Our Medium to Long-Term Managemen Strategy for Achieving MSV

R&D Strategy

The world is seeing the emergence of numerous problems that are difficult to solve by using methods of prior years. To help solve these problems, we will use many partnerships to further upgrade our ability to create innovative ideas.

Our approach to achieving MSV

Our technology mission is to drive and sustain growth and market share in Japan and globally as a leading technology organization for coatings and adjacent markets. Our innovation strategy has three pillars: 1) build an adaptive organization; 2) develop core enabling technology competency; and 3) expand into adjacent and emerging markets. These are initiatives for Maximizing Shareholder Value (MSV) from a technology perspective. We believe that our technology organization's culture of being customer centric, socially

responsible and collaborative is the key driver to success. Importantly, technology collaboration and intellectual property sharing among our partner companies around the globe are under the principle of our Asset Assembler model, which Nippon Paint Group strategically employs to manage the business of partner companies. The technology teams of partner companies are highly autonomous to effectively address the needs of their respective markets and customers.

We started LSI (Leverage, Share & Integrate) activity aimed at driving technology sharing and capability

(patents, etc.) enhance global technology

capabilities in joint technology development projects, helping address the needs of local

Roadmap

	2022	2023	~2027
Sustainable Products	 NIPSEA Group: Redefined sustainable products NIPSEA Group, Japan Group: Developed Sustainability Scoreboard DuluxGroup: Established sustainable products targets and developed roadmaps for ANZ⁻¹ businesses 	 Life Cycle Assessment (LCA) of selected products can be calculated at each Partner Company DuluxGroup: Develop GHG emissions (Scope 3) reduction roadmap 	 Manage the performance of Sustainability Scoreboard of each partner company every quarter Promote creation of more innovative sustainable products DuluxGroup: Implement sustainable products and GHG emissions (Scope 3) roadmaps
Chemicals of Concern	 Each Partner Company responded to US Environmental Protection Agency (EPA) and REACH DuluxGroup developed position statements for 50% of high concern CoC Dunn-Edwards: Incoming Chemical Management / Selection per Chemicals of Concern 	 Consider the phase out plan of Chemicals of Concern in each partner company NIPSEA Group: Focus on 4 hazardous heavy metals¹² DuluxGroup: Complete position statements for 75% of CoC and develop a structured program of CoC in Europe 	Create sustainable products based on phase out plan
R&D	Developed Green Design Review	R&D activities for sustainable products from Partner Companies beyond Japan and NIPSEA Group, e.g. DuluxGroup, Dunn-Edwards, etc.	Drive innovation towards UN SDGs and carbon neutrality
Product Stewardship	DuluxGroup established packaging recycled content targets and developed roadmaps for ANZ businesses	 Identify inquiry items Stakeholder questionnaire NIPSEA Group: Reinforce PS&RA'³ team DuluxGroup: Implement Product Vision to help with formulation management & regulatory tracking 	 Implement inquiry management database Inquiry response training Training for customers and business partners DuluxGroup: Implement packaging roadmaps

*1 Australia and New Zealand *2 Lead, Chromate (Cr6+), Cadmium, and Mercury *3 Product Stewardship & Regulatory Affairs

77 Nippon Paint Holdings Co., Ltd.

How Shareholder Value Is Maximized ▶ See page 5.



leveraging among partner companies to facilitate technology exchange platforms and cross-PC projects. We have established adaptive ways to collaborations for increasing the added value of intellectual property. The technology teams in various fields such as decorative paints or paints for automotive have formed a global technical community to share best practices and leverage research consumers in each country.

R&D framework and core technologies

Nippon Paint Group has 3,895 technical staff working worldwide, including 1,141 in Japan. They are the nucleus of our innovation power and core competitiveness for achieving sustainable business growth in the marketplace. We have technology teams at 52 R&D and technical centers to serve our customers and consumers worldwide, including our major R&D centers in Tokyo and Osaka in Japan, Shanghai in China, Singapore, Melbourne in Australia, Los Angeles and Cleveland in the US, and France in Europe. In 2022, R&D expenditures at Nippon Paint Group in Japan was over JPY28.1 bn and there were 169 patent applications. As of the end of 2022, the Group had more than 1,508 patents.

R&D organization

Nippon DGI Paint Internationa Automotive Japan Dunn Group Americas Edwards NIPSEA Group Nippon Paint Group (Global) Japan Group Dulux 1,141 technical staff 3,895 technical staft Group 9 R&D and technical centers 52 R&D and technical centers JPY28.1 bn technology expense 1,508 granted patents

Core technologies



field are working in core R&D teams in the R&D centers and collaborating with scientists from the global network of technical centers to support product development across the group. Nippon Paint Group possesses a broad open innovation network with universities and academic research institutions worldwide.

Nippon Paint Group has classified Experts in each core technology

> Marine coatings Sustainability

In 2020, Nippon Paint Group entered into a strategic research partnership with The University of Tokyo, resulting in the establishment of the University of Tokyo & Nippon Paint joint laboratory. The partnership aims to create innovative coating technologies in three fields, namely, infectious disease risk reduction, social cost and environment burden control, and contributions to smart society. In Singapore, NIPSEA Group has been collaborating with the research institutes of A*STAR (Agency for Science, Technology and Research) for decades. Recently, NIPSEA Group has strategically joined hands with A*STAR to develop disruptive technologies in the fields of smart surface enabling autonomous driving and the use of artificial intelligence in coating research.

Moreover, in 2023, Nippon Paint Group joined the Massachusetts Institute of Technology Industrial Liaison Program (MIT-ILP), which is dedicated to creating and strengthening mutually beneficial relationships between MIT and companies worldwide.

Innovation initiatives and programs

The New Product Sales Index (NPSI) is one of the indicators for measuring technology output. At Nippon Paint, new products are categorized into several categories, ranging from products upgraded through improvements in stages and to newto-market products with disruptive innovations. NPSI is achieved with the joint efforts of technical teams with business and supply chain operation teams, where strong collaboration brings together our commitment to the MSV. In 2022, Japan Group and NIPSEA Group together have achieved NPSI of 20% and launched 12,000 new products.

Our Medium to Long-Term Managemen Strategy for Achieving MSV

Creation of sustainable products will drive long-term business success

Sustainability of our products

We believe that sustainable features are essential elements of our products to benefit society and achieve the longterm success of our businesses. We define sustainable products and technologies based on the principle of product life cycle and according to the framework of the United Nation's Sustainable Development Goals (SDGs). This is a systematic approach, covering the following three main stages of a product's life cycle.

1. Production 2. Use 3. Service

Furthermore, in each stage, the advantages over the mainstream products in the market are assessed by translating the SDGs into the attributes of paint and coatings products. In the production stage, manufacturing efficiency, raw materials, logistic and packaging are the key aspects for

assessments. In the product use stage, the advantages are helping customers and consumers when using products by reducing energy and material consumption, chemical emissions, and chemical hazards. In the service stage, products are assessed in terms of product service life, use in clean technologies, contribution to health and well-being, as well as end-of-life treatment. Under those sustainability principles, the Sustainability Scoreboard for new product assessment has been developed and is implemented in the NPSI systems of partner companies, Japan and NIPSEA China. In 2022, of the new product sales of Japan Group and NIPSEA China together, 52% were from newly developed sustainable products. The Green Design Review has been developed and is used in the R&D

project management systems of Japan

project portfolios of Japan Group and

NIPSEA Group, 47% of R&D projects

sustainable benefits according to the

Group and NIPSEA Group. In the

are in the focus areas of creating

Green Design

Review principles.

Results of sustainability products

Dulux envirO₂ ™

elivers superior performance In 2022, the Dulux business backaging for the envirO₂ [™] range. Dulux envirO₂[™] is also the only Global GreenTag™ certification



Decorative films

Nippon paint group also developed products for Solar Power system and Lithium-ion Batteries (LIBs) toward realization of sustainable low carbon

Toyota Motor Corporation and lippon Paint Automotive Coatings pintly developed decorative films for hotovoltaic modules that provide design and color flexibility to



High adhesion primer

Nippon Paint Surf Chemilal



Our products comply with the Hazardous Chemical Substance Regulation

Chemical substance management

In 2021, Japan Group launched the "Green 30" chemicals management system to minimize the impact of chemicals on the environment and public health. The system is designed to manage chemicals of concern based on regulations or treaties such as REACH regulations in EU, TSCA in the USA and CSCL in Japan. We classify chemical risks in three categories (Rank A, Rank B, Rank C) according to the laws and regulations in the countries where we operate. Japan Group started using this system in 2021 and the system is being expanded to our partner companies outside Japan.

Alkylphenol ethoxylates (APEs) are mainly used for surfactants and include the subcategory of nonylphenol ethoxylates (NPEO/NPE). Nonylphenols (NP), raw materials for NPE, are regulated by REACH and TSCA. Nippon Paint Group has been

steadily phasing out APEs-containing surfactants.

In addition, we have been replacing UV absorbers such as UC-328 and UV-327 that are considered as persistent organic pollutants (POPs) with other substances. Our next plan is to completely phase them out in all products sold in Europe by the end of 2023. We are also reducing the use of UV-328 in Japan Group. Moreover, we are lowering the use of other POPs such as Medium-chain

chlorinated paraffins (MCCP, carbon chain lengths in the range C14-17 and chlorination ratio ≥45% by weight) in Japan.





* The definitions of categories

Bank A (Prohibited): Prohibition of introduction

Rank B (Restricted for new introduction): Prohibition of new introduction with some exceptions Rank C (Avoid new introduction): Decide whether or not to introduce based on regulatory trends, environmental impact, and the business environment No rank: No impact on raw material introduction

Sustainable product data

New Product Sales Index (NPSI)



Sustainability product sales ratio of the new product sales



Sustainability product development project ratio in R&D expenses



DuluxGroup has continued its focus on identifying, managing, and addressing chemicals of emerging concern to make safer products available to the market. Some examples of our chemicals of concern initiatives in 2022 include: -Removed APEs from Cabot's Aquadeck and Intergrain Ultradeck ranges and from an additional one million liter of products in our Dulux NZ business. -Launched a safer Selleys paint

stripper that is free of DCM (Dichloromethane) and removed toluene, cyclic siloxanes and UV-327 from several Selleys products.