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THE SUSTAINABILITY@CLARIANT PORTFOLIO VALUE PROGRAM

# Developing Tools for Sustainable Product Portfolio Management

Clariant's Story of Creating Sustainable Value  
in the Specialty Chemicals Industry

## ABOUT

# CLARIANT



CLARIANT is one of the world's leading companies for specialty chemicals.

The company operates globally, has over 17,000 employees and acts in four

main business areas: Care Chemicals, Natural Resources, Catalysis & Energy, and Plastics & Coatings.

Clariant's vision is to be the globally leading company for specialty chemicals and to stand out for above-average value creation for all of its stakeholders. To achieve this aim, sustainability has become a key driver of Clariant's activities, translated into innovative strength and strict sustainable practices. The target for Clariant is to create value through sustainability and innovation.



CSCP is a globally operating think- and do-tank based in Germany and composed of an international and interdisciplinary team. CSCP's purpose is to drive sustainability in all sectors of society and engage with stakeholders from private and public

sectors to develop, scale up and support the implementation of a shared vision of future sustainable lifestyles, sustainable infrastructures, products and services as well as sustainable business models and entrepreneurship.

## The Sustainability@Clariant Portfolio Value Program

Clariant and CSCP have been working in partnership to develop and implement the Sustainability@Clariant Portfolio Value Program. Launched in 2012, the program is aimed at enabling sustainable innovation and the realization of sustainable value at Clariant. It comprises three key steps to systematically integrate sustainability into development of the product portfolio: firstly to anticipate, cater and tailor to future needs and demands; secondly to build sound sustainability evidence based on reliable criteria and verified assessments; and thirdly to engage and create solutions collaboratively with key stakeholders – both internal and external – in transparent and credible ways. Among the core outcomes of the program is the development and implementation of innovative tools for sustainable product portfolio management at Clariant. The learning of this program provides the case, which is the basis of this publication on product portfolio sustainability.

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## IMPRINT

### Authors:

Neil Coles // Mariana Nicolau // Nora Brüggemann

### CSCP Contact:

Neil Coles // [neil.coles@scp-centre.org](mailto:neil.coles@scp-centre.org)

Collaborating Centre on Sustainable Consumption  
and Production (CSCP)  
Hagenauer Straße 30 42107 // Wuppertal | Germany

Phone +49 202 45 95 8 -10 // Fax +49 202 45 95 8 -31  
[www.scp-centre.org](http://www.scp-centre.org) // [info@scp-centre.org](mailto:info@scp-centre.org)

### Clariant Contact for the PVP Program:

Lynette Chung // [lynette.chung@clariant.com](mailto:lynette.chung@clariant.com)

Corporate Sustainability & Regulatory Affairs,  
Strategic Issues

CSCP: Registered at the Amtsgericht Wuppertal  
Register No.: HRB 20060, USt.-ID Nr./VAT ID  
No.: DE 250 910 282

Managing Director: Michael Kuhndt

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## EXECUTIVE SUMMARY

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### Setting the scene: SECTION 1

Understanding the sustainability trends and the drivers shaping the landscape in which businesses will operate in the future is a prerequisite for grasping what performing sustainably means. Adding value through sustainability performance involves addressing challenges e.g. resource scarcity and climate change, but also recognising opportunities ranging from closed loop solutions to increased value chain cooperation.

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### Addressing product sustainability: SECTION 2

Most life cycle environmental impacts are determined at product design. Addressing sustainability at the product level therefore provides businesses the largest opportunity to leverage sustainability. This requires viewing product footprints in relation to the value handprints the relevant products deliver. Equally important is to ensure sustainability assessment through two lenses: in relation to the market and in absolute terms. The Portfolio Value Program System ('PVP System') developed by Clariant and CSCP integrates these aspects in a set of interlinked tools for assessment, innovation, and internal and external stakeholder involvement. It provides the case study for this publication.

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### Screening the portfolio: SECTION 3

The identification of relevant criteria lies at the foundation of any approach to evaluating the sustainability of a product portfolio. The 36 criteria of the PVP System were developed with future orientated inputs of customers, research and stakeholders. They were subsequently refined through testing for the industry at hand. Screening the product portfolio with these criteria required other building blocks, including: defining product clusters, selecting the screening team, building a solid screening evidence base, setting the market references and detailing the definition of sustainability risks and benefits.

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### Acting on screening results: SECTION 4

To manage a large product portfolio, a categorisation to support decision-making is required, with three main categories: products standing out for their sustainability performance; products meeting a certain threshold or standard set internally or externally; and products falling below a defined sustainability standard, prioritised for improvement. In the PVP System, excellence solutions go through a process to acquire the EcoTain® label.

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### Driving improvement and innovation: SECTION 5

A structured roadmap is required to move forward, including: plan development for the most pressing issues; identification of innovation needs; time based milestones and targets; and relevant Key Performance Indicators (KPIs) to monitor progress. A sustainable innovation pipeline represents the greatest improvement potential. In the PVP System, early screening of R&D projects prevents path dependency. Further integration of the PVP System into innovation processes and PVP screening prior to product launch ensure further consideration of sustainability .

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### Ensuring credibility: SECTION 6

Both a quality control process and the inclusion of external perspectives are central to ensure credible sustainability product portfolio management and in delivering consistent results. The PVP System combines external process assurance and an ongoing multi-stakeholder engagement in order to find common understanding on addressing complex sustainability issues.

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### Learning from experience: SECTION 7

The PVP System represents more than two years of development with a large working group. As such, it has provided a number of lessons learnt in practice, and its development continues with partners and stakeholders.

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## 1. THE CHALLENGE FOR A SUSTAINABLE SPECIALTY CHEMICALS INDUSTRY

Specialty chemicals combine superior technical competence in their production process with specific formulation and high-performance characteristics. They comprise a wide range of products with various industry applications, from catalysts to ensure efficiency in production processes, to chemical solutions for personal care products.

The performance of the specialty chemicals industry in the upcoming decades is interlinked with how consumption, infrastructure, technology and wider society will behave and evolve. Understanding the sustainability trends and drivers that shape the landscape where chemical companies will operate in the future is a prerequisite for grasping what performing sustainably means. Such understanding supports

the design of the actions needed from businesses to create sustainable value.

### Understanding the sustainability landscape

As global resource extraction and use grow, resource scarcity has become an imminent threat and climate change has shown to require costly adaptation. 75% of firms worldwide expect to face supply risk already by 2020 (KPMG, 2012), while costs to adapt to a warmer world by 2050 may require up to USD 100 billion per year. In view of rising public awareness about consumer safety and carbon emissions, there is an increasing societal and regulatory pressure to identify alternatives to hazardous substances as well as an increasing consumer demand for transparency and environmental performance beyond compliance.

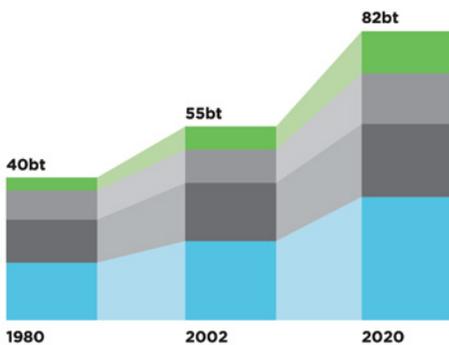
This scenario intensifies the need for a business paradigm shift, where efficiency, renewable resources, approaches to close the loop of resource use and increasing transparency will play a key role. Whilst challenging, making the shift will also bring opportunities for the industry.

Bio-derived chemicals are expected to represent 20% of the global chemicals sales by 2020, a considerable jump in comparison to the 3% share in 2011 (Vijayendran-Battelle, B., 2010). Looking at waste management, industrial recycling services are likely to more than double between 2011 and

2017 to USD 300 billion (Tekes, 2012), while there is also now an increased focus from all stakeholders on a larger shift to 'closing the loop' and keeping materials in circulation.

In terms of indirect financial value, sustainability is additionally identified as an increasingly important factor in attracting and motivating employees (Davis-Peccoud, J., 2015) as well as in improving corporate reputation and competitive position in the market.

## RESOURCE SCARCITY, SUBSTITUTION AND CLOSED LOOP SOLUTIONS

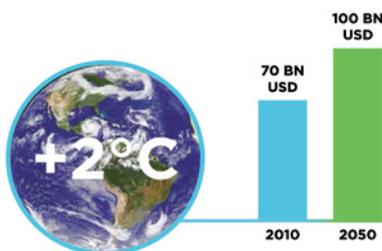


**GLOBAL RESOURCE EXTRACTION WILL INCREASE MORE THAN 30%** from 2002 to 2020 to 82 billion tons:

- metal ores: 93%
- fossil energy carrier: 40%
- biomass: 30%
- non metallic minerals: 53%



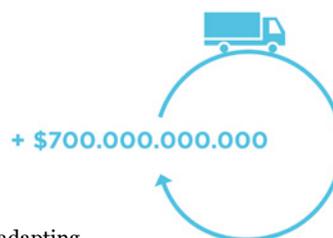
Global demand for **FRESHWATER** WILL EXCEED SUPPLY BY 40% by 2030.



Estimated costs of adapting to a **2°C WARMER WORLD**.



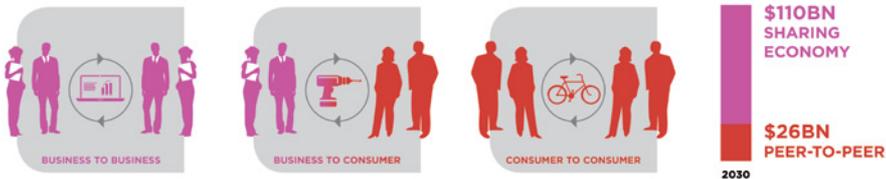
Increasing regulatory **PRESSURE FOR SUBSTITUTION** and alternatives for hazardous substances.



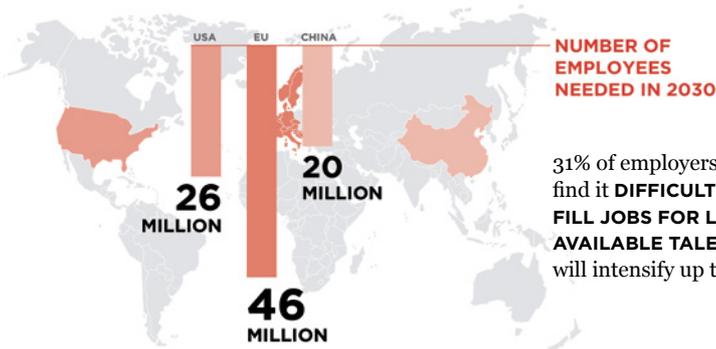
The potential of material **SAVINGS BY CLOSED LOOP APPROACHES** is estimated at **USD 700 BILLION** in consumer goods alone.

# BUSINESS MODEL SHIFT TOWARDS INCREASED SUSTAINABILITY

CIRCULAR ECONOMY AND SHARING ECONOMY will be mainstream in 2030.



On average **CHEMICAL LEASING GENERATES COST SAVINGS** up to 15% and results in a **NEW QUALITY TYPE OF BUSINESS RELATIONS** based on long-term partnerships and improved competitiveness.



31% of employers worldwide find it **DIFFICULT TO FILL JOBS FOR LACK OF AVAILABLE TALENT**, which will intensify up to 2030.



**NEW SKILLS PARADIGM:** a more holistic approach with greater emphasis on design and working in multidisciplinary teams with a high degree of responsibility and common knowledge creation.

References: Sacks, D., 2011; Wong, C., 2013; Roland Berger, 2011; Cedefop, 2009.

## Framing the challenge

When translating this macro picture of the changing sustainability landscape into the reality of the specialty chemicals industry, the components of the challenge ahead are three-fold: to deliver innovative and competitive solutions to meet very specific industry needs and applications (Performance), while committing to environmentally sustainable and market-leading products and services (Planet) and meeting the present and future societal needs and demands (People).

**IN SHORT: HOW TO ADD VALUE THROUGH SUSTAINABILITY PERFORMANCE AT PRODUCT LEVEL IN THE SPECIALTY CHEMICALS SECTOR?**

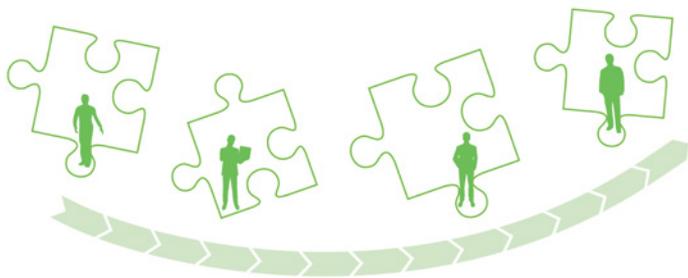
Whether or not companies face this challenge, the path chosen will have implications. The shift towards a sustainable specialty chemicals

industry will entail investments, skill development and change to organizational practices. Besides creating lasting value to society and the environment, this shift also provides advantages in terms of improving performance and market position, exploring new business fronts, building a talented work team and increasing value chain collaboration.

Maintaining 'business-as-usual', on the other hand, offers limited room for creating sustainable value and is susceptible to risks of disruption. As businesses increasingly reposition themselves in the value chain in order to meet changing demands (Vanson Bourne, 2012), disruption is likely to be driven not only by natural systems, governments and society, but also by the industry itself.

When long-term vision is at stake, the decision on which path to take points towards sustainability.

## VALUE CHAIN COLLABORATION AND TRANSPARENCY



Improved collaboration, new supply chain technologies and information transparency will enable a more **SYNCHRONIZED VALUE CHAIN WITH GREATER VISIBILITY AND TRACEABILITY.**



**REPUTATION LEADERS WERE FOUND TO PERFORM 22% BETTER** than the Standard & Poor's average.

In the last 10 years, **7 TIMES AS MANY COMPANIES** around the world **ISSUED SUSTAINABILITY REPORTS.**

References: CGF Capgemini and HP, 2011; EY and Boston College Center for Corporate Citizenship, 2013; Mohin, T., 2012.

### Driving progress across the value chain

Sustainability and performance leadership require moving beyond compliance and current standards by innovating and addressing sustainability in pioneering ways.

In order to drive sustainable innovation and the realization of sustainable value, three aspects of essential importance were identified: firstly to anticipate, cater and tailor to future needs and demands; secondly to build sound sustainability evidence based on reliable criteria and verified assessments; and thirdly to engage and create solutions collaboratively with key stakeholders – both internal and external – in transparent and credible ways.

Implementing such a strategy requires a fit with organizational culture, which in this case matches well with Clariant's own vision to stand out for above-average lasting value creation for all of its stakeholders and the integration of sustainability as one of the strategic pillars in the company strategy.

The Sustainability@Clariant Portfolio Value Program, launched in 2012 and developed in partnership with CSCP, integrates these defining elements and represents an important milestone on the way to realizing Clariant's vision. The program's holistic approach provides a significant driver for sustainability progress not only within the company, but also across the value chain and ultimately the chemicals sector.

A central part of the program is the development of a systematic approach for the assessment and continuous improvement of the sustainability performance of products: the Clariant Portfolio Value Program System (PVP System).

This publication presents the PVP System, looking at its highlights in terms of approach, methodology, current achievements as well as learnings gathered so far. The goal with this case study publication is to share insights on relevant approaches and tools for sustainable product portfolio management as well as to inspire other stakeholders to face the challenge and take action.

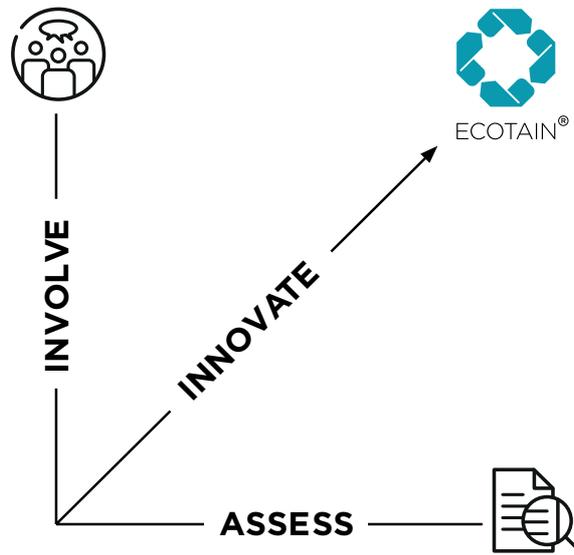


FIGURE 1: SUSTAINABILITY@CLARIANT PORTFOLIO VALUE PROGRAM (PVP)

## 2. A SYSTEMATIC APPROACH TO PRODUCT SUSTAINABILITY: THE PVP SYSTEM

The PVP System consists of a tailor-made approach for assessing and continuously improving the sustainability performance of Clariant's products. Its development is the result of three key streams of work, all interconnected and mutually reinforcing:



**ASSESS** comprised understanding the status quo and identifying needs and innovation opportunities through benchmarking of product and portfolio sustainability tools.



**INVOLVE** aimed at engaging stakeholders and harnessing their diverse input and contributions for a shared vision and deployment of sustainable value creation.



**INNOVATE** involved creatively responding to society's current and future trends and demands, as well as further improving existing product and portfolio

sustainability tools by addressing existing gaps and limitations.

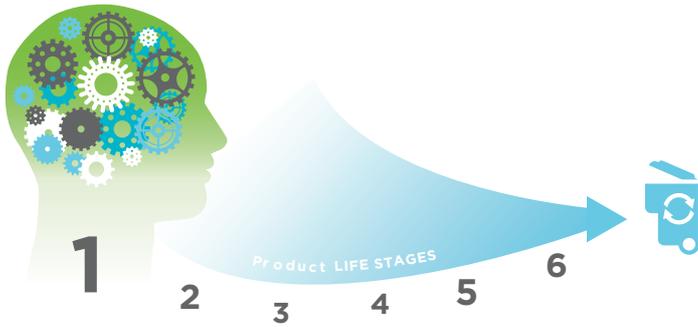
Together, these streams of work enabled the development of a unique and systematic approach to product sustainability at Clariant.

This section presents the distinctive and unique features of the PVP System in terms of approach to sustainability portfolio management and highlights the System's main components and outcomes.

### Developing a unique approach to product sustainability performance

Why focus on the product level?

More than 80% of the environmental impact of a product is determined at the design stage. This means that it is by modifying the design of their products that companies have the largest potential to reduce the negative impacts of their performance to sustainable levels. Such modifications, on the other hand, require understanding the life cycle of products as a whole in order to be effective. The PVP System captures this in full, by delivering a set of interlinked tools and



components for assessing sustainability performance at the product level, rather than at the corporate level, based on life cycle assessment and systems thinking and covering the entire value chain. Based on this a first full screening of Clariant’s diverse product portfolio is near completion (expected within 1st half of 2015).

### Combining both handprint and footprint

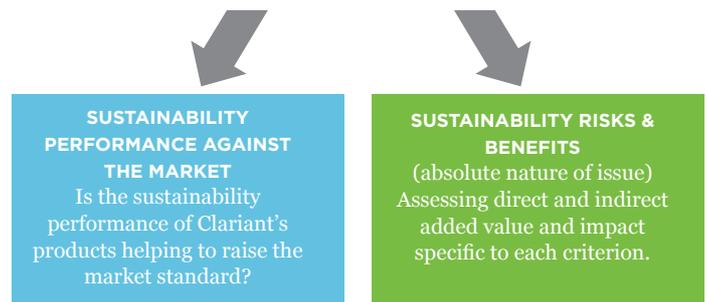
An authentic approach to sustainable value goes beyond the reduction of negative impacts of products, commonly referred to as footprint. It also comprises the delivery and increase of social and environmental benefits – the scale of the contribution that footprint represents. The “Handprint” concept aims at filling this gap. The assessment Criteria Catalogue of the PVP System combines footprint and handprint criteria to provide a comprehensive picture of performance, efficiency and potential to create true sustainable value.



### Two lenses to look at product sustainability

Most approaches to product sustainability focus on one of two standards for comparison, either (i) sustainability performance in comparison to the market (comparison with your peers) or (ii) sustainability risks and benefits from the absolute nature of the issue being analysed, which is most relevant, but difficult to define objectively. The PVP System captures the benefits of both in a two-sided assessment. Whereas the first one provides a lens to understand to what extent the sustainability performance of Clariant’s products is helping to raise the market standard, the second one assesses direct and indirect added value and impact specific to each criterion.

#### A TWO-SIDED ASSESSMENT USES TWO LENSES TO LOOK AT PRODUCT SUSTAINABILITY



By combining both perspectives, the PVP System activates a ‘checks and balances’ system between market performance and absolute benefit-risk throughout the product screening, avoiding misleading results, e.g. overrating the sustainability benefit of not including hazardous substances when all other competing products in the market are able to deliver the same level of performance.

# THE SUSTAINABLE PORTFOLIO SYSTEM

## Main Components

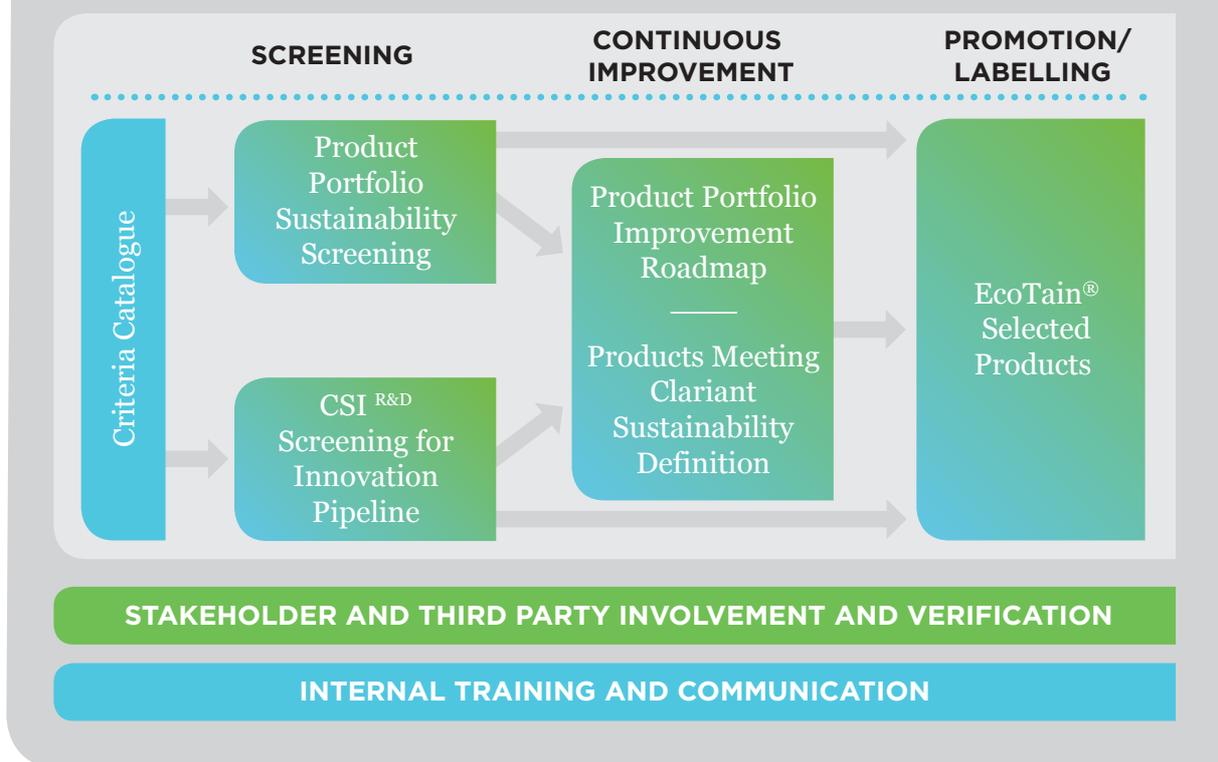


FIGURE 2: MAIN COMPONENTS OF THE PVP SYSTEM

## Key components of the PVP System

The PVP System comprises a set of interlinked components and tools, aimed at strategically driving product and portfolio sustainability. These are elaborated in the next section and Figure 2 demonstrates how they connect.

### Criteria Catalogue:

Tailor-made set of triple bottom line criteria relevant to sustainability at the product level. A glossary was prepared to facilitate a common understanding of the Criteria Catalogue as well as a consistent and comparable screening approach.

### Product Portfolio Sustainability Screening:

Process for a two-sided sustainability assessment at the product level. It is carried out

by an interdisciplinary screening team, which captures the results in an Excel screening tool and is supported by screening guidelines.

### Corporate Sustainability Index for Research and Development Projects (CSI<sup>R&D</sup>) Screening:

Screening that takes product sustainability into account in the development process of major new R&D projects.

### Product Portfolio Improvement Roadmap:

Structured plan to define strategic targets, concrete actions and reportable KPIs for an increasingly sustainable product portfolio.

### Products Meeting Clariant's Product Sustainability Definition:

Products that fulfil a given sustainability definition and are a base requirement for the further definition of EcoTain<sup>®</sup> products.

### **EcoTain® Products:**

Clariant's branding for external communication, which meets a consistent standard and selection process.

### **Stakeholder and Third Party Involvement and Verification:**

Dialogue process to ensure external verification and develop an institutionalized process of external input. These ensure the robustness and the credibility of outcomes and claims.

### **Internal Training and Communication:**

Process to ensure understanding, to inspire employees to change and to guarantee a consistent application of the PVP System.

While the implementation phase of the system is still ongoing, in terms of outcomes, the System has already delivered the following benefits:

- Increased transparency of the sustainability status of the product portfolio, by supporting the identification of the most pressing sustainability issues as well as sustainability added value in the portfolio;
- Evidence-based decision making towards increased sustainability performance, embodied in the development and implementation of e.g. the Product Portfolio Improvement Roadmap;
- Increased engagement and dialogue with stakeholders to exchange on key challenges;
- Credible and robust sustainability marketing and branding for external communications including the newly launched EcoTain® label.

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### 3. SCREENING THE EXISTING PRODUCT PORTFOLIO

#### Establishing relevant triple bottom line criteria

The identification of relevant criteria lies at the foundation of any portfolio sustainability approach. A comprehensive catalogue, covering all relevant aspects of sustainability can provide the basis for a number of activities:

- Screening the current portfolio for sustainability benefits and issues;
- Understanding connections and trade-offs between sustainability dimensions;
- Assessing and classifying products against defined sustainability standards;
- Tracking of continual progress and improvement through corresponding KPIs.

Whilst alignment with existing systems is desirable, such a catalogue must also balance this with the selection of the most relevant aspects at the product level for the industry and market at hand, in order to optimise completeness and usability. For the specialty chemicals industry this ranges from applications in large-scale industrial processes to use in consumer products. In addition to this the criteria should ensure fit

for purpose not only for the present, but also be orientated to anticipated future priorities.

The development of the Criteria Catalogue in the PVP System took place in multiple stages. In the first phase of the program benchmarking of existing criteria, in both the chemicals industry and other promising tools, was combined with stakeholder priorities identified in a survey of key customers and interviews with NGOs, trade unions and policymakers. These perspectives were then combined with scientific reasoning through a trend research of more than 50 opinion-leading reports.

In the second phase the base criteria set was refined through extensive testing product screening and review by a working group composed by members of all Clariant's business units and relevant functions. As important as the criteria themselves were the detailed definition and benchmarks developed in a comprehensive glossary.

#### Overview of Criteria Catalogue:

The resulting set of 36 criteria, detailed below, encompasses the full life cycle from material sourcing to sustainability in use as well as provides a holistic picture of social, environmental and economic sustainability.



## SAFE USE, TRANSPARENCY AND INFORMATION

## ADDRESSING MEGATRENDS AND SOCIETAL NEEDS

### PEOPLE

- SVHC\* substance profile
- CMR\* substance profile
- Hazard classification level
- Level of solvents and VOCs\* in the use phase
- Available information on performance and impacts across the life cycle

- Solutions meeting societal / environmental needs or megatrends:

- *Food and Nutrition,*
- *Health and Safety of People,*
- *Environmental Issues, Societal Challenges,*
- *Green and Sustainable Living, and*
- *Climate Change*



## RAW MATERIALS & SUSTAINABLE SOURCING

## ENVIRONMENTAL PROTECTION

### PLANET

- Material use efficiency in the production
- Material efficiency in the use phase
- Raw material scarcity
- Use of renewable raw materials
- Use of non-food competing renewable raw materials
- Sustainability certification of renewable raw materials
- Use of recycled material in the production
- Support of recycling opportunities in the value chain
- Impact on biodiversity

- Water footprint of raw material production
- Water consumption in the production
- Water consumption in the use phase
- Energy footprint of raw material production
- Energy consumption in the production
- Energy consumption the use phase
- GHG\* footprint of raw material production
- GHG\* emissions in the production
- GHG\* emissions in the use phase
- Emissions in the use phase
- Hazardous waste classification in the production
- Hazardous waste classification in the use phase
- Waste generation in the production
- Waste generation in the use phase
- Biodegradability/Compostability of product
- Effect on aquatic environment
- Waste water formation at use phase



## INTEGRATED SUSTAINABLE BUSINESS

## PERFORMANCE ADVANTAGES

### PERFORMANCE

- Value chain collaboration
- Value adding product related services and product service systems

- Additional performance features and benefits to the customer
- Third party certification of product

\*Abbreviations: Substances of Very High Concern (SVHC), Carcinogenic, Mutagenic or Toxic for Reproduction (CMR), Volatile Organic Compounds (VOCs), Greenhouse gas (GHG)

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### Criteria in action:

The following examples illustrate how some of these criteria relate to specific sustainability challenges in the chemicals industry.

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#### RAW MATERIAL SCARCITY:

This criterion identifies dependency of products on materials considered scarce now or which may become so in the future, but can also identify a product benefit.

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The product FLOTIGAM® 5806 is a flotation agent used for purification of phosphate rock in fertiliser production. Phosphate rock is considered a critical raw material by the the European Union (EU). Flotigam 5806 enables a higher phosphate recovery rate in separating phosphate from other minerals. The use of waste products from soy bean oil in its ingredients makes a further contribution to resource efficiency.

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#### USE OF NON-FOOD COMPETING RENEWABLE RAW MATERIALS:

Use of renewable materials is generally considered as a positive sustainability benefit, but

such use may have implications on land use and food or animal feedstock supply. For this reason the PVP System Criteria Catalogue considers not only if renewable raw materials are used but also to what extent these may compete with food and whether they come from certified sources.

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The product CONTAINER DRI® II is a lightweight and efficient desiccating agent used to ship moisture sensitive cargo globally, important for affordable supply of food and food aid. It uses a 100% renewable gelling agent. 25g of gelling agent combined with 100g of calcium chloride enable the same drying effect as 500g of other calcium chloride based desiccants, at a lower cost and producing less waste from product and cargo. The use of food competing ingredients was captured in assessment, though in this case not evaluated as a risk due to the quantities involved and in view of much larger resulting saving in food waste of cargo and assurance of food supply worldwide.

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#### GHG EMISSIONS IN THE USE PHASE:

When considering a product's environmental footprint (such as water, energy, emissions and

waste) the Criteria Catalogue covers different life cycle stages to ensure all issues are identified. The final screening evaluation must consider the full chain picture. GHG emissions in the use phase assesses the level of direct and indirect emissions from product application at customer or end consumer level.

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The product ENVICAT® N<sub>2</sub>O is a catalyst designed specifically to reduce nitrous oxide emissions from industrial processes by removing them from the waste gas of industrial plants and converting them into harmless nitrogen, oxygen and water.

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#### VALUE CHAIN COLLABORATION:

One key trend highlighted in research and stakeholder feedback when building the Criteria Catalogue was the increasing need to address sustainability challenges collaboratively through the whole value chain and life cycle. This criterion considers the extent of upstream and downstream collaboration and evidence of resulting sustainability.

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The product group EXOLIT® OP is the result

of extensive work with stakeholders to develop, test, implement and verify a new series of halogen free flame retardant. It is used for safer performance of electrical, electronic and automotive equipment, partially substituting conventional brominated alternatives. One example of further collaboration was identified in Clariant's participation in the European ENFIRO research consortium for life cycle assessment of the most environmentally compatible flame retardant solutions.

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#### SOLUTIONS MEETING SOCIETAL / ENVIRONMENTAL NEEDS OR MEGATRENDS:

All products fulfil a purpose or application. In order to reflect their handprint of sustainable value, some evaluation of benefits delivered is needed. This criterion assesses products' contribution to meeting key societal and environmental needs and megatrends identified across different topics.

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For example the product HYDROCEROL® is a chemical foaming agent which, as one of its advantages, reduces the density of plastics, thus enabling lighter materials in e.g. car components, packaging and other plastic applications. This meets two key environmental trends in reducing resource use and waste (by lowering material and fuel needs in mobility) and reducing climate changing CO<sub>2</sub> emissions (from reduced

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## Key building blocks for an effective screening process

While a comprehensive criteria set provides the base for the screening of a portfolio, there are a number of other building blocks required in the system and process design for providing workable results. These are presented below.

### Definition of product clusters to screen

For screening and updating a complex portfolio numbering tens of thousands of products, the screening of product clusters, rather than single individual products, ensures that the full product portfolio is screened efficiently, while enabling a meaningful level of granularity to identify issues. In the PVP System, Clariant product groups are defined either based on similar properties, market sectors or application. When different products in a group result in considerably divergent screening results, the product group is further narrowed down.

### Selection of the screening team

Establishing an interdisciplinary yet small screening team provides a number of benefits, in order to bring different perspectives to light in a dialogue-based setting. To this end, the screening process at Clariant is conducted by cross-functional teams, each with a trained team leader to ensure consistency of approach and interpretation.

### Ensuring life cycle thinking and value chain perspective

Life cycle thinking enables a more comprehensive understanding of a product's risks and benefits, besides fostering product stewardship by

broadening the role of industry across the value chain. Therefore, the product portfolio assessment should be systematic by considering the entire life cycle of products, covering upstream, production, use and end of life phases. The PVP System embeds this thinking firstly through the definition of the Criteria Catalogue, which already encompasses the full life cycle, and secondly through the work of the screening teams, who double-check the overall performance of products before finalising the screening, in order to avoid gaps during the assessment.

### Building a screening evidence and documentation base

Best available information and data should support the screening process, in order to ensure credible and robust assessment results. At the same time, for most criteria, available information may come from varied sources, which can range from Life Cycle Analysis to secondary data to expert opinion. Hence a flexible frame is required.

In the PVP System, this documentation is requested prior to the screening process, including e.g. environmental assessments, formulation information, emission and consumption data, Material Safety Data Sheets (MSDS) and market studies. An initial guide to recommended sources for each criterion has been developed.

### Defining a market reference

As referred to in section 2, combining absolute sustainability with market benchmarks provides a full picture of product sustainability as well as a market based differentiation and competition on sustainable value. For chemicals and other Business-to-Business (B2B) industries, this may

PERFORMANCE OF PRODUCT GROUPING (relative to market standards)	SUSTAINABILITY BENEFITS AND RISKS OF PRODUCT GROUPING (in relation to the absolute nature of issue)
 Best-in-class performer	Sustainability Benefit 
 Higher than market standard/average	Neutral 
 Average	Medium/potential risk 
 Lower than market standard/average	High risk 
Not applicable	Not applicable
Data insufficient for assessment	Data insufficient for assessment

FIGURE 3: THE STANDARD PVP SYSTEM SCREENING SCALE

involve varied applications and differing standards. In the PVP System, Clariant benchmarks against the main market reference technology depending on the type and size of market. If there are large variations then the screening is split. Once the reference is defined, the screening for the product market performance on all 36 criteria must be made consistent with this reference.

### Definition of absolute risks and benefits

In addition to the market performance assessment, assessment of absolute sustainability risks and benefits enables the identification of direct and indirect added value and impacts of products. In the PVP System, risks and benefits are defined as follows:

- Sustainability benefit recognizes product groupings which either support increased sustainability directly or indirectly, or have sustainability features;

- Sustainability risks can be classified as medium/potential risks and those considered high-risk issues. The guidance for risk considers recognised classifications, issues of public scrutiny from external stakeholders, performance relative to internal benchmarks or other specific reference points.

The ‘traffic light’ legend for both sides is shown in figure 3 above.

While the assessment scale for performance against the market remains the same, assessment of what constitutes a sustainability benefit, medium or high risk is elaborated in the criteria glossary.

A comprehensive screening process and supporting tools:

Bringing these elements together encompasses a rounded system for reliable screening. Figure 4 shows an overview of this process as applied in Clariant’s PVP System, which combines both

assessment lenses for comprehensive screening outcomes. Finally this system is supported by a set of tools and guidelines:

*A screening tool* captures the details on the assessment selection, rational and supporting data for each criterion, as well as provides an overview of screening results.

*A screening guideline* supports the teams and reflects the learning process and questions identified in the pilot phases.

*A detailed glossary* provides not just the scope and intention of the criteria, but also specific guidance for each of the 36 criteria for selection of risks and benefits.

**Post screening evaluation:**

A key outcome of the screening process is an overview of the different sustainability aspects of a product grouping. However, the screening results may require further balanced consideration in order to determine the overall sustainability, combining and ensuring product performance, various sustainability impacts, societal needs and economic feasibility and to identify appro-

priate actions. The profile of different criteria may range in importance or scale or be interconnected representing optimised choices, e.g. a product with higher raw material footprint than comparable products, because it substitutes the use of certain dangerous substances.

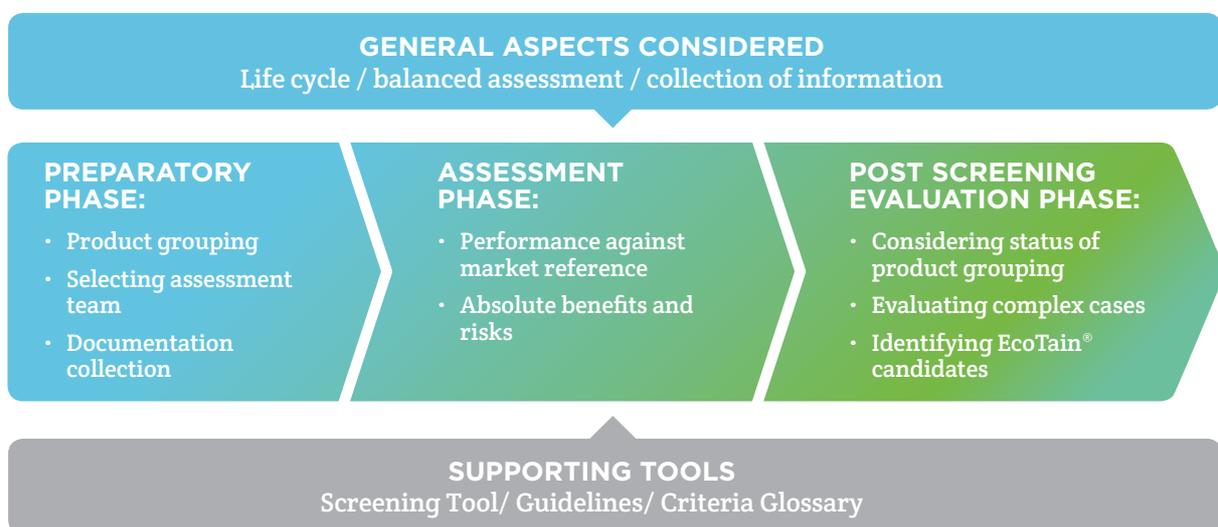
The assessment team makes an initial evaluation after screening. The criteria assessments are not changed in this discussion, but the screening team has some room to provide justification for potential risks or capture concerns beyond the assessment given. Some guidelines for consideration are provided in this regard relating to:

- Some priority for criteria identified as key customer and stakeholder topics;
- The impacts across the full life cycle and across different environmental media and their relative scale;
- The availability of alternative solutions coupled with societal need of the end application.

Based on this the team makes a recommendation on the status of the product category (see Portfolio management in section 4).

More complex cases are referred to the EcoTain® review panel (see section 4).

**FIGURE 4: OVERVIEW OF KEY COMPONENTS OF THE PVP SCREENING PROCESS**



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## Screening in action

### NIPAGUARD® SCE

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#### Product description

This is an antimicrobial agent designed for the preservation of cosmetic products and toiletries. It exhibits microbial activity against a wide range of bacteria, yeast and molds.



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#### Distinctive feature

Nipaguard® SCE is a paraben-free solution for personal care products, based on renewable raw materials. Parabens have been under public scrutiny due to potential negative impacts on health associated to their oestrogen-like properties, besides concerns around the negative impacts of certain parabens to the aquatic environment.

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#### Benchmark for market performance assessment

Paraben-based preservatives, as the mainstream market solution, are the benchmark against which Nipaguard® SCE is consistently assessed across all criteria in terms of market performance. Although consisting of two different technologies, Nipaguard® SCE and parabens have the same market application.

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### KEY DISCUSSION POINTS FROM SCREENING

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#### CHALLENGES BEHIND RENEWABLE CONTENT

- Benefits from being 85% based on renewable raw materials, partly certified by the Roundtable on Sustainable Palm Oil (RSPO)
- As parabens consist of synthetic raw materials, they present no renewable raw material content, which positions Nipaguard® SCE as a best-in-class performer in terms of renewable content
- Renewables include palm kernel oil, which is flagged as a potential risk due to the competition with food supply and impacts on biodiversity if produced through monoculture

#### CONSIDERING HEALTH AND ENVIRONMENTAL ADVERSE EFFECTS

- Benefits from being a safe alternative to parabens, for meeting the societal demand for health protection and having no impacts on the aquatic environment
- Additional benefit from enabling third party certification: Ecocert certification for enabling natural cosmetics
- As methylparabens present chronic aquatic toxicity, Nipaguard® SCE also stands out with a higher than average market performance for not presenting side-effects to the aquatic environment

#### CONTROLLING THE USE OF HAZARDOUS SUBSTANCE

- Ingredient in the product composition classified as hazardous for eye irritating properties if used in 100% concentration
- Although under controlled use and in concentration that presents zero harmful impacts, the inclusion of any classified substance is flagged as a potential risk in the guideline from the criteria glossary, as a precautionary approach

Figure 5 provides a snap shot of the screening evaluation of these key points illustrating the interface between them.

In addition a number of further benefits and outstanding market performance were identified in the full screening:

- Increased material efficiency in the production and use phase;
- Reduced energy consumption in the use phase;
- Zero waste generation in production;

- Product readily biodegradable;
- Value adding product related services, e.g. formulation guidance, distribution trainings and customer workshops;
- Additional benefits to customers for allowing paraben-free claim.

FIGURE 5: NIPAGUARD® SCE KEY SCREENING RESULTS

CRITERIA	PERFORMANCE AGAINST THE MARKET BENCHMARK	SUSTAINABILITY RISKS AND BENEFITS
Use of renewable raw materials	 Zero renewable content in benchmark	 85% renewable based
Use of non-food competing renewable raw materials	Not applicable as no renewable content in reference group	 Palm kernel oil content
Sustainability certification of renewable raw materials	Not applicable as no renewable content in reference group	 Palm kernel oil mass balance RSPO certified
Effect on aquatic environment	 Benchmark presents chronic aquatic toxicity	 Paraben-free
Third party certification of product	 Benchmark presents no certification	 Ecocert certified
Hazard classification level	 Some benchmark variations under regulation	 Precautionary flag of a classified ingredient
Solutions meeting societal / environmental needs or megatrends:	Not applicable as this criterion is not assessed against the market	 Health protection and green living

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## 4. ACTING ON SCREENING RESULTS

### Portfolio management and screening evaluation

In order to manage a large product portfolio, a basis for categorisation to support decision-making is required. This enables different handling based on the characteristics concerned. This is no different when it comes to product sustainability, and whilst many filters may be applied, actions are normally steered around three broad categories:

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#### 1. Products standing out for their sustainability:

Products representing excellence, or best-in-class-solutions, with a positive contribution to the sustainability of the industry. In the case of the PVP System these are differentiated through the EcoTain<sup>®</sup> Label (see later in this section).

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#### 2. Products meeting a benchmark or threshold set by the organisation or externally:

Products representing a standard considered

an acceptable level of sustainability. In the case of the PVP System the screening outcomes are compared against a set of requirements based on at least reaching market standards, providing some benefits and providing justifications for any risks based on overall sustainability performance and socio-economic need. This should not be a static benchmark, but a continuously reviewed standard reflected in the PVP System by the periodical update of the criteria assessment scale.

#### 3. Products falling below the acceptable sustainability standard:

Products requiring most focus for action, either through improvement, replacement or discontinuation. In the case of the PVP System these are dealt with by the portfolio improvement road mapping process, elaborated in section 5. In most product portfolios, it is still likely to exist a percentage of products within this group to which solutions are not yet identified. These may still be justified based on outstanding need or demand where more sustainable alternatives are not considered technically or economically feasible.

## Promoting sustainable choice: The EcoTain® Label

The EcoTain® label was first introduced in 2012 by Clariant Industrial & Consumer Specialties Business Unit as a way to increase their sustainability efforts and support responsible customer choice. Positive trade feedback and sales provided a proof point of demand for such a system.

With the development of the PVP System, this concept was evolved to a company wide label, applicable for all Clariant's business units. The concept was revamped to reflect a consistent standard, based on the assessment under all 36 criteria in the new Criteria Catalogue. The screening teams identify and nominate promising candidates to go through a further level of scrutiny and requirements.

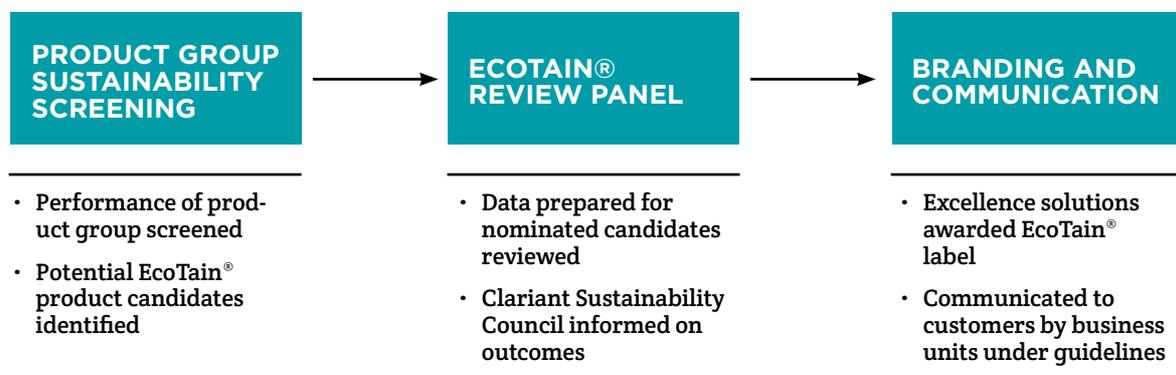
In addition to meeting Clariant's product sustainability standard as detailed before, EcoTain® product candidates must demonstrate a benefit for criteria in multiple life cycle phases, have some best-in-class sustainability attributes and



not pose adverse effects to the environment or public health. No high risks under any criteria are permitted either, in order to ensure the label promises a holistic standard without selective promotion of benefits.

All EcoTain® products are approved by an internal review panel featuring different functional representation, including the Corporate Sustainability and Regulatory Affairs department. Only then can the EcoTain® branding be used. The Clariant Sustainability Council, chaired by the CEO, is informed on the outcomes. The new EcoTain® standard is launched in April 2015.

FIGURE 6: THE PROCESS OF BECOMING AN ECOTAIN® PRODUCT



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## EcoTain® in action

### INVOQUE™

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#### Product description

Clariant's unique patented sediment management solution consisting of non-toxic, inorganic/mineral-based flocculation and coagulation technologies for fast and effective de-watering of notoriously hard to flocculate sediments.



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#### Distinctive feature

Invoque™ is an alternative to conventional technologies, providing a revolutionary approach to dealing with hard-to-treat sediments in stressed waterways and water bodies, mining runoffs and tailings, and civil engineering application fields. Invoque™ enhances the ability to use recovered sediments as resources, e.g. use of nitrate and/or phosphate rich sediment in the production of fertilizers, and reduces the cost, complexity and need for downstream water treatment.

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#### Sustainability benefits & Market performance highlights

Seventeen benefits across all 3 sustainability pillars, no risks and best-in-class or higher than market standard performance for all assessment criteria where there is a benefit.

#### PEOPLE

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- SVHC- and CMR-free solution as an alternative to conventional technologies
- Meets societal and environmental needs and megatrends, e.g. health and safety through substitution of hazardous substances and environment protection

#### PLANET

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- Increased material efficiency in the production and use phase, enabling separation of a broad spectrum of sediments in fresh, brackish and salt water applications
- Support of recycling opportunities across the value chain by allowing the use of de-watered sediments in value-added downstream applications
- Low water consumption in the production phase with substantial water benefits through efficient water recovery in the use phase
- Reduced energy consumption and GHG emissions in the use phase through fast and efficient de-watering of sediments and enhanced logistics footprint
- Zero hazardous waste in the production and use phase and no waste water formation

#### PERFORMANCE

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- High cooperation across value chain delivering sustainability benefits to customers and enabling additional value-added solutions, e.g. by enabling use of sediments as resources and avoiding disposal costs

## ED PIGMENTS RANGE

### Product description

'Easily dispersible' pigments that can be easily incorporated into paint systems with a dissolver and without an additional milling step. This is an innovative approach for paint manufacturing which offers efficiency as well as energy and raw materials savings.



### Distinctive feature

Clariant has developed a highly efficient production process for these pigments, resulting in an overall energy use reduction across the product life cycle. Competing products deliver similar product performance at the use phase at the cost of considerably increased energy consumption in the production phase.

### Sustainability benefits & Market performance highlights

Six benefits across all 3 sustainability pillars, no risks and best-in-class or higher than market standard performance for all assessment criteria where there is a benefit.



#### PEOPLE

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- CO<sub>2</sub> emissions reduction solution, thus addressing the climate change megatrend



#### PLANET

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- Increased pigment dispersibility allows higher colour yield, thus enabling increased material efficiency in the use phase of the product
- Up to 90% reduction in energy consumption and GHG emissions in the use phase in comparison to standard powder pigments
- Reduced cleaning efforts and waste water formation in the use phase



#### PERFORMANCE

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- Above market standard technical support service
- Intensive collaboration with raw material suppliers and customers for product development and introduction into the market
- Improved colouristic performance

## 5. DRIVING PORTFOLIO IMPROVEMENT AND SUSTAINABLE INNOVATION

### Addressing issues with a Product Portfolio Improvement Roadmap

To ensure continuous improvement of a product portfolio, a structured process or roadmap is required in order to know how to move forward. This should not be developed in isolation but instead needs to be linked to and embedded in existing operational and strategic processes, as well as backed up with endorsement by top management. Execution may vary but key elements to a roadmap process include:

- Plan development for the most pressing issues recurring in a category or sector;
- Identification of specific innovation needs;
- Time based milestones and target setting;
- Development of relevant KPIs to monitor progress on criteria.

In the case of the PVP System, portfolio screening outcomes are consolidated at the business unit and corporate levels for review. This ensures all identified risks are screened for possible improvement. In addition, the screening outcomes are considered and linked to each business unit's strategy process.



**SUSTAINABILITY IS A MOVING BENCHMARK: EU APPLIANCE LABELS INTRODUCED IN 2005, BY 2010 90% REACHED EFFICIENCY CLASS A**

For the chemicals industry, such a roadmap can represent a timeframe that can range from months, e.g. for testing and changing a supplier of material at the same grade, to years, e.g. for developing alternative chemistry and plants. Even for longer-term development targets, the roadmap is important in order to 'backcast' projects to initiate early actions and steps and identify milestones.

Roadmap solutions can be varied in nature, from product to process to partnership. To illustrate this, we present here two examples of products where actions have been identified and implemented:



**Bentonite** is a functional mineral, which due to its high surface area and strong binding properties has all round applications enhancing a wide

range of products and processes in various industries, from food to foundry. Clariant has a fully integrated value chain: from exploration, mining, processing and refinement to tailored industry and customer specific solutions. One key factor of bentonite sustainability was identified as fossil fuel consumption in transportation of the wet clay and drying of the material.

#### Roadmap action:

A review of options identified sun-drying as an alternative process. Implementation involved a change of the logistics set up in Sardinia and identification of relevant investments. The new process provides fossil fuel savings of 300 kWh/ton representing CO<sub>2</sub> savings of 36 m<sup>3</sup>/ton. Sun-drying pilots will take place in the summer of 2015.



Emulsogen® LCN217 is used as a nonionic emulsifier for the emulsion polymerization of paints and coatings and as a dispersing agent to disperse organic pigments and carbon black in water-based pigment preparations. A key sustainability risk in previous versions of the product was the inclusion of alkylphenol ethoxylates (APEO) with potentially serious effects to the environment and classified as a Substance of Very High Concern (SVHC).

**Roadmap action:**

A focus at Clariant on reduction of SVHCs has enabled re-formulation with innovative new surfactants, resulting on this SVHC-free solution based on fatty alcohol ethoxylates. Emulsogen® LCN217 is hazard label free, with low Volatile Organic Compounds (VOCs) and readily biodegradable.

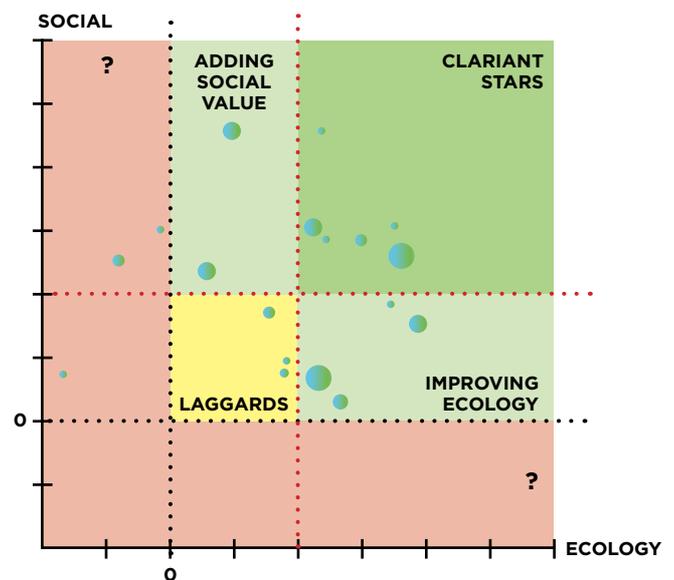
## Ensuring a sustainable innovation pipeline:

### Evaluating sustainability early in product development

Innovation is the lifeblood of a successful chemical company and as such already a key process and competence. It also represents the highest potential for improved sustainability performance.

Too often sustainability assessment is only applied to new products near to or after launch to the market. This provides a number of barriers to improvement, due to path dependency created by previous investments, production choices and supply chain or customer decisions. As most of the environmental impact of a product is determined at the design stage, it is advisable to address product sustainability at the start of development rather than later.

In Clariant's PVP System, the CSI<sup>R&D</sup> provides early screening of research concepts in the R&D pipeline allowing steering of their development to optimise sustainability.



CSI<sup>R&D</sup> REFLECTS SUSTAINABILITY PERFORMANCE INDEXED AGAINST OTHER MAJOR R&D PROJECTS (ILLUSTRATIVE)

The CSI<sup>R&D</sup> uses environmental and social criteria as aligned with the PVP System Criteria Catalogue, but the assessment is specific to R&D development, recognising the different levels of information and certainty available at this stage, for example in absence of information on specific material suppliers, scale up or certification of end product.

The index is mandatory for all major research and development projects. The results are indexed against the R&D average sustainability

performance, enabling Clariant to determine the relative sustainability performance of the products and solutions under development. Outcomes and insights from the CSI R&D are then used for further improvement in the development phase.

The benchmark at an early stage against the R&D average sustainability performance drives internal competition and works as a rising benchmark, aiming to ensure a sustainable product development and that products remain viable in the future. In addition, project managers know that estimated outcomes will be compared with final achievements prior to launch as well as subsequent screenings.

### Embedding sustainability in all innovation processes

R&D development is key to the formulation and technical performance of new products. However there are many further potential impacts and benefits that can be determined in product innovation. These remain similar to what is captured in the PVP portfolio screening, e.g how products are benchmarked and positioned against an existing market sector, supporting sustainable choice, and the provision of services

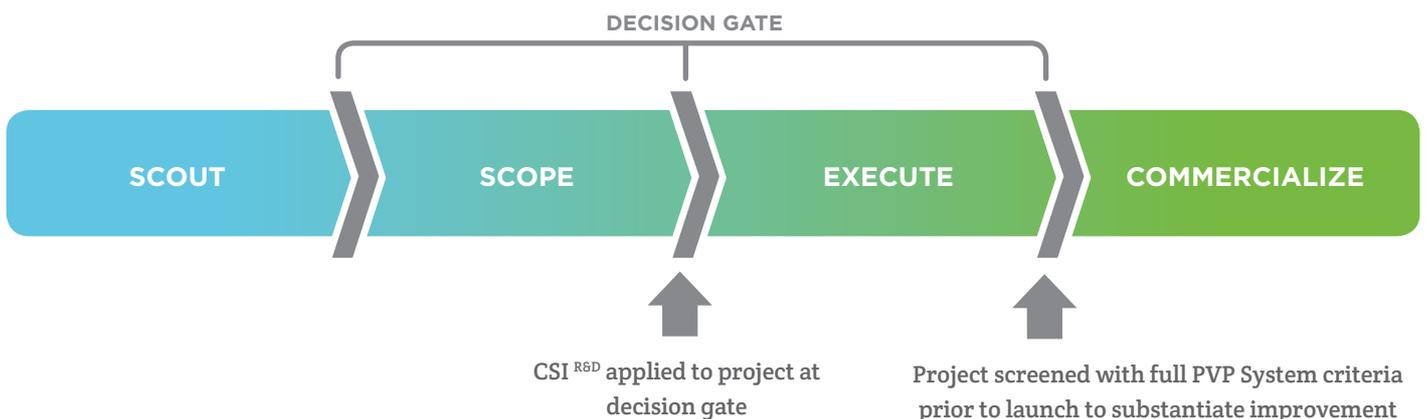
and support that enable optimisation of customers' own sustainability in application, disposal or recycling of relevant products.

To capture these aspects fully in product development, the PVP System is further integrated into relevant Clariant processes and programs between concept and launch in the market. Project managers conduct a final review of the product innovations in a screening with the full PVP System Criteria Catalogue before the commercialisation of products (see figure 7 – Stage gate process). This ensures consistency within the overall PVP System so that also new products stemming from the innovation pipeline are recognised and considered similarly in terms of their sustainability performance or EcoTain® labeling.

### Collaborative and open innovation

A special mention is worthwhile to the growing role of collaborative innovation. Here actors share knowledge and resources to address sustainability challenges in the form of both pre-competitive horizontal collaboration (cross industry initiatives) and joint innovation projects with customers and suppliers. The Clariant Innovation Centre (CIC) has joint working spaces to allow such development with partners.

FIGURE 7: R&D PROJECTS ASSESSED FOR SUSTAINABILITY AT KEY DEVELOPMENT STAGES



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## 6. ENSURING CREDIBLE AND RELIABLE OUTCOMES

Quality control supported by additional external perspectives is central to ensure a credible and robust sustainability product portfolio management, delivering consistent results. This section explores some relevant approaches in this context.

### Considering verification and certification

Verifiable and credible results can be ensured through consideration of recognised third party certification processes and assurance from external auditors. Both approaches are integral parts of the PVP System:

- There are many recognised existing third party labels of differing acceptance. However, as available third party labels still

represent a limited set of criteria, focusing often on single issues and lacking the comprehensive approach targeted by the PVP System, there is not one single product standard to align to. For this reason, the Criteria Catalogue acknowledges a range of product level certifications that address both product specificities, e.g. the criterion ‘Sustainability certification of renewable raw materials’, and general product performance, e.g. the criterion ‘Third party certification of product’.

- Whilst labels can reflect results, further credibility comes from a credible process. The PVP System is undergoing external assurance from a recognised audit firm to verify a robust process, including portfolio improvement actions, in order to ensure trustworthy results.

Further credibility over time comes from the level of information sharing and disclosure on sustainability performance and progress.

## Stakeholder involvement

Stakeholder engagement is often seen as a necessary exercise to communicate performance and answer questions. However, a thorough and well designed multi-stakeholder process can even provide an additional source of sustainable value, with multiple benefits:

- Integration of stakeholder feedback and inputs for further development and refinement of tools and processes;
- Providing both a source and testing ground for new innovations and overcoming potential barriers to implementation and adoption;
- Inclusion of new perspectives and viewpoints into internal processes;
- Building common understanding as a basis for ongoing dialogue in support of continual performance improvement.

Indeed, many of the complex challenges sustainable consumption and production present are only solvable with the support of all major stakeholders: a responsible and innovative business sector, in a supportive regulatory environment with an engaged civil society.

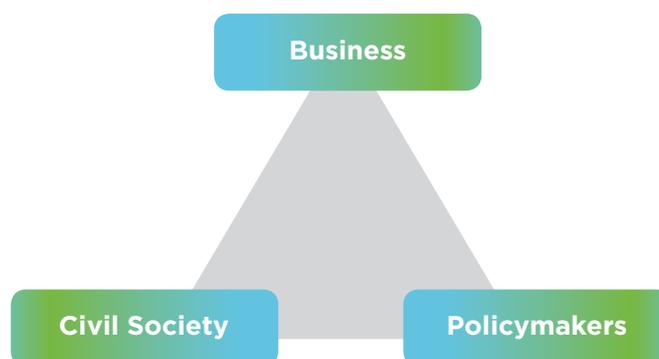
Since early stages of the Sustainability@Clariant Portfolio Value Program, stakeholder engagement has played a key role in supporting the shift towards a more sustainable product performance.

Prior to the development of the PVP System, a survey of selected key customers and interviews with policymakers, NGOs and trade union organisations were conducted, in order to assess and understand sustainability priorities and expectations.

Once the PVP System had been developed, a mix of 30 key external stakeholders, including experts, policy makers, businesses and NGOs took part in a workshop to input and exchange on key aspects of sustainable portfolio management.

Due to the continual nature of the improvement process, stakeholder involvement in the program continues through bilateral exchanges with industry, NGOs and an international stakeholder dialogue conference on creating sustainable value through product performance in September 2015.

FIGURE 8: MULTI-STAKEHOLDER PARTNERSHIPS AS CATALYST FOR A TRIANGLE OF CHANGE TOWARDS SUSTAINABLE CONSUMPTION AND PRODUCTION



## 7. KEY LEARNINGS

The PVP System represents 2 years of development cooperation between Clariant and CSCP, with the involvement of a working group of around 20 representatives from Clariant business units and corporate functions. As such, as well as being built on a sound base of research and evidence, it provided a number of lessons learnt along the way:

- 1 The specialty chemicals industry represents a complex scope but with high potential to drive sustainability throughout the life cycle. An approach flexible enough to cover products and services as well as topics from material sourcing through to indirect effects in application was needed.
- 2 As important as developing a comprehensive set of environmental, social and economic criteria to capture all relevant issues was refinement of understanding through an extensive glossary and benchmarks valid for use in different applications and markets.
- 3 For a consistent comparable portfolio screening approach, the screening process needed to cover preparation of information, assessment guidelines and post screening evaluation of actions.
- 4 Only with the twin lenses of performance against the market standard and absolute benefits and risks can a full profile of a product's sustainability be captured.

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5 Performance on the 36 criteria should not be looked at in isolation but in the context of the full profile, in order to identify interconnected issues and relative importance of risks and benefits identified. Only then can sustainability performance be optimised.

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6 To harness sustainable innovation potentials, early screening enables steering the innovation process and avoids path dependency from investments. Further integration in all development processes and screening prior to market launch leads to a sustainable innovation pipeline and an increased number of EcoTain® labelled sustainable solutions.

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7 Involvement of stakeholders from the early development of the PVP System proved to provide more than an extra check. It is a source of new ideas and information exchange, and the basis for cooperation on key issues in a longer-term dialog process.

Sustainable value across the life cycle is currently more challenging to measure than production impacts, but an essential part of a full picture of product sustainability. The PVP System reflects an ambitious attempt to contribute to that understanding and put it into practice, to identify the potential of the chemicals industry to support a sustainable society. This is a journey that continues in partnership with all key stakeholders and customers.



# Independent Assurance Report on the Clariant Portfolio Value Program and Corporate Sustainability Index for Research and Development Processes

To the Sustainability Council, Pratteln

We have been engaged to perform assurance procedures to provide limited assurance on the portfolio value program (PVP) processes, including the Corporate Sustainability Index for Research and Development Projects (CSI R&D), of Clariant AG and the consolidated subsidiaries (Clariant').

## Scope and Subject Matter

Our limited assurance engagement focused on the processes, tools used and the defined procedures of the portfolio value program and the Corporate Sustainability Index for Research and Development Projects performed in 2015.

## Criteria

The screening and evaluation criteria used by Clariant are described in the internal guidelines outlined in the portfolio value program screening guideline and the portfolio value program criteria glossary as well as the CSI R&D template and list of criteria by which the PVP assessments and the CSI R&D evaluations and the corresponding conclusions are internally performed, collated, aggregated and carried out (referenced in the publication 'Developing Tools for Sustainable Product Portfolio Management' concerning 'The Sustainability @ Clariant Portfolio Value Program', dated April 2015, with regard to systems and processes on pages 6-9, the relevant triple bottom line criteria on pages 10-11, the key building blocks for an effective screening process on pages 14-16, the portfolio management and screening evaluation on page 19, the process of becoming an EcoTain product on page 20 and on ensuring a sustainable innovation pipeline on pages 24-25).

The adequacy, accuracy and completeness of the processes and tools and concluding information are subject to inherent limitations given their nature and methods for determining, assessing and evaluating such information. Our assurance report should therefore be read in connection with Clariant's internal guidelines, definitions and procedures on the processes of the PVP assessment and CSI R&D evaluation.

## Responsibility of the Sustainability Council

The Sustainability Council is responsible for both the design, implementation and performance of the PVP assessment and CSI R&D evaluation processes in accordance with the criteria. Our responsibility is to form an independent opinion, based on our limited assurance procedures, on whether anything has come to our attention to indicate that the processes were not performed, in all material respects, in accordance with the internal guidelines.

## Independence and Quality Controls

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

In accordance with International Standard on Quality Control 1, PricewaterhouseCoopers AG maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

## Our Responsibility

We conducted our limited assurance engagement in accordance with International Standard on Assurance Engagements 3000, 'Assurance Engagements other than Audits or Reviews of Historical Financial Information', by the International Auditing and Assurance Standards Board. These standards require that we plan and perform this engagement to obtain limited assurance about whether the PVP assessment and the CSI R&D evaluation processes are performed in accordance with the internal guidelines.

For the subject matter for which we provide limited assurance, the nature, timing and extent of procedures for gathering sufficient appropriate evidence are deliberately limited relative to a reasonable assurance engagement.

## Main Assurance Procedures

Our limited assurance procedures included the following work:

- **Interviews**  
Interviewing personnel responsible for the PVP assessments and CSI R&D evaluations at group and business unit level;
- **Review of the assessments and evaluation processes and systems**  
Performing tests on a sample basis of evidence supporting the PVP assessment and CSI R&D evaluation processes outlined in the scope and subject matter section above concerning completeness, accuracy, adequacy and consistency;
- **Review of the relevant policies and guidelines**  
Reviewing the relevant documentation, internal guidelines and procedures in relation with the PVP and CSI R&D processes;
- **Assessment of the data collection, aggregation and evaluation**  
Reviewing the appropriateness of the management and review procedures on the data collection and aggregation at group level for the PVP assessment and CSI R&D evaluation.

## Limited Assurance Conclusions

Based on our work described in this report, nothing has come to our attention that causes us to believe that the PVP assessment and the CSI R&D evaluation of Clariant, performed in 2015, and as outlined in the scope and subject matter section has not been conducted, in all material aspects, in accordance with the Clariant internal guidelines, procedures and documentation.

Zurich, 18<sup>th</sup> December 2015

PricewaterhouseCoopers AG

  
Dr. Marc Schmidli

  
Stephan Hirschi

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Collaborating Centre on Sustainable  
Consumption and Production (CSCP)  
Hagenauer Straße 30  
42107 Wuppertal | Germany

Clariant International Ltd  
Corporate Center  
Hardstrasse 61  
4133 Pratteln | Switzerland

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