

# Enabling sustainable growth through innovation

Capital Markets Day  
May 11, 2022

Harald Schwager, Deputy CEO

Next Generation Innovation



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- 1. RD&I Strategy**
2. Operational innovation
3. Long-term innovation

## EVONIK PURPOSE

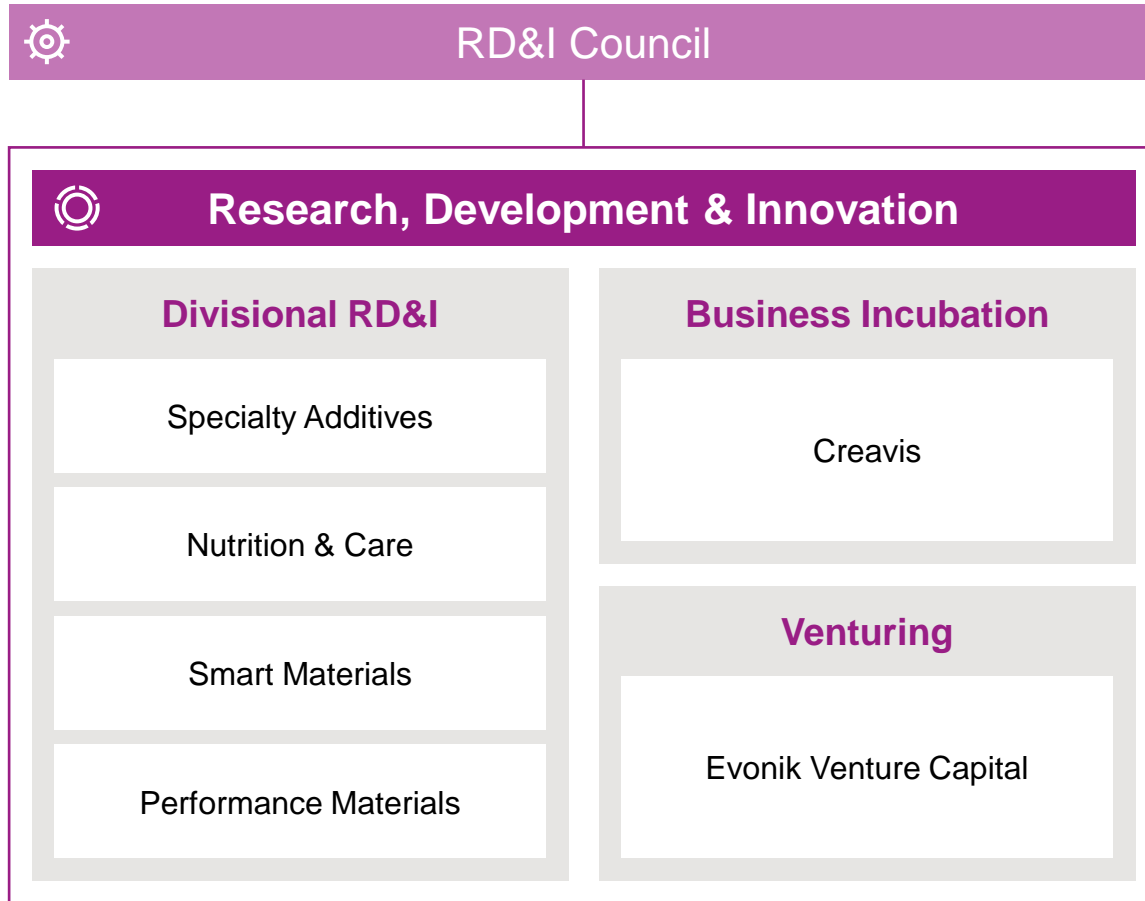
Leading beyond  
chemistry to  
improve life,  
today and  
tomorrow

RD&I particularly  
contributes to the  
“**beyond**” and  
“**tomorrow**” –  
by pioneering  
sustainable  
solutions

## RD&I MISSION

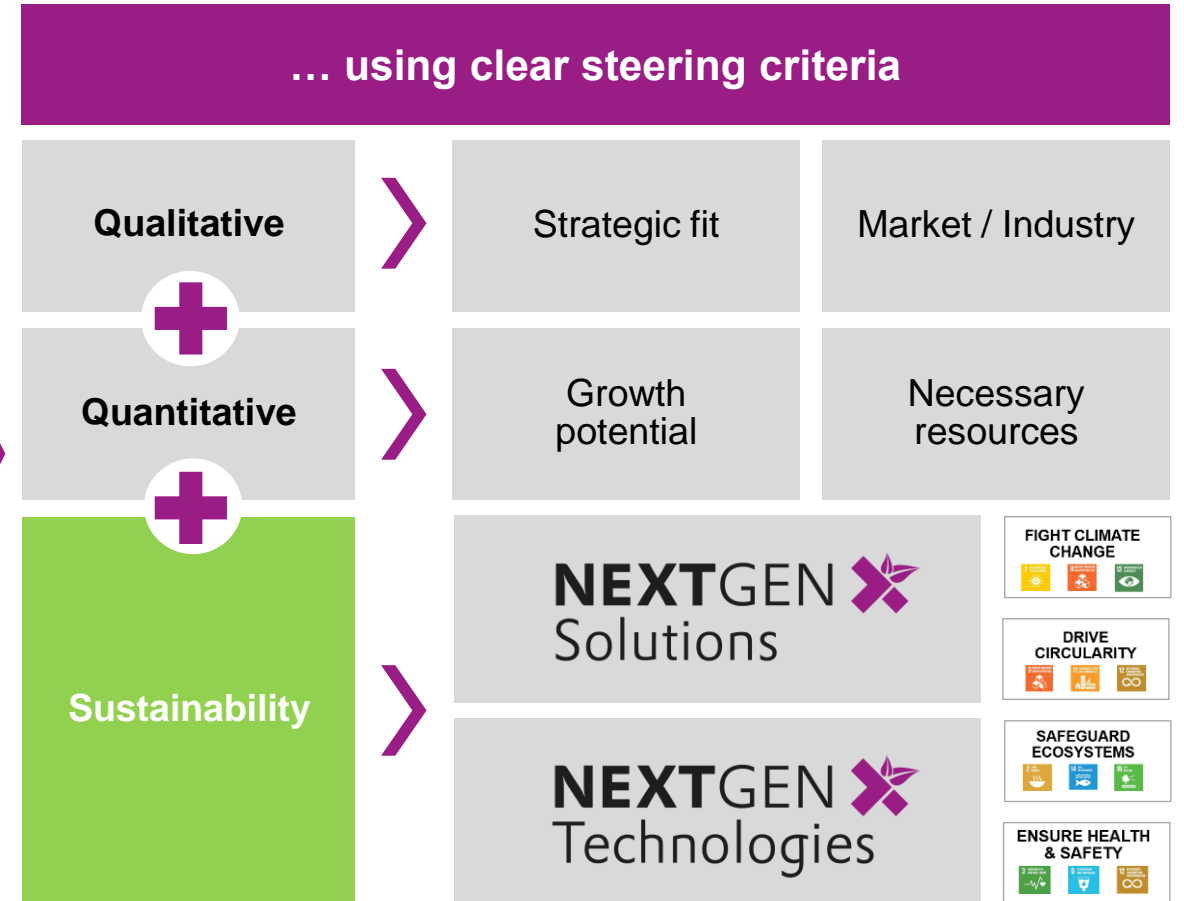
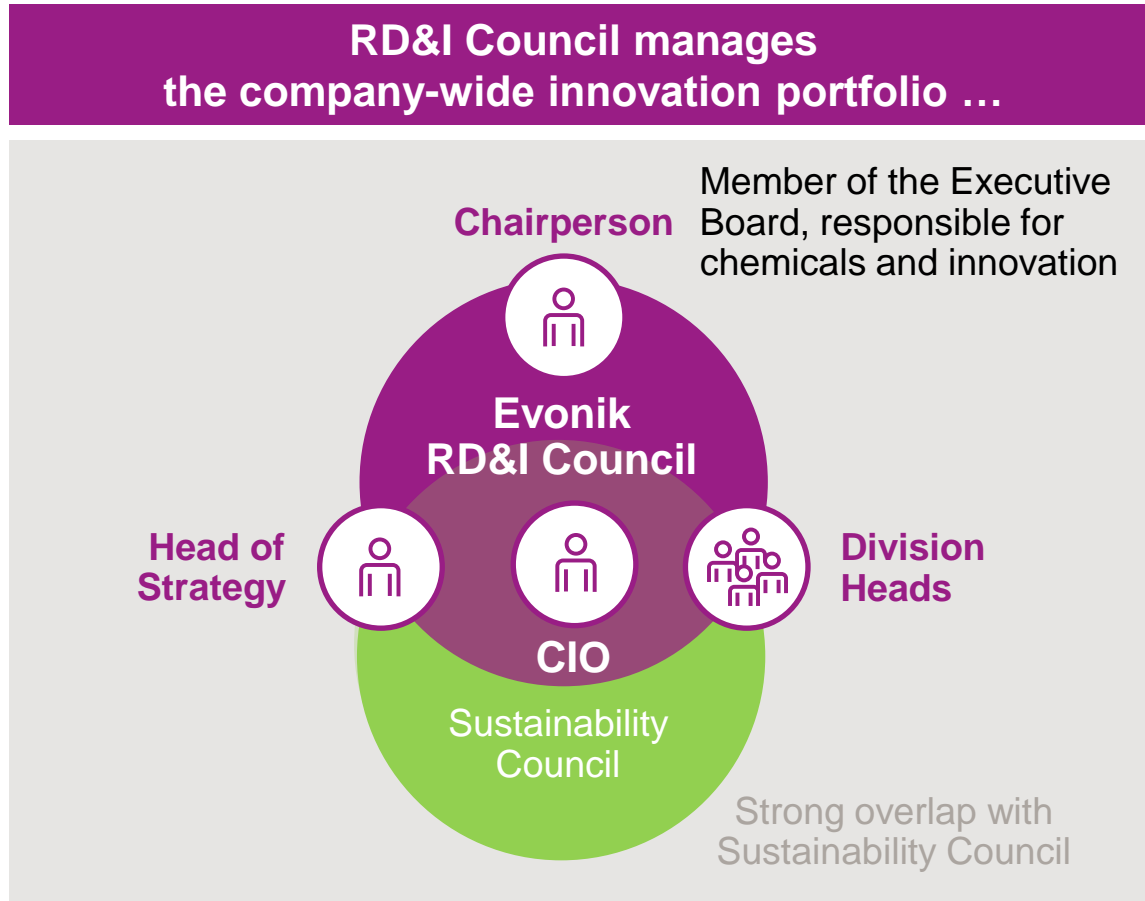
Delivering  
innovative  
solutions by  
combining  
technology and  
business  
to promote  
sustainable growth

# RD&I steers innovation based on clear alignment and continuous exchange across the entire Evonik organization



- Consistent focus on the same strategic direction as a Group
- Knowledge sharing and use of different technology platforms
- Efficient use of resources and competencies; flexible setup of interdisciplinary project teams
- Full integration of sustainability criteria into decision making and allocation of resources

# Sustainability is fully integrated into innovation portfolio steering



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- 2. Operational innovation**
  - **Product innovation**
  - Process innovation
3. Long-term innovation

# Innovation Growth Fields on track to achieve target of >€1 bn sales

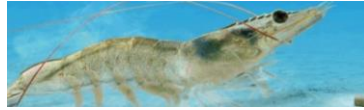
## Innovation Growth Fields



Advanced Food  
Ingredients



Additive  
Manufacturing



Sustainable  
Nutrition



Cosmetic  
Solutions



Membranes



Healthcare  
Solutions

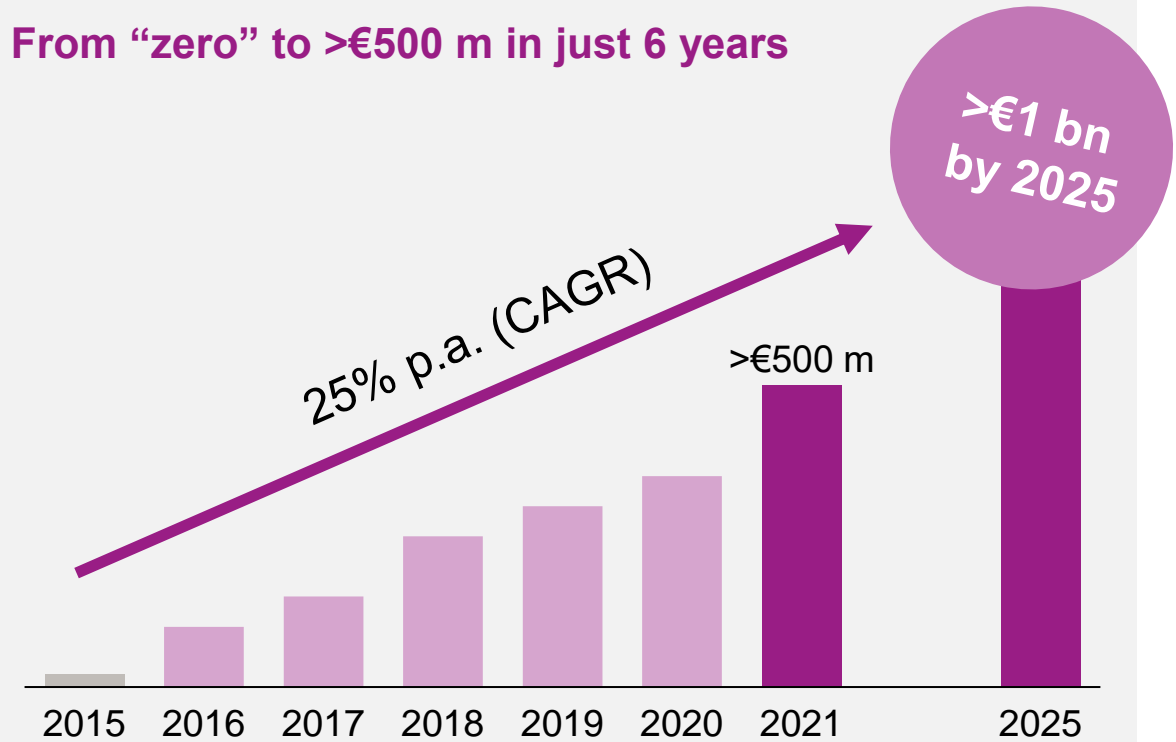


**Sizeable sales base** established in all  
growth fields

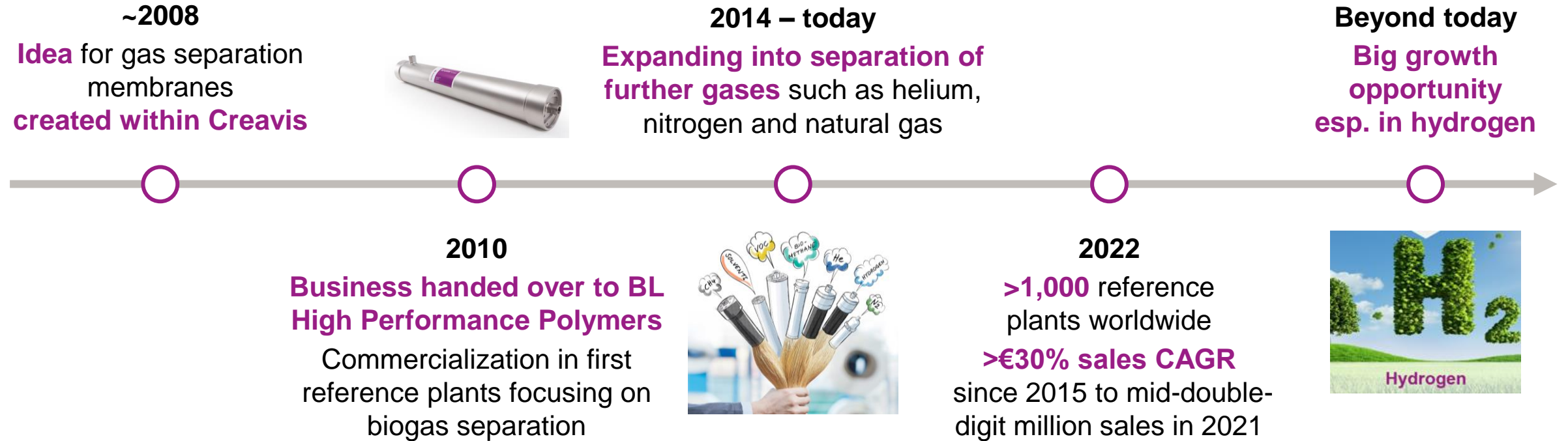
**Above-average margin** contribution

## Sales contribution Innovation Growth Fields

From “zero” to >€500 m in just 6 years



# Innovation Growth Field “Membranes” as blueprint for future innovation



Continuous RD&I efforts to improve product characteristics and scope of application



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1. RD&I Strategy

**2. Operational innovation**

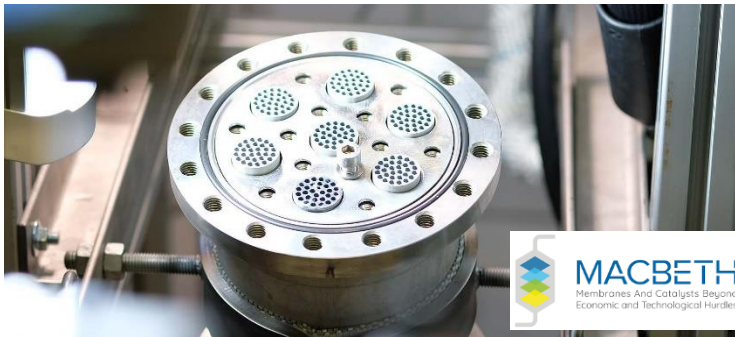
– Product innovation

– **Process innovation**

3. Long-term innovation

# Driving sustainability through process innovation in new technologies

## Breakthrough technology – Catalytic membrane reactors



- Development of two-in-one reactor: **Efficient catalytic reactor technology** and **sustainable downstream** processing
- Demonstration of **CO<sub>2</sub> saving** potentials (up to 35%) and increase in **energy efficiency** (up to 70%)
- **New business opportunities** by technology enabled alternative reaction pathways

## SAM 3D – Disruptive digital design for sustainable processes



- **New generation of reactors** designed to drive decarbonization
- Perfectly adjusted reactor geometries by **simulations, additive manufacturing and AI** for production accurate to the molecule
- **Minimized emissions & energy costs** in tailored reactors with enhanced process control

## New solvolysis process for PET recycling



- Development of **sustainable engineering packages backed by life cycle assessments**
- **Technology** as building block and differentiating factor **for strategic alliances**
- Enabling **new business for Evonik alkoxides** in chemical recycling of PET

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**3. Long-term innovation**

– **Business Incubation: Creavis**

– Evonik Venture Capital

# Creavis acting as business incubator within Evonik

## The Creavis approach ...

Using this approach Creavis pursues **New Business Development** for the **divisions** and the **group**



focuses on **new markets** and **evolving value chains**

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focuses on **sustainable system solutions**<sup>1</sup>

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focuses on **commercialization within a 5-10-year time frame**<sup>2</sup>

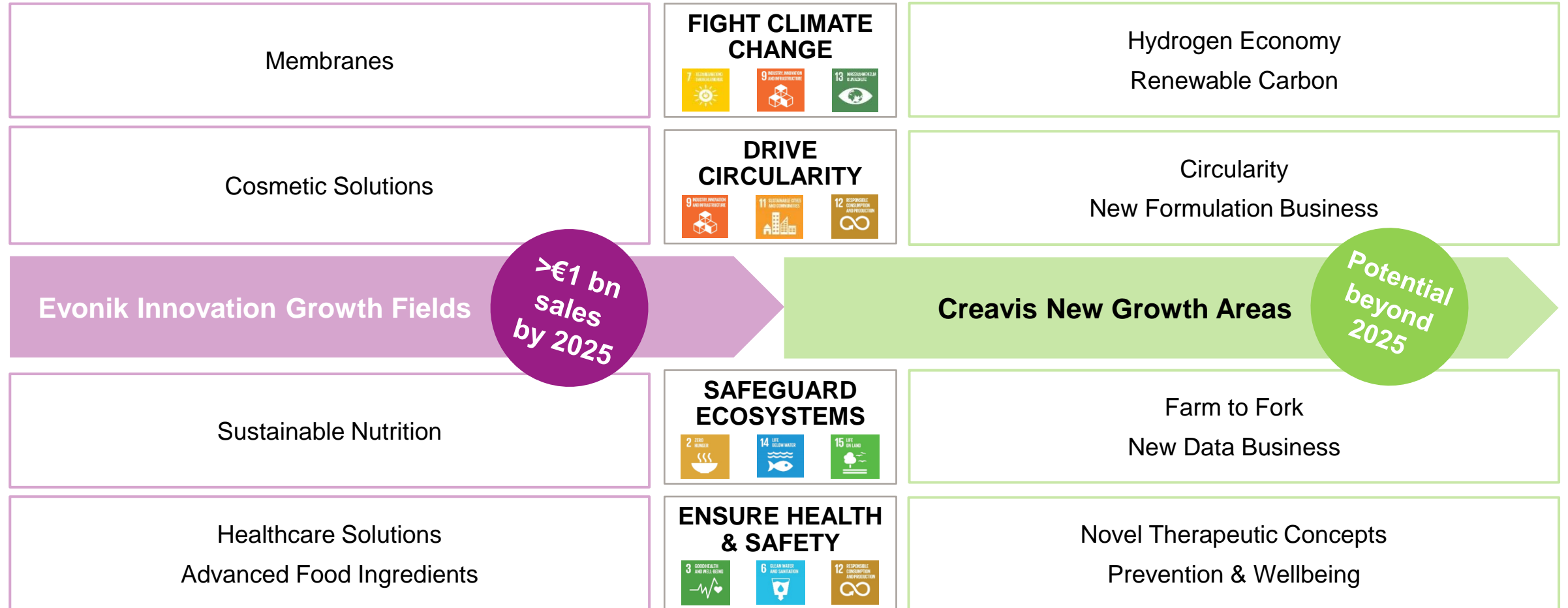
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is **cross-industry** and **interdisciplinary**

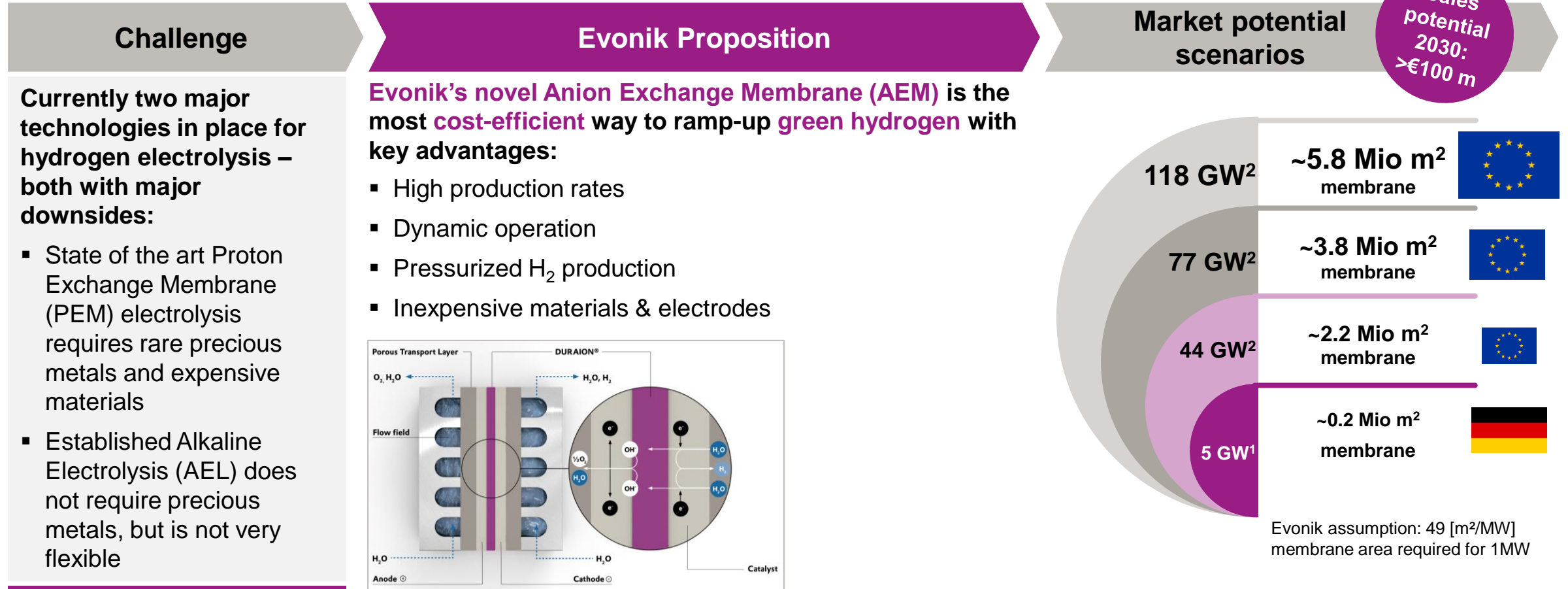
1. Next Generation Solutions (Driver, Leader) according to PARC logic at the time of commercialization 2 After project start

# Innovation with clear focus on Sustainability Focus Areas



# New Growth Area: Hydrogen Economy

## Tapping into a major opportunity with our DURAION® membrane



1. Study IndWEDe– NOW GmbH, 2018 2 Green Hydrogen for a European Green Deal A 2 x 40 GW Initiative, Hydrogen Europe; Translation with internal assumptions (Creavis)

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– Business Incubation: Creavis

– **Evonik Venture Capital**

# Evonik Venture Capital enables access to technology leaders globally

- Investments in global innovation leaders with **disruptive technologies and business models**
- High relevance for Evonik portfolio – aim to **support and accelerate the growth** of Evonik

**€250 m**

designated funds

**46**

investments to date

**7**

exits to date

**>2x**

financial returns<sup>1</sup>

## Integration into business

### Structured Polymers (US)

- Formulations and Materials for 3D-Printing
- Acquisition by Division Smart Materials in 2018

### JeNaCell (DE)

- Nature identical biomaterials
- Acquisition by Division Nutrition & Care in 2021

## Value creating exit

### FRX Polymers (US)

- IPO in May 2022

- Cooperation with Division Specialty Additives

<sup>1</sup> Based on capital invested



# Evonik Sustainability Tech Fund

for investments in technologies towards carbon neutrality

New  
Venture Capital fund  
with volume of  
**€150 m**

Start in  
**May 2022**

Investments made with the primary objective to achieve CO<sub>2</sub> mitigation by reducing and removing emissions and foster carbon sequestrations

Drive  
Circularity

Feedstock Switch  
and Substitution

Future Mobility

Hydrogen  
Economy

Renewable  
Carbon

Clean  
Energy Production

# Enabling sustainable growth through innovation

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Our new RD&I organization enables clear alignment across divisions and functions – ensuring **consistency and efficiency**

**Sustainability is fully integrated** into innovation portfolio steering – aiming at both handprint and footprint optimization

**Innovation Growth Fields** on track to achieve target of **>€1 bn sales in 2025**

**Creavis focused on potential beyond 2025** – aligned with our four Sustainability Focus Areas

New **Sustainability Tech Fund** to capture business opportunities and position Evonik as sustainability leader



**EVONIK**

**Leading Beyond Chemistry**

# RD&I at a glance

## RD&I AT EVONIK

>€450 m SPENT

>€500 M SALES IN 2021 FROM  
INNOVATION GROWTH FIELDS

~24,000 PATENTS<sup>1</sup>

>€2,500 EMPLOYEES

100% SUSTAINABILITY-INTEGRATED

### FIGHT CLIMATE CHANGE



### DRIVE CIRCULARITY



### SAFEGUARD ECOSYSTEMS

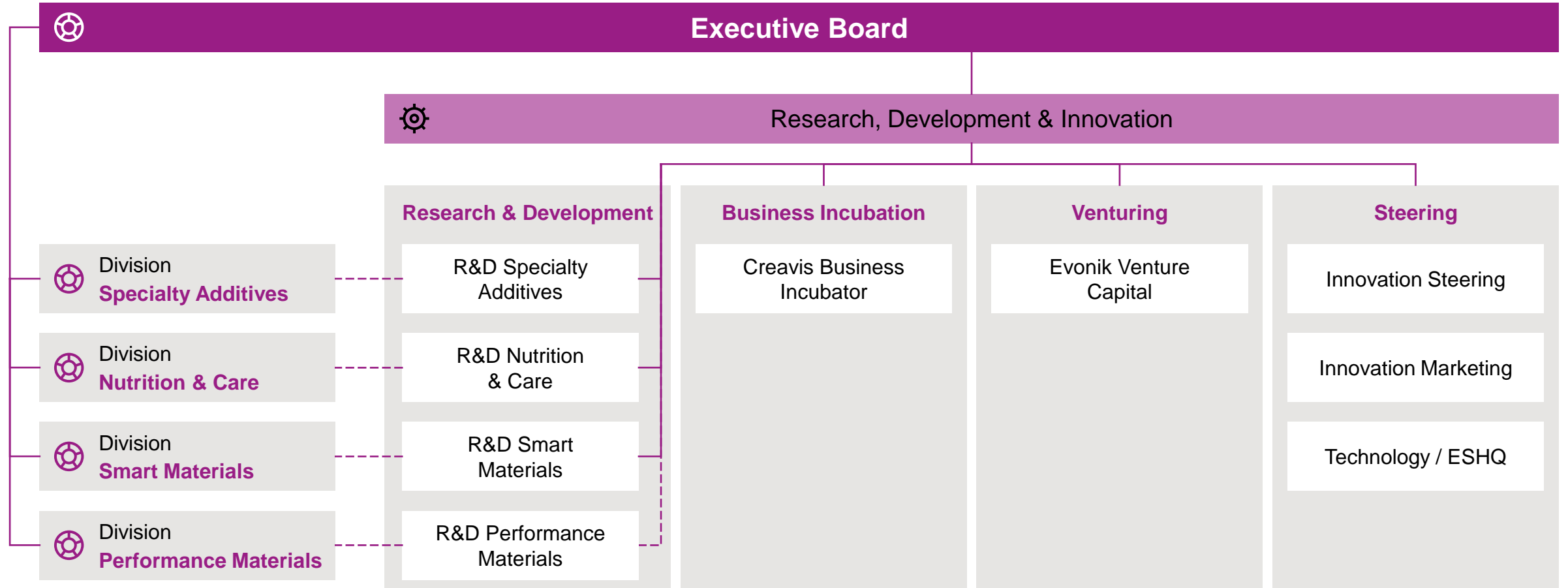


### ENSURE HEALTH & SAFETY



1. Patents and patents pending

# RD&I well aligned across divisions and functions

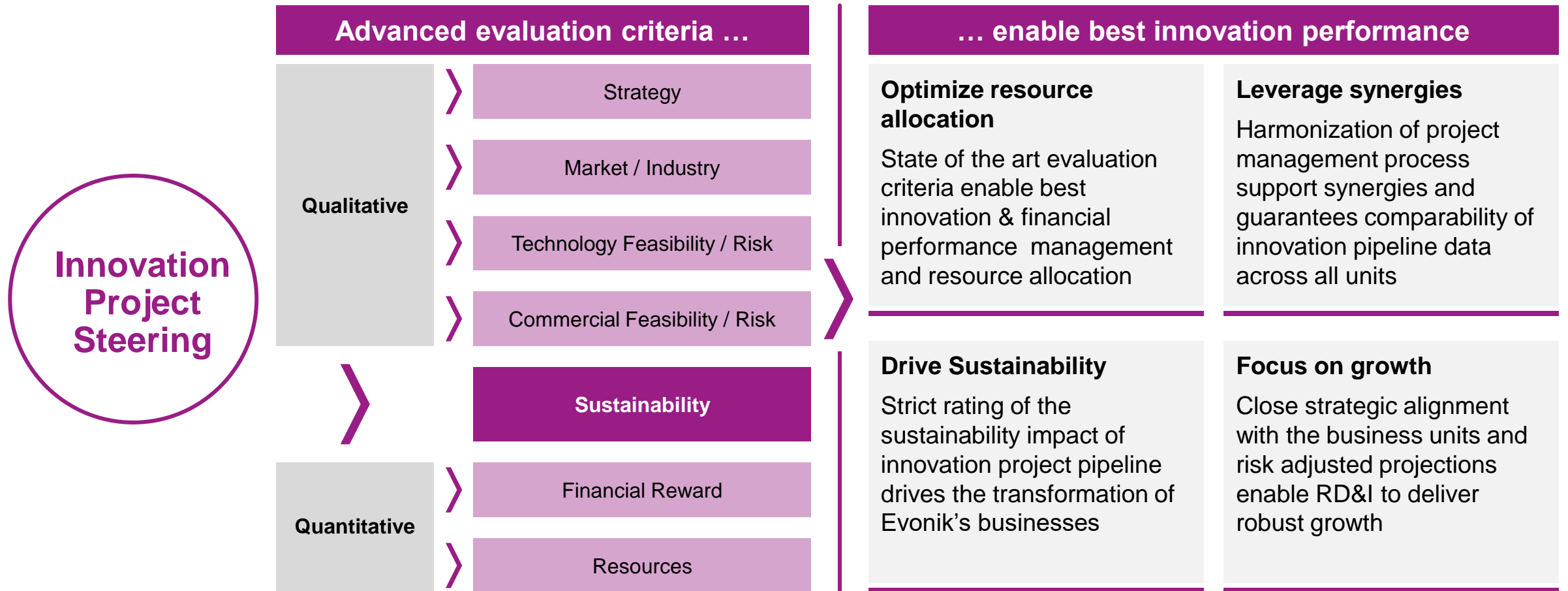


— Disciplinary & functional assignment  
- - - Functional assignment only

# Four focus areas where RD&I is adding value for Evonik



# Evonik's RD&I projects are steered using clear criteria for optimized innovation performance and sustainable growth



# Driving sustainability through process innovation in new technologies

## Energy integration via heat pumps for site steam supply



- **High-temperature heat pumps** for steam generation out of waste heat at chemical multi-user sites
- **Energy saving of 65%** for steam generation by heat recovery
- Substantial **CO<sub>2</sub> reduction** through total avoidance of natural gas boiler
- Central step for **CO<sub>2</sub> neutral production site**

## Sustainable processes via electrochemical pH-shift



- Development of **sustainable processes** avoiding acids, bases and salt containing waste streams
- pH induced reactions by applying electrochemical process steps – **“electrons replace chemicals”**
- Technology as enabler to minimize carbon footprint

## Turning old mattresses into value by new PU foam recycling process



- Integrated process development as **enabler for circular economy** of Polyurethane (PU) foams
- **Significant CO<sub>2</sub> footprint reduction** of recycled PU monomers of high quality
- **Securing and supporting the growth** of core business for PU foam additives



# Smart enabler of the sustainable gas economy with our membranes



With our **membrane technology**, we significantly contribute to the transition to a sustainable gas economy:

## 1 SEPURAN® Green

- Raw biogas from organic waste is converted into **sustainable biomethane** and "green" CO<sub>2</sub>

## 2 SEPURAN® Noble

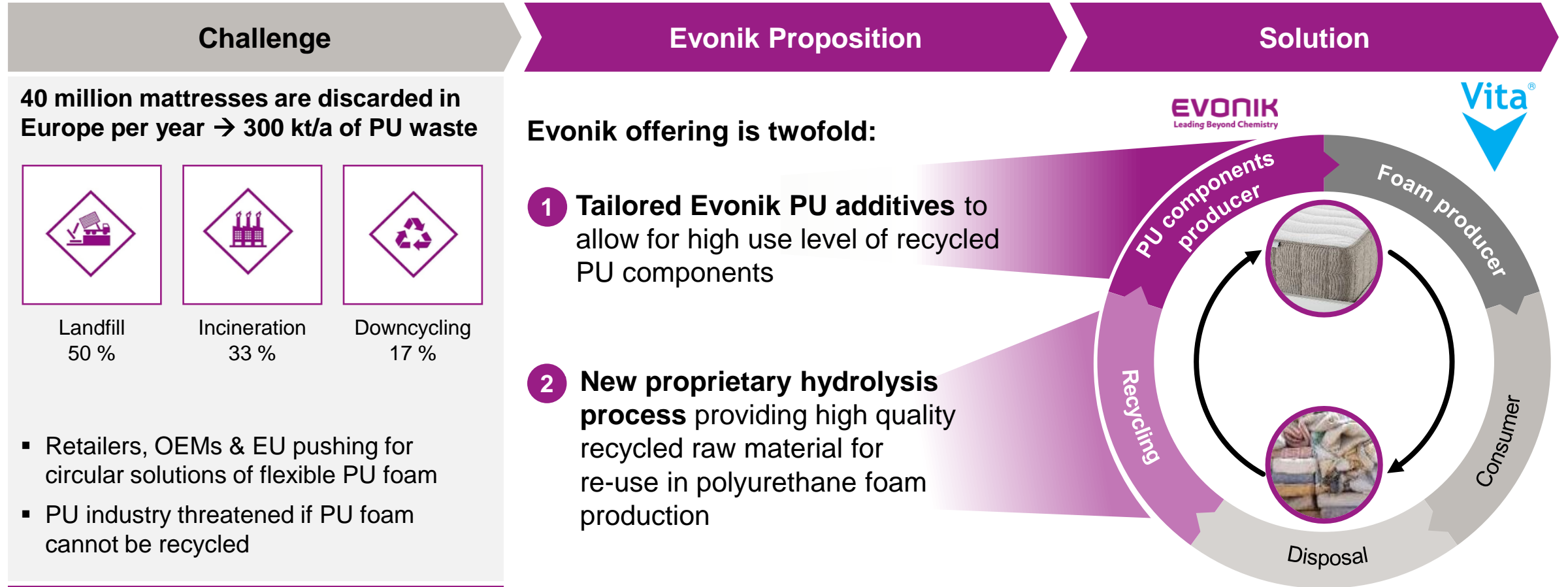
- Our **hydrogen extraction membranes** enable to **use existing natural gas pipelines** to transport and extract green hydrogen
- In the **production of synthetic biomethane** from CO<sub>2</sub> and green hydrogen, we ensure efficient product separation

## 3 Anion Exchange Membrane

- With our ion-conducting AEM membranes, we contribute to the **breakthrough of electrolytic production of green hydrogen** in the future

# New Growth Area: Circularity

## Novel PU additives enabling chemical recycling of flexible foam



# We have aligned Creavis to address key global challenges

## Incubation Clusters



### Defossilisation

Solutions for a climate-neutral society



### Life Sciences

Solutions for a growing & aging world population



### Solutions Beyond Chemistry

Data-based solutions for system renewal

## Functions



### Foresight

Identification of future chances and challenges



### Networks

Link to external innovation partner & organizations




### Technology & ESHQ

Providing the technical and organizational basis



# Incubation Cluster



**Defossilisation**

**What the planet needs**  
Solutions for a climate-neutral society

**What drives us**  
Supporting industries to become independent of fossil raw materials and to enable a climate-neutral hydrogen economy



**Life Sciences**

**What the planet needs**  
Sustainable solutions for nutrition and health promotion of a growing and aging world population

**What drives us**  
Supporting the transition to a global, sustainable food production and developing new solutions to prevent and cure diseases



**Solutions Beyond Chemistry**

**What the planet needs**  
Solutions to replace outdated, unsustainable and wasteful systems

**What drives us**  
Improving the transparency, efficacy and thus sustainability of complex systems based on data analysis combined with comprehensive domain knowledge

# Unboxing Defossilisation

## What the planet needs

Solutions for a climate-neutral society

## What drives us

Supporting industries to become independent of fossil raw materials and to enable a climate-neutral hydrogen economy



# Unboxing Defossilisation

## RENEWABLE CARBON

Closing the carbon cycle by carbon capture, biotechnological as well as chemical conversion technologies. Creating products based on new sustainable feedstocks



## HYDROGEN ECONOMY

Enabling a green hydrogen economy as key element of a climate neutral society with specialty chemicals & materials for the production, logistics & storage of hydrogen

## CIRCULARITY

Enabling the development of circular economies in existing Evonik polymer and additive markets, commodity plastics, and key industry relevant metals



# Incubation Cluster Life Sciences

## What the planet needs

Sustainable solutions for nutrition and health promotion of a growing and aging world population

## What drives us

Supporting the transition to a global, sustainable food production and developing new solutions to prevent and cure diseases



# Unboxing Life Sciences

## PREVENTION & WELLBEING

Promotion of health and wellbeing & prevention of undesirable health conditions by providing sustainable solutions of demonstrated efficacy in the sectors of nutrition, personal care and cleaning



## NOVEL THERAPEUTIC CONCEPTS

Providing innovative solutions for vaccines, medical devices & pharmaceutical products to enable novel therapeutic concepts for diseased people

## FARM TO FORK

Addressing the entire value chain from farm to fork to enable sustainable and healthy food production



# Solutions Beyond Chemistry

## What the planet needs

Solutions to replace outdated, unsustainable and wasteful systems

## What drives us

Improving the transparency, efficacy and thus sustainability of industry systems based on data analysis combined with comprehensive domain know-how



# Unboxing Solutions Beyond Chemistry

## NEW FORMULATION BUSINESS

Developing additive solutions based on data analysis and domain know-how as key enabler for a sustainable chemical industry

Our business solutions are nuclei for new and asset light Evonik business platforms.



## FUTURE MOBILITY\*

Supporting the ongoing transformation of mobility with solutions that significantly increase electrical efficiency, sustainability and connectivity

\*Innovation Domain

## DATA-DRIVEN BUSINESS

Developing novel solutions for proof of origin and affordable status read-outs from biological and chemical systems, and for recording and prediction of animal and human health status



**EVONIK**

**Leading Beyond Chemistry**