Evonik Green Bond Allocation Report 2022

March 2023

EVONIK
Leading Beyond Chemistry

Introduction

Evonik is one of the world leaders in specialty chemicals. According to our purpose "Leading beyond chemistry to improve life, today and tomorrow" we are interlinking disciplines, skills, and perspectives so that we can create value-generating and sustainable solutions for our customers. These solutions play a key role in our customers' products and help them meet their sustainable goals and position themselves for the future. For that we rely, above all, on our innovative capability, which is based on our strong innovation culture.

In 2022, Evonik has embarked on the next phase of its strategic transformation. Sustainability is being integrated fully and systematically into all elements of the corporate strategy: portfolio management, innovation and HR processes. Accordingly, we set ourselves new ambitious sustainability targets. These relate, for example, to the transformation of our portfolio and the update of our climate strategy for the period 2021 to 2030 in line with the commitment to the Science Based Targets initiative (SBTi). Our commitment to become climate neutral in 2050 goes far beyond the issuance of Green Finance Instruments.

Evonik Industries AG issued its first Green Finance Instrument in the form of a green hybrid bond in 2021, with a nominal volume of €500 million. The proceeds have been fully allocated in 2021. Evonik issued its second green senior bond on May 25, 2022, with a nominal volume of €750 million. Evonik's Green Finance Instruments offer investors the opportunity to contribute to the financing of Eligible Green Projects as defined in Evonik's Green Finance Framework, primarily capital expenditure related to the manufacturing of "Next Generation Solutions" that have a strongly positive sustainability profile.

The Green Finance Framework has been set up in line with the ICMA Green Bond Principles as well as the LMA Green Loan Principles and received a Second Party Opinion from ISS ESG.

The Green Finance Framework and the Second Party Opinion are available on our website.

The net proceeds received by the issuance of Green Finance Instruments as of December 31, 2022, that are subject to this allocation report, amount to €750 million:

Green Bond Evonik Industries AG 2022/2027	
Issuer	Evonik Industries AG
Amount	€750,000,000
Use of proceeds	Eligible Green Projects according to Evonik's Green Finance Framework
Issue Rating	S&P: BBB+; Moody's: Baa2
Tenor/Final Maturity	5 years and 4 months/September 25, 2027
Coupon (fixed interest rate)	2.25 %
Re-offer Price	99.386 %
ISIN/WKN	XS2485162163 / A30VJM
Listing/Law	Luxembourg/Regulated Market/German Law
Documentation	Debt Issuance Programme
Final Terms	Download

Use of proceeds according to Evonik's Green Finance Framework

According to Evonik's Green Finance Framework, an amount equivalent to the net proceeds from Evonik's Green Finance Instruments shall be used to finance or refinance, in whole or in part, existing and/or future Eligible Green Projects that meet the Eligibility Criteria as defined below and are financed by Evonik through operating and/or capital expenditure.

In the case of refinancing existing Eligible Green Projects, expenditures which have been made within the 3-year period preceding the year of issuance of a Green Finance Instrument shall be considered for inclusion as Eligible Green Projects.

Eligible Green Projects

GBP/GLP Category	Eligibility Criteria	UN SDG	EU Environmental Objective
(a) Eco-efficient products acting as low carbon transition enablers and sustainability enablers in various industries	Capital expenditure related to the manufacturing of **"Next Generation Solutions"** Only the highest level of sustainable products (solutions referred to as "Next Generation Solutions") is eligible. These products have a substantial sustainability contribution in the value chain and include "Leader" (A++) and "Driver" (A+) products and solutions, based on the WBCSD sector standard approach for Portfolio Sustainability Assessments. More details of Evonik's Sustainability Analysis based on this approach can be found in section 2.2 of this Framework Expenditure related to **research, development and innovation (RD&I)** specifically aimed at further developing and enhancing the sustainability impact of **"Next Generation Solutions"**		o Climate Change Mitigation o Climate Change Adaptation o Sustainable Use and Protection of Water and Marine Resources o Transition to the Circular Economy o Pollution Prevention and Control o Protection and Restoration of Biodiversity and Ecosystems

GBP/GLP Category	Eligibility Criteria	UN SDG	EU Environmental Objective
(b) Energy Efficiency	Expenditure related to measures to increase energy efficiency in Evonik's production process including energy monitoring systems, lighting upgrades, smart devices to optimize energy consumption, switching to more energy-efficient units (ventilation, compressors, engines etc.), thermal energy storage systems, building refurbishment and any other sustainability-oriented construction materials		o Climate Change Mitigation
(c) Renewable Energy	Expenditure and financial investments related to: o the production and transmission of electricity and heat from renewable sources and o sourcing of renewable energy, e.g. through long-term Power Purchase Agreements		o Climate Change Mitigation

Portfolio Sustainability Assessment and "Next Generation Solutions"

In order to define "Next Generation Solutions", Evonik uses a method called Portfolio Sustainability Assessment which has been assured by an external auditor. The methodology is based on the World Business Council for Sustainable Development (WBCSD)'s framework for portfolio sustainability assessments (PSA)[1], which Evonik was involved in developing from the outset. The objective is to proactively steer Evonik's product portfolio towards improved sustainability performance and to identify strengths and weaknesses of Evonik businesses. The Sustainability Analysis is a key component of the Evonik sustainability strategy used to assess our businesses and innovations.

The unit of assessment is defined as a so-called product-application-region-combination (PARC). PARCs group combinations of products, applications and regions for which sustainability performance – in terms of both favorable and unfavorable sustainability signals – is similar.

Sustainability signals relate to material ecological or social aspects along the value chain, from the supply chain through production and subsequent use to end of life.

The PSA methodology describes the signal categories (SCs) of specific relevance for the chemical industry:

1. Chemical hazard and exposure across the life cycle (SC 1)
2. Global regulatory trends (SC 2)
3. Sustainability ambitions in the value chain (SC 3)
4. Authoritative ecolabels (SC 4)
5. Sustainability performance compared to alternative solutions (SC 5)

Evonik follows this approach and evaluates the signal categories 1 to 5 to determine the sustainability performance of our portfolio.

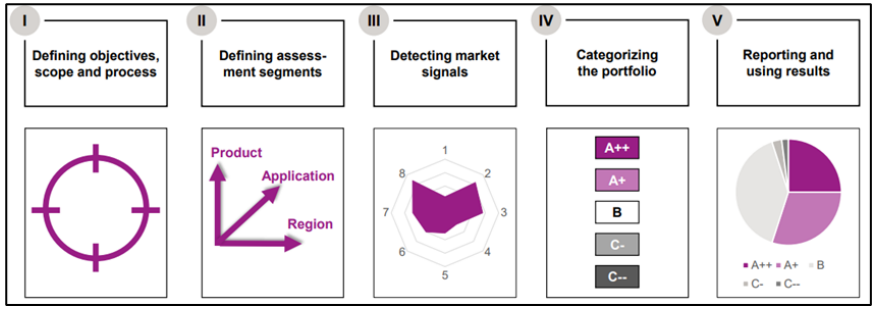


FIGURE 1: PORTFOLIO SUSTAINABILITY ASSESSMENT (PSA) FRAMEWORK

The findings are used in a structured overall evaluation of the PARC's sustainability performance, resulting in allocation to the performance category A++ (Leader), A+ (Driver), B (Performer), C- (Transitioner) or C-- (Challenged). Equal weight is given to all material signals; negative signals are not offset by positive signals.

A++ (Leader):

A++ indicates PARCs that take the lead in meeting the standards for sustainable business defined by Evonik's stakeholders and our impact. PARCs in the A++ category fully meet the requirements. They do not show any material negative signals. Moreover, material strong positive signals have been identified in one or more signal categories.

A+ (Driver):

A+ indicates PARCs that are at an advanced stage of meeting the standards for sustainable business set by Evonik's stakeholders and our impact. PARCs in the A+ category meet almost all the requirements. They do not show any material negative signals. Unlike those in the A++ category, however, only material weak positive signals were identified for one or more signal categories.

Together, the categories "Leader" and "Driver" cover the "Next Generation Solutions".

1 World Business Council for Sustainable Development: Portfolio Sustainability Assessment (https://www.wbcsd.org/Projects/Chemicals/Resources/Framework-for-portfolio-sustainability-assessments)

Amount of net proceeds allocated to Eligible Green Projects

As of December 31, 2022 Evonik has allocated €580 million to Eligible Green Projects, of which €376 million (~65%) were allocated to refinance existing projects with expenditures in 2019-2021 and €204 million (~35%) were allocated to finance new projects with expenditures in 2022. Thereby Evonik has allocated €580 m out of €750 m net proceeds of the green senior bond issued in 2022.

€50 million out of the € 204 million were expenditures related to projects in research, development and innovation to specifically enhance and further develop the sustainability impact of Evonik's "Next Generation Solutions".

Allocation Amount (in €m)				
GBP/GLP Category	Eligibility Criteria	Existing Projects (Refinancing): Expenditures 2019-2021	New Projects (Financing): Expenditures 2022	Total
Eco-efficient products acting as low carbon transition enablers and sustainability enablers in various industries	Next Generation Solution Capex	376	154	530
	Next Generation Solution RD&I (Opex)	-	50	50
Energy Efficiency		-	-	-
Renewable Energy		-	-	-
Total Eligible Green Projects		376	204	580

Amount of net proceeds allocated to Eligible Green Projects

In 2022, 43% of Evonik's sales were generated by "Next Generation Solutions" and the clear ambition is to increase this share to above 50% by 2030. Evonik is already well equipped today to reach this objective as the portfolio is concentrated around four Sustainability Focus Areas:

- Fight Climate Change,
- Drive Circularity,
- Safeguard Ecosystems and
- Ensure Health and Well-being.

Therefore, the net proceeds from the green senior bond were primarily allocated to capital expenditures for "Next Generation Solutions" in these Sustainability Focus areas.

The allocation includes, for example, capital expenditures for the manufacturing of the following "Next Generation Solutions":

Evonik's hollow fibre membranes technology for efficient gas separation comes along with a highly reduced energy-consumption as well as no waste. This technology significantly contributes to the transition to a sustainable gas economy. For example, with our SEPURAN® Green raw biogas from organic waste is converted into sustainable biomethane and "green" CO_2.

The high-performance structural foam ROHACELL® contributes to resource efficiency and avoidance of emissions. It is lightweight and strong at the same time. Therefore, it is a substitute for metal construction in the aviation industry but also used in automobiles as especially for electric cars lowering vehicle weight is of particular importance.

Methionine is an essential amino acid in human beings and used in livestock farming to feed animals healthily, efficiently, and sustainably. In Evonik's Animal Nutrition business products, services and system solutions are developed that help supply a growing world population – especially in emerging and developing countries – with healthy, high-quality and affordable animal protein while reducing nitrogen excretion and increasing the conversion efficiency of feed material, thus reducing the pressure on ecosystems to source these feed materials.

The auditing firm KPMG has conducted an external verification of the allocation report according to ISAE 3000 ("limited assurance") and confirmed the allocation of an amount equivalent to the net proceeds to Eligible Green projects (see Appendix).

This report constitutes the first allocation report for Evonik's 2022 green senior bond.

Independent assurance practitioner's report regarding the Use of Proceeds in the "Green Bond Allocation Report 2022" of Evonik Industries AG

To Evonik Industries AG, Essen

We have performed a limited assurance engagement on qualitative and quantitative disclosures related to the use of bond proceeds for eligible green projects in the "Evonik Green Bond Allocation Report" of Evonik Industries AG, Essen, (further "the Company"), as of December 31, 2022 (further "the Report").

Responsibilities of Management

Management of the Company is responsible for the preparation of the Report in accordance with the Reporting Criteria. Evonik Industries AG applied the principles and standard disclosures of Evonik's Green Finance Framework as Reporting Criteria, which is based on the 2021 ICMA Green Bond and LMA 2021 Green Loan Principles, for the preparation of the Report.

This responsibility includes the selection and application of appropriate methods to prepare the Report and making assumptions and estimates about individual disclosures of the group that are reasonable in the circumstances. Furthermore, management is responsible for such internal controls as they consider necessary to enable the preparation of a Green Bond Allocation Report that is free from material misstatement, whether due to fraud or error.

Independence and Quality Assurance of the Assurance Practitioner's firm

We have complied with the independence and quality assurance requirements set out in the national legal provisions and professional pronouncements, in particular the Professional Code for German Public Auditors and Chartered Accountants (in Germany) and the quality assurance standard of the German Institute of Public Auditors (Institut der Wirtschaftsprüfer, IDW) regarding quality assurance requirements in audit practice (IDW QS 1).

Responsibility of the Assurance Practitioner

Our responsibility is to express a conclusion with limited assurance on the Report based on our assurance engagement.

We conducted our assurance engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000 (Revised): "Assurance Engagements other than Audits or Reviews of Historical Financial Information" issued by the IAASB. This standard requires that we plan and perform the assurance engagement to obtain limited assurance about whether any matters have come to our attention that cause us to believe that the above mentioned company's Report has not been prepared, in all material respects, in accordance with the Reporting Criteria.

In a limited assurance engagement, the procedures performed are less extensive than in a reasonable assurance engagement, and accordingly, a substantially lower level of assurance is obtained. The selection of the assurance procedures is subject to the professional judgment of the assurance practitioner.

In the course of our assurance engagement we have, among other things, performed the following assurance procedures and other activities:

- Inquiries of personnel on group level responsible for the development of Green Finance Framework as well as for related procedures and process documentation
- Assessment of suitability of the Reporting Criteria regarding the 2021 ICMA Green Bond and LMA 2021 Green Loan Principles
- Verification whether the reported eligible green assets are aligned with the eligibility criteria set out in the Green Finance Framework
- Evaluation of eligibility of processes, guidelines, and principles for allocating financial resources pursuant to the self-defined requirements and criteria (i.e. Evonik Green Finance Framework)
- Evaluation of processes for determining the Evonik Next Generation Solutions, defined as relevant within the Evonik Portfolio Sustainability Analysis (PSA)
- Evaluation of selected internal and external documents
- Interviews with relevant staff on corporate level responsible for providing and consolidating the data and information, as well as carrying out internal control procedures on the data and information
- Assessment of data collection, validation and reporting processes and correctness and reliability of reported data via a sampling
- Evaluation of design and implementation of controls related to these data under consideration of the adherence to the Evonik Green Finance Framework
- Assessment of the overall presentation of the disclosures related to the adherence to the Evonik Green Finance Framework

Our assurance does not extend to any other information in the Report. We will neither review and do not provide any assurance over any individual project information reported, nor is the reporting on the project evaluation and selection and the management of proceeds part of our assurance procedures.

It was not part of our engagement to review the Green Finance Framework of Evonik Industries AG and the report on impacts.

The verification of the issue conditions of the Green Bonds (including issue volume) and the process for internal tracking of disposition of funds was not part of our limited assurance engagement.

In our opinion, we obtained sufficient and appropriate evidence for reaching a conclusion for the assurance engagement.

Assurance Opinion

Based on the assurance procedures performed and the evidence obtained, nothing has come to our attention that causes us to believe that the disclosures in the "Evonik Green Bond Allocation Report" as of December 31, 2022 has not been prepared, in all material respects, in accordance with the Reporting Criteria.

Restriction of Use

This assurance report is solely addressed to Evonik Industries AG, Essen.

Our assignment for Evonik Industries AG, Essen and professional liability is governed by the General Engagement Terms for Wirtschaftsprüfer (German Public Auditors) and Wirtschaftsprüfungsgesellschaften (German Public Audit Firms) (Allgemeine Auftragsbedingungen für Wirtschaftsprüfer und Wirtschaftsprüfungsgesellschaften) in the version dated January 1, 2017 (https://www.kpmg.de/bescheinigungen/lib/aab_english.pdf). By reading and using the information contained in this assurance report, each recipient confirms having taken note of provisions of the General Engagement Terms (including the limitation of our liability for negligence to EUR 4 million as stipulated in No. 9) and accepts the validity of the attached General Engagement Terms with respect to us.

Düsseldorf, 29 March 2023

KPMG AG
Wirtschaftsprüfungsgesellschaft
[Original German version signed by:]

Brandt
Wirtschaftsprüferin
[German Public Auditor]

ppa. Dietrich

Evonik Green Bond Impact Report 2022

March 2023

EVONIK
Leading Beyond Chemistry

Sustainability impacts of "Next Generation Solutions"

GBP/GLP Category	UN Sustainable Development Goals	Sustainability impact metric	Impact result
Eco-efficient products acting as low carbon transition enablers and sustainability enablers in various industries		Sales of all "Next Generation Solutions" in 2022: • Amount • Percentage of total sales[1]	~€ 7.2 billion 43%
		CO_2e avoided by using selected "Next Generation Solutions" sold in 2022:	44.3 million metric tons CO_2e

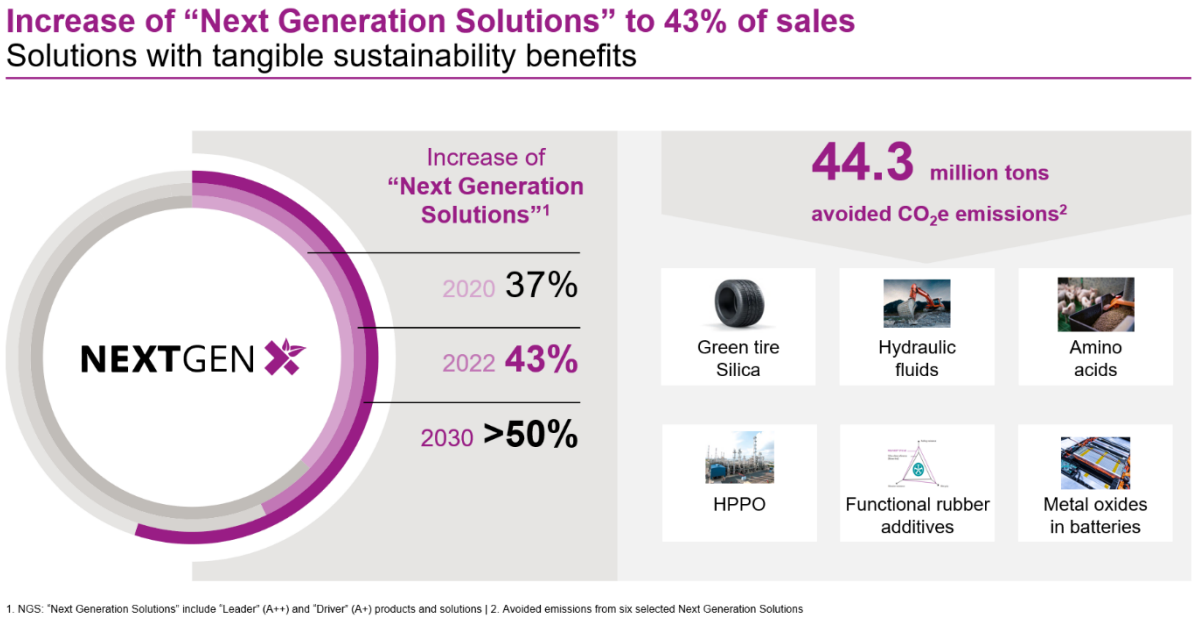
For further details on the CO_2e avoided please refer to our brochure "Next Generation Solutions – Their contribution to the sustainability focus areas" on our website.

[1] The sustainability analysis covers all external sales of our chemicals manufacturing divisions. Consequently, the Technology & Infrastructure division is not part of the scope.

Handprint of selected Evonik's "Next Generation Solutions"

We define handprint as positive sustainability impacts that Evonik products enable along the value chain compared with other established products and applications on the market, especially in customer application. These products make a relevant contribution to a direct (measurable) improvement regarding one or more environmental and/or social indicators.

In 2022 we generated 43% of our sales by products and solutions that come with superior sustainability benefits above or well above market reference, our "Next Generation Solutions" (NGSs). Our goal is to grow the NGSs sales share beyond 50% by 2030. On the one hand, this is to be achieved through the further development of existing "Next Generation Solutions". On the other hand, we are focusing research and development on generating additional sales with new "Next Generation Solutions". At the same time, we intend to reduce the sales share of products classified as "transitioner" or "challenged" through targeted reformulation or withdrawal from the relevant businesses. Our target is to keep the proportion of sales from "challenged" products permanently <5 percent.



Increase of "Next Generation Solutions" to 43% of sales
Solutions with tangible sustainability benefits

1. NGS: "Next Generation Solutions" include "Leader" (A++) and "Driver" (A+) products and solutions | 2. Avoided emissions from six selected Next Generation Solutions

Handprint of selected Evonik's "Next Generation Solutions"

Evonik offers a variety of products enabling greenhouse gas emission reductions over the life cycle of their application compared to using conventional alternatives.

Assessments of avoided greenhouse gas emissions of products and their applications follow the recommendations given in the "Avoiding Greenhouse Gas Emissions" guidelines.[2] The internal Evonik life cycle management team works in close cooperation with experts from the responsible business lines and performs life cycle assessments (LCAs) in accordance with the requirements of DIN ISO 14040 ff. Greenhouse gas emission savings are calculated on the basis of the life cycle emissions of applications of selected Evonik products compared to conventional alternatives. Both the emission-saving product and the reference solution must deliver the same function to the user and be used for the same application.

Additionally, the reference solution must be available on the market, interchangeable for the typical customer in the selected market, and as similar as possible to the emission-saving product in terms of data quality, methodology, and assumptions. The simplified calculation methodology as mentioned in the "Avoiding Greenhouse Gas Emissions" guidelines is applied, so that identical steps and corresponding emissions over the life cycle for the reference and Evonik solution are excluded from assessments. This approach has no impact on the final amount of calculated greenhouse gas emission reductions.

The avoided emissions reported here result from applying the following six Evonik solutions, to which, among others, proceeds of the 2022 green senior bond issuance have been allocated as Capex and/or Opex (RD&I):

- green tire technology,
- amino acids in animal feed,
- improved hydraulic fluids,
- hydrogen peroxide to propylene oxide (HPPO) process,
- POLYVEST® in green tire tread compounds and
- fumed metal oxides in lithium-ion batteries.

Within the sustainability analysis, it has been checked that the selected PARCs are rated as "Next Generation Solutions" so that these products do not reveal any negative signals.

In 2022, the use of the six selected Evonik "Next Generation Solutions" result in the avoidance of 44.3 million metric tons CO_2e[3]. These 44.3 million metric tons CO_2e reflect the total savings of the selected applications enabled by the amounts of the six Evonik solutions sold in 2022[4].

Each NGS provides a measurable improvement over the life cycle and the associated Evonik products have either a fundamental, extensive, or at least a substantial contribution to reducing greenhouse gas emissions compared to conventional alternatives[5].

For 2022 we have already extended our avoided emissions' calculation to six "Next Generation Solutions". Our ambition is to further increase the number of NGSs' handprint quantification in the future. Next to the greenhouse gas avoided emissions we are currently working on further quantification of handprints of our "Next Generation Solutions". Indeed, our intention is to report in the future absolute avoided water (or waste) from products' application alongside avoided greenhouse gas emissions.

In the following chapter you find detailed information about the selected six "Next Generation Solutions" for the year 2022.

2 World Business Council for Sustainable Development (WBCSD) and International Council of Chemical Associations (ICCA), 14 Avoiding Greenhouse Gas Emissions - Guidelines: Accounting for and Reporting Greenhouse Gas (GHG) Emissions Avoided along the 14 Value Chain based on Comparative Studies, Version 2, December 2017.

3 Avoided emissions results have been calculated using forecast sales volumes for 2022. They were verified within the scope of our auditors' limited assurance engagement of the 2022 sustainability report.

4 For further details on the CO_2e avoided please refer to our brochure "Next Generation Solutions – Their contribution to the sustainability focus areas" on our website.

5 The significance contribution of chemical products to value chain avoided emissions is described in the WBCSD "Avoided Emissions" Guideline.

Case Studies of the six "Next Generation Solutions"

Green Tire Technology

Evonik's silica/silane system for Green Tires is a Next Generation Solution. Compared to conventional car tires using carbon black as filler, the use of the silica/silane system and a certain polymer blend (solution styrene butadiene rubber (S-SBR) and butadiene rubber (BR)) – known as Green Tire technology – can achieve significant fuel savings and improved wet grip without impacting abrasion resistance (see Figure 1).

The rubber compounds in tires have a major impact on the characteristics of the tire performance. Organic and inorganic components determine the performance of the tread compound that is in contact with the road surface.

Such treads typically contain about 35% reinforcing filler, which is a key ingredient in the rubber compound to reach the desired properties. Instead of carbon black, silica can be used as filler. Bifunctional organic silicon compounds – called organosilanes – serve as coupling agents that connect silica and rubber.

In contrast to conventional carbon black as filler, the use of the silica/silane system allows an expansion of the "magic triangle" of tire performance (see Figure 1).

Rolling resistance and wet traction are improved without significantly affecting abrasion and therefore the service life of the tire. These improvements result in significantly lower fuel consumption for end users and therefore in reduced greenhouse gas emissions.

Carbon black filled tires still dominate the global market. As the Green Tire technology has penetrated the European and parts of the Asian (Japan and South Korea) market, the advantage is only claimed for the rest of the world where carbon black tires still prevail.

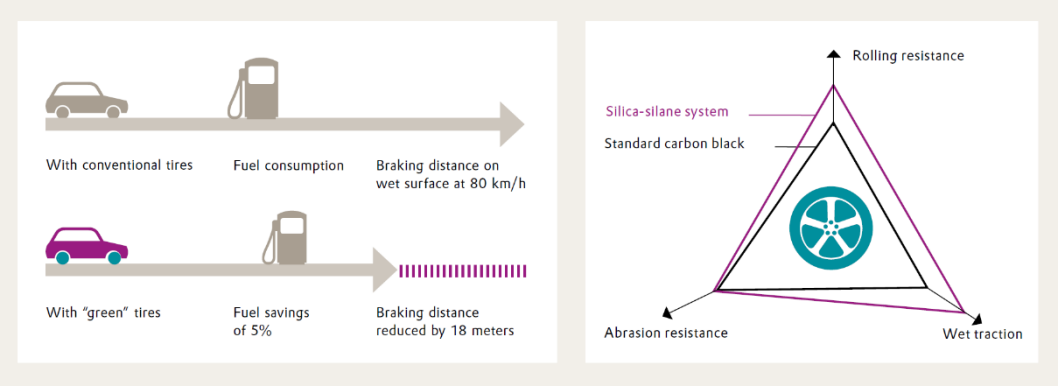


FIGURE 1: THE EXPANDED "MAGIC TRIANGLE" AND IMPACT ON FUEL CONSUMPTION REVEAL THE GREEN TIRE TECHNOLOGY'S BENEFIT

Case Studies of the six "Next Generation Solutions"

Amino Acids in Animal feed

Animal feed is specifically formulated to meet the physiological and nutritional needs of animals, and in particular the necessary requirements of essential amino acids. A lack of certain amino acids in animal feed can be compensated either by adding a higher percentage of protein-rich feed components such as oil seed, or by fortifying the feed with essential amino acids. Supplementing animal feed with essential amino acids allows for the substitution of high protein ingredients which are associated with high emissions and requirements on land and water resources.

Potentially, higher feed conversion rates can even allow for an absolute reduction in feed demand. Furthermore, feed supplementation with these essential amino acids reduces the crude protein content of the diet. Hence nitrogen emissions such as ammonia and laughing gas resulting from the manure management are diminished.

Case Studies of the six "Next Generation Solutions"

Improved hydraulic fluids

In hydraulic construction equipment, fluid viscosity must be high enough to protect the moving parts and to guarantee high pump efficiency over extended oil drain intervals. However, as fluid moves dynamically through the system, it heats up under demanding conditions and viscosity of the oil drops down resulting in volumetric losses in the pump.

Hydraulic fluids formulated with DYNAVIS® technology save energy in almost all hydraulic applications. The foundation of DYNAVIS® technology are the highly shear stable viscosity index improvers from Evonik that go by the tradename VISCOPLEX®. Increasing the shear stability and viscosity index of a hydraulic fluid balances volumetric with mechanical efficiencies and expands the temperature operating window for hydraulic systems.

The stable viscosity over a broad temperature range allows the use of one ISO grade lower than the monograde recommended by the oil manufacturer. This reduces hydromechanical losses in the entire system and the higher viscosity index avoids internal leakage at the pump. Depending on the specific situation, energy savings of up to 15% have been measured.

Based on years of intensive R&D and meticulously designed field test trials, hydraulic equipment operating with fluids formulated with DYNAVIS® technology have credibly demonstrated their potential to achieve more hydraulic power under full load conditions, lower fuel consumption, faster response to operator control and reduced peak temperatures due to higher system efficiency.

Case Studies of the six "Next Generation Solutions"

Hydrogen Peroxide to Propylene Oxide (HPPO) Process

Propylene oxide (PO) is an important intermediate in the production of polyurethane — a highly in-demand chemical necessary for the foam used in everyday items like seat cushions, sport shoes, insulating materials, and more. The problem is that conventional production processes for PO tend to generate large quantities of co-products and consume a great deal of resources. Evonik and thyssenkrupp Industrial Solutions (tkIS) have therefore developed an alternative process that is more efficient and more environmentally friendly. Known as HPPO, from "hydrogen peroxide to propylene oxide," this technology involves the direct synthesis of PO from hydrogen peroxide (H_2O_2). The process uses far fewer resources than conventional methods, while generating only water as a co-product.

As industries around the world develop increasing sustainability ambitions, face stricter environmental regulations, and are keener than ever on lowering their investment costs, HPPO is becoming a highly attractive technology for PO production.

Evonik and tkIS supply PO producers with the license and know-how for HPPO plants. In addition, Evonik provides the necessary amounts of hydrogen peroxide through the construction of on-site hydrogen peroxide megaplants.

The titanium silicalite-1 (TS-1) catalyst used for the HPPO process was also custom-made by Evonik. In addition, Evonik and tkIS work together with producers on-site on the planning, construction, and commissioning of the plants.

Case Studies of the six "Next Generation Solutions"

POLYVEST® in green tire tread compounds

POLYVEST® ST-E 60 is a new generation of silane functional rubber additives. It is used in green tire tread compounds to improve the homogenous dispersion of silica particles in the rubber matrix as well as to act as a reactive plasticizer decreasing the viscosity of the compound. It combines the advantages of liquid rubbers and functional silanes. Due to its rubber-based nature it exhibits a natural fit and excellent compatibility with the rubber matrix of tire tread compounds.

As a dual functional material POLYVEST® ST-E 60 forms strong chemical bonds with filler and matrix to create a stable and long-lasting network.

If not using POLYVEST® ST-E 60, the standard plasticizer in tire treads is TDAE oil. This process oil does not chemically react with the system, leading to migration onto the surface and consequently a decrease in tire performance over time. With POLYVEST® ST-E 60 the migration effect can be overcome, increasing the durability of a tire.

In combination with the silica/silane system, POLYVEST® ST-E 60 enables further improvement of key performance indicators of green tire tread compounds such as rolling resistance, abrasion resistance, and wet grip (see Figure 2). This effectively leads not only to improved fuel efficiency, resulting in less greenhouse gas emissions, but also to enhanced driving safety.

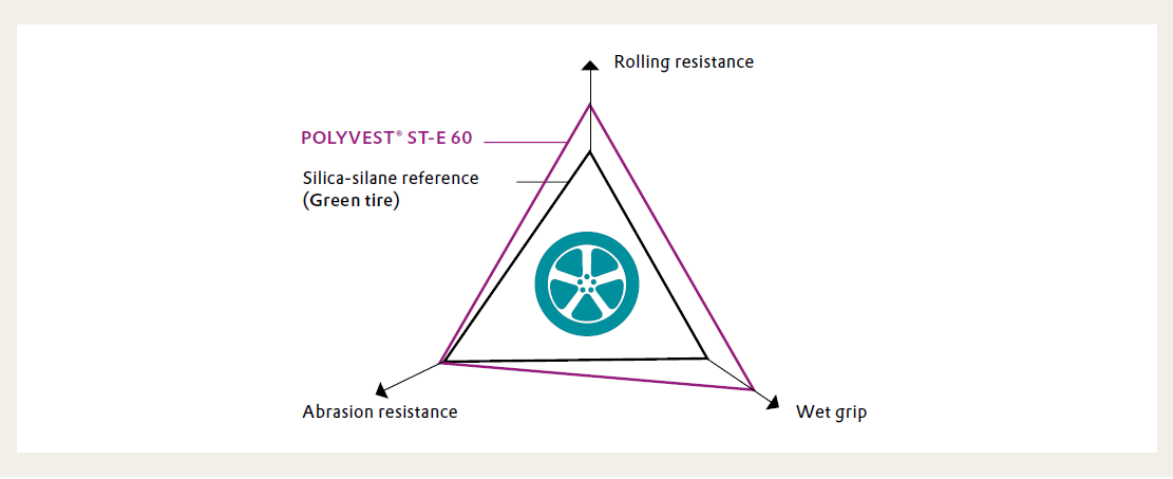


FIGURE 2: THE EXPANDED "MAGIC TRIANGLE" FOR POLYVEST® IN GREEN TIRE TREAD COMPOUNDS

Case Studies of the six "Next Generation Solutions"

Fumed metal oxides in lithium-ion batteries

The global shift to electric mobility is key to reducing greenhouse gas emissions and air pollution from road traffic. Batteries that are powerful yet safe, with quicker charging times and extended driving ranges, are essential for the acceptance of electric vehicles. However, their high energy density puts increased strain on the battery materials and demands better technology development.

High-quality metal oxides from Evonik are used as additives in Li-ion batteries (LIB) to increase their performance, service life, and safety. AEROXIDE® fumed alumina and fumed titania are produced by flame hydrolysis and consist of nanostructured aggregates with mean aggregate sizes of approx. 100 nm. The white powder provides a very narrow particle size distribution and exhibits high chemical purity. As dry coating on the surface of cathode materials AEROXIDE® acts as a defined cathode electrolyte interface (CEI). It prevents undesired reactions and makes batteries last longer. This increases the service life of a Li-ion battery significantly by about 50%.

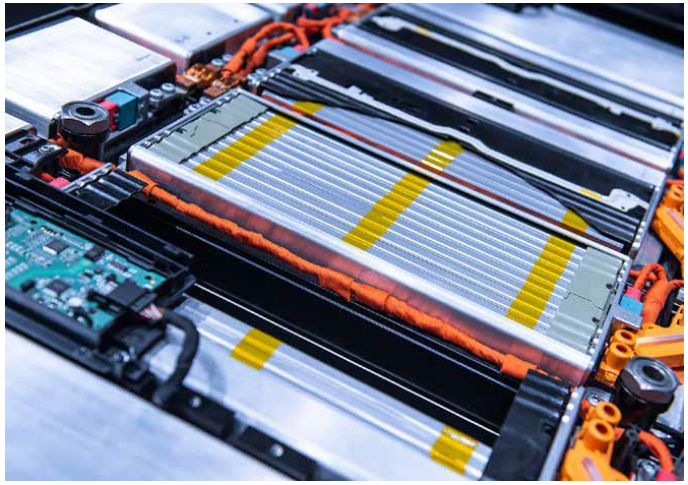
With longer lasting Li-ion batteries, fewer newly produced batteries are required to meet market demand.

The production of Li-ion batteries itself is very energy intensive and causes a lot of greenhouse gas emissions as well as the raw material production and supply.

By increasing the battery lifetime and consequently reducing battery production, the Evonik solution avoids the emission of greenhouse gas.

Applications of AEROXIDE® in Li-ion batteries:

- Protective dry coating for cathode materials
- High performance LIB separator coating
- Nanostructured ceramic fillers inside separators
- Additive for electrolyte immobilization
- (gel polymer type)



For further details on the CO_2e avoided please refer to our brochure "Next Generation Solutions – Their contribution to the sustainability focus areas" on our website.

Disclaimer

In so far as forecasts or expectations are expressed in this report or where our statements concern the future, these forecasts, expectations or statements may involve known or unknown risks and uncertainties. Actual results or developments may vary, depending on changes in the operating environment. Neither Evonik Industries AG nor its group companies assume an obligation to update the forecasts, expectations or statements contained in this report.

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