SOLVAY

Sustainable Portfolio Management

Toolkit

Sustainable Solution

A SUSTAINABLE SOLUTION as defined by SOLVAY SPM is a product in a given application which brings:

- higher social and environmental contribution to our customer performance
- and at the same time demonstrates a lower environmental impact in its production phase.



SOLVAY ASSESSES THE SUSTAINABILITY PROFILE OF OUR PRODUCTS USING OUR SUSTAINABLE PORTFOLIO MANAGEMENT TOOL - SPM More information

SPM methodology has been highlighted as a case study by Harvard Business School as a tool to drive strategy implementation to deliver better sustainability outcomes





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SPM is a compass to inform business on market signals on sustainability along the value chain = risks & opportunities management



Key Figures More business solutions for more value





SOLVAY SOLUTIONS

- Climate Change (29%)
- Resource Efficiency (17%)
- Safety & Prevention (12%)
- Very low environmental manufacturing footprint (13%)
- Human Toxicity (5%)
- Environment Toxicity (5%)

KEY LEVERS

- Portfolio effect (M&A)
- Innovation
- Capex
- Strategy
- Marketing & Sales
- Risks





SPM as a Compass

1-1-80

100

SOLVAY

35

022/00/2/-

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081

How it works

SPM methodology Scope



SPM methodology How does it work?

The SPM gives dynamic vision of product's sustainability risks and opportunities in their business environment. Decision-makers are informed on the contribution of Solvay's products to sustainability considering both:

Operations Vulnerability

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Their environmental manufacturing footprint and correlated risks and opportunities

Quantitative assessment by 21 impact indicators

Market Alignment

How in their applications they bring benefits or faces challenges from a market perspective







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SPM toolkit and Life Cycle Analysis (LCA)

Stage 1: SPM Fast Track

SD scorecard

Scoring based on SD expertise and expert intuition

Resource requirements: 10 products in applications: 1 hour (business self assessment with or without the support of the SPM team)

Stage 2: Full SPM

Thorough assessment, auditable and fact-based (X axis: questionnaire – Y axis: based onEco profile)

Resource requirements:

- Y AXIS: Quantitative LCA assessment (cradle-to-gate ecoprofile) depending on the number and the complexity of the products: about one month.(run by LCA expert team)
- X AXIS: Qualitative fact based questionnaire (market alignment)
 :10 products in applications: 1 day (run by SPM team)

Stage 3: Full LCA

Fully quantitative assessment, auditable, full (cradle-to-cradle) data needed

Resource requirements: 3 months (run by LCA expert team)

LCA (Life Cycle Analysis)

LCA evaluates environmental impacts of products during their entire life cycle



To carry out a LCA, inventory of inputs and outputs has to be made in order to define impacts according to:

- GHG emissions (kg CO₂ eq)
- Acidification (kg SO2 eq)
- Eutrophication (kg PO4 ³⁻ eq)
- Water consumption ...

For example:

- Often positive impacts of the bio-based carbon-based chemistry on GHG emissions compared to fossil-based chemistry
- Bio-based products may however generate negative impacts on Acidification or Eutrophication axes, so they are not necessarily sustainable

Source: Chimie du Végétal - L'Analyse de Cycle de Vie des Produits biosourcés

Operations vulnerability Based on monetized Ecoprofiles



Energy
Climate Change

SOLVA

Product A

Operations vulnerability



Based on the ratio monetized Ecoprofiles / Value for the Society (Price)





LCA Modeling: what is considered?

Exchanges of the process **Emissions** to air and Transport of main raw with the environment materials included water included Mass and energy balance for Deep approach on bio-based materials Cradle to Gate each step and intermediates (RSPO, Biogenic content, Land use, ...) approach LCA Cradle to Gate RM-2 RM-3 RM-4 **RM-1** Elec Heat SOLVAY Intermediate **Product A** To market Heat SOLVAY

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Market Alignment

Assessment relies on a no-concession decision tree



Identifying sustainability signals for each PAC by answering the questionnaire on environmental and social issues to collect information on obstacles, concerns, benefits, benchmark (Star) potential and amplifiers. The questionnaire is structured around 4 themes:

Health & Climate Resources Opinion Leaders

... and 29 sub-themes.

Each sub-theme includes a description of the topic that is covered. A specific question has been developed for each level of performance in such a way that the answer should only be Yes or No.

Market Alignment Categorization

For the relevant sub-theme, the information gathered and the answer are applied to a decision tree which positions the product on a 1-5 scale of performance level as Challenged (1), Exposed (2), Neutral (3), Aligned (4), Star (5). This category is then added to the SPM Heat Map for the relevant sub-theme.

3 Sustainability Signals

We look for positive and negative sustainability signals on the Product Application Combinations (PACs) taking the entire value chain into consideration in a 'cradle-to-cradle' approach, from raw material extraction through product use, disposal or recycling at the end of life.



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Market Alignment



Questionnaire structured in 4 themes and 28 sub-themes

1	Health and Safety	Human Toxicity Classifications
		Eco Toxicity Classifications
		Substance Lists
		SIN List
		Medical Care
		Chronic Diseases
		Healthy Habits
		Food Availability
		Water and Air Quality
		Safety and Prevention
		Limitation from aging
		Topical Care
2	Climate Change	Climate Change
~	Resource	Energy Efficiency
3		Renewable Energy
		Resource Efficiency
		Renewable-based Materials
		Scarce Materials
		Freshwater
		Availability
		Waste Generation
		Waste Valorization
		Recyclability
		Biodegradability
_		Raw Materials
4	Opinion Leaders	Countries
		Major Customers
		Ecolabels
		Downstream Sustainability

The level of performance of the Product in its Applications is assessed through a No concession Decision tree



Market Alignment



Questionnaire structured in 4 themes and 28 sub-themes

Example of questions

CLIMATE CHANGE		
Benefit	Does <product> in <application> help consumers or actors in the upstream or downstream value chains to directly, measurably and significantly reduce emission of substances with a GHG potential?</application></product>	
Concern	Is <product> in <application> reported by at least one authoritative body to contribute directly, measurably and significantly to climate change (absolute or relative)?</application></product>	
Obstacle	Is <product> in <application> reported by at least one authoritative body as a major direct, measurable and significant contributor to climate change in the marketplace and being actively displaced by solutions that have a significantly better profile?</application></product>	
Star	Is <product> in <application> reported by authoritative body amongst the best-in-class solutions in the market to directly, measurably and significantly reduce emissions of substances with a GHG potential AND actively displacing less efficient solutions?</application></product>	
Amplifier	From the standpoint of climate change, from cradle to grave, and in comparison with its next best comparably priced alternatives, the <product> in <application> is anticipated to lead to: Worse profile? No significant change? Better profile?</application></product>	

RAW MATERIALS		
Benefit	Does <product> in <application> present direct, measurable and significant positive social impact in its raw materials sourcing, which is valorized by actors in the downstream value chain?</application></product>	
Concern	Does <product> in <application> present direct, measurable and significant negative social impact in its raw materials sourcing, which is leading to delisting by actors in the downstream value chain?</application></product>	
Amplifier	From the standpoint of raw materials sourcing and its social impact for workers, small holders or communities, among others, and in comparison with its next best comparably priced alternatives, the <product> in <application> is anticipated to lead to: Higher negative impact? No significant change? Higher positive impact?</application></product>	



Sustainable portfolio management

Solvay's contribution to e-mobility & electronics



SPM A call for Action

SPM A call for action





SPM approach gaining momentum Solvay SPM recognized as benchmark by



Sustainability in key business processes

SPM a business compass for better business because more sustainable



Solvay innovation process

SPM in the wego phase gate project management



SPM Fast Track

The Fast Track SPM version uses the 4 themes (Health & Safety, Climate Change, Resource and Opinion Leaders) for assessing the existing or reference product and the desired future target. Fast track results are reported using the following scale:



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10/10

Apply SPM to innovation projects

Operation Vulnerability (cradle to gate) New product in new apolication vs. existing product in existing application (Reference) Climate change Non-renewable Social resources impacts consumption Water Human health management Ecosystem quality Major deterioration New product in new application Deterioration -- Existing product in existing application No change (reference) Improvement Major improvement



Ecosystem quality

Water

management

New product in

-- Existing product in

Human health

new application

existing application (reference)

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Seeds - Integrating Sustainability & Ecodesign to develop **Solutions** according to SPM methodology

Market sustainability drivers

What are the sustainability drivers of the application / market? Climate Change, Water Consumption, Resource Scarcity, Toxicity / Human Health, Ecotoxicity, Social Impacts



Opportunities for Ecodesign

- · What would be alternative proposals to improve the sustainability of the product / Technology?
- Circular design : what could be the place of your product in a circular use?
- ...an adapted approach will be defined in function of the maturity of the seed

Benefits & Challenges (SPM evaluation)

Seed Leader + SPM experts (*) evaluate by SPM or by the simplified questions of the experts the Benefits & Challenges of the new technology vs the Reference, in the targeted application

💎 2-1. Application (Horizontal SPM axis)

- What is / are the current reference(s) technology/product used ?
- · What are the potential sustainability benefits/challenges of your new technology/product vs this reference?

2-2. Ecoprofile vs reference (Vertical SPM axis)

- Energy / Greenhouse Gases? •
- Classified Raw materials or Intermediates?
- Number of Production / Washing / Drying Steps?
- Use of biosourced or recycled materials? •
- Generation of co-products? Waste? Yield? Selectivity?
- Waste recovery? •

These 3 Sustainability aspects will be evaluated for the Seed Kick-off, and already envisaged for the seed proposal

(*) Contact A. Pilas Béqué: SPM experts = SD & SIP experts :SD: Sustainable Development; SIP R&I / Sustainable Innovative Processes

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