

PS2 - MATERIAL EFFICIENCY



SOLVAY

asking more from chemistry®

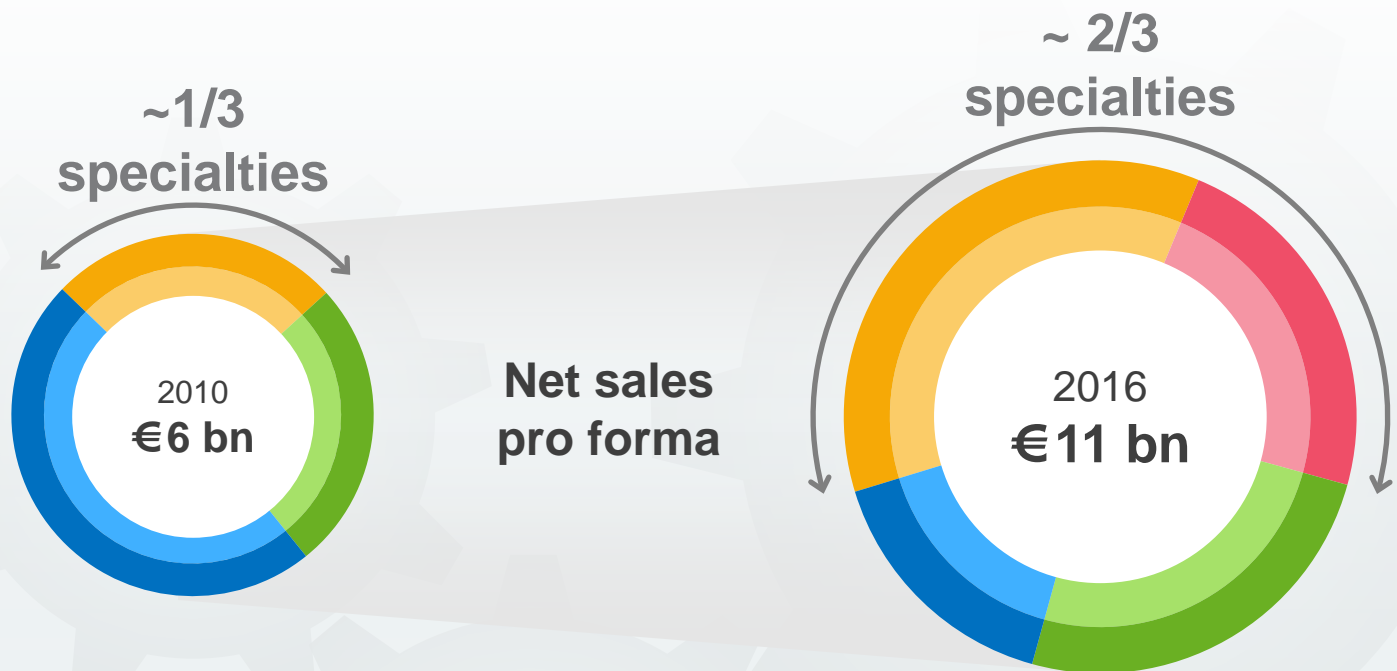
MORE



FUTURE

World Material Forum, June 29 & 30, Nancy
Jean-Pierre Clamadieu

SOLVAY: MORE SPECIALTY DRIVEN BY INNOVATION



- Advanced Materials
- Advanced Formulations
- Performance Chemicals
- Functional Polymers

Diversified chemicals

Multi-specialty chemicals

MULTI-SPECIALTY PORTFOLIO SET FOR *MORE* GROWTH, RETURNS & RESILIENCE



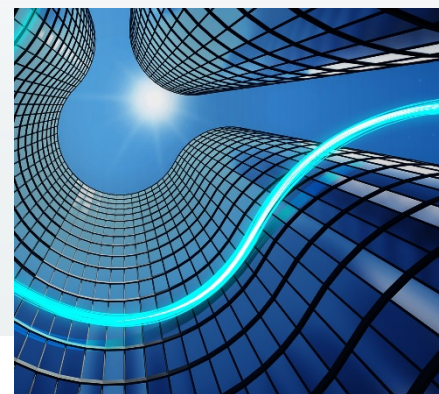
ADVANCED MATERIALS

Providing solutions for sustainable mobility, lightweighting, CO₂ and energy efficiency



ADVANCED FORMULATIONS

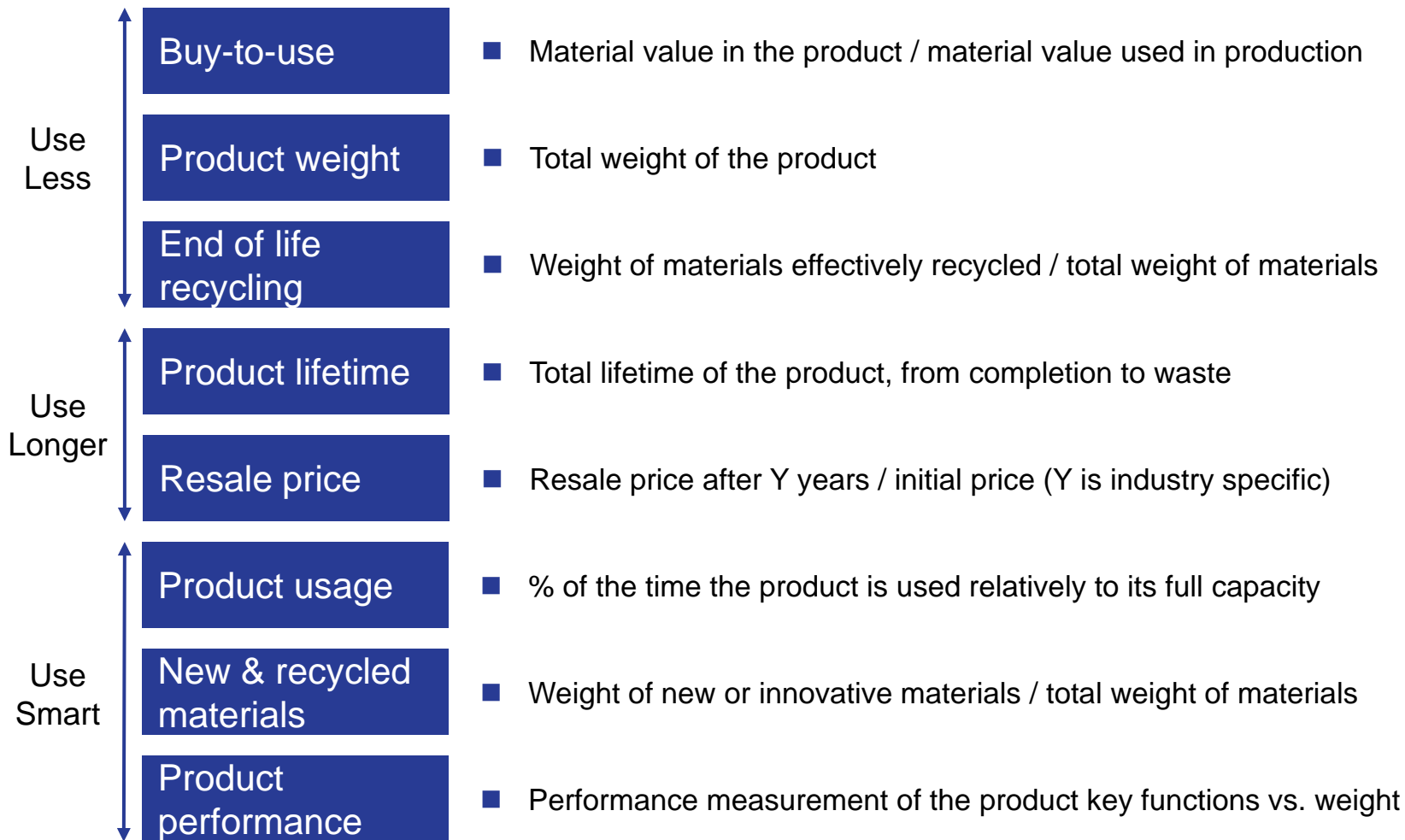
Customized specialty formulations in surface chemistry and liquid behavior, maximizing yield & efficiency, minimizing eco impact



PERFORMANCE CHEMICALS & FUNCTIONAL POLYMERS

Leading positions in chemical intermediates through scale and technology, developing innovative application and industrial innovation for optimized costs

WMF PROPOSED 8 PRELIMINARY KPIS FOR MATERIAL EFFICIENCY...



... OF WHICH 6 KPIS ARE RELEVANT FOR SOLVAY

USE SMART KEY KPI FOR SOLVAY AS SOLUTION PROVIDER

		Example 1: <i>Silica for tires</i>	Example 2: <i>Carbon Fiber Composites</i>
USE <i>SMART</i>	Product performance	✓	✓
	New & recycled material	✓	✓
	Product usage		
USE <i>LESS</i>	Buy-to-use	✓	✓
	End-of-life-recycling	✓	✓
	Product weight	✓	✓
USE <i>LONGER</i>	Product lifetime	✓	✓
	Resale price		



SOLVAY INTRODUCED SILICA AS BREAKTHROUGH TECHNO TO *IMPROVE* TIRE PERFORMANCES

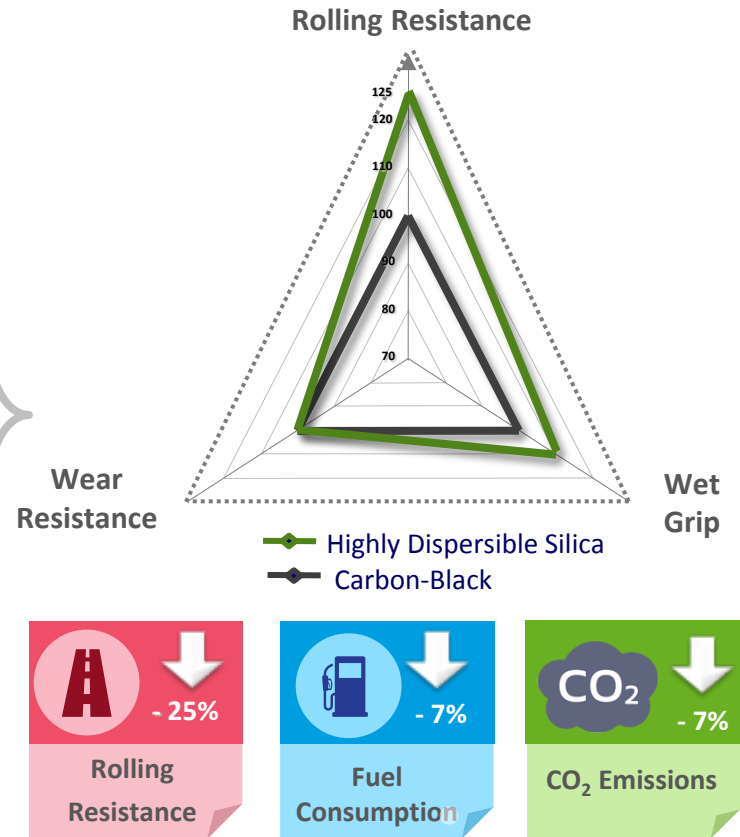
1973 First oil shock

1979 Second oil shock

1980s - 1990s

- Company (e.g. Michelin) looking for new solutions to lower fuel consumption & Carbon Black prices raises
- Silica was used in feed, food and consumer industrial goods such as shoe sole

1991 ➤ Technologic & Application breakthrough with Silica
 ➤ Zeosil 1165 Highly Dispersible Silica is developed to replace Carbon black





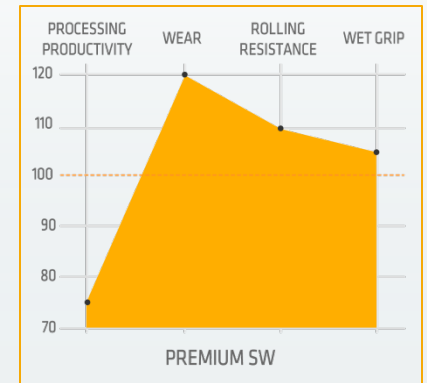
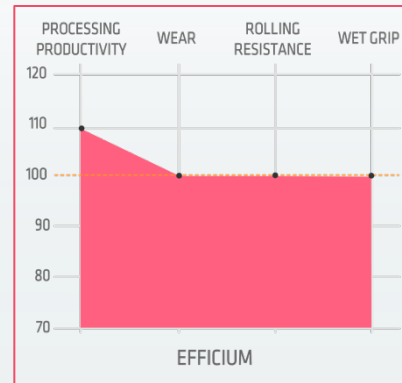
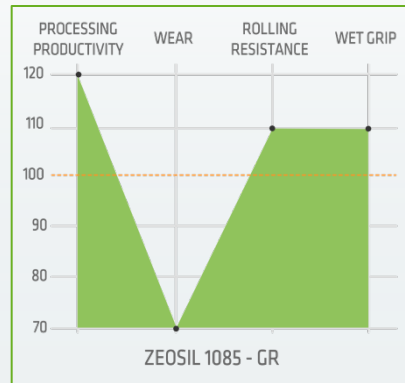
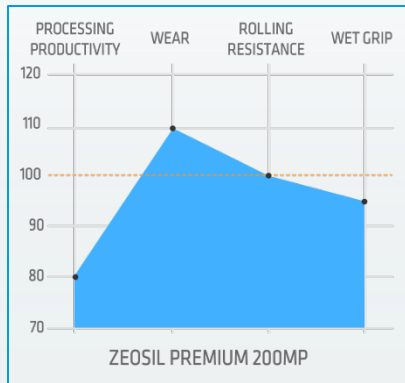
OUR CONSTANT INNOVATION RESULTS IN SMARTER PRODUCTS WITH LONGER LIFETIME FOR OUR CLIENTS

PREMIUM

ZEOSIL® 1085 GR

efficiium®

PREMIUM SW



Performance & Energy efficiency for Passenger Car "sport", "electric" & Truck Tire

Ultimate solution for winter & Nordic tires for Passenger Car "tourism "

Productivity & Performance for all Passenger Car, SUV & Truck Tire

Ultra Performance & Safety for all Passenger Car, SUV & Truck Tire

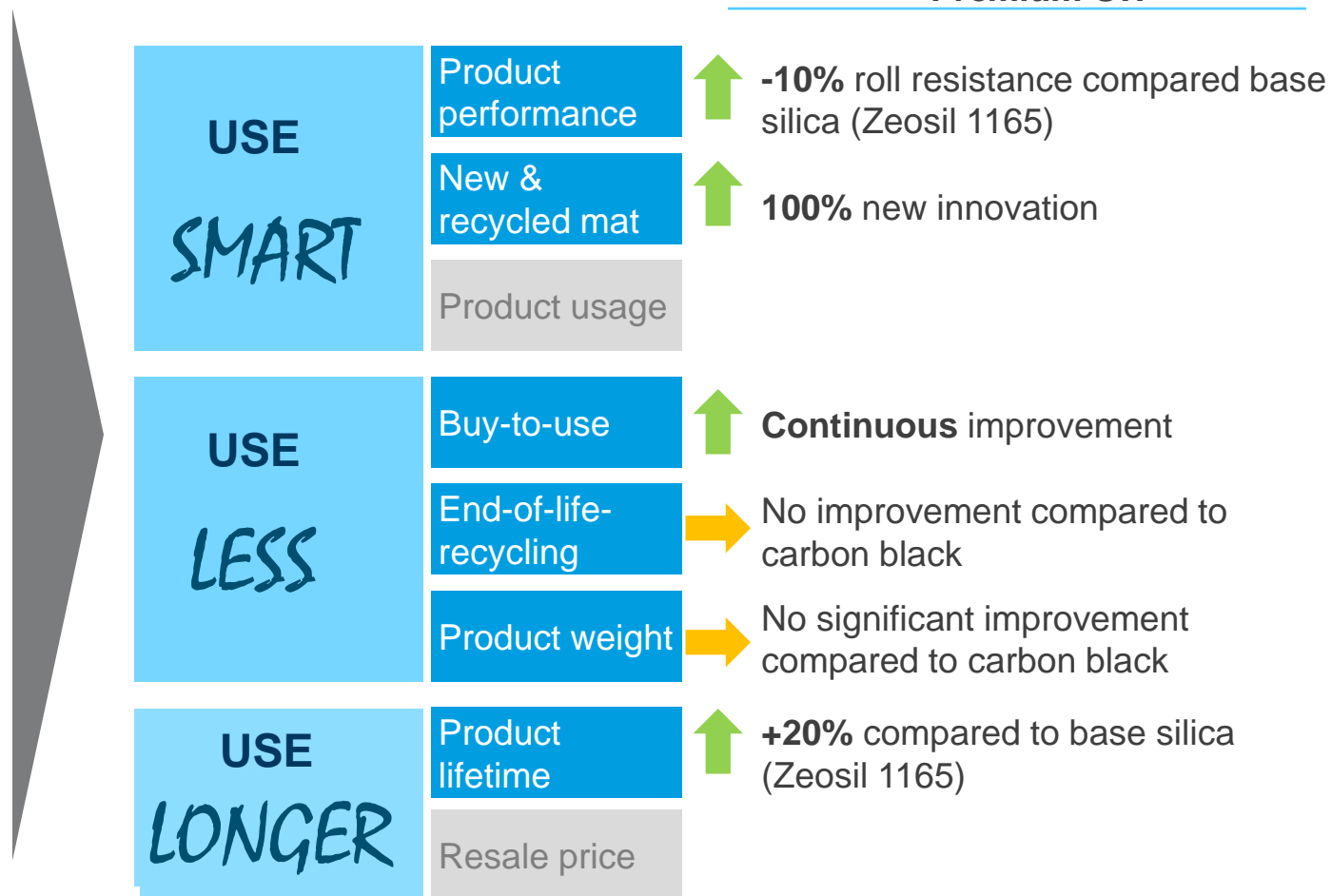


APPLYING PROPOSED KPIS TO SILICA LEARNS THAT INNOVATION IS KEY TO IMPROVE MATERIAL EFFICIENCY

KPIs for latest innovation
Premium SW

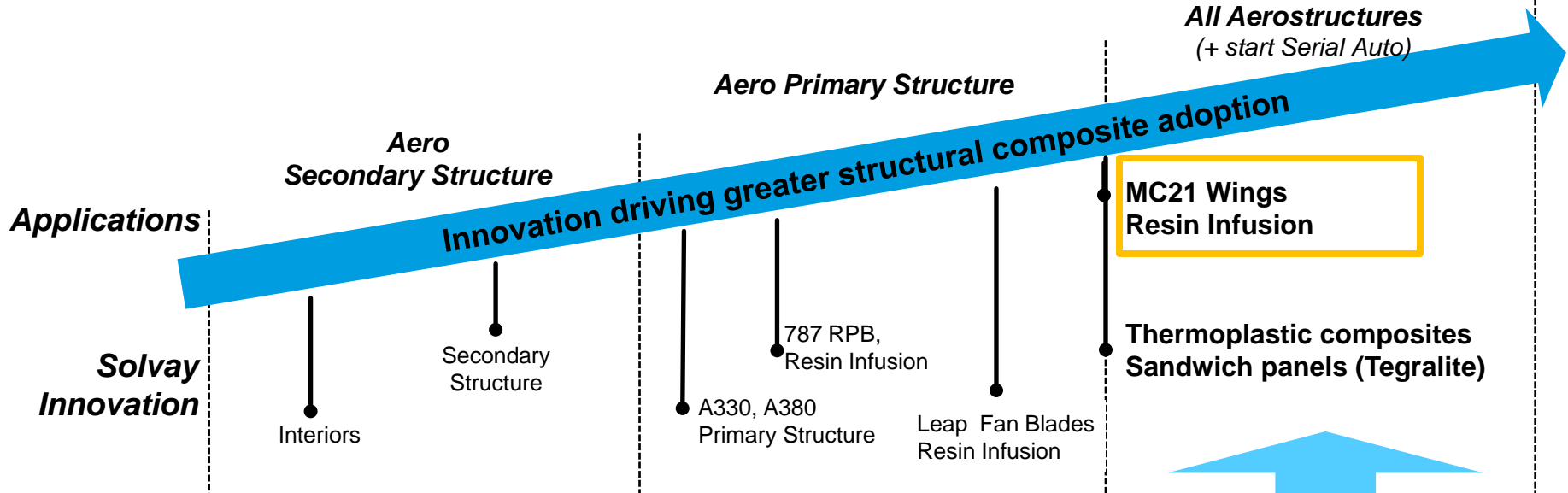
Innovation

- Product (Dispersibility & surface area)
- Process





AERO CARBON COMPOSITE INDUSTRIALIZATION: GREATER ADOPTION + BETTER MATERIAL EFFICIENCY



Innovation	Legacy	State-of-the-Art	Future
Products	Thermoset Prepregs	Toughened prepregs and Resins Advanced Textiles	Thermoplastic prepregs, Rapid cure, ...
Processes	Mainly manual	Starting automation (Advanced autoclaves,...)	Full automation (Advanced out-of-autoclaves, ...)
End-of-Life	None	Minimal re-cycling	Full Recycling





MC-21 WING WITH RESIN INFUSION COMBINES PRODUCT ADVANTAGES WHILE USING LESS MATERIAL & ENERGY

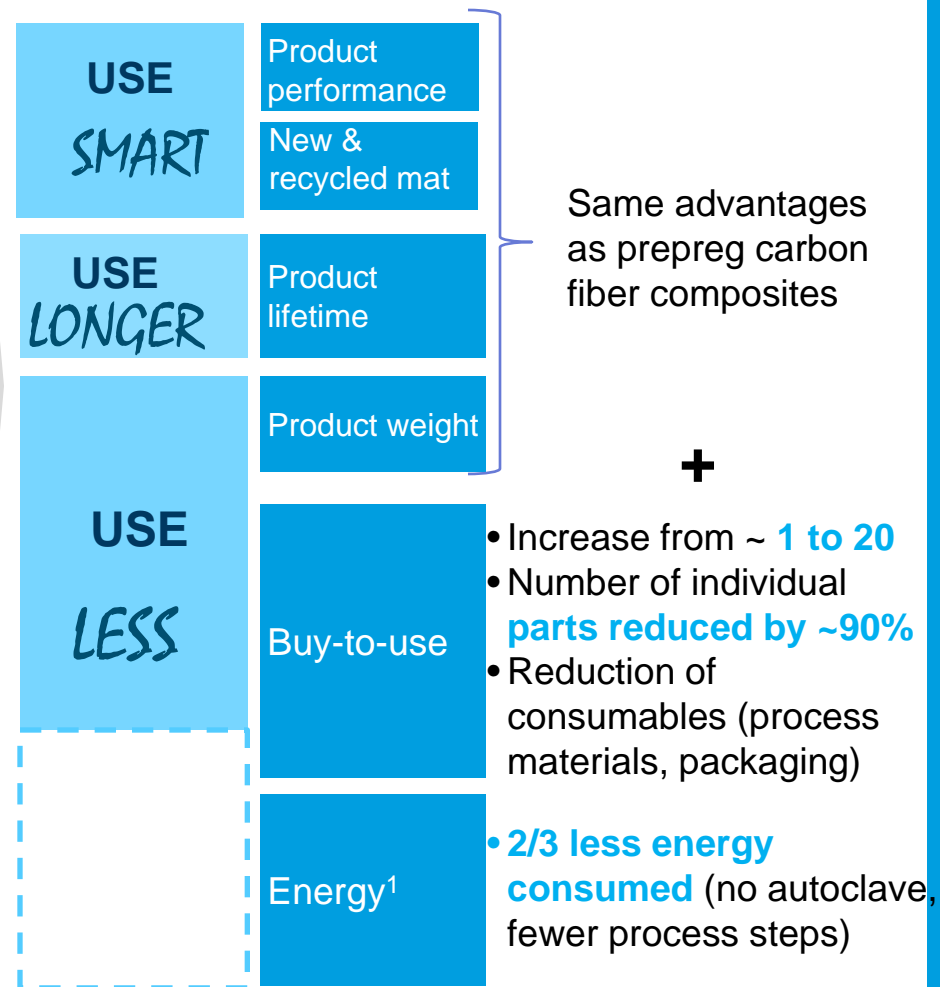
Intensive collaboration between Solvay, UAC and AeroComposit resulted in breakthrough resin infusion technology for advanced Aero primary structures

More design flexibility

- Allows manufacturing of large, complex and integrated parts

More manufacturing throughput

- Faster and less manufacturing steps



MATERIAL EFFICIENCY EMBEDDED IN OUR STRATEGY

RAW MATERIAL INTENSITY DECREASED WITH 50% OVER 3 YEARS

USE **SMART**

Key lever in our innovation strategy to develop more performant solutions hand in hand with our customers

USE **LESS**

- “Use less” is part of our core DNA (“license to operate”) by continuously improving our operational efficiency
 - Our **lightweight solutions** allow our customers to use less material

USE **LONGER**

We create **durable products** helping to increase lifetime of our customers’ products

Solvay aims to decouple growth in value added from material consumption

	2013	2016	Δ
REBITDA (bn€)	1,6	2,3	+40%
Raw material (mT)	9,2	6,5	-30%
Raw material / REBITDA	5,8	2,9	-50%