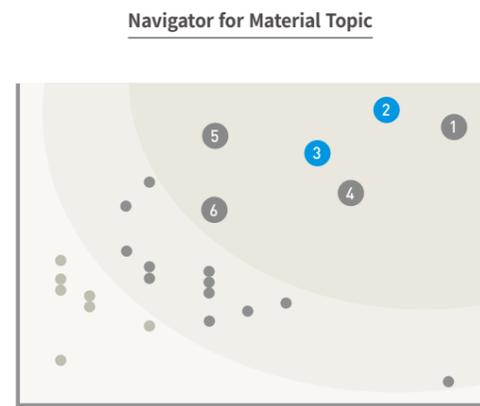
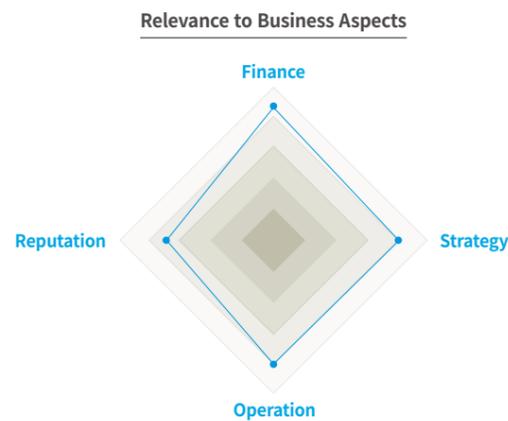


2

MATERIAL TOPIC

Strengthen Business Competitiveness



Financial Impact of Material Issues

NO.	Material Issue	Impact	Financial Impact		
			Revenue/Cost	Assets/Liabilities	Cost of Capital
2	Create profits through business operation	HIGH	●	●	
3	Select and launch technological innovation projects	HIGH	●	●	●

Link to SDGs

- [Goal 8] Sustainable Economic Growth and Job Quality**
 - 8.2 Increase productivity through diversified business portfolio and technological innovation
- [Goal 9] Sustainable Infrastructure and Industrialization**
 - 9.4 Improve industries through the efficient use of resources, clean technology and eco-friendly processes



Opportunity

Taking advantage of rapidly changing technology, the world is moving to a new era described as the Fourth Industrial Revolution. Meanwhile, companies are committed to solving the social and environmental issues that our global society faces. Therefore, it is important for corporate innovation to focus on R&D projects that have a positive impact on our society and the environment. As a producer of basic chemical products and renewable energy affecting the daily lives of people, OCI will continue to explore opportunities for high value-added businesses through R&D and investment, and create value for society and the environment in the long term.

Risk

In response to the expanding the solar PV market, global companies are focusing their resources on ESS (Energy Storage System) and big data as part of their R&D efforts. A number of chemical companies are also developing technology-intensive, high value-added products while diversifying their portfolios. However, there are concerns that profitability may deteriorate when we make daring innovation attempts amid tightened global regulations and demand uncertainty for solar PV systems. OCI will focus on sustaining competitive advantages through process innovation and cost reduction as well as securing top talents in order to solidify our foundation for sustainable growth.

R&D Investment

(Unit : KRW million, %)

Category	2015	2016	2017
R&D Expenses	28,948	26,905	21,147
Ratio of R&D Expenses to Revenue	1.33	0.98	0.58

Response to Customer Requests



Implementation Tasks by Material Issue

Material Issue	Short-term Tasks	Mid-to Long-term Tasks
Create profits through business operation	<ul style="list-style-type: none"> Investment and development for process innovation Product competitiveness through quality improvement 	<ul style="list-style-type: none"> Future growth engines through product and technological advancement Optimization and scale-up of production through strategic alliances and M&As
Select and launch technological innovation projects	<ul style="list-style-type: none"> Cooperation among departments, plants and the R&D center New business models in line with business strategies 	<ul style="list-style-type: none"> Global R&D network Energy solution provider through high value-added products and portfolio diversification

Stakeholder Opinions

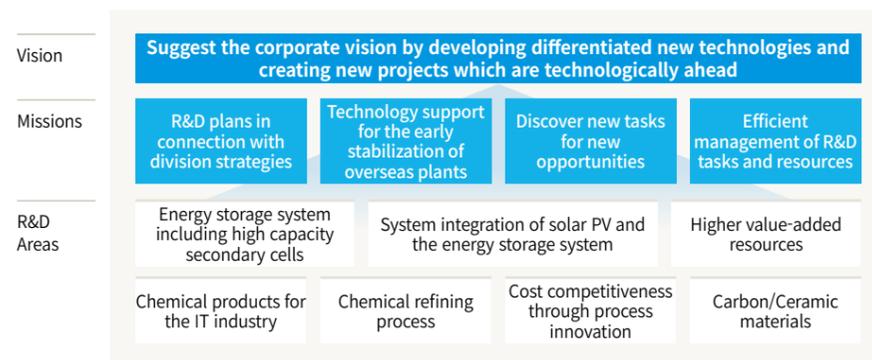
“Acquiring global leadership is not a vision but the task we have to face to ensure sustainability. It is important to improve OCI’s structure, considering the changes brought by the Fourth Industrial Revolution in order for us to solidify our position as a global leader.”

“It is essential to build a foundation for sustainable growth through the development of next-generation high value-added products and product portfolios in response to the changing business environment.”

Technological Innovation

Technological Competence

OCI R&D Center has played a key role in our technological innovation since its foundation in 1983. It has built a foundation for our renewable energy business based on the polysilicon manufacturing technology, and has expanded its research areas from basic chemical products to advanced new materials and energy sector through its differentiated technical capability.



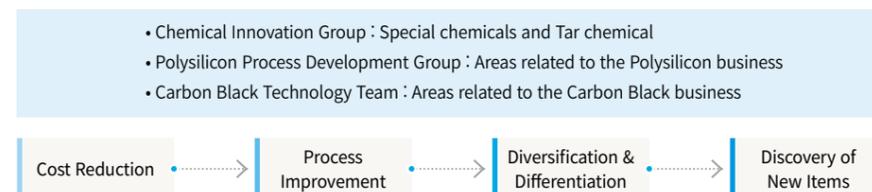
R&D Organization

We organize a dedicated team of R&D experts to undertake projects with a focus on core technologies in line with our business strategy, development of next-generation products and securing competitive advantages of existing products.



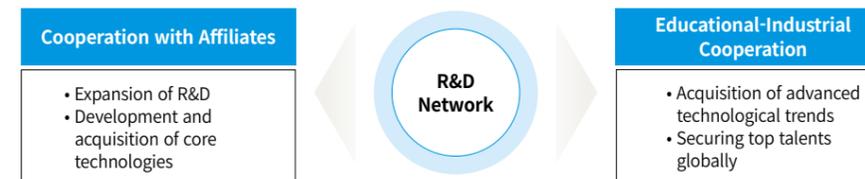
Department-Business Site-R&D Center Coordination Process

We established a coordination system among our business departments, plants and R&D center, and assigned personnel to undertake projects in line with the strategy of each business department.



R&D Network

In response to rapid technological advancement, we diversify our R&D network to secure growth engines for the future and strengthen cooperation with domestic and overseas universities/ research institutes and with overseas affiliates in the US, China, Japan and Malaysia.



Research Cooperation Project

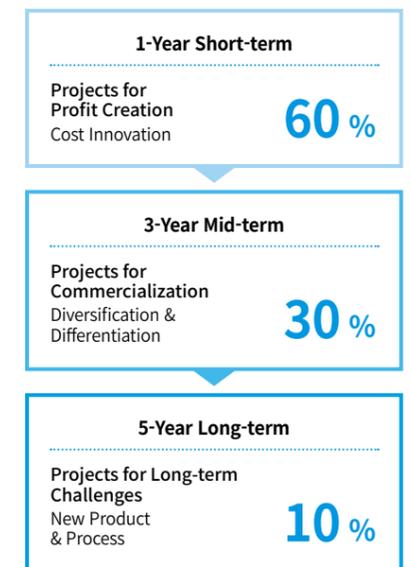
We carry out various research cooperation projects including government supported technology development projects by taking advantage of our R&D capability. By doing so, we will continue to secure core technologies and build a foundation for new market development.

Project	Period	Research Outcome and Expected Effect
Circulation technology of NF3 generated by semi-conductor/LCD process	Dec. 2013 – Sep. 2016	Eco-friendly recycling technology by separating and purifying waste gas from semi-conductors
Manufacturing and application of specialty carbon black for high color and high conductance	Jun. 2014 – May 2018	Manufacturing technology and application of specialty carbon black for high quality black pigment and highly conductive materials
High-performance low-cost conductive paste materials using a core-shell metal complex	Nov. 2013 – Oct. 2018	Price competitiveness achieved by developing core materials of low-cost metal and silver complex based on the need for Ag-reduced metal materials
VRFB system technology for buildings with high energy consumption and for renewable energy	Dec. 2014 – Mar. 2018	VRFB ESS system with a power capacity of 250kW/1MWh and a system efficiency of 70% or more
Technology for high energy efficiency and monitoring of the utility-based water supply system	Aug. 2016 – Apr. 2021	Optimized Hydrogen Peroxide injection system and operation technology for water treatment plants, and entry into the water treatment chemical market

New Project Development

Our R&D Center organized a "New Technology Council" to explore new business opportunities that coordinate with social development and technology trends. In addition, we are building up our communication channels with business departments to expand existing businesses and generate ideas that will drive our growth for the future.

Research Portfolios



Technological Innovation

Competitive Advantages in Technology

We strive to advance our business projects and technological expertise to the next level while ensuring the development of innovative and market-leading technologies. In addition, by developing technologies that create sustainable values for our society and environment, we will gain competitive advantages in the long-term. We will continue to maximize the values we create for the future and provide superior products to achieve the highest level of customer satisfaction.

 <p>Basic Chemical</p>	<p>We diversified our product portfolio by developing new grades and optimized the process through its analysis and modeling. In particular, we developed a new refining technology and applied it to our production process to increase cost efficiency and product quality. We are also developing new products in the information and electronics industry.</p>
 <p>Petrochemicals & Carbon Materials</p>	<p>We developed carbon black with superior performance and durability through joint research with tire manufacturers, and specialty carbon black with various grades based on grain size and structure control technology is also under development. We are working on the development of high value-added technologies to increase our global market share.</p>
 <p>Energy Solution</p>	<p>We improved our ESS (Energy Storage System) design in order to maximize its efficiency, and installed 250kW / 1MWh VRFB with high-efficiency specifications and a high-performance electrolyte. We have also upgraded our energy business with the EMS (Energy Management System) which controls PV power generation facilities by adding an ESS. Meanwhile, we saved energy and costs by improving the production process and equipments for polysilicon.</p>



Intellectual Property Rights Management

In addition to our R&D projects for future core technology, we are committed to securing intellectual property rights. We have organized an IP Team (Intellectual Property Team) to enhance our competitiveness in patents and managed our intellectual properties efficiently. We set our own strategy based on specific portfolios for each business area and manage risks through analyzing competitors' patents. As of 2017, we have registered 176 patents in Korea and 84 patents overseas, and will continue our efforts to gain technological competitiveness through systematic management in the company's intellectual property.

Intellectual Property Training

Business Site	Training	Training Hours
R&D Center	<ul style="list-style-type: none"> Intellectual property management system Searching patents Overview of intellectual property for new hires 	4.0
Pohang	<ul style="list-style-type: none"> Consultation on inventions and patent application practice 	1.5
Gwangyang	<ul style="list-style-type: none"> Consultation on inventions and patent application practice 	2.0
Overseas	<ul style="list-style-type: none"> Patent application and research practice (Malaysia) 	2.0

Patent Analysis Support

Business area	Basic Chemical	Petrochemicals & Carbon Materials	Energy Solution
Patent analysis support	11 cases including the TDI technology patent trend	23 cases including the DOTP plasticizer patent map	3 cases including the PERT cell patent investigation

Intellectual Property Rights in 2017

(Unit : case)

Type	Domestic Patent	Overseas Patent	Domestic Trademark	Overseas Trademark	Total
Registered	176	84	59	26	345
Applying	101	67	0	4	172
Total	277	151	59	30	517

Process Innovation

Process Innovation Project

By carrying out process innovation projects based on the collaboration among HQ, business sites and the R&D center, we optimize our business approach to gain competitive advantages.

Business Site	Gunsan	Pohang	Iksan
Project Overview	<ul style="list-style-type: none"> Improve the polysilicon process 	<ul style="list-style-type: none"> Improve DOTP productivity 	<ul style="list-style-type: none"> Develop a new process for purifying crude hydrogen peroxide
Details	<ul style="list-style-type: none"> Improve the existing process Develop a new process Improve equipments 	<ul style="list-style-type: none"> Optimize reaction conditions and the post-treatment process 	<ul style="list-style-type: none"> Develop new process technology for purifying crude hydrogen peroxide to electronic grade
Benefits	<ul style="list-style-type: none"> Save electricity costs per unit Reduce the manufacturing cost 	<ul style="list-style-type: none"> Increase productivity (> 70%) Improve quality 	<ul style="list-style-type: none"> Cost reduction through a simplified process Quality improvement

Cost Competitiveness

We are committed to reducing costs by replacing outdated production facilities and improving their performance as well as through efficient operation of processes on a corporate-wide level. We also focus on offering a competitive price by implementing more efficient work processes suitable for each business site.

Cost Reduction Activities

Gunsan	Polysilicon process improvement and the Smart No.1 Plant program <ul style="list-style-type: none"> OCI's own operation process for polysilicon production Save electricity Reduce the use of raw materials and packaging materials Reduce wastewater and waste materials 	Economic benefit of saving electricity and steam KRW 1,605 million
Pohang	Optimized process operation <ul style="list-style-type: none"> Optimize the heater's air-fuel ratio of the #2 Tar and Naphthalene process Discover and improve unnecessary steam usage Optimize the use of steam in pre-processing 	Economic benefit of saving energy KRW 649 million
Gwang-yang	Improve the productivity of carbon black by increasing the raw material, oil, injection pressure <ul style="list-style-type: none"> Increase the nozzle's injection pressure to an undifferentiated droplet size Improve productivity by increasing the injection flow of raw material oil 	Economic benefit of improving production yield and reducing the fixed cost KRW 681 million
Iksan	Wastewater Recycling <ul style="list-style-type: none"> Retrieve wastewater produced from the K-3 hydrogen peroxide plant Retrieve remaining hydrogen peroxide and reduce net usage 	Economic benefit of retrieving the remaining hydrogen peroxide and reducing net usage KRW 172 million
Iksan VIP	Optimized process and package specifications <ul style="list-style-type: none"> Save energy by changing the drier's operating temperature Save packaging and transportation cost by changing the packaging box size Reduce raw material cost by using dust-collecting materials 	Economic benefit of improving facilities and changing packaging materials KRW 210 million

Product Liability

Product Liability Management

We are dedicated to providing top-quality products and creating values for our customers based on our global quality management system. All our domestic business sites have been certified for ISO 9001 (Quality Management System) and we are also working on the certification of our global production sites. In addition, we are going to improve the quality of our products based on customers' demands by conducting customer satisfaction surveys on a regular basis. We will continue to provide products that meet customers' needs and regulatory requirements and build trust with our customers.

Polysilicon Quality Enhancement

We supply polysilicon for monocrystalline wafers to the world's leading wafer manufacturers and semiconductor companies based on the production capacity of 65,800 MT and the production of 10-Nine Grade ultra-pure polysilicon. Lately, the demand for polysilicon for monocrystalline wafers is soaring with the rising demand for high-efficiency solar cells in China. Amid increased demand for polysilicon, we are taking the initiative by promptly responding to technological changes, which is driving the increase of our market share in the global polysilicon market due to the improved quality of polysilicon and reduced costs.

Product Safety Management

As part of our product safety management, we conduct risk analysis on our development, production and supply processes. For the transportation of our products, we ensure full compliance with the laws including the Chemicals Control Act and Act on the Safety Control of Hazardous Substances. We also prepare and distribute MSDSs (Material Safety Data Sheet) of our products to promote safety for our employees and customers.

Product Labeling

We display specifications and indicate warnings and precautionary statements on our products in accordance with the safety and environmental laws and regulations. We also ensure compliance with the global product labeling regulations by adopting the GHS (Global Harmonized System) of labeling. By labeling the risks and related information on our products, we fulfill our responsibility for providing information about our products.

Quality Management System Certification

Business Site	Certification
HQ	ISO 9001, ISO/TS 16949
Gunsan	ISO 9001
Pohang	ISO 9001, ISO/TS 16949
Gwangyang	ISO 9001, ISO/TS 16949
Iksan	ISO 9001, KS M 1112
Iksan VIP	ISO 9001

Customer Satisfaction Survey Result; Polysilicon*



4 consecutive years
Agree
 (2014~2017)

* We measure the level of customer satisfaction with 5 options to choose from: Strongly agree, Agree, Neutral, Disagree, Strongly disagree.