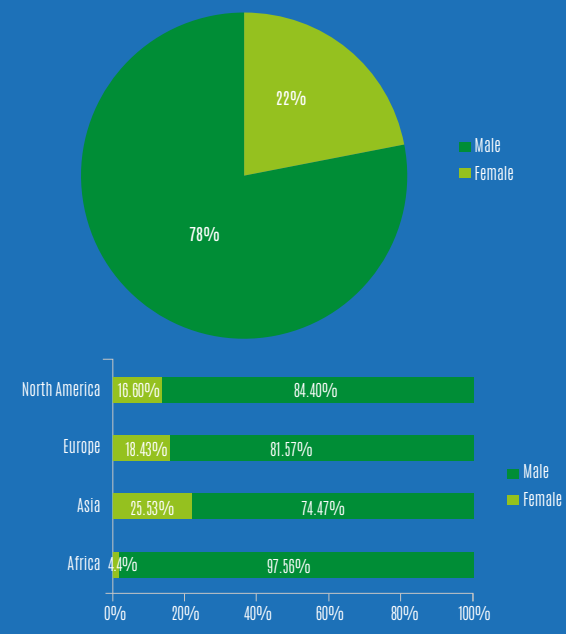
## Age Diversity

Diversity can also be defined in terms of age distribution. In looking at our entire company, IVL has a balanced and stable age mix across our different businesses and markets. The average age of our employees is 39.2 years.

## Gender Diversity

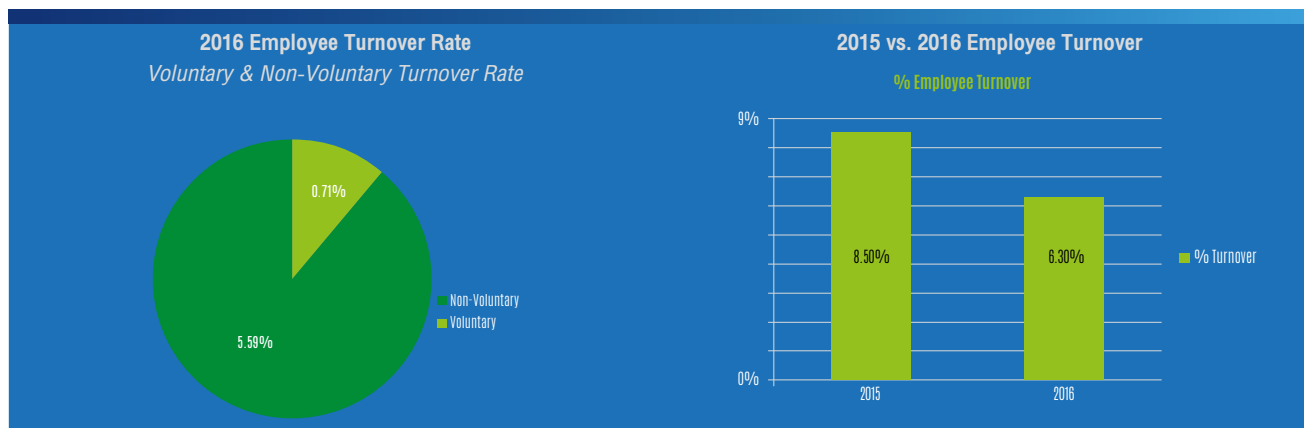
Like many manufacturing companies, IVL also faces the challenge of improving our gender balance.

At the end of 2016, our workforce constituted 22% females and 78% males.



## Employee Turnover

The long-term nature of our employees' career prospects is one reason why the voluntary employee turnover rate of permanent employees is 6.3% compared to 8.5% in 2015. Based on the employee engagement survey results, unit specific interventions such as variable compensation, clear career progression from current role, embedded global career mobility, and tailgate meetings has a significant impact on retaining and engaging our workforce.



25.88% - Reduction in Attrition Rate in 2016 over 2015

## Employee Engagement

Our global success is underpinned by one of our strongest assets - our talented and engaged employees. To gain an insight into our engaged staff, the "Engagement For Results" (EFR) survey was conducted in association with Boston Consulting Group (BCG) last year in which 90% of our employees participated. The survey assessment helped us identify employee engagement interventions that needed to be adjusted.

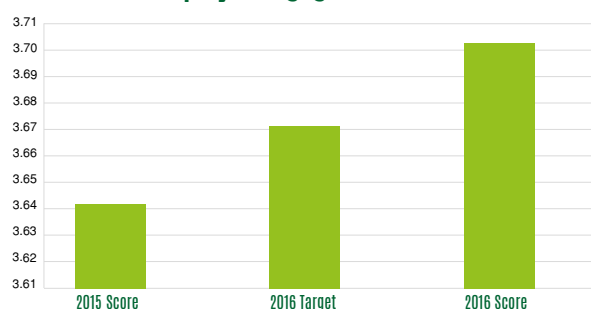
All of the business units prepared and executed their action plans and milestones were monitored by the Apex committee. For example, in one country we engaged Mercer to study salaries and allowances for Petrochemicals in the region. Based on the IPE reports, the compensation bands were realigned.

To understand the impact of these action plans, the "Global Employee Engagement" (GEE) Survey" was launched for the year reported in which 93.5% of our employees participated. We witnessed a significant improvement in the average engagement score to 3.70 in 2016 from 3.64 in 2015.

### Employee Engagement Survey – 2015 & 2016

Employee Engagement Score			
	2015	2016	% Increase
Male	3.62	3.69	1.93
Female	3.71	3.80	2.43
Overall	3.64	3.70	1.65

## Employee Engagement Scores



## Executive Remuneration

IVL's senior leaders receive fixed compensation, benefits and variable compensation linked to the Company's results also in addition to their individual achievements versus their targets.

The targets are set annually but are connected to the long-term goals for every unit. This allows us to tie parts of the total compensation to the long-term objectives of the Company. IVL has also introduced a long term incentive program aimed at Key employees in order to encourage long term Sustainable value creation.

### Material Labor Disputes

IVL has never had any material labor disputes since its inception in any of its operations.

## Industry Associations and Memberships:

As a leading chemical company, IVL demonstrates leadership in regards to driving innovation, product stewardship, creating positive impact on climate. Throughout 2016, IVL played an active role in various industry associations.

We continue to be members in associations including the European PET Bottle Platform, Responsible Care Management Committee of Thailand (RCMCT), PETCycle project, PET Resin Association, Operation Clean Sweep, The Association of Plastic Recyclers, National Association for PET Container Resources, Committee of PET Manufacturers in Europe (CPME), Plastics Recyclers Europe, Petcore Europe, EDANA, Americas Fiber Manufacturing Association, British Plastics Federation Recycling Council, The Employers' Association of Bavarian Chemical Industry and others.

### European Plastics Converters (EuPC)

Best Polymer Supplier Award from EuPC at its Annual Meeting on 3 June 2016

EuPC is the EU-level Trade Association representing 51 European Plastics Converting national and European industry associations and close to 50,000 companies, producing over 45 million tonnes of plastic products every year

EUPC started the Best Polymer Producers Awards for Europe in order to re-establish a good communication between users of polymers and their suppliers, which has obviously suffered lately. We simply want to award those producers who support their European customer base," outlines Ron Marsh, chairman of the Polymers for Europe Alliance. "Therefore, we chose what we believe are the five most important criteria for users of polymers when it comes to their suppliers: Polymer quality, Regulatory Compliance, Material Delivery Performance, Communication and Innovation".

During the main conference of the EuPC Annual Meeting on 3rd June 2016, the seven winners of the Best Polymer Producers Awards for Europe 2016 were announced. Indorama Ventures won the award for best PET supplier, 76% of the customers voted for Indorama Ventures.

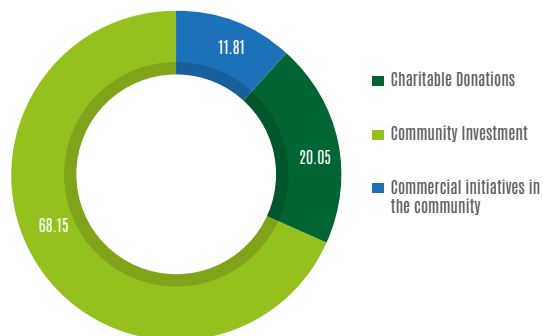
Some more details on Industry Associations are available in our last two years sustainability reports available on our website.

## Corporate Social Responsibility

### Three priorities of Group CSR Strategy



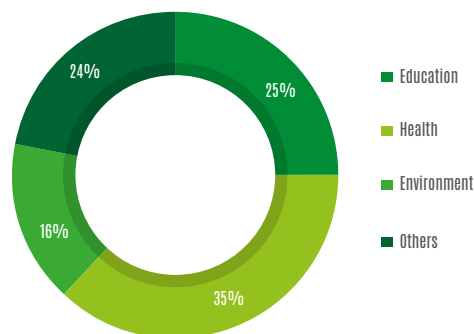
## Total Philanthropic Activities



To achieve our vision of being a world-class chemical company making great products for society, we engage with the communities where we work and operate given our belief that vibrant communities are essential to our success. Our group-wide strategy and philanthropy aims to support and develop local communities in creating value for all of our stakeholders. IVL's strategic social responsibility themes focus on creating value for both the Company and society. By adopting CSV principles, we are focusing our efforts on CSR programs that are aligned with our business needs and knowledge while addressing social challenges and taking further steps to create shared value across the entire value chain.

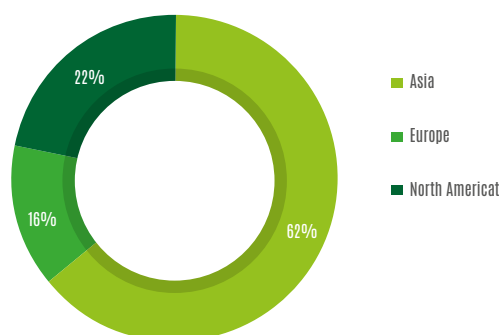
In 2016, IVL arranged 410 activities under three key CSR themes which are in-line with the United Nations Sustainability Development Goals, specifically the Environment (SDG No. 8 Decent Work and Economic Growth), Health (SDG No. 3 Good Health and Well-Being) and Education (SDG No. 4 Good Education). In addition to the three key themes, IVL also contributes and supports the arts and culture in our communities as we believe this is integral to building awareness and support for our CSR strategy and in engaging with stakeholders in the widest possible sense. IVL also increased its emphasis on projects that have a strong focus on empowering women, girls and gender equality.

## 410 CSR activities by theme in 2016





CSR percentage by region in 2016



## Education

The basic premise of education lies in its ability to provide an important platform for knowledge which leads to relevant and effective learning outcomes. We support students acquiring knowledge, and technical and vocational skills that can lead to employment and to interest them in the dynamic world of chemistry.

In Thailand IVL collaborates with Bangkok Bank Public Company Limited, The Office of the Vocational Education Commission and the Ministry of Science and Technology to organize yearly training programs for six university students from Thanlyin Technological University in Banbwagon, Myanmar. This is so that they gain industrial knowledge and practical experience in Thailand which they can utilize after they return to Myanmar. The program consists of two modules. In the first, the participants attend classes at Samut Songkhram Technical College; in the second, students work as interns at Indorama Ventures' facility in Lopburi, Thailand. As part of the education training program, IVL provides accommodation, transportation and a daily allowance for all of the interns. Two out of the six engineering graduates who attended the program in 2015 were subsequently recruited by IVL's subsidiary, Indorama Ventures Packaging (Myanmar) Limited, in Myanmar last year. In 2016, we had 12 interns as part of our global educational initiatives working in the Human Resources, Health & Safety, Optimization, and Production departments.

## Environment

We aim to minimize our impact on the environment and adjacent communities by actively seeking opportunities to preserve biodiversity, reduce post-consumer waste by focusing on reducing, reusing, recycling, and to educate and create awareness about the natural environment with students and those in the communities where we work and operate.

Our Wetland's Edge Environmental Center (WECC) environment initiative is a partnership between Indorama Ventures Xylenes and PTA

(IVXP) and Decatur City Schools which offers students and the public a hands-on experience and opportunities to learn about wildlife and the environment. Since opening its doors in 2002, WEEC has educated more than 80,000 students, teachers and visitors. WEEC provides hands-on, environmental "place-based" educational opportunities across the K-16 curriculum to all who visit. The WEEC facility consists of a building showcasing aquatic life, including two floors of touch tanks, a 1,650-gallon marine tank, and a 780-gallon freshwater ecosystem. In addition, more than two miles of trails traverse the 320 acre habitat enabling visitors to see several diverse ecosystems including a swamp, a marsh, bottomland hardwoods, upland species, young pines, and one of the largest white oak trees in the world.

This award-winning wildlife habitat was certified by the Wildlife Habitat Council (WHC), a non-profit, non-lobbying group dedicated to increasing the quality and amount of wildlife habitat on corporate, private and public lands. These programs have earned the WHC's "Wildlife at Work" and "Corporate Lands for Learning" certification for IVXP's plant.

## Health

We aim to strengthen the capacities of the communities where we work and live by focusing on risk reduction and management of health risks by improving local standards of living and providing health services to the communities. Having signed a Memorandum of Understanding (MoU) on Child Rights with UNICEF, IVL is integrating child rights into our business practices and implementing the guidelines of the Children's Rights and Business Principles (CRBP) in our CSR initiatives. We have initiated projects to help children in communities access clean water in addition to improving access to healthcare for children and people in community health facilities.

### IVL supports Operation Smile Thailand

Operation Smile Thailand is a charitable medical service organization which IVL is pleased to be supporting since 2014. The organization provides access to surgery and post-operative care to children who were born with cleft lips or palates; a birth defect, which can be repaired with surgery. Operation Smile Thailand has been helping these children by planning and arranging surgeries, supporting travel costs and offering post-operative care, such as speech therapy. In 2016, 317 children received this surgery so they can live happy and healthy lives. Last year, 30 IVL employees volunteered their time to make comfortable splints to prevent children from bending their arms and touching their face following the surgery. Another seven employees travelled to and participated at the Surin Speech Camp, Mobile Medical Unit in Tak Province and a Medical Mission in Mae Hong Son during the year.

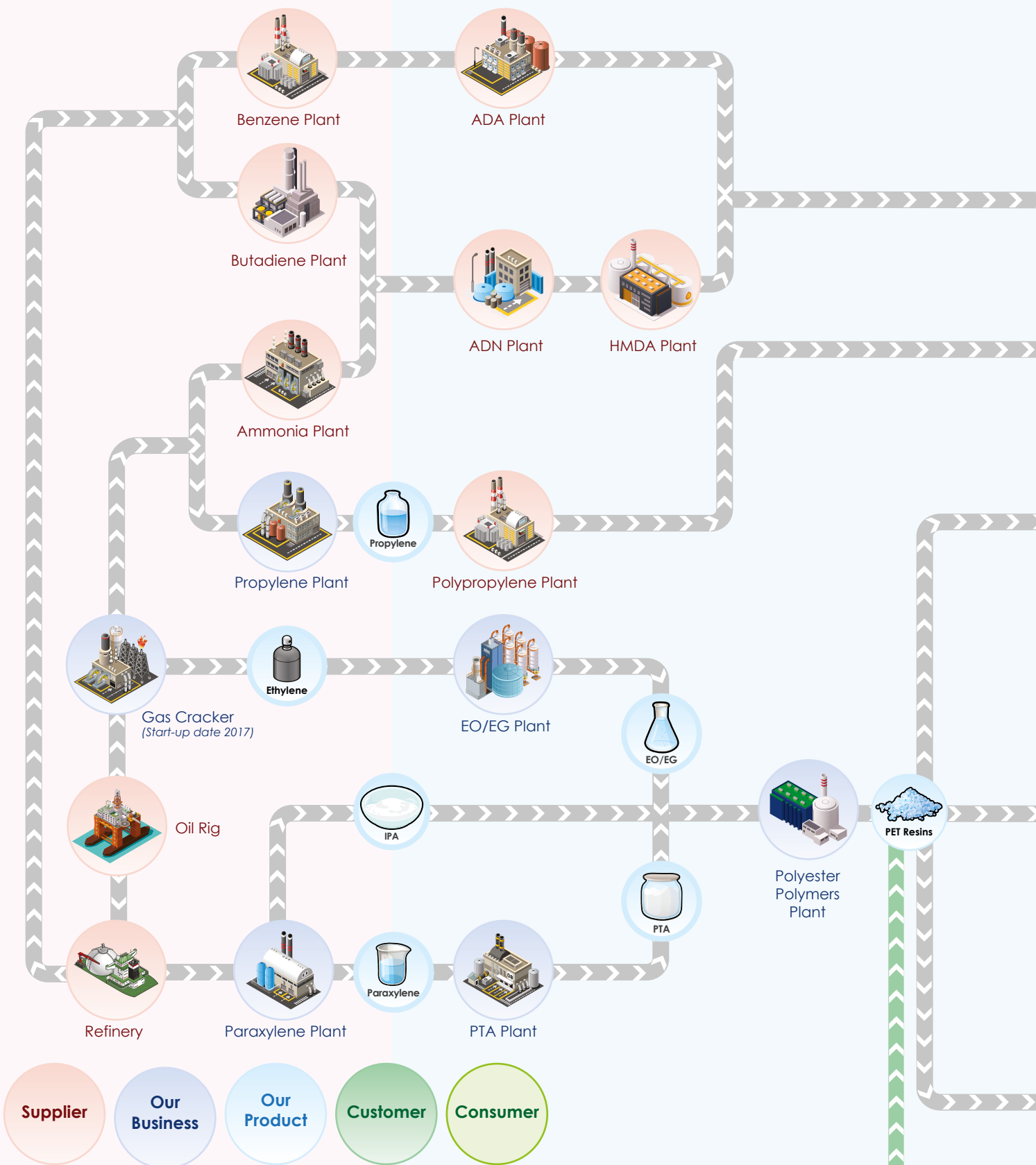
IVL does not provide any direct or indirect aid to individuals, political groups, or candidates.

# Business Value Chain

As of December 2016

## UPSTREAM

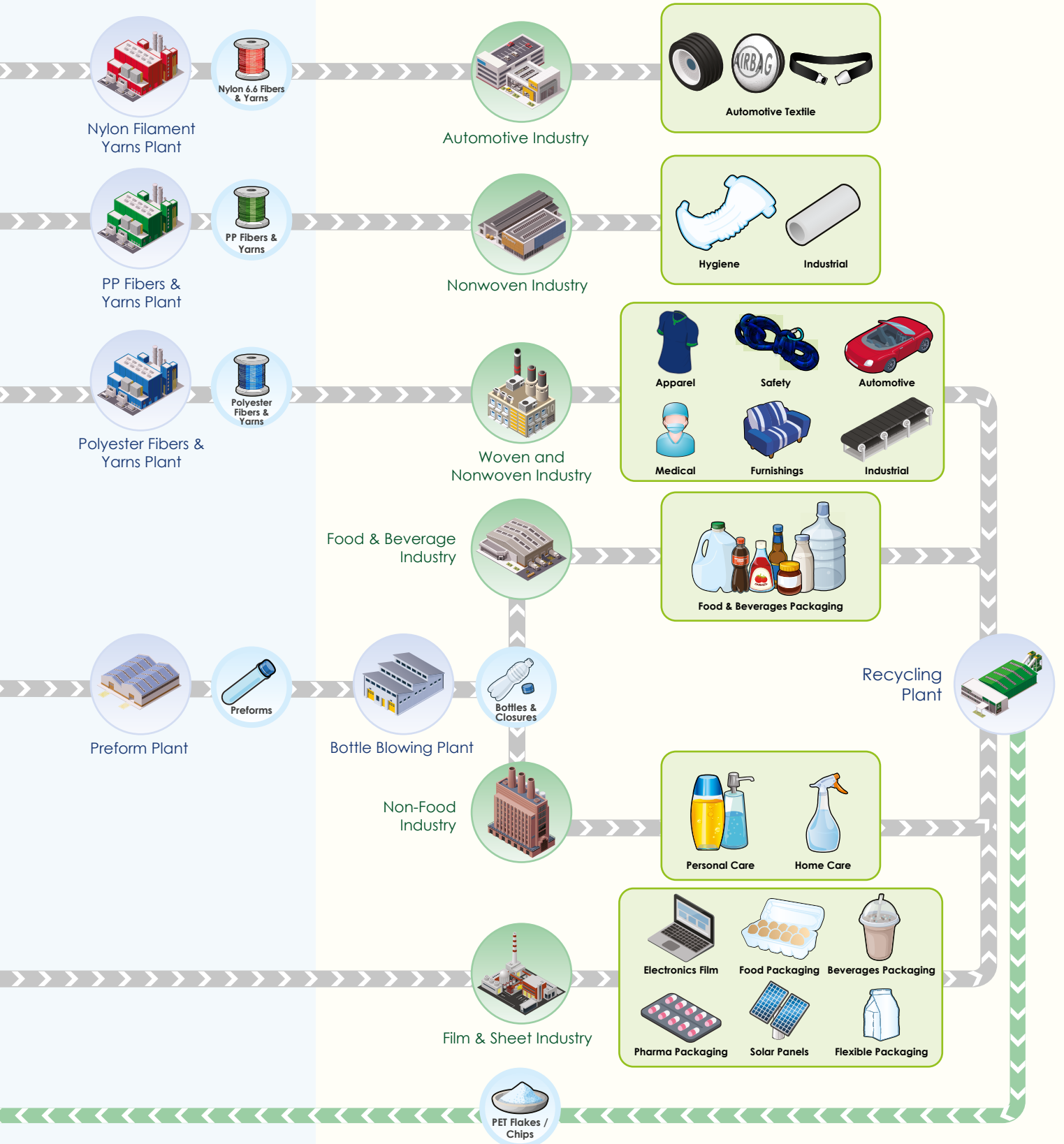
## MIDSTREAM



ADA : Adipic Acid  
 ADN : Adiponitrile  
 HMDA : Hexamethylenediamine

IPA : Isophthalic Acid  
 EO/EG : Ethylene Oxide / Ethylene Glycol  
 PTA : Purified Terephthalic Acid  
 PET : Polyethylene Terephthalate

## DOWNSTREAM



# CSR ACTIVITIES 2016

## IVL SUPPORTS EDUCATION AROUND THE WORLD



### POLAND

A group of students from a secondary school in Wloclawek visited Indorama Ventures Poland. Their participation was conducted entirely in English as part of a language training. This program, as with many others, is meant to inform students but also convey the unique opportunities available to them in their futures and which could also benefit IVL in regards to meeting future staffing requirements.



### INDIA

Micro Polypet donated classroom furniture, stationery and snacks to a local school. IVL's social responsibility themes are in-line with the UN's Sustainability Development Goals, and includes good education (SDG #4), which extends to providing some material support to provide a better learning environment for both teachers and students.

### THAILAND

TPT Petrochemicals was pleased to give a scholarship to Wat Krok Yai Cha school in Rayong to enhance the educational opportunities of its students. This CSR activity is one example of helping the community by making an investment in its long-term future.



### THAILAND

A representative from Indorama Ventures educates students in Surat Thani province about recycling PET. IVL is proactively supporting the need to reduce, reuse and recycle. While the Company is at the forefront of innovation in its recycling operations, underscoring the importance of recycling to students at a young age is essential.



### MEXICO

Students from ITESM Campus Queretaro visited Indorama Ventures Servicios Corporativos, gaining insights about the company's PET operations. These visits are also important in demonstrating potential career options for the students who might be interested in pursuing work in this sector after graduating in their programs.



### UNITED STATES

AlphaPet & Cedar Ridge Middle School have teamed up to support the Partners-in-Education program for Decatur City Schools. This program is designed to tap into the resources from both business and industry to enrich the educational programs offered to school students, and to encourage them to be thinking about their academic interests and pursuits.



## IVL STAFF LEND A HELPING HAND



### THAILAND

Mrs. Suchitra Lohia, Director and Chairperson of the CSR Committee of Indorama Ventures and volunteer employees join a Medical Mission at Mae Hong Son with Operation Smile Thailand to help provide access to surgery and post-operative care to patients who were born with cleft lips or palates; a birth defect, which can be repaired through surgery and staffs make special armbands for children who had undergone surgery by Operation Smile Thailand to repair their cleft lips and cleft palates, to prevent them from touching their faces ensuring their operation was successful and they healed without complications



# IVL BELIEVES IN A CLEAN ENVIRONMENT

## POLAND

Indorama Ventures Poland sponsored prizes for the 14<sup>th</sup> Tree for a Bottle campaign, which aims to raise environmental awareness and the importance of environmental protection among the younger generation and society. Employees at the company also volunteered to take students to clear litter from a forest near their school.



## THAILAND

Staff at IVL subsidiaries in Rayong responded to the call for action and cleaned up a beach in support of International Coastal Cleanup Day.



## LITHUANIA

Orion Global Pet volunteers joined forces with residents in the community and children from a local school to clean their surrounding area.



## THE PHILIPPINES

Indorama Ventures Packaging (Philippines) Corporation planted mangrove trees in the coastal areas of Looc, Villanueva, Misamis Oriental. The Philippines is highly vulnerable to the effects of climate change and mangroves provide multiple benefits including protecting shorelines by reducing erosion, providing stand protection from waves and water movement, and carbon sink and sequestration.



## HONG KONG

Employees with Performance Fibers (Hong Kong) took the Company's values in being environmentally responsible to heart by volunteering to clean up a park in their community.



## UNITED STATES

Two employees at Indorama Ventures Xylenes and PTA took the initiative and organized a charitable activity where a group of volunteers made 25 soft blankets for sick children suffering from cancer at St. Jude Children's Research Hospital in Memphis, Tennessee. This activity was a part of the company's "Living our Values" CSR program.



## UNITED STATES

IVL's subsidiaries in the US have generated funds for the United Way, an organization that aims to improve people's lives by mobilizing the power of communities, which is very much in keeping with IVL's corporate philosophy, and to advance the common good by creating opportunities for all with a focus on education, income, and health.

## UNITED STATES

The team at AlphaPet was actively engaged in community engagement activities having collected 1,446 non-perishable food items for its annual holiday fundraiser to benefit the local food pantry in Decatur, Alabama. In addition, AlphaPet also raised funds to support the Decatur-Morgan County Hospital Foundation to purchase much-needed medical equipment.



## THAILAND

IVL's subsidiary in Rayong, Thailand arranged a free mobile medical clinic at Nong Fab temple in Rayong while Micro Polypet provided a free ambulance service for a community nearby. Health is another strategic social responsibility theme, and is also in-line with SDG #3, Good Health and Well-Being. These two goodwill activities demonstrate how CSR can provide effective support while remaining proactively engaged in the communities.



## UNITED STATES

Employees at FiberVisions take the initiative annually by holding cookouts and barbecues in support of The March of Dimes, whose mission is to improve the health of babies by preventing birth defects and infant mortality. The average medical cost for a premature baby is over 12 times that of a healthy baby, and FiberVisions is doing its part by raising awareness and support for mothers and newborns.



## UNITED STATES

StarPet provided funds to Habitat for Humanity, an organization that is a true world leader in addressing the issues of poor housing conditions. StarPet's contribution was used to construct housing for low-income families, meeting the need for affordable quality housing and a new opportunity of increased confidence and self-reliance.

# GLOBAL PERFORMANCE DATA

This summary covers all IVL sites across all business units (PET, Feedstock (PTA, EO/EG, PX), Fibers, Packaging, Recycling and Wool)

Indorama Ventures is leading supplier of bicomponent fiber for products in the hygiene and industrial markets. We are proud to be part of our customers' success. Today, one in two premium baby diapers is made from IVL materials.



## NORTH AMERICA

- AlphaPet
- Auriga Polymers
- FiberVisions Manufacturing
- FiberVisions Products
- Indorama Ventures EcoMex (EcoMex)
- Indorama Ventures (Oxide & Glycols) (IVOG)
- Indorama Ventures Polymers Mexico (IVPM)
- Indorama Ventures PTA Montreal (IVPTA)
- Indorama Ventures Xylenes and PTA (IVXP)
- Polyamide High Performance (PHP USA)
- StarPet

## ASIA

- Asia Pet (Thailand) (APT)
- FiberVisions (China) Textiles Products
- Guangdong IVL PET Polymer Company (GIVL)
- Indorama Holdings (Thailand) (IRH)
- Indorama Petrochem (IRPL)
- Indorama Polyester Industries, Nakorn Pathom (IPI-N)
- Indorama Polyester Industries, Rayong (IPI-R)
- Indorama Polymers Public Company (IRP)
- Indorama Ventures Packaging (Myanmar) (IVPML)
- Indorama Ventures Packaging (Philippines) (IVPPC) - Batino
- Indorama Ventures Packaging (Philippines) (IVPPC) - MOP
- Indorama Ventures Packaging (Philippines) (IVPPC) - Davao
- Indorama Ventures Polymers (Rayong) (IVPR)
- IVL Dhunseri Petrochem Industries (IVLDPI)
- Micro Polypet
- Performance Fibers (Kaiping) (PF) 1
- Performance Fibers (Kaiping) (PF) 2

For the majority of sustainability data indicators IVL is showing an improving trend on a global level, especially when comparing environmental intensity (i.e. emissions or consumption per ton of production) year on year. General trends include decreasing combined direct and indirect Greenhouse Gas Emissions (Scope 1&2) intensity, energy intensity, water intensity and COD intensity in the effluent / waste water. This year also we continue to achieve our commitments to reduce air emissions (NOx, SOx and VOC) within regulatory requirements.

- Petform, Korat
- Petform, Lopburi
- Petform, Pathum Thani
- Petform, Rayong
- PT. Indorama Polychem Indonesia (PTIPCI)
- PT. Indorama Polyester Industries Indonesia (PTIPII)
- PT. Indorama Ventures Indonesia (PTIVI)
- PT. Indorama Petrochemicals (PTIP)
- PT. Indorama Polypet Indonesia (PTIPPI)
- TPT Petrochemicals (TPT)

## EUROPE, MIDDLE EAST AND AFRICA (EMEA)

- Beverage Plastics (BPL)
- FiberVisions A/S (FVAS)
- Indorama PET (Nigeria) (IPNL)
- Indorama Ventures, Europe (IVE)
- Indorama Ventures Adana PET (IVAPET)
- Indorama Ventures Corlu PET (IVCPET)
- Indorama Ventures Packaging (Ghana) (IVPG)
- Indorama Ventures Packaging (Nigeria) (IVPN)
- Indorama Ventures Poland (IVP)
- Indorama Ventures Quimica (IVQ)
- PHP Fibers (PHP Germany)
- Trevira - Bobingen
- Trevira - Guben
- Orion Global Pet (OGP)
- Wellman France Recyclage (WFR)
- Wellman International, Ireland (WIL)
- Wellman International, The Netherlands (WIL NL)

When comparing absolute figures there is a year on year increase in resource consumption and absentee days, however these can be attributed to the growth of IVL in terms of both production output as well as number of employees.

We have restated some environmental and social data from 2013-2015 that was previously stated on our Sustainability Report 2015 due to improving data coverage and revised calculations.



## Global EHS Data

GRI G4		Unit	2013	2014	2015	2016
<b>Production</b>						
General	Total Production	Tons of Production	5,584,728	6,687,525	7,481,352	9,960,132
	- PET	Tons	2,794,016	3,197,330	3,544,468	4,099,124
	- PTA	Tons	1,710,054	1,805,713	2,153,836	3,415,374
	- Packaging	Tons	42,041	65,659	82,596	113,202
	- Yarn and Fibers	Tons	612,756	1,047,044	1,134,341	1,327,927
	- Feedstock (e.g. EG/EO)	Tons	321,417	422,831	361,709	869,569
	- Wool	Tons	2,271	3,140	3,077	2,672
	- Recycling Plants Production (flakes+In process reuse)	Tons	95,661	83,762	108,958	119,429
	- Others	Tons	6,512	62,045	92,366	12,835
<b>Revenue</b>						
General	Revenue of Business (Converted)	MillionTHB	276,282	292,554	246,582	324,556
<b>Materials</b>						
	Total material use	Tons	6,157,740	7,078,276	7,881,517	10,216,877
	- PTA	Tons	2,744,177	3,161,880	3,482,025	4,197,946
	- MEG <sup>11</sup>	Tons	1,125,961	1,451,681	1,601,371	1,751,885
	• Bio - MEG	Tons	14,848	18,062	15,694	10,736
	- Paraxylene	Tons	-	-	-	2,271,643
	- Acetic Acid	Tons	-	-	-	124,233
	- Purified isophthalic acid	Tons	-	-	-	52,929
EN1	- PET	Tons	-	-	-	302,350
	- PP	Tons	-	-	-	128,239
	- PE	Tons	-	-	-	32,505
	- HDPE	Tons	-	-	-	4,538
	- Wool	Tons	-	-	-	2,938
	- Cardboard packaging	Tons	-	-	-	11,097
	- Textile grade chips	Tons	-	-	-	19,132
	- Partially oriented yarn (POY)	Tons	-	-	-	5,374
	- Others	Tons	2,268,786	2,441,658	2,780,037	1,301,332
EN2	Total recycled materials	Tons	84,324	111,415	144,007	169,854
<b>Energy</b>						
	Total energy consumption <sup>12</sup>	GJ	33,242,804	37,522,808	41,467,851	52,273,383
	• Fuel Oil	GJ	106,495	125,305	219,851	444,337
	• Natural Gas	GJ	14,617,329	15,303,426	16,392,113	21,506,204
	• LPG	GJ	19,995	44,817	58,300	54,600
	• Diesel	GJ	11,229	16,688	23,005	68,687
	• Gasoline	GJ	15,747	27,587	2,802	30,485
EN3	• Fuel Gas	GJ	-	-	-	40,483
	• Coke	GJ	-	-	-	354,894
	• Coal	GJ	10,570,044	11,791,536	12,376,449	15,883,530
	• Other	GJ	75,248	42,147	24,376	56,987
	• Renewable Energy <sup>13</sup>	GJ	407,021	461,537	584,691	856,864
	Biomass <sup>14</sup>	GJ	198,360	208,998	227,034	373,656
	Biogas <sup>15</sup>	GJ	187,629	219,067	317,477	317,438
	Electricity (Solar/Wind/Hydro) <sup>16</sup>	GJ	21,082	33,472	40,180	165,770

GRI G4	Unit	2013	2014	2015	2016	
EN3	Total Indirect energy consumption (electricity, cooling, steam purchased from outside of IVL group)	GJ	9,489,110	11,762,833	13,510,681	14,527,078
EN3	Total Indirect energy consumption	MWh	2,635,864	3,267,454	3,752,967	4,035,300
EN3	- Electricity purchased Conventional Sources (e.g. natural gas, coal, nuclear, heating oil)	GJ	5,876,249	7,466,557	9,408,898	11,487,654
EN3		MWh	1,632,291	2,074,044	2,613,583	3,191,015
	- Purchased Steam	GJ	2,064,066	2,261,891	2,151,325	2,048,701
		MWh	573,352	628,303	597,590	569,084
	- Purchased Heating	GJ	-	-	-	805,571
		MWh	-	-	-	223,770
	- Purchased Cooling	GJ	-	-	-	54,275
		MWh	-	-	-	15,076
	- Electricity purchased Renewable Sources <sup>17</sup> (e.g. hydro, wind, solar)	GJ	0	0	0	130,878
		MWh	56,958	83,137	186,745	36,355
EN3	Electricity sold	GJ	999,773	990,603	698,158	700,432
EN3	Total steam sold	GJ	1,069,642	1,062,464	1,026,259	850,334
EN5	Energy Intensity	GJ/Tons of Production	5.90	5.56	5.52	5.25
EN6	Energy saved due to conservation and efficiency improvement	GJ	234,401	228,812	413,342	786,520
<b>Water Withdrawal and Consumption</b>						
	Total water withdrawn by sources	m <sup>3</sup>	27,132,709	36,099,631	38,200,946	46,837,024
	- surface water	m <sup>3</sup>	14,093,121	16,960,419	18,472,443	28,612,963
	- sea water (excluding once through cooling water)	m <sup>3</sup>	-	-	-	-
EN8	- Once through cooling water	m <sup>3</sup>	-	952,172	2,736,178	1,245,728
	- Municipal water and water utilities	m <sup>3</sup>	10,476,878	12,003,015	10,602,732	10,626,736
	- Ground water	m <sup>3</sup>	2,507,663	6,146,267	6,351,455	6,299,896
	- Rain water	m <sup>3</sup>	55,047	37,758	38,140	51,701
	Water Intensity	m <sup>3</sup> /Ton of Production	4.89	5.43	5.12	4.70
<b>Reused / Recycled Water</b>						
EN10 <sup>8</sup>	Total volume of recycled/reused water	m <sup>3</sup>	2,303,659	2,436,929	2,780,405	3,229,152
EN10	% of recycled/reused water	%	8.49%	6.75%	7.28%	6.89%
<b>Emission</b>						
EN15	Direct GHG emissions of GHG from all sources owned or controlled by company (Scope 1 emission)	tCO <sub>2</sub> e	1,968,370	2,087,526	2,226,176	3,236,692
EN16	Indirect GHG emissions of GHG resulting from the generation of electricity, heat, or steam (Scope 2 emission)	tCO <sub>2</sub> e	1,325,575	1,567,192	1,842,432	1,917,894
	Total GHG emission (Scope 1 + Scope 2)	tCO <sub>2</sub> e	3,293,945	3,654,718	4,068,608	5,154,586
EN17	Other indirect GHG (Scope 3) emission <sup>9</sup>	tCO <sub>2</sub> e	11,031	17,217	15,389	70,428
EN18	Scope 1 GHG Intensity	tCO <sub>2</sub> e/Ton of Production	0.352	0.312	0.298	0.325
	Scope 2 GHG Intensity	tCO <sub>2</sub> e/Ton of Production	0.237	0.234	0.246	0.192
	Scope 1 + Scope 2 GHG Intensity	tCO <sub>2</sub> e/Ton of Production	0.590	0.546	0.544	0.517
EN18	GHG Intensity in tonnes CO2e per currency total revenue (if currency was not THB, please make a note in remarks)	tCO <sub>2</sub> e/Million THB	7.12	7.14	9.03	15.88

GRI G4	Unit	2013	2014	2015	2016	
EN18	GHG Intensity in tonnes CO <sub>2</sub> e per full time equivalent (FTE) employee	tCO <sub>2</sub> e/FTE	223.17	198.74	179.26	390.74
EN21	Total NOx emission	Tons	2,060	1,977	2,430	1,779
EN21	Total SOx emission	Tons	288	752	1,075	1,126
EN21	Total VOC emission	Tons	661	854	1,149	2,033
<b>Wastewater Discharge</b>						
	Total water discharge volume	m <sup>3</sup>	6,722,467	12,269,886	12,940,673	21,251,430
	COD in treated wastewater discharged	Tons	542.04	525.29	446.27	1,121
	BOD in treated wastewater discharged	Tons	63.31	76.55	58.45	110.41
	TSS in treated wastewater discharged	Tons	1,122.42	1,325.29	1,576.78	1,709
	Oil and grease in treated wastewater discharged	Tons	19.13	14.25	17.34	18
EN22	COD in untreated wastewater discharged to third party	Tons	-	-	-	3,793
	BOD in untreated wastewater discharged to third party	Tons	-	-	-	1,606
	TSS in untreated wastewater discharged to third party	Tons	-	-	-	1,035
	Oil and grease in treated wastewater discharged	Tons	-	-	-	4.75
	Recycled & Reused water	m <sup>3</sup>	1,539,294	1,768,053	1,748,067	1,954,678
<b>Solid Waste</b>						
	Total hazardous waste	Tons	20,580	37,171	34,229	47,465
	- Reuse	Tons	11	4,397	819	726
	- Recycling	Tons	346	7,596	12,545	12,038
	- Recovery (including energy recovery)	Tons	459	483	782	2,153
	- Composting	Tons	-	-	13	43
	- Incineration	Tons	5,665	4,624	4,151	4,860
	- Landfill	Tons	13,641	17,784	1,684	2,348
	- Others	Tons	459	2,286	14,234	25,298
	Total non-hazardous waste	Tons	71,913	73,297	83,730	99,150
EN23	- Reuse	Tons	611	595	1,829	3,604
	- Recycling	Tons	36,319	36,146	39,728	28,189
	- Recovery (including energy recovery)	Tons	6,663	6,259	11,460	6,143
	- Composting	Tons	290	384	720	5,642
	- Incineration	Tons	697	1,412	819	779
	- Landfill (General waste)	Tons	18,522	18,699	16,681	28,293
	- Others	Tons	8,812	9,802	12,494	26,499
	Total Reused, Recycled and Recovered Waste	Tons	44,408	55,478	67,162	52,584
	Total Waste Disposed (not Reused, Recycled or Recovered)	Tons	48,085	54,991	50,797	93,762
EN25	Total weight of hazardous waste transported	Tons	5,755	19,043	32,873	43,882
EN25	Total weight of hazardous waste treated	Tons	5,521	6,323	6,594	6,726
EN25	The total weight of hazardous waste shipped internationally	Tons	7	39	8	45
<b>Spills<sup>10</sup></b>						
EN24	Total significant spills**	Cases	14	17	41	38
		Tons	12	107	94	90

GRI G4		Unit	2013	2014	2015	2016
EN24	- Hydrocarbon spills**	Cases	1	0	0	2
		Tons	2	0	0	0
EN24	- Chemical spills**	Cases	9	13	30	31
		Tons	12	1	89	50
EN24	- Other spills**	Cases	4	5	11	5
		Tons	0	107	4	39
<b>Environmental Compliance</b>						
EN29 <sup>11</sup>	ALL FINES: Monetary value of ALL fines for non-compliance with environmental laws and regulations	USD	0	0	205	260
EN29	FINES OVER USD 10,000: Monetary value of significant fines over USD 10,000 for non-compliance with environmental laws and regulations	USD	0	0	0	0
EN29	Total number of non-monetary sanctions for non-compliance with environmental laws and regulations	Cases	5	9	4	2
EN29	Total number of non-monetary sanctions for non-compliance with environmental laws and regulations were incurred	Cases	5	8	4	2
<b>Occupational Health and Safety</b>						
LA5	Total workforce represented in formal joint management—worker health and safety committees	Person	1,812	2,689	2,772	3,773
LA5	Percentage of workforce represented in formal joint management—worker health and safety committees	%	21%	26%	22%	29%
	Total Recordable Injury rate (TRIR) (per 200,000 man-hours)	No/200,000 Man-Hours	1.25	1.48	1.57	1.00
	Employees	No/200,000 Man-Hours	1.30	1.55	1.57	1.11
	- Male	No/200,000 Man-Hours	1.33	1.66	1.65	1.15
	- Female	No/200,000 Man-Hours	1.15	1.05	1.21	0.91
	Contractors	No/200,000 Man-Hours	1.00	1.13	1.55	0.67
	- Male	No/200,000 Man-Hours	1.02	1.18	1.79	0.76
	- Female	No/200,000 Man-Hours	0.88	0.89	0.34	0.00
	Total Recordable Injury (not including first aid incidents)	Cases	132	184	214	164
	Employees	Cases	117	163	186	138
	Contractors	Cases	15	21	28	26
LA6	Lost Time Injury Frequency Rate (LTIFR) (per million man-hours) <sup>12</sup>	No/MillionMan-Hours	5.6	4.1	3.6	3.0
	Employees	No/MillionMan-Hours	5.9	5.2	3.6	3.4
	- Male	No/MillionMan-Hours	6.1	5.5	3.5	3.4
	- Female	No/MillionMan-Hours	4.8	4.1	3.8	3.5
	Contractors	No/MillionMan-Hours	3.7	2.1	4.1	1.8
	- Male	No/MillionMan-Hours	3.7	1.6	5.0	2.0
	- Female	No/MillionMan-Hours	3.5	4.5	0.0	0.0
	Total Lost-Time Injuries <sup>13</sup>	Cases	117	118	100	99
	Employees	Cases	106	110	85	85
	- Male <sup>14</sup>	Cases	89	93	68	69
	- Female	Cases	17	17	17	16

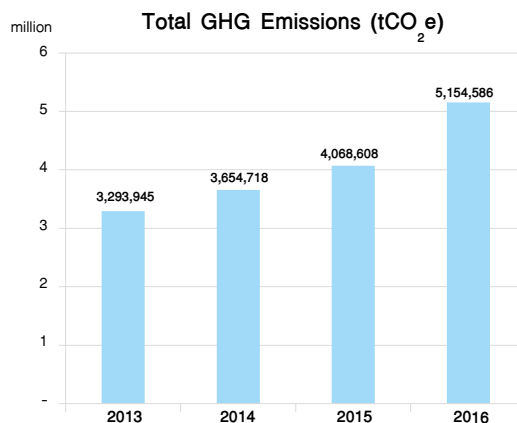
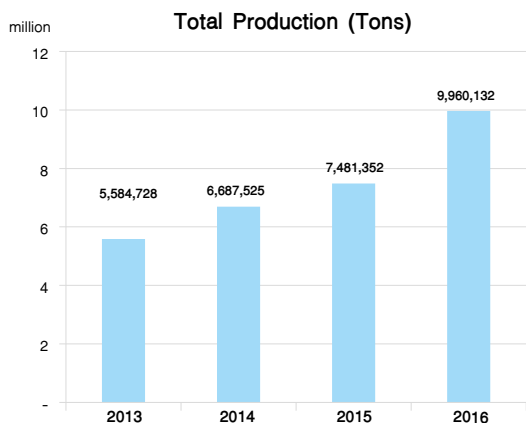
GRI G4	Unit	2013	2014	2015	2016
Contractors	Cases	11	8	15	14
- Male	Cases	9	5	15	14
- Female	Cases	2	3	0	0
Occupational Illness Frequency Rate (OIFR)	No/MillionMan-Hours	0.00	0.00	0.04	0.03
Total number of occupational diseases cases	Cases	0	0	1	1
Employees	Cases	0	0	1	1
- Male	Person	0	0	1	1
- Female	Person	0	0	0	0
Contractors	Cases	0	0	0	0
- Male	Person	0	0	0	0
- Female	Person	0	0	0	0
Fatalities (all employees and contractors)	Person	0	0	0	0
Lost day rate (LDR)	Days/MillionMan-Hours	77	52	83	46
Employees	Days/MillionMan-Hours	89	59	87	54
- Male	Days/MillionMan-Hours	100	62	99	48
- Female	Days/MillionMan-Hours	45	44	27	80
Contractors	Days/MillionMan-Hours	1	11	56	21
- Male	Days/MillionMan-Hours	2	9	37	24
- Female	Days/MillionMan-Hours	0	19	151	0
Total number of lost day (only including lost scheduled work days)	Man Days	1,618.8	1,280.2	2,252.2	1,508
Employees	Man Days	1,614.8	1,239.2	2,049.2	1,341
- Male	Man Days	1,454.8	1,063.2	1,939.2	974
- Female	Man Days	160	176	110	367
Contractors	Man Days	4	41	203	167
- Male	Man Days	4	28	113	167
- Female	Man Days	-	13.0	90.0	-
Absentee rate (AR)	%	1.6%	1.8%	1.8%	2.1%
Employees	%	1.8%	2.1%	2.0%	2.5%
- Male	%	1.7%	2.0%	1.9%	2.3%
- Female	%	2.4%	2.4%	2.6%	3.6%
Contractors	%	0.1%	0.3%	0.2%	0.5%
- Male	%	0.1%	0.3%	0.2%	0.4%
- Female	%	0.0%	0.4%	0.2%	1.7%
Absentee days	Days	38,563.7	54,330.1	62,869.6	81,830.0
Employees	Days	38,333.7	52,754.1	61,870.1	76,652.0
- Male	Days	27,388.1	40,586.8	46,916.3	56,876.0
- Female	Days	10,945.6	12,167.4	14,953.8	19,776.0
Contractors	Days	230.0	1,576.0	999.5	5,178.0
- Male	Days	230	1,235	860	3,328
- Female	Days	0	342	140	1,850
Near Miss	Cases	-	-	-	732
Employees	Cases	-	-	-	650
- Male	Cases	-	-	-	582
- Female	Cases	-	-	-	68

LA6

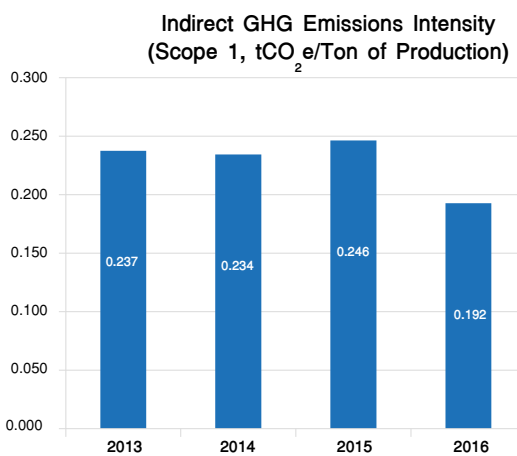
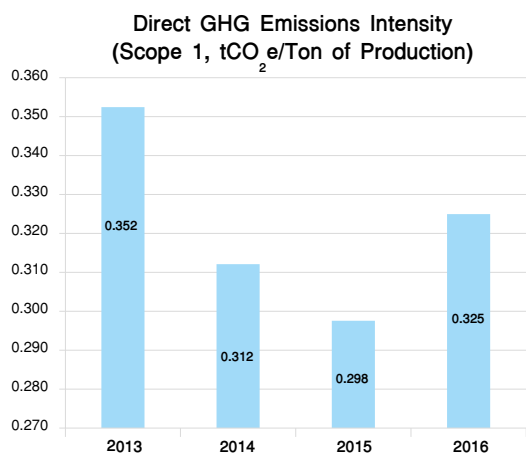
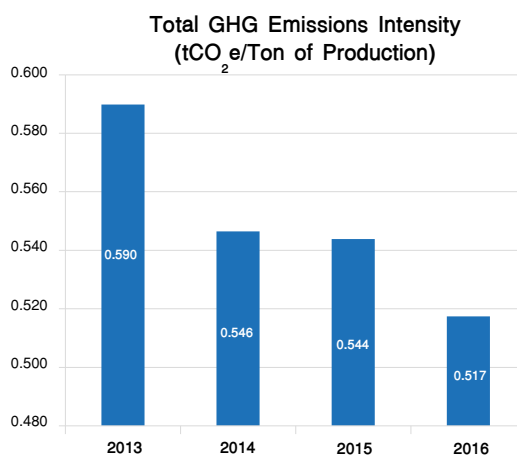
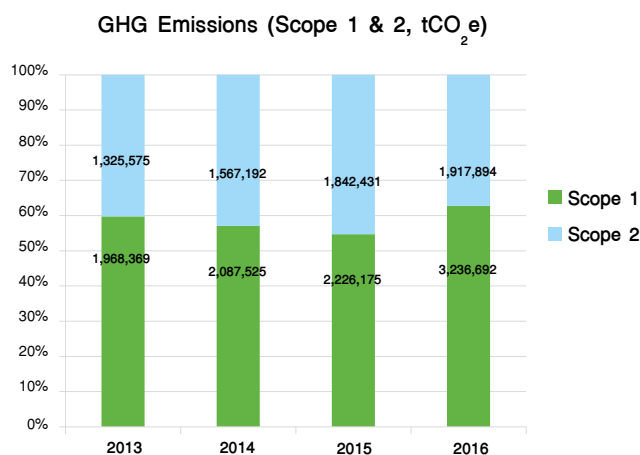
GRI G4		Unit	2013	2014	2015	2016
LA6	Contractors	Cases	-	-	-	82
LA6	- Male	Cases	-	-	-	73
LA6	- Female	Cases	-	-	-	9
	Worker with high incidence or high risk of diseases related to their occupation <sup>*15</sup>	Person	114	114	114	193
	Employees	Person	61	61	81	136
LA7	- Male	Person	61	61	81	136
	- Female	Person	0	0	0	0
	Contractors	Person	53	53	33	57
	- Male	Person	53	53	33	57
	- Female	Person	-	-	-	-

Notes:

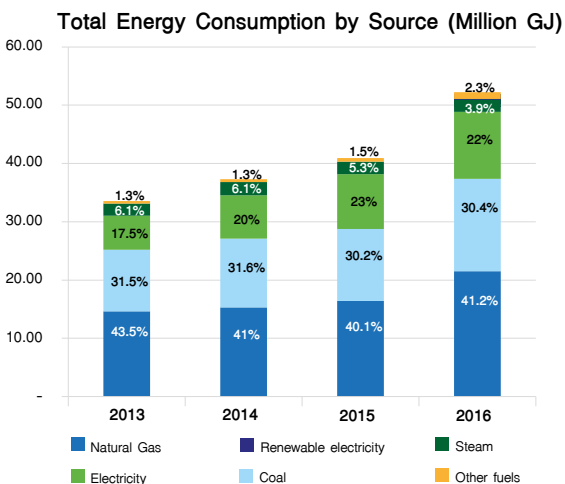
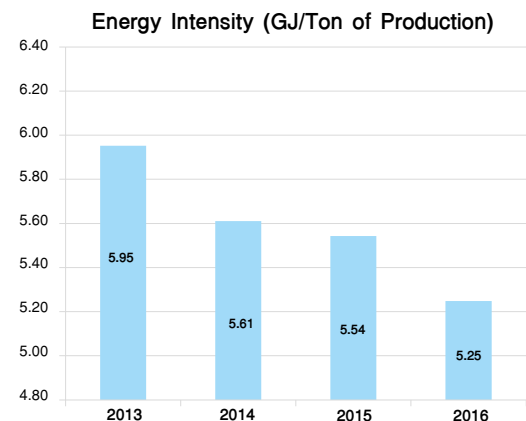
- \*1 2013, 2014 & 2015 reported numbers have been restated from 1,144,777, 1,474,737 & 1,601,371 respectively.
- \*2 2013, 2014 & 2015 reported numbers have been restated from 32,954,966, 37,186,156 & 41,260,994 respectively.
- \*3 2013, 2014 & 2015 reported numbers have been restated from 119,182, 124,885 & 383,833 respectively.
- \*4 2013 & 2014 reported numbers have been restated from 0.
- \*5 2013, 2014 & 2015 reported numbers have been restated from 0.
- \*6 2013, 2014 & 2015 reported numbers have been represented from 119,182, 124,885 & 156,799 respectively.
- \*7 2013, 2014 & 2015 reported numbers have been restated from 205,050, 299,293 & 672,283 respectively.
- \*8 2013, 2014, 2015 reported numbers have been previously restated from 5,993,966 m<sup>3</sup>, 7,256,147 m<sup>3</sup> & 9,485,506 m<sup>3</sup> respectively.
- \*9 Report includes only data from 2 sites (IRPL & OGP).
- \*10 2015 spill data has been restated.
- \*11 2015 reported number has been restated from THB 249,431.
- \*12 2015 LTIFR numbers have been restated.
- \*13 2013, 2014 & 2015 reported numbers have been restated from 223, 228 & 185 respectively.
- \*14 2014 reported number has been restated from 93.
- \*15 2013, 2014 & 2015 reported numbers have been restated.

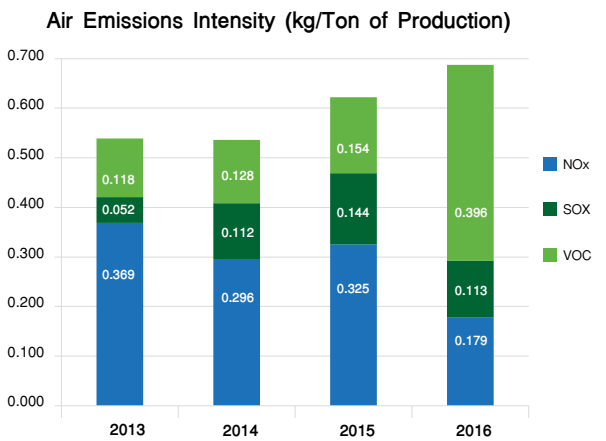
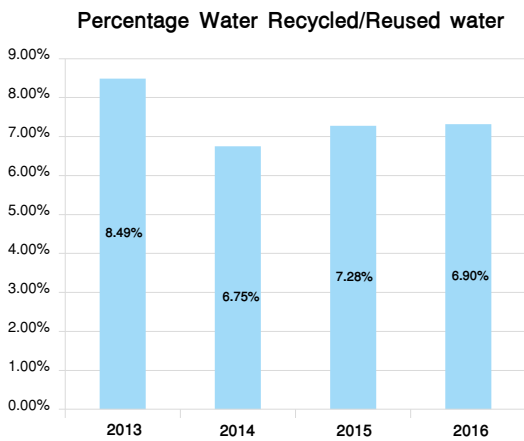
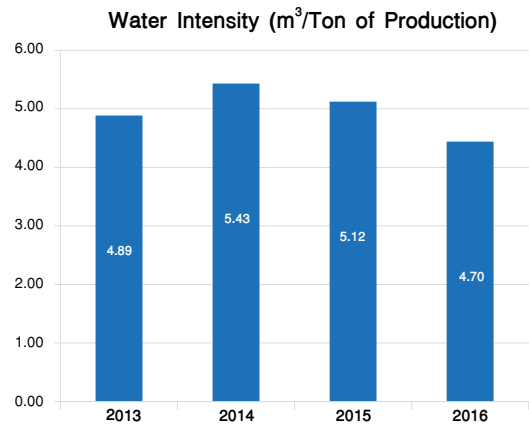
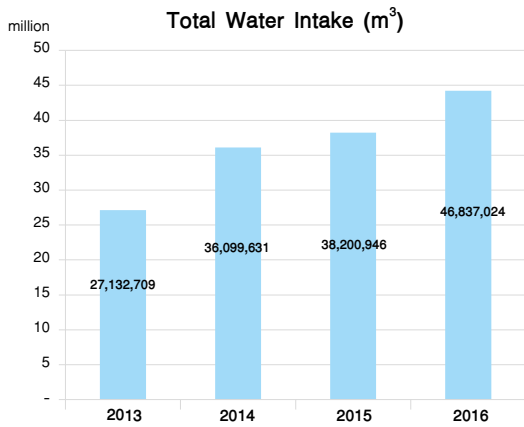


\* Total overall GHG emissions have increased as our Production has increased from 7.48 MillionTons during the same period.

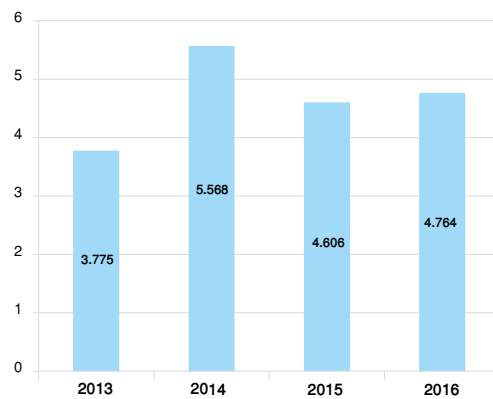


\*The Total Direct emission has increased with the addition of two new Coal based power plants



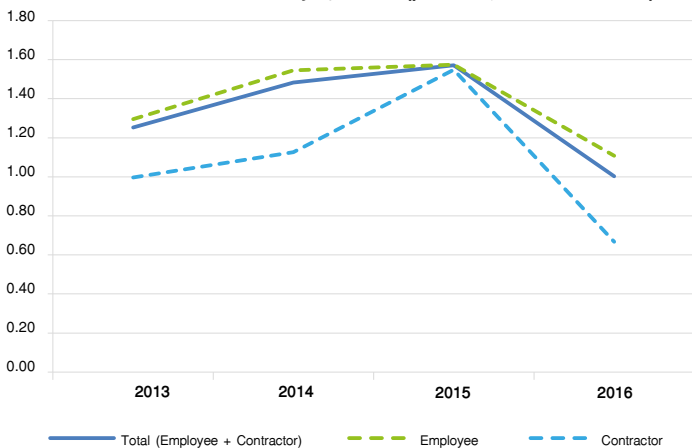


### Hazardous Waste Intensity (kg/Ton of Production)

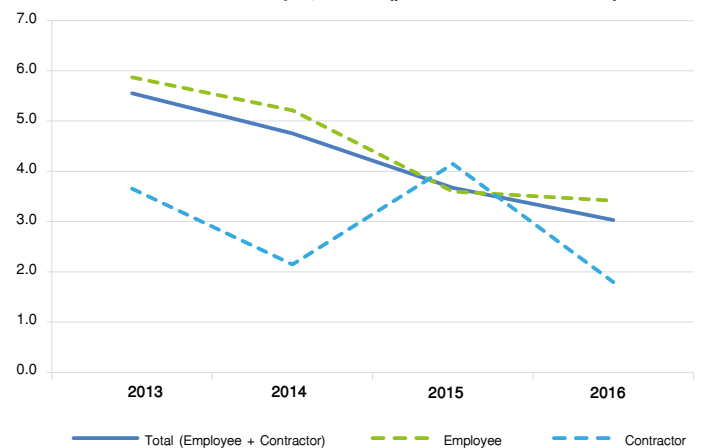


Hazardous waste intensity per ton has increased marginally with the acquisitions of plants and operation of Coal fired boilers in two sites

### Total Recordable Injury Rate (per 200,000 Man-hours)



### Lost Time Injury Rate (per Million Man-hours)





## Global Human Resources Data

GRI G4		Unit	2014*	2015*	2016
<b>Employees</b>					
G4-10	Total employees	FTE Employees	11,175	12,868	14,432
	- Male	FTE Employees	8,605	10,080	11,257
	- Female	FTE Employees	2,570	2,788	3,175
	Total full-time employees	Person	10,610	12,273	13,769
	- Male	Person	8,120	9,583	10,718
	- Female	Person	2,490	2,690	3,051
	Total temporary contract employees	Person	565	595	663
	- Male	Person	485	497	539
	- Female	Person	80	98	124
	G4-10, LA12	Total employees	Person	11,175	12,868
- Male		Person	8,605	10,080	11,257
- Female		Person	2,570	2,788	3,175
Total employees by Level		Person	11,175	12,868	14,432
Executive		Person	77	92	120
- Male		Person	68	80	105
- Female		Person	9	12	15
Senior Management		Person	502	539	592
- Male		Person	410	433	459
- Female		Person	92	106	133
Middle Management		Person	2,301	2,481	2,645
- Male		Person	1,789	1,954	2,109
- Female		Person	512	527	536
Employee		Person	8,295	9,756	11,075
- Male		Person	6,338	7,613	8,584
- Female		Person	1,957	2,143	2,491
LA12	Total employees by Age	Person	11,175	12,868	14,432
	Over 50 years old	Person	1,694	1,742	2,502
	- Male	Person	1,368	1,412	2,159
	- Female	Person	326	330	343
	30-50 years old	Person	6,425	7,776	8,444
	- Male	Person	4,875	6,100	6,463
	- Female	Person	1,550	1,676	1,981
	Below 30 years old	Person	3,056	3,350	3,486
	- Male	Person	2,362	2,568	2,635
	- Female	Person	694	782	851
<b>Employee hires and turnover</b>					
LA1	Total new employees	Person	876	1,645	1,484
	- Male	Person	534	1,292	1,054
	- Female	Person	342	353	430
	Total new hire rate	New hire rate (%)	8%	13%	10%
	- Male	New hire rate (%)	6%	13%	9%
	- Female	New hire rate (%)	13%	13%	14%
	New employees by Age	Person	876	1,645	1,484
	Over 50 years old	Person	9	96	102
	- Male	Person	2	90	93
	- Female	Person	7	6	9
30-50 years old	Person	209	626	691	
- Male	Person	107	501	500	
- Female	Person	102	125	191	

Note: \*Some data for 2014 & 2015 have been restated.

GRI G4		Unit	2014*	2015*	2016
LA1	Below 30 years old	Person	658	923	691
	- Male	Person	425	701	461
	- Female	Person	233	222	230
	New hire rate by Age	New hire rate (%)	9%	16%	10%
	Over 50 years old	New hire rate (%)	1%	6%	4%
	- Male	New hire rate (%)	0%	6%	4%
	- Female	New hire rate (%)	2%	2%	3%
	30-50 years old	New hire rate (%)	3%	8%	8%
	- Male	New hire rate (%)	2%	8%	8%
	- Female	New hire rate (%)	7%	7%	10%
	Below 30 years old	New hire rate (%)	22%	28%	20%
	- Male	New hire rate (%)	18%	27%	17%
	- Female	New hire rate (%)	34%	28%	27%
	Total employee turnover	Person	698	1,094	909
	- Male	Person	500	884	676
	- Female	Person	198	210	233
	Total employees turnover rate	Turnover rate (%)	6.25%	8.50%	6.30%
	- Male	Turnover rate (%)	5.81%	8.77%	6.01%
	- Female	Turnover rate (%)	8%	8%	7%
	Turnover by Age	Person	698	1,094	909
	Over 50 years old	Person	120	160	172
	- Male	Person	98	128	132
	- Female	Person	22	32	40
	30-50 years old	Person	297	511	438
	- Male	Person	192	401	314
	- Female	Person	105	110	124
	Below 30 years old	Person	281	423	299
	- Male	Person	210	355	230
	- Female	Person	71	68	69
	Turnover Rate by Age	Turnover rate (%)	6%	9%	6%
	Over 50 years old	Turnover rate (%)	7%	9%	7%
	- Male	Turnover rate (%)	7%	9%	6%
	- Female	Turnover rate (%)	7%	10%	12%
	30-50 years old	Turnover rate (%)	5%	7%	5%
	- Male	Turnover rate (%)	4%	7%	5%
	- Female	Turnover rate (%)	7%	7%	6%
	Below 30 years old	Turnover rate (%)	9%	13%	9%
	- Male	Turnover rate (%)	9%	14%	9%
	- Female	Turnover rate (%)	10%	9%	8%
	Voluntary employees turnover	Person	617	888	807
	Voluntary employee turnover	Turnover rate (%)	5.26%	6.9%	5.59%
	Number of employees laid off	Person	68	0	89
"Number of consultations/negotiations with employees over organizational changes"	Person	139	61	28.00	
<b>Parental leave</b>					
LA3	Number of employees entitled for parental leave	Person	1,946	4,334	5,448
	- Male	Person	1,336	3,402	4,299
	- Female	Person	610	932	1,149
	Number of employees taken parental leave	Person	86	188	224
	- Male	Person	34	116	149
	- Female	Person	52	72	75

Note: \*Some data for 2014 & 2015 have been restated.

GRI G4	Unit	2014*	2015*	2016	
	Number of employees return to work after parental leave	Person	75	172	194
	- Male	Person	33	107	143
	- Female	Person	42	65	51
	Return to work (after parental leave) rate	%	87%	91%	87%
	- Male	%	97%	92%	96%
	- Female	%	81%	90%	68%
LA3	Number of employees returning from parental leave and still employed for the next 12 months	Person	50	167	171
	- Male	Person	22	105	131
	- Female	Person	28	62	40
	Retention (after parental leave and still employed for the next 12 months) rate	%	67%	97%	88%
	- Male	%	67%	98%	92%
	- Female	%	67%	95%	78%
<b>Employee training</b>					
	Total training hours provided to employees	hours	123,349	186,914	284,357
	- Male	hours	89,146	141,557	211,450
	- Female	hours	34,203	45,357	72,907
	Executive	hours	1,522	1,859	3,749
	- Male	hours	1,290	1,529	3,195
	- Female	hours	232	330	553
	Senior Management	hours	5,199	6,268	12,818
	- Male	hours	3,988	4,854	9,735
	- Female	hours	1,211	1,414	3,083
	Middle Management	hours	22,566	44,283	66,168
	- Male	hours	16,513	33,013	53,924
	- Female	hours	6,053	11,270	12,244
	Employee	hours	94,062	134,504	201,622
	- Male	hours	67,355	102,161	144,596
	- Female	hours	26,707	32,343	57,026
LA9	Average training hours	hours/employee	11	15	19.7
	- Male	hours/employee	10	14	18.8
	- Female	hours/employee	13	16	23.0
	Executive	hours/employee	20	20	31.2
	- Male	hours/employee	19	19	28.4
	- Female	hours/employee	26	28	30.9
	Senior Management	hours/employee	10	12	21.6
	- Male	hours/employee	10	11	21.2
	- Female	hours/employee	13	13	23.2
	Middle Management	hours/employee	10	18	25.0
	- Male	hours/employee	9	17	25.6
	- Female	hours/employee	12	21	22.8
	Employee	hours/employee	11	14	18.2
	- Male	hours/employee	11	13	16.8
	- Female	hours/employee	14	15	22.9
<b>Performance Review</b>					
	Number of employees receiving regular performance reviews	Person	4,946	8,123	14,432
LA11	Executive	Person	77	92	120
	Senior Management	Person	388	541	592
	Middle Management	Person	1,880	2,297	6,522
	Employee	Person	2,601	5,193	7,198

Note: \*Some data for 2014 & 2015 have been restated.

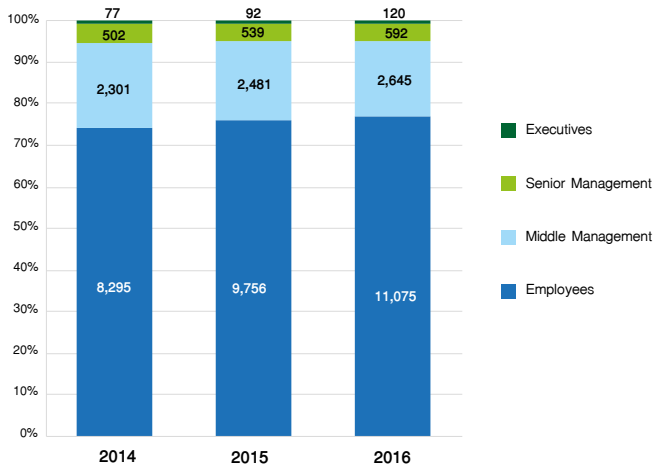
GRI G4		Unit	2014*	2015*	2016
LA11	% of employees receiving regular performance reviews	%	44%	63%	100%
	Executive	%	100%	100%	100%
	Senior Management	%	77%	100%	100%
	Middle Management	%	82%	93%	96%
	Employee	%	31%	53%	90%
	Number of employees receiving career development reviews	Person	2,536	7,806	13,252
	Executive	Person	50	92	120
	Senior Management	Person	388	541	592
	Middle Management	Person	1,150	1,980	2,526
	Employee	Person	948	5,193	10,014
<b>Remuneration Ratio of women to men</b>					
LA13	Ratio of basic salary + remuneration of women to men				
	Strategic	Ratio	0.850	0.860	0.950
	Managerial	Ratio	0.890	0.910	0.931
	Supervisory and operational	Ratio	0.910	0.890	0.912
<b>Satisfaction/ Engagement Score</b>					
	Employees satisfaction score	%	-	85.92%	86.02%
	- Male	%	-	82.98%	82.62%
	- Female	%	-	88.91%	89.39%
	Data coverage of employees satisfaction/ engagement survey			90.42%	93.5%
	- Male	% of male employees	-	89.80%	93.4%
	- Female	% of female employees	-	91.1%	93.3%
	<b>Collective Bargaining</b>				
G4-11	Total employees covered by collective bargaining agreements	Person	3,266	4,391	6,984
	Percentage of total employees covered by collective bargaining agreements	%	29%	34%	48.4%
	"Number of consultations/negotiations with trade unions over organizational changes"	Number	21	56	65
<b>Human Rights Integration</b>					
HR2	Total number of hours of employees training on human rights policies or procedures concerning aspects of human rights that are relevant to operations	hours	-	3251	9269
	Total number of employees trained in human rights policies or procedures concerning aspects of human rights that are relevant to operations	Person (s)	-	3832	7997
	Percentage of employees trained in human rights policies or procedures concerning aspects of human rights that are relevant to operations	% of total employees	-	30%	55%
<b>Non-discrimination</b>					
HR3	Total number of incidents of discrimination and corrective actions taken	Cases	-	1	2
	Number of incidents of discrimination and corrective actions taken regarding employees	Cases	-	1	1
	Number of incidents of discrimination and corrective actions taken to all excluding employees	Casse	-	0	1

Note: \*Some data for 2014 & 2015 have been restated.

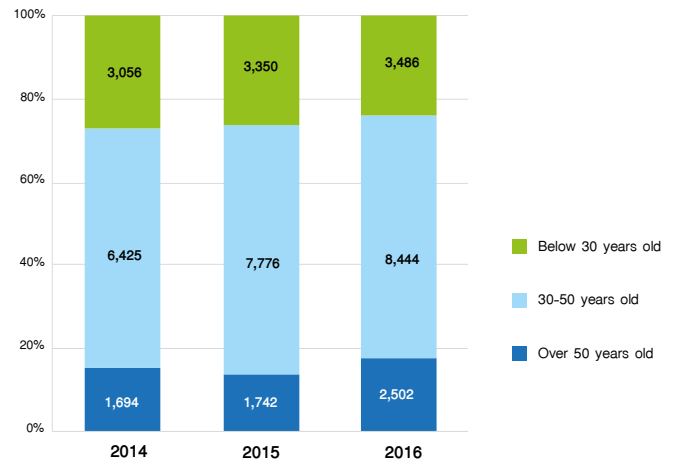
GRI G4	Unit	2014*	2015*	2016	
<b>Security Practices</b>					
HR7	Total number of security personnel trained in the organization's human rights policies or procedures that are relevant to operations	Person (s)	-	89	405
	% of security personnel trained in the organization's human rights policies or procedures that are relevant to operations	%	-	42%	88%
	Total number of security personnel	Person (s)	-	212	461
<b>Indigenous Rights</b>					
HR8	Total number of incidents of violations involving rights of indigenous peoples and actions taken	Cases	-	0	0
<b>Human Rights Assessment</b>					
HR9	Total number of operations	Number	-	59	69
	Total number of operations that have been subject to human rights reviews or impact assessments	Number	-	59	69
	% of operations that have been subject to human rights reviews or impact assessments	%	-	99%	100%
<b>Human Rights Grievance</b>					
HR12	Total number of grievance about human rights through formal grievance process	Cases	-	0	0
	Number of grievance about human rights (not related to employees) through formal grievance process	Cases	-	0	0
	Number of grievance about human rights (related to employees) through formal grievance process	Cases	-	0	0
	Total number of human rights grievance in this reporting period addressed	Cases	-	0	0
	Number of human rights grievance (not related to employees) in this reporting period addressed	Cases	-	0	0
	Number of human rights grievance (related to employees) in this reporting period addressed from employees	Cases	-	0	0
	Total number of human rights grievance in previous reporting period resolved	Cases	-	0	0
	Number of human rights grievance (not related to employees) in previous reporting period resolved	Cases	-	0	0
	Number of human rights grievance (related to employees) in previous reporting period resolved from employees	Cases	-	0	0
<b>Labor Practice Grievance</b>					
EN34, LA16	Total number of grievances about labor practices filed through formal grievance mechanisms during the reporting period.	Cases	-	45	41
	Total number of grievances about labor practices addressed during the reporting period	Cases	-	48	44
	Total number of grievances about labor practices resolved during the reporting period	Cases	-	36	32
	Total number of grievances about labor practices filed prior to the reporting period that were resolved during the reporting period	Cases	-	27	24

Note: \*Some data for 2014 & 2015 have been restated.

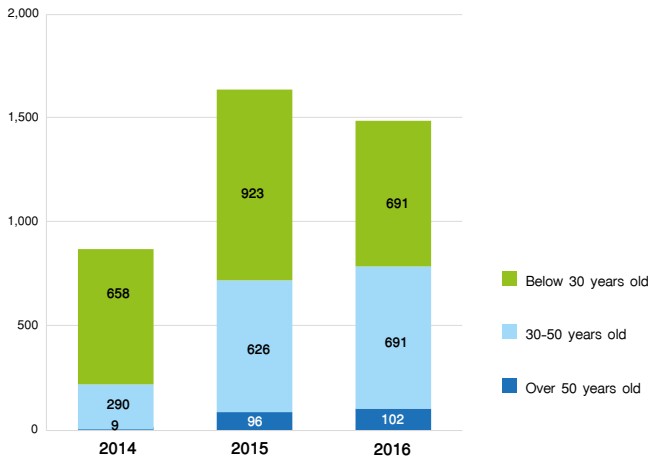
**Employee Breakdown by Level**



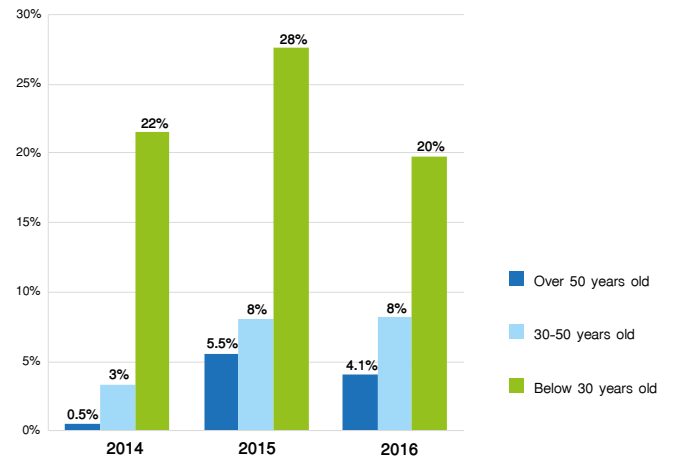
**Employee Breakdown by Age**



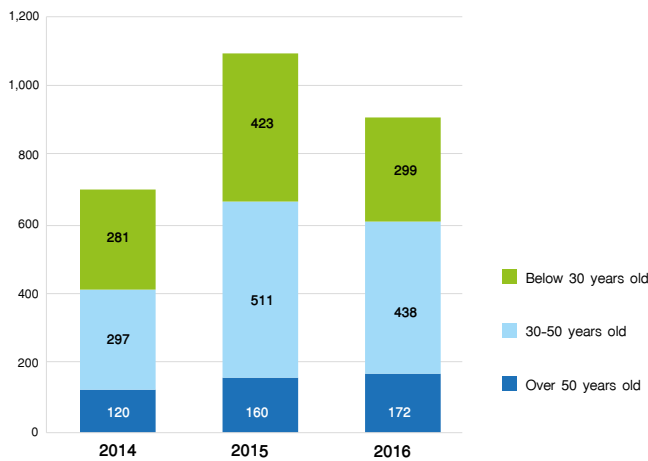
**Total New Hires**



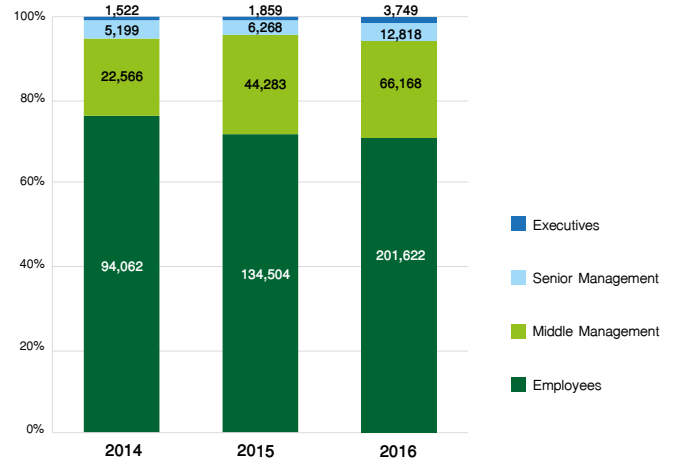
**New Hire Rate by Age**



**Turnover Numbers**



**Total training hours provided to employees**



## Global CSR Data

GRI G4		Unit	2015	2016
<b>Local community engagement</b>				
SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs	%	50%	73.13%
	Total number of operations with any of the below local community engagement, impact assessments and developed programs	Number	15	18
	Number of operations with implemented social impact assessment including gender assessment	Number	4	4
	Number of operations with implemented environmental impact assessment	Number	12	14
	Number of operations with implemented public disclosure of results of environmental and social impact assessment	Number	8	9
	Number of operations with implemented local community development programs	Number	6	10
	Number of operations with implemented stakeholder engagement plans	Number	4	9
	Number of operations with implemented broad base local community consultation committees and processes	Number	4	4
	Number of operations with implemented works councils, occupational health and safety committees and other employee representation bodies to deal with impacts	Number	14	12
Number of operations with implemented formal local community grievance process	Number	8	6	
<b>Societal Grievance</b>				
SO11	Number of grievance regarding society received through formal grievance process	Case	7	4
	Total number of societal grievance in this reporting period addressed	Case	7	4
	Total number of societal grievance in this reporting period resolved	Case	7	4
	Total number of societal grievance in previous reporting period resolved	Case	6	1
<b>Philanthropic</b>				
Total philanthropic activities	%	100%	100%	
Charitable donations	THB	7,642,944	4,750,340	
Community investments	THB	3,094,868	15,829,611	
Commercial initiative	THB	6,998,698	2,774,916	
<b>Philanthropic Contribution</b>				
Total cash contributions	THB	16,748,119	19,360,660	
Time: Estimate employee cost	THB	995,673	13,289,843	
Total in kind giving: product or service donations, projects/partnerships or similar	THB	548,877	2,834,100	
Total management overheads	THB	433,515	1,159,106	

## Operations Information Included in 2016 Sustainability Report

Business Segment	Plant Name	Region	Type of New Entity and Year of Start		Environment										Social			
					Energy	Emissions		Air			Waste	Water				Health & Safety	CSR	HR
						GHG Scope 1	GHG Scope 2	NOx	SOx	VOC		COD	BOD	Total Water Withdrawn by Sources	Waste Water Discharge			
PTA	IRPL	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PTA	PTIP	APAC			✓	✓	✓	'14-'16	'14-'16	NA	✓	✓	✓	✓	✓	✓	✓	
PTA	TPT	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PTA	IVQ	EMEA	2016	Acquisition	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	
PTA	IVE	EMEA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PTA	IVPTA	NA	2015	Acquisition	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	
PTA	IVXP	NA	2016	Acquisition	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	
Feedstock	IVQ	EMEA	2016	Acquisition	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	
Feedstock	IVOG	NA			✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	
Feedstock	IVXP	NA	2016	Acquisition	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	
PET	AsiaPet	APAC			✓	'14-'16	✓	'14-'16	'14-'16	✓	✓	✓	✓	✓	✓	✓	✓	
PET	GIVL	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PET	IPI - R	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PET	IVLDPI	APAC	2016	Acquisition	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	'16	
PET	IVPR	APAC	2015	Acquisition	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	
PET	MPPL	APAC	2016	Acquisition	'16	'16	'16	'16	'16	NA	'16	'16	'16	'16	'16	'16	'16	
PET	PTIPPI	APAC			✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	
PET	PTIVI	APAC			✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	
PET	IRPN	EMEA			✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	✓	NA	✓	
PET	IVAPET	EMEA	2014	Acquisition	'14-'16	'14-'16	'14-'16	NA	NA	NA	'14-'16	NA	NA	'14-'16	NA	'14-'16	'14-'16	
PET	IVCPET	EMEA	2015	Acquisition	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	NA	'15-'16	'15-'16	NA	'15-'16	'15-'16	'15-'16	'15-'16	
PET	IVE	EMEA			✓	✓	✓	✓	NA	✓	✓	✓	NA	✓	✓	✓	✓	
PET	IVP	EMEA			✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	
PET	IVQ	EMEA	2016	Acquisition	'16	'16	'16	'16	'16	NA	'16	'16	'16	'16	'16	'16	'16	
PET	OGP	EMEA			✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	
PET	AlphaPet	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PET	Auriga	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PET	IVPM	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PET	StarPet	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	FiberVisions Asia	APAC			✓	✓	✓	NA	NA	NA	✓	✓	NA	✓	✓	✓	✓	
Fibers	IPI-N	APAC			✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	
Fibers	IPI-R	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	PF China	APAC	2015	Acquisition	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16	
Fibers	PTIPCI	APAC	2014	Greenfield	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	NA	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	
Fibers	PTIPII	APAC			✓	✓	✓	✓	✓	✓	✓	NA	NA	✓	✓	✓	'15-'16	
Fibers	PTIVI	APAC			✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	
Fibers	FiberVisions Varde	EMEA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	PHP Germany	EMEA	2014	Acquisition	'14-'16	'14-'16	'14-'16	'16	NA	'14-'16	'14-'16	'14-'16	NA	'14-'16	'14-'16	'14-'16	'14-'16	
Fibers	Trevira Guben	EMEA			✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	Trevira Bobingen	EMEA			✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	Wellman Ireland	EMEA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	Auriga	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	FiberVisions Athens	NA			✓	✓	✓	NA	NA	NA	✓	NA	NA	✓	✓	✓	✓	
Fibers	FiberVisions Covington	NA			✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	IVPM	NA			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Fibers	PHP USA	NA	2014	Acquisition	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	



Business Segment	Plant Name	Region	Type of New Entity and Year of Start		Environment										Social			
					Energy	Emissions		Air			Waste	Water				Health & Safety	CSR	HR
						GHG Scope 1	GHG Scope 2	NOx	SOx	VOC		COD	BOD	Total Water Withdrawn by Sources	Waste Water Discharge			
Packaging	IVPPC Batino	APAC	2014	Greenfield	'14-'16	'14-'16	'14-'16	NR	NR	NR	'14-'16	'14-'16	'14-'16	'14-'16	'14-'16	'15-'16	'14-'16	
Packaging	IVPPC MOP	APAC			✓	✓	✓	NR	NR	NR	✓	✓	NR	✓	✓	✓	'15-'16	✓
Packaging	IVPPC Dav	APAC	2016	Greenfield	✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	✓	✓	'15-'16	✓
Packaging	IVPML	APAC			✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	✓	✓	'15-'16	✓
Packaging	Petform, Korat	APAC			✓	✓	✓	NR	NR	NR	NR	✓	✓	✓	✓	✓	✓	✓
Packaging	Petform, Lopburi	APAC			✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	NR	✓	✓	✓
Packaging	Petform, Pathumthani	APAC			✓	'14-'16	'14-'16	NR	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓
Packaging	Petform, Rayong	APAC			✓	✓	✓	NR	NR	NR	NR	NR	NR	✓	✓	✓	✓	✓
Packaging	BPL	EMEA			✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	✓	✓	'15-'16	✓
Packaging	IVPN	EMEA			✓	✓	✓	NR	NR	NR	✓	NR	NR	✓	✓	✓	'15-'16	✓
Packaging	IVPG	EMEA	2015	Greenfield	'15-'16	'15-'16	'15-'16	NR	NR	NR	'15-'16	NR	NR	'15-'16	'15-'16	'15-'16	'15-'16	'15-'16
Recycling	IPI - N	APAC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recycling	Wellman, Spijk, NL	EMEA			✓	✓	✓	✓	NA	NA	✓	NA	NA	✓	✓	✓	✓	✓
Recycling	Wellman, Verdun, FR	EMEA			✓	✓	✓	NR	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓
Recycling	EcoMex	NA			✓	✓	✓	NR	NR	NR	✓	✓	✓	✓	✓	✓	'15-'16	✓
Wool	IRH	APAC			✓	✓	✓	'14-'16	'14-'16	NA	NR	NR	NR	✓	NR	✓	✓	✓

## Notes:

- ✓ Data fully reported from 2013-2016  
 NA Not Available  
 NR Not Relevant  
 '13-'16/'14-'16 Data reported only for the years mentioned (e.g. '14-'16 means data reported for 2014-2016 only)

## Coverage of Data Collection (% of Total IVL Global Production)

Material Indicator	2013	2014	2015	2016
Total energy consumption	100%	100%	100%	100%
Direct GHG Emissions Scope 1	100%	100%	99.6%	100%
Indirect GHG Emissions Scope 2	99.4%	99.3%	99.7%	100%
Total NOx Emissions	80.0%	82.3%	84.1%	95.2%
Total SOx Emissions	73.2%	75.0%	77.3%	83.9%
Total VOC Emissions	59.7%	61.4%	63.6%	77.4%
Total waste (excluding reuse and recycle)	97.4%	99.8%	99.6%	100%
COD in treated wastewater discharged	82.2%	83.4%	77.3%	93.5%
BOD in treated wastewater discharged	NA	NA	NA	83.9%
Total Water Withdrawn by Sources	97%	100%	100%	100%
Waste Water Discharge	NA	NA	NA	98.4%
Health & Safety	98%	98%	100%	100%
CSR	NA	56%	60%	100%
HR	NA	66.7%	75.8%	100%



# About This REPORT

This is Indorama Ventures PCL's Seventh Annual Sustainability Report and third in accordance with the GRI G4 Guidelines.

**Indorama Ventures PCL** ("IVL" or "Company") is a Public Limited Company with office at 75/102, Ocean Tower 2, 37<sup>th</sup> Floor, Soi Sukhumvit 19 (Wattana), Asoke Road, Klongtoey Nuer Sub-district, Wattana District, Bangkok Metropolis 10110 Thailand, Tel: +66 2 661 6661 and website, [www.indoramaventures.com](http://www.indoramaventures.com).

IVL is listed on the Stock Exchange of Thailand (Stock Code: IVL).

Indorama Ventures entered into the recycling business in 2011 with the acquisition of Wellman International in Europe, later extending recycling production in Thailand, the USA and Mexico. The company's aim is to increase the use of recycled PET in its operations.

## Primary Brands, Products and Services

IVL is one of the world's leading petrochemical producers and a leading global manufacturer of wool yarns. Our global sales and manufacturing presence can be seen in all high-growth economies and industries. Our products serve major players in diversified end-use markets, including food, beverages, personal and home care, healthcare, automotive, textiles and industrial.

IVL is guided by a continued focus on building strong and lasting relationships with all its stakeholders, including customers, employees, investors, business partners, communities, and the environment, and to provide the best quality products and services. More information on our products is available on our [website](#).

## Our Approach

IVL publishes a sustainability report on an annual basis as part of our commitment to communicating effectively and transparently, and providing a better understanding of our sustainable development efforts. This includes our economic, environmental and social initiatives, which allows us to strengthen our engagement with stakeholders regarding how we are integrating sustainability into our operations. This report provides insights into our approach to sustainability, along with our objectives, strategy and performance.

## Period & Scope

Our 2016 Sustainability Report covers our operations across four continents in 21 countries around the world for the 2016 reporting year (1st January 2016 to 31st December 2016). As a company undergoing significant growth, we recognize the importance of ensuring progress on prioritizing sustainability. We declare this report to be in accordance with the G4 Guidelines at a core level. The key elements of the G4 Sustainability Reporting approach that we have focused on, in keeping with the intent of the guidelines, are described below.

IVL's Sustainability Reports from 2010-2015 are available on our website at: [www.indoramaventures.com/sustainability](http://www.indoramaventures.com/sustainability). Our last Sustainability Report was published in 2016.

## Principles for Defining Report Content

The Company strongly believes that a broad and inclusive materiality process, including stakeholder engagement, can deliver valuable benefits to the entire organization. This includes:

- Prioritizing our organization's resources for the sustainability issues that matter most to our business and stakeholders.
- Ensuring the right business strategy by taking into account significant social, environmental, and economic initiatives thereby focusing our time and resources on the most important material aspects.
- Embedding sustainability issues into the day-to-day management and operations of our wider business processes.

- Identifying trends on the horizon and potential emerging risks enabling the business to be ready to take advantage of opportunities to develop new products or services and stay ahead of our competitors.

## Principles for defining Reporting Quality

The G4 Guidelines set out principles for defining reporting quality — Balance, Comparability, Accuracy, Timeliness, Clarity, and Reliability. The Company has taken a number of actions to meet the above reporting quality principles.

- We continue to improve the quality of information and disclose it in a timely manner enabling our stakeholders to effectively integrate this into their decision-making.
- The information in the Report is presented in a manner that is understandable and accessible to stakeholders.
- We value the opinion of our internal and external stakeholders. We incorporated the feedback received from our stakeholders in preparing this report.
- The information and the feedback received from stakeholders through various channels has been compiled and analyzed, including key focus areas (i.e. material issues have been identified).

This year, we conducted a materiality assessment to screen the content significant to our business operations and our stakeholder decisions, with a focus on economic, environmental and social aspects. There are a number of actions we have taken this year to meet these principles. Through a robust assurance process leveraging external and internal expertise, we have taken steps to ensure increased coverage while maintaining the integrity of the information contained in this report. We have also developed targets and commitments to improve the way we perform, which have been adapted to business segment, team, and individual targets in addition to key performance indicators (KPIs).

GRI's G4 principles on defining content are applied throughout the report. The process consists of the following three steps:

### 1. Sustainability Context

This process involves the analysis and identification of sustainability-related materiality aspects. Materiality aspects of significance to the Company's business strategy and operations occur in the economic, environmental and social areas of the business and are identified based on business opportunities, levels of risk and possible impacts to our long-term sustainable growth. This process also involves the evaluation of external trends relating to our business. Furthermore, stakeholders' points of view arising from our stakeholder engagement process are used as inputs to identify the issues they underlined as important.

### 2. Materiality Assessment:

By combining the significant issues that may affect us and our stakeholders, we are able to identify several materiality aspects. As part of this year's materiality assessment, we have conducted a

survey covering both external stakeholders (suppliers, customers, investors, media, analysts and bankers) and internal stakeholders (across all operations, businesses, and key functions). Details of the materiality assessment are given under Materiality Assessment chapter in this report.

We created a matrix of key issues which were assessed by business leaders. Based on this assessment, senior management agreed on the material issues for our business going forward. We reviewed the GRI aspects and where relevant, assigned indicators (please see the GRI content index).

Ten material issues have been identified. Details of the materiality matrix are given under Materiality Assessment chapter in this report. In order to drive performance improvements, we established key performance indicators and targets directly related to our material issues.

### 3. Assurance:

IVL has standardized data collection processes with relevant training globally such as Environmental, Health and Safety (EHS), Greenhouse Gases (GHG), and Corporate Social Responsibility. The data measurement methodology provided herein remains the same as in our 2015 report though the consistency has improved for several parameters including safety statistics, GHG emissions, and Human Resources. We enlarged the scope of our reporting boundary as compared to previous years and will continue to expand this process further in the future.

Selected content and data disclosed in our sustainability report were verified and assured by an independent external assurance auditor, TUV India Private Limited. An Assurance Statement issued by TUV India is available in the Assurance section of this report. The assured data is indicated in the GRI Content Index.

## Methodology of the Data

### Data Coverage:

Data verification coverage has been expanded this year to 22 sites covering more than 50% of total production capacity, compared to 15 sites last year covering 40% of production capacity globally. Nine of the total sites selected are located in Thailand. Nine indicators were selected for the assurance audit based on the issues that are most significant to the sustainability performance of the business, as well as the key risks identified by the whole group.

This year, we have plans to further expand data verification coverage to more sites and by 2020; we are targeting data verification coverage to 100% of the Company's sites globally.

Assurance Audit Coverage Target: 100% Production Capacity by 2020

## GHG Scopes 1 & 2 Accounting and Verification:

During the reporting year, GHG scope 1 and scope 2 emissions were calculated systematically across all IVL operations globally as per Greenhouse Gas Protocol on Corporate Accounting and Reporting by the World Resource Institute (WRI)/World Business Council for Sustainable Development (WBCSD).

The Company's GHG Scope 1 and 2 emissions have been verified by TUV NORD CERT GmbH in accordance with ISO 14064-3.

## Scope of Reporting Boundaries

The scope and reporting boundaries cover our disclosures across IVL as a group including subsidiaries and factories except those mentioned under the topic 'Exceptions', within social, environmental and economic parameters and are indicated in the GRI Content Index. The information of the companies acquired during the year includes the information from the date of acquisition.

## Environment

The environmental data is based on data sources from accounting evidence, meter reading, data from production system and estimation with ground rules.

## Greenhouse Gas (GHG) Emissions

GHG data in this report represent an account of IVL's GHG emissions from the operations of based on WRI/WBCSD GHG Emissions Protocol.

## Changes in size, structure, ownership

In 2016, IVL acquired Indorama Ventures Xylenes & PTA LLC in the United States, Indorama Ventures Quimica S.L.U. in Spain, IVL Dhunseri Petrochem Industries Limited in India, a Joint Venture Company, and incorporated a new manufacturing company in Myanmar, Indorama Ventures Packaging (Myanmar) Limited.

More details on our acquisitions are available on our website under [Media Center](#).

## Exceptions:

In the 2016 Sustainability Report, environmental, safety and human resources data from all business units including some of the joint venture entities is included in the report except the following:

- Environmental and safety information of three joint ventures, namely, ShenMa-PHP (Pingdingshan) Air Bag Yarn Manufacturing Co., Limited and ES Fibervisions (Suzhou) Co., Ltd. in China and ES FiberVisions (Thailand) Company Limited in Thailand.
- Environmental, safety and human resources of Indorama Ventures Olefins, LLC as the company is yet to commence operations.
- Environmental and safety information of sales offices, corporate offices.

# GRI G4 INDEX

We have encouraged our subsidiaries to invent products that elevate the quality of life for people around the world. One of them is flame retardant fibers for home textiles, which is known for its safety.



## GRI Content Index for 'In accordance' - CORE General Standard Disclosures

General Standard Disclosures	Page	External Assurance
Strategy and Analysis		
G4-1	Page 3-5	-
Organizational Profile		
G4-3	<a href="#">Annual Report</a> Page25, Sustainability Report Page 89	-
G4-4	<a href="#">Annual Report</a> Page79-80, <a href="#">IVL Website</a>	-
G4-5	<a href="#">Annual Report</a> Page25, Sustainability Report Page 89	-
G4-6	<a href="#">Annual Report</a> Page26, Sustainability Report Page 89	-
G4-7	<a href="#">Annual Report</a> page 26, Sustainability Report Page 89	-
G4-8	<a href="#">Annual Report</a> Page26, Sustainability Report Page 8-9	-
G4-9	Page 7, 79	-
G4-10	Page 79	-
G4-11	Page 82	-
G4-12	Page 64-65	-
G4-13	Page 91	-
G4-14	Page 27	-
G4-15	<a href="#">Annual Report</a> Page 63, Sustainability Report Page 16-17	-
G4-16	Page 62	-
Identified Material Aspects and Boundaries		
G4-17	<a href="#">Annual Report</a> Page 82, Sustainability Report Page 91	-
G4-18	Page 26, 90-91	-
G4-19	Page 27	-
G4-20	Page 28-29	-
G4-21	Page 28-29	-
G4-22	Page 70	-
G4-23	Page 91, 86-87	-
Stakeholder Engagement		
G4-24	Page 20	-
G4-25	Page 18-21	-
G4-26	Page 20	-
G4-27	Page 20-29	-
Report Profile		
G4-28	Page 90	-
G4-29	Page 90	-
G4-30	Page 90	-
G4-31	Page 104	-
G4-32	Page 90-91	Page 100-103
G4-33	Page 90-91	Page 100-103
Governance		
G4-34	Page 14-15, <a href="#">IVL Website</a>	-
Ethics and Integrity		
G4-56	Page 14	-



## Specific Standard Disclosures

Material Aspects	DMA and Indicators	Page	Omission	External Assurance
Materials	G4-DMA	Page 33-34	-	-
	G4-EN1	Page 71	-	-
	G4-EN2	Page 71	-	-
Energy	G4-DMA	Page 47-49	-	-
	G4-EN3	Page 71-72	-	Page 100-103
	G4-EN5	Page 72	-	-
	G4-EN6	Page 72	-	-
Water	G4-DMA	Page 47	-	-
	G4-EN8	Page 72	-	Page 100-103
	G4-EN10	Page 72	-	-
Emissions	G4-DMA	Page 47	-	-
	G4-EN15	Page 72	IVL is in the process of setting up GHG data collection tool to collect on biogenic CO <sub>2</sub> emissions.	Page 100-103
	G4-EN16	Page 72	IVL is in the process of setting up GHG data collection tool to collect on biogenic CO <sub>2</sub> emissions.	Page 100-103
	GE-EN17	Page 72	-	-
	G4-EN18	Page 72-73	-	-
	G4-EN21	Page 73	-	Page 100-103
	G4-EN22	Page 73	Only disclose total water discharge by quality. We do not track water discharge by destination yet but will do so in the future.	Page 100-103
Effluents and Wastes	G4-DMA	Page 47	-	-
	G4-EN23	Page 73	-	Page 100-103
	G4-EN24	Page 73-74	-	-
	G4-EN25	Page 73	-	-
	G4-EN29	Page 74	-	-
Compliance	G4-PR9	Page 37	-	-
	G4-DMA	Page 40	-	-
Supplier Environmental Assessment	G4-EN32	Page 40, 57	-	-
Employment	G4-DMA	Page 52	-	-
	G4-LA1	Page 80	-	-
	G4-LA3	Page 80-81	-	-
Occupational Health and Safety	G4-DMA	Page 52	-	-
	G4-LA5	Page 74	-	-
	G4-LA6 *	Page 74-76	-	Page 100-103
	G4-LA7	Page 76	-	-
Training and Education	G4-DMA	Page 59	-	-
	G4-LA9	Page 81	-	Page 100-103
	G4-LA11	Page 81-82	-	-
Diversity and Equal Opportunity	G4-DMA	Page 58	-	-
	G4-LA12	Page 79	-	-
Equal Remuneration for Women and Men	G4-LA13	Page 82	-	-
Supplier Assessment for Labor Practices	G4-LA14	Page 40, 57-58	-	-

\* Partially

Material Aspects	DMA and Indicators	Page	Omission	External Assurance
Labor Practices Grievance Mechanisms	G4-LA16	Page 83	-	-
Investment - Employee Training on Human Rights Policies and Procedures	G4-HR2	Page 82	-	-
Non-discrimination	G4-HR3	Page 82	-	-
Security Practices	G4-DMA	Page 55-57	-	-
	G4-HR7	Page 83	-	-
Indigenous Rights	G4-HR8	Page 83	-	-
Assessment — Human Rights	G4-DMA	Page 55-58	-	-
	G4-HR9	Page 83	-	-
Supplier Human Rights Assessment	G4-DMA	Page 57	-	-
	G4-HR10	Page 57	-	-
Human Rights Grievance Mechanisms	G4-DMA	Page 57	-	-
	G4-HR12	Page 83	-	-
Local Communities	G4-SO1	Page 85	-	-
Grievance Mechanisms for Impacts on Society	G4-SO11	Page 85	-	-
Results of surveys measuring customer satisfaction	G4-DMA	Page 39	-	-
	G4-PR5	Page 39	-	-
Economic performance	G4-EC1	Annual Report Page 181	-	-
Anti-corruption	G4-SO5	Page 33	-	-
Anti-competitive behaviour	G4-SO7	Page 33	-	-
Environmental Grievance mechanisms	G4-EN34	Page 47	-	-



# INDEPENDENT ASSURANCE STATEMENT

Indorama Ventures is at the forefront of innovation in the fiber space and continues to develop new ideas for our customers. We have engaged in diverse industrial markets, where our polyester is used as material for different parts.



# Independent Assurance Statement

## Introduction and Engagement

Indorama Ventures Public Company Limited (hereafter 'IVL' or 'the Company') commissioned TUV India Private Limited (TUVI) to conduct the independent assurance of IVL's sustainability report (hereinafter 'the Report'), which includes "limited assurance" of IVL's sustainability information and a "reasonable assurance" on IVL's direct and indirect (Scope 1 and 2) CO<sub>2</sub> emissions as a whole within the sustainability information for the applied reporting period. This assurance engagement has been conducted against the Global Reporting Initiative (GRI G4) - Sustainability Reporting Guidelines and AA1000AS (2008) Protocol (Type I, Moderate Level) for verification of the Sustainability Report. The verification was conducted in February 2017 at "Rayong: Indorama Polyester Industries, Fibers and Yarn, Indorama Polyester Industries-Petform, TPT Petrochemicals, Indorama Ventures Polymers; Lopburi: Indorama Polymers, AsiaPet, Petform, Indorama Holdings; Nakhon Pathom: Indorama Polymer Industries (recycle and fiber); Bangkok: Indorama Ventures PCL." IVL opted for external assurance for the second time for the 2016 calendar year. The Report covers IVL's sustainability information for the 1 January 2016 to 31 December 2016 period.

## Scope, Boundary and Limitations of Assurance

The scope of the assurance includes the environmental and social indicators in the report as per the Core disclosures required in the GRI G4 Guidelines. In particular, the assurance engagement included the following:

- Verification of the application of the Report content, and principles as mentioned in the GRI G4 Guidelines, and the quality of information presented in the Report over the reporting period (1 January 2016 to 31 December 2016);
- Review of the policies, initiatives, practices and performance described in the Report;
- Review of the disclosures made in the Report against the requirements of the GRI G4 Guidelines and AA1000AS (2008), with a Type 01, moderate level of assurance;
- Verification of the reliability of the GRI G4 Performance Indicators (G4- EN3,EN8,EN15, EN16,EN21,EN22,EN23,LA6,LA9);
- Specified information is selected based on the materiality determination and needs to be meaningful to the intended users;
- Confirmation of the fulfillment of the GRI G4 Guidelines; 'in accordance' with the Core criteria, as declared by the management of IVL.

The reporting boundary is based on the internal and external materiality assessment covering the below sites. The reporting aspect boundaries are as set out in the Report covering the sustainability performance of IVL limited to the below tabulated sites.

**7 plants in Thailand:** AsiaPet (Lopburi), Indorama Holdings (Lopburi), Indorama Polymers (Lopburi), Petform (Lopburi), Petform (Rayong), Indorama Polyester Industries (Nakhon Pathom), Indorama Ventures Polymers (Rayong).

**15 overseas plants:** AlphaPet (USA), Auriga Polymers (USA), Indorama Ventures Xylenes and PTA (USA), StarPet (USA), Indorama Ventures PTA (Canada), Fiber Visions (Denmark), Guangdong IVL (China), Performance Fibers (China), Indorama Ventures (Poland), Indorama Ventures Polymers (Mexico), Orient Global Pet (Lithuania), Trevira (Germany), Wellman France Recyclage (France), Wellman International (Ireland), Wellman International (The Netherlands).

Our engagement did not include an assessment of the adequacy or the effectiveness of IVL's strategy or management of sustainability related issues. During the assurance process, TUVI did not come across the limitations to the scope of the agreed assurance engagement. No external stakeholders were interviewed as a part of the sustainability engagement for the period 01 January 2016 to 31 December 2016.



## Verification Methodology

This assurance engagement was planned and carried out in accordance with the GRI G4 Guidelines and AA1000AS (2008). The Report has been evaluated against the following criteria:

- Adherence to the principles of Stakeholder inclusiveness, Materiality, Responsiveness, Completeness, Neutrality, Relevance, Sustainability context, Accuracy, Reliability, Comparability, Clarity and Timeliness; as prescribed in the GRI G4 Guidelines and AA1000AS (2008);
- Application of the principles and requirements of the GRI G4 Guidelines for its 'in accordance' Core criteria.

During the assurance engagement, TUVI adopted a risk-based approach, concentrating on verification efforts on the issues of high material relevance to IVL's business and its stakeholders. TUVI has verified the statements and claims made in the Report and assessed the robustness of the underlying data management system, information flow and controls. In doing so:

- TUVI reviewed the approach adopted by IVL for the stakeholder engagement and materiality determination process. TUVI performed limited internal stakeholder engagement to verify the qualitative statements made in the Report;
- TUVI verified the sustainability-related statements and claims made in the Report and assessed the robustness of the data management system, information flow and controls;
- TUVI examined and reviewed the documents, data and other information made available by IVL for the reported disclosures including the Disclosure on Management Approach and performance indicators;
- TUVI conducted interviews with key representatives including data owners and decision-makers from different functions of the Company during the site visit;
- TUVI performed sample-based reviews of the mechanisms for implementing the sustainability related policies, as described in IVL's Sustainability Report;
- TUVI verified sample-based checks of the processes for generating, gathering and managing the quantitative data and qualitative information included in the Report for the reporting period.

## Opportunities for Improvement

The following is an extract from the observations and opportunities for improvement reported to the Management of IVL and are considered in drawing our conclusions on the Report; however they are generally consistent with the Management's objectives.

Opportunities are as follows:

- We recommend using enterprise sustainability data management and reporting software accredited by the GRI framework for the collection, calculation and monitoring of various material aspects and indicators, and evaluating performance and setting higher standards;
- The Company can opt for SA8000, Water Footprint (ISO 14046), Eco Labeling (ISO 14025), Green Product Certification (ISO 14024), Life Cycle Assessment (ISO 14044);
- The impact assessment of implemented CSR projects shall be done on a periodic basis to evaluate their effectiveness;
- The Company can consider increased contributions of renewable energy, water recycling and rain water harvesting;

The Company can establish specific energy and water consumption benchmarks either process wise/departments wise or product wise.

## Conclusions

The Sustainability Report was prepared based on the GRI G4 Reporting Principles and Standard Disclosures 'in accordance' with the GRI G4 Core option. In our opinion, based on the scope of this assurance engagement, the disclosures on sustainability performance reported in the Report along with the referenced



information provides a fair representation of the material aspects, related strategies, and performance indicators, and meets the general content and quality requirements of the GRI G4 Core option.

- **General Standard Disclosures:** TUVI is of the opinion that the reported disclosures generally meet the GRI G4 reporting requirements for 'in accordance'- Core reporting.
- **Specific Standard Disclosures:** TUVI is of the opinion that the reported disclosures generally meet the GRI G4 reporting requirements for 'in accordance' - Core reporting based on the GRI G4 covering the generic Disclosures on Management Approach (DMAs) and Performance Indicators for the identified material aspects as below.

The requirements below were verified by the assurance team:

#### Environmental

- G4 EN 3 Energy consumption within the organization
- G4 EN 8 Total water withdrawal by source
- G4 EN 15 Direct greenhouse gas (GHG) emissions (Scope 1)
- G4 EN 16 Energy indirect greenhouse gas (GHG) emissions (Scope 2)
- G4 EN 21 NOX, SOX, and other significant air emissions
- G4 EN 22 Total water discharge by quality and destination
- G4 EN 23 Total weight of waste by type and disposal method

#### Social Labor Practices and Decent Work

- G4 LA6 Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender
- G4 LA 9 Average hours of training per year per employee by gender, and by employee category

- **Limited Assurance Conclusion:** On the basis of the procedures we have performed, nothing has come to our attention that causes us to believe that the information subject to the limited assurance engagement is not prepared, in all material respects, in accordance with the GRI G4 Core sustainability reporting guidelines or that the sustainability information is not reliable in all material respects, with regards to the reporting criteria.
- **Reasonable Assurance Conclusion:** On the basis of the procedures we have performed, in our opinion, IVL reported the direct and indirect (Scope 1 and 2) CO<sub>2</sub> emissions as a whole, which were prepared in accordance with the reporting criteria and is reliable, in all material respects, with regards to the reporting criteria.

TUVI did not perform any assurance of procedures on the prospective information, such as targets, expectations and ambitions, disclosed in the Sustainability Information. Consequently, TUVI draws no conclusion on the prospective information. This assurance statement has been prepared in accordance with the terms of our engagement. Type I moderate level assurance engagement with respect to sustainability related data involves performing procedures to obtain evidence about the Sustainability Information. The procedures performed depend on the practitioner's judgment, but their nature is different from, and their extent is less than, a Type II moderate level assurance engagement. It does not include detailed testing of source data or the operating effectiveness of processes, internal controls and consequently they do not enable us to obtain the assurance necessary to become aware of all significant matters that might be identified in a Type II moderate level assurance engagement.

TUVI has evaluated the Report's adherence to the following principles with respect to the requirements of the GRI G4.

**Stakeholder Inclusiveness:** Stakeholder identification and engagement is carried out by IVL on a periodic basis to bring out key stakeholder concerns as material aspects of significant stakeholders. In our view, the Report meets the requirements.

**Materiality:** The materiality assessment process has been carried out, based on the requirements of the GRI G4, considering aspects that are internal and external to the Company's range of businesses. The Report

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fairly brings out the aspects and topics and its respective boundaries of the diverse operations of IVL. In our view, the Report meets the requirements.

**Responsiveness:** TUVI believes that the responses to the material aspects are fairly articulated in the report, i.e. disclosures on IVL's policies and management systems including governance. In our view, the Report meets the requirements.

**Completeness:** The Report has fairly disclosed the General and Specific Standard Disclosures, including the Disclosure on Management Approach, covering the sustainability strategy, management approach, monitoring systems and sustainability performance indicators against the GRI G4 Guidelines, 'in accordance' Core option. In our view, the Report meets the requirements.

**Reliability:** The majority of the data and information was verified by TUVI's assurance team at IVL's office on the factory's premises and found to be fairly accurate. Some inaccuracies in the data identified during the verification process were found to be attributable to transcription, interpretation and aggregation errors and these errors have been corrected. Therefore, in accordance with the GRI G4 Guidelines and AA1000AS (2008) for a Type 01, moderate level assurance engagement, TUVI concludes that the sustainability data and information presented in the Report is fairly reliable and acceptable. In our view, the Report meets the requirements.

**Neutrality:** The disclosures related to sustainability issues and performance are reported in a neutral tone, in terms of content and presentation. In our view, the Report meets the requirements.

TUVI expressly disclaims any liability or co-responsibility for any decision a person or entity would make based on this Assurance Statement. The intended users of this assurance statement are the management of IVL. The Management of the Company is responsible for the information provided in the Report as well as the process of collecting, analyzing and reporting the information presented in the web-based and printed Reports, including website maintenance and its integrity. TUVI's responsibility regarding this verification is in accordance with the agreed scope of work which includes non-financial quantitative and qualitative information (Sustainability Performance – environmental and social indicators) disclosed by IVL in the Report. This assurance engagement is based on the assumption that the data and the information provided to TUVI are complete and true.

## TUV's Competence and Independence

TUVI is a global provider of sustainability services, with qualified environmental and social assurance specialists. TUVI states its independence and impartiality with regard to this assurance engagement. In the reporting year, TUVI did not work with IVL on any engagement that could compromise the independence or impartiality of our findings, conclusions and recommendations. TUVI was not involved in the preparation of any statements or data included in the Report, with the exception of this Assurance Statement. TUVI maintains complete impartiality toward any people interviewed during the assurance engagement.

### For and on behalf of TUV India Private Limited

Manojkumar Borekar  
Project Manager and Reviewer  
Head – Sustainability Assurance Service  
TUV India Private Limited



Date: 20/04/2017

# KEY CONTACTS AND FEEDBACK

Indorama Ventures welcomes your feedback on this report, and our sustainability policies and performance.

Please email your comments to [sustainability@indorama.net](mailto:sustainability@indorama.net) or feel free to share your thoughts online at: [www.indoramaventures.com/sustainability/share-your-thoughts.php](http://www.indoramaventures.com/sustainability/share-your-thoughts.php)

You can also reach out to:



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Indorama Ventures, as the largest PET producer in the world, has responsibility to educate people on recycling. All the name cards that IVL employees carry are made of 100% recycled PET bottles.



100% recycled PET



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