



Progress beyond

WEBINAR

Solvay Materials

*Bringing More
Sustainable Solutions to
Consumer Appliances*

Federico Baruffi, Philippe Brasseur, Claire Guerrero

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The Solvay Team



Claire Guerrero

Global Marketing Manager Sustainability
& Consumer EMEA
Solvay Materials

Claire Guerrero is the Global Marketing Manager for Sustainability in Consumer and Packaging markets. Claire has a Master degree in Chemistry from ECPM School in Strasbourg, France and Master degree in Strategy and Management from Bordeaux University. Claire joined Solvay in 2015 as business intelligence analyst then led several projects in operational and marketing excellence programs for Solvay Group before joining Solvay Specialty Polymers with a specific focus in Consumer and Packaging market segments..



Philippe Brasseur

Technical Development Engineer
Consumer
Solvay Materials

Philippe Brasseur is a Senior Technical Development Engineer Philippe holds a degree in Mechanical Engineering and has started his career in 1995 at Solvay Automotive as CAD designer and Project Manager. Since 2001, he is in charge of technical support for all Specialty Polymers of Solvay. He has been serving various different markets from Automotive to Aerospace and those last years a special focus on healthcare and consumer markets.



Federico Baruffi

Technical Development Engineer
Consumer
Solvay Materials

Federico is a Technical Development Engineer at Solvay Materials based in Bollate, Italy. Federico holds a Masters degree in Mechanical Engineering from Politecnico di Milano, Italy. He was then awarded a PhD in Manufacturing Engineering by the Technical University of Denmark, where he specialised in micro injection molding for medical devices. He joined Solvay in 2019 and, since then, he supports application development and provides technical support for customer in the Consumer, Healthcare and Construction markets in EMEA.



Adding Sustainability with no compromise on Performance



High Performance Materials



Sustainability Goals



Sustainable solutions for Consumer Appliances



Circular Economy and Recycling Loops



Agenda

Our Commitment to Sustainable Progress

How our materials can support your sustainability targets

Real world applications case studies

Case study 1 – New recycled-based HPPA for Kitchen Robot

Case study 2 – Closing the loop in Healthcare application

Conclusion and Q&A

01

A



Solvay Materials

Our Commitment to Sustainable Progress

2030 Solvay One Planet Goals

10 ambitious objectives to reduce our global impact



2020 results
(Baseline 2018)

CLIMATE

Fight against climate crisis



Align greenhouse gas emissions with Paris Agreement & SBTi*



Reduce by 26% (-2%/y)

Phase out coal



Achieve 100%

Reduce pressure on biodiversity¹



Reduce by 30%

RESOURCES

Embed circular business



Increase sustainable solutions
% of Group sales



Achieve 65% vs 50%

Increase circular economy²
% of Group sales



More than double

Reduce non-recoverable industrial waste



Reduce by 30%

Reduce intake of freshwater



Reduce by 25%

BETTER LIFE

Improve quality of life



Safety (MTAR³ indicator)



Aim for zero

Women in mid & senior management levels



Achieve 50% by 2035

Extend maternity leave time and open it to co-parents



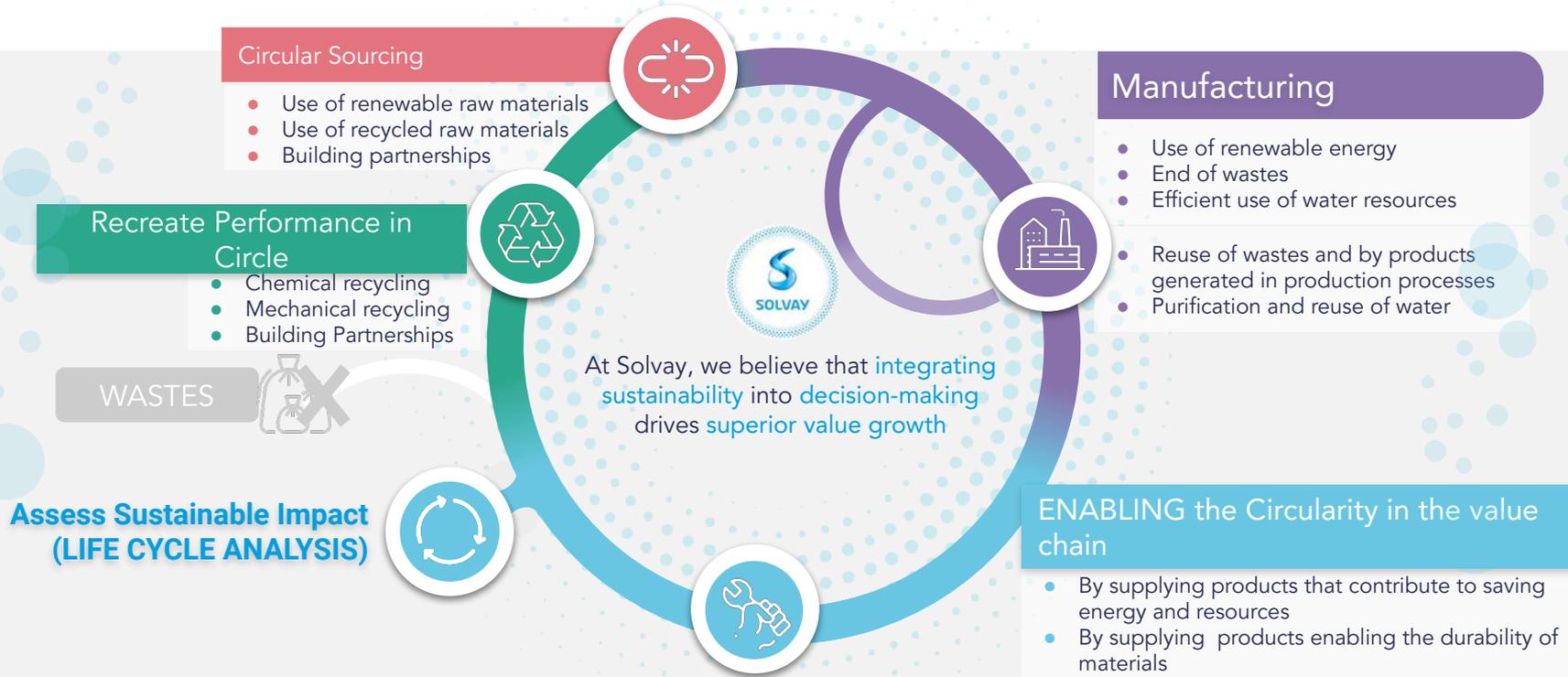
16 weeks regardless of the gender in 2021



Circular Economy with Solvay Materials



R&I : Circular Design
(Products, Processes) with 4R





Solvay Materials Approach to Sustainability

We want to enhance Sustainability and Circularity in the Consumer appliances market through Recycled & Bio-based materials



Solvay portfolio of Bio-based feedstock



Renewable feedstocks



Solvay portfolio of recycled feedstock



Recycled Feedstocks & Fibers



We invest in energy transition and operations efficiency

Solvay among top 10 companies using solar power: Solvay is the **only chemical company** on the Solar Energy Industries Association's top 10 list of companies operating in the US with the **most solar capacity**.

Four families of high performance polymers are now manufactured using **100% renewable electricity**¹.

- Amodel[®] PPA
- Ryton[®] PPS
- Kalix[®] HPPA
- KetaSpire[®] PEEK¹



...ongoing projects in Europe (target use **100% renewable electricity by 2025**), India and China...

We aim at being carbon neutral by 2040.



Top 10 Corporate Solar Users²



1		Apple	398.2 MW
2		Amazon	369.0 MW
3		Walmart	331.0 MW
4		Target	284.8 MW
5		Google	245.3 MW
6		Kaiser Permanente	181.8 MW
7		Switch	179.0 MW
8		Prologis	133.7 MW
9		Facebook	119.5 MW
10		Solvay	81.4 MW

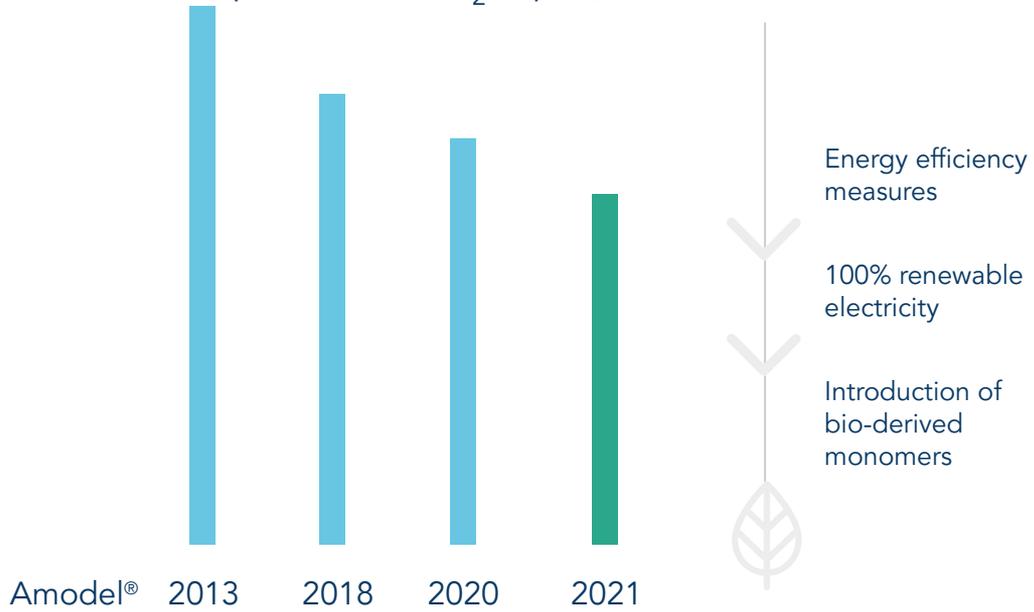
¹ For our US site

² SOURCE: Solar Means Business Report, 2019



Carbon Footprint evolution for Amodel[®] PPA

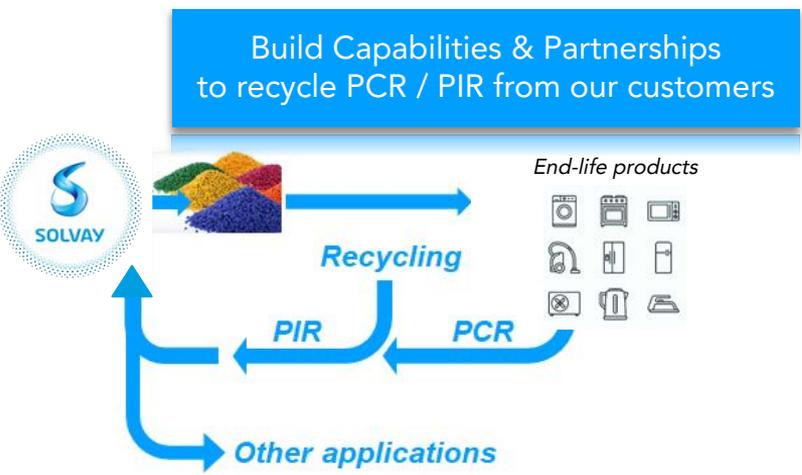
GWP expressed in CO₂ eq./kg of Amodel[®] PPA



Carbon footprint of our Amodel[®] PPA was reduced by 30% between 2013 and 2021

Solvay Materials Approach to Sustainability

Enhancing Circularity in the Consumer appliances market through Recycling Loops and Value Chain Partnerships



Using End-of-life Batteries as a source of metals and materials



Leveraging their recycling capabilities & Using new chemical recycling technologies to close the loop in Materials



Solvay Materials Solutions

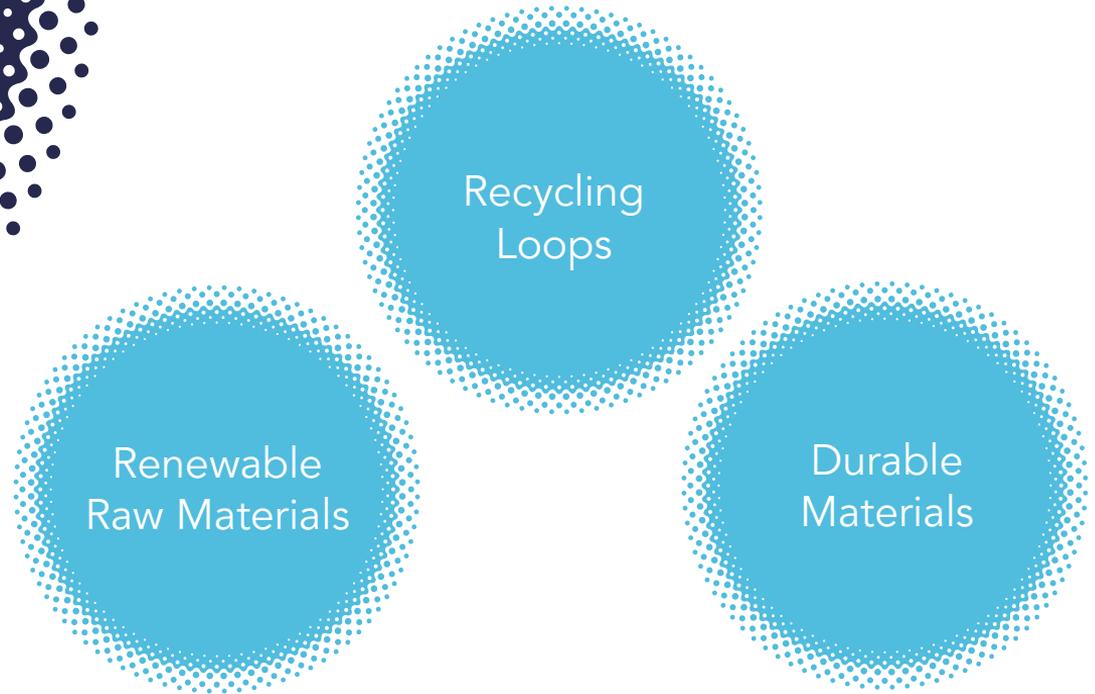
Sustainability without compromise on Performance



Solvay is Global partner
of Ellen MacArthur
Foundation

First chemical company to
join the Foundation in 2018

How can we support your Sustainability targets?



How can we support your Sustainability targets?



Providing...

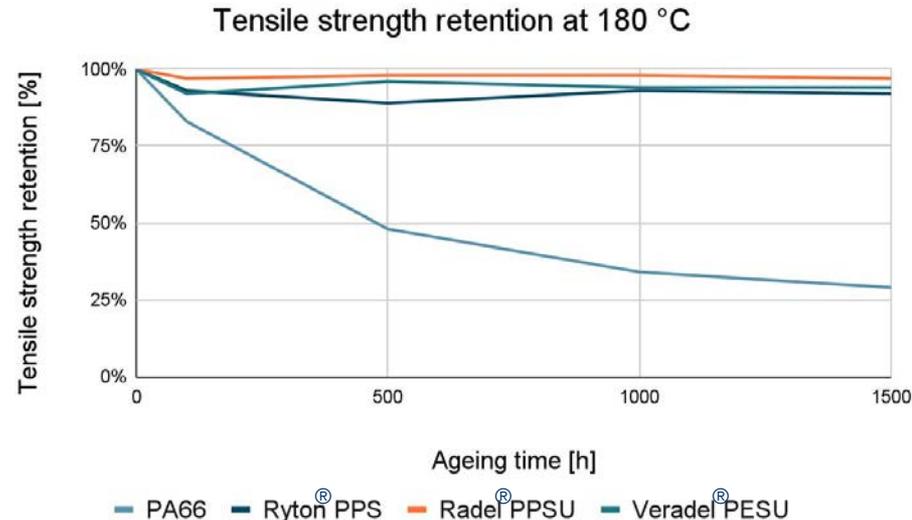


To...

- Extend service life of your product
- Improve resistance to harder conditions in use
- Maintain performance after recycling loop



ECO Conception



How can we support your Sustainability targets?



Bio-sourced polymers

Kalix® HPPA up to 62% bio content

Amodel® Bios up to 22% bio content



Recycled Fillers Carbon Fiber

Ixef® PARA up to 35% recycled content

Amodel® PPA up to 40% recycled content

Ryton® PPS up to 40% recycled content



Mass Balance Approach

High Performance Polymers with
Bio & Recycled attributed content



Recycled Base Resin

Recycled-based Omnix® HPPA with up
to 70% of recycled content



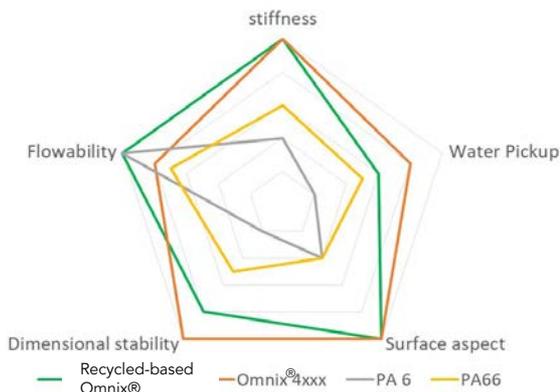
Introducing a new Sustainable HPPA solution, Recycled-based Omnix® HPPA



PA6 & PA 6.6

Standard Performance

- Chemical resistance
- Good mechanical performance
- Good heat resistance
- High moisture absorption



Solvay Materials towards more Sustainability in Consumer Appliances



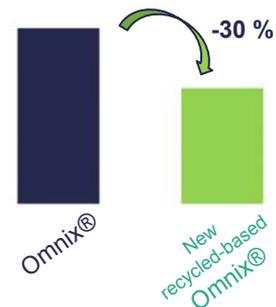
Omnix® HPPA

Recycled-based
Omnix® HPPA

Best of PA 6 and 6.6 plus...

- Better mechanical properties
- Lower water absorption
 - Better dimensional stability
 - Better retention of mechanical properties
- More aesthetic surface appearance

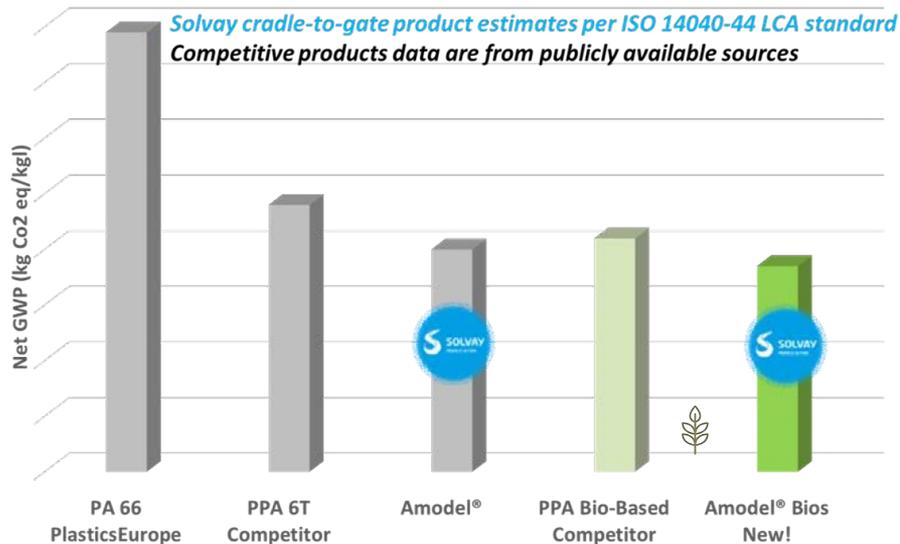
GWP (kg CO₂ eq/kg)



New Amodel[®] BIOS



- Partially Bio-sourced (Lower GWP than 6T PPA)
- Bio-based resin from non-food competing feedstock
- Resin produced with 100% Renewable Electricity
- Highest T_g (135°C) among Bio-based PPA
- Lower Moisture absorption than 6T PPA
- High elongation & weldline strength
- Excellent surface finish and colorability
- Dimensional Stability & Chemical resistance



Lowest
GWP
among
PPAs

Up to -14% GWP Reduction vs. standard PPA

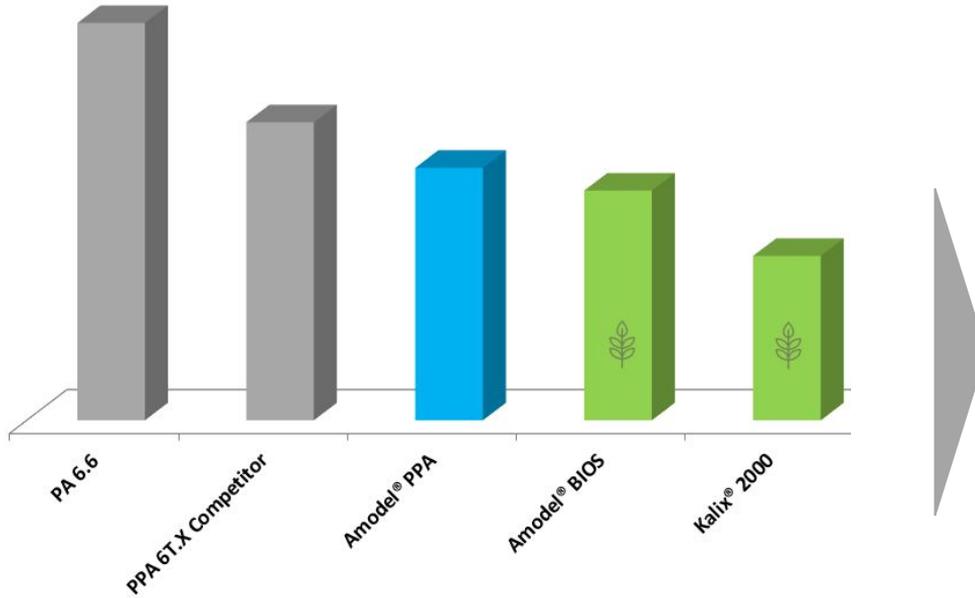


New Sustainable Solvay Materials Solutions

Improved Eco-Profiles to support your Sustainability targets



Net GWP (kg CO2 eq/kg)



Kalix® 2xxx Series

HPPA variant - the structural material with optimal combination of:

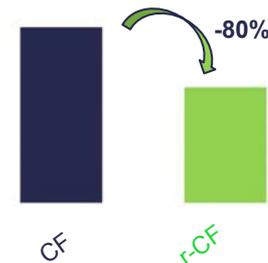
- strength,
- rigidity,
- aesthetics,
- low moisture pick up,
- bio-based content (made from castor bean oil)
- produced from 100% renewable electricity.

Renewable
Raw
Materials

Sustainability with no compromise on Performance



GWP (kg CO₂ eq/kg)



PRODUCT	POLYMER	RECYCLED CONTENT	PROPORTION OF RECYCLED CONTENT
AMODEL®	PPA	RECYCLED* CARBON FIBER	Up to 40%
IXEF®	PARA	RECYCLED* CARBON FIBER	Up to 35%
RYTON®	PPS	RECYCLED* CARBON FIBER	Up to 40%

*pre-consumer waste



The mass balance approach is commonly used in the chemical industry to track and allocate the blended chemicals

Value Chain



Bio-Based Feedstock

From non food competing feedstock



Recycled feedstock & fibers

Post consumer recycling (PCR)
Post industrial recycling (PIR)



Fossil-based feedstock

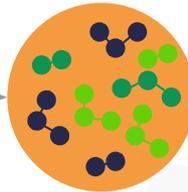
Natural gas / Crude Oil

Refinery Steam Crackers



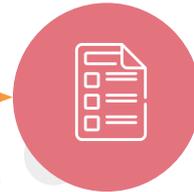
We adopt a pragmatic and sustainable approach and rely on existing infrastructure

Chemicals



We formulate high performance solutions

Allocation



We allocate the renewable share to selected products using the **Mass Balance Approach**

Final Products



Bio-based & Recycled

Fossil-based

Several Product Families to be covered by this approach to cover our wide solution portfolio

Certification schemes



RSB
Roundtable on Sustainable Biomaterials
www.rsb.org

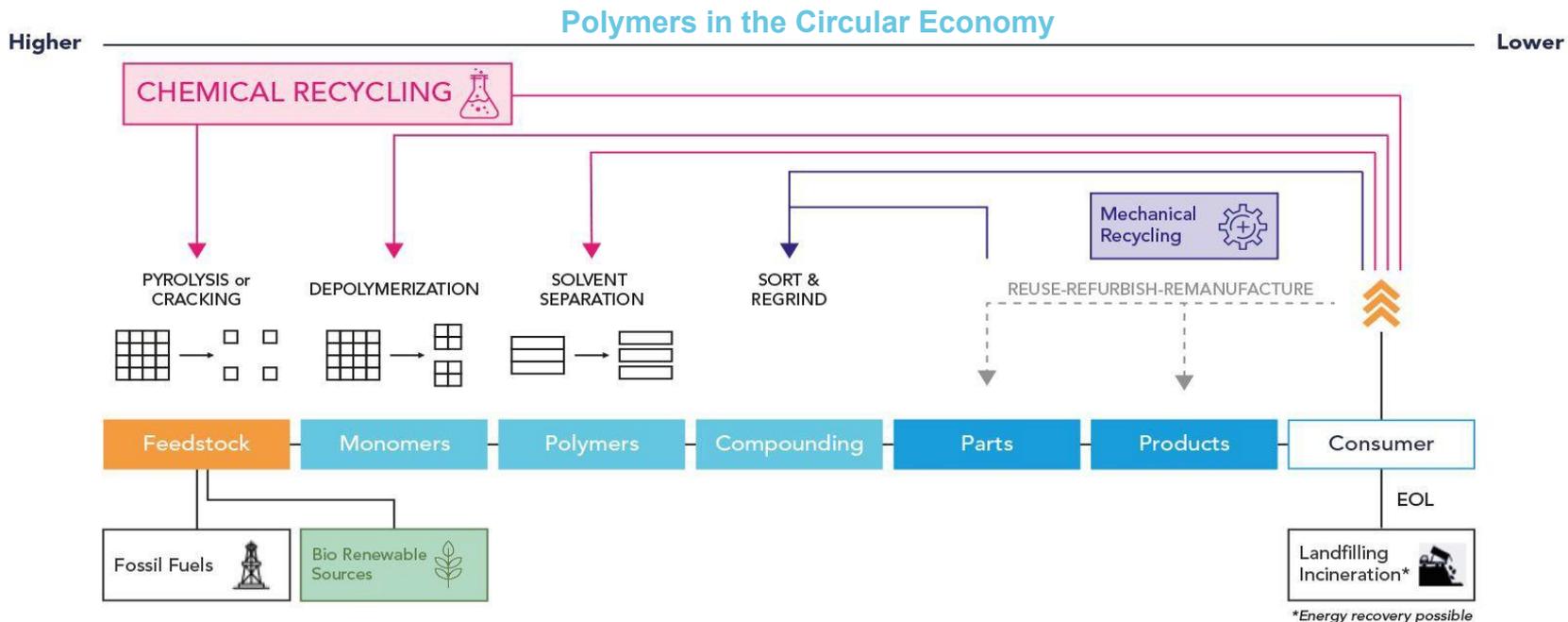




How can we support your Sustainability targets?



We create value by upcycling molecules & additives derived from lower performing polymers





Sustainability & Circularity in Action

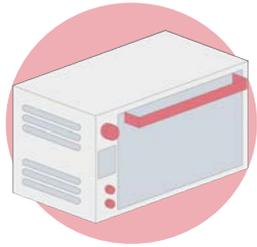
Case Studies

Where Recycled-based Omnix® can bring value and competitive advantage

Some examples in the Consumer Appliances Market



Coffee makers
(Both Drip &
Single serve types)



Microwaves



Compressors
(refrigerators)



Ovens & Air Fryers



Kitchen Utensils



Food processors &
slow cookers

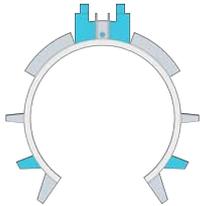
Key benefits
compared to PA6 and PA6.6

- Better mechanical properties
- Lower water absorption
 - Better dimensional stability
 - Better retention of mechanical properties
- More aesthetic surface appearance
- Lower GWP
- Recycled resin content up to 70%

Recycled-based Omnix® for Capsule Coffee Machines



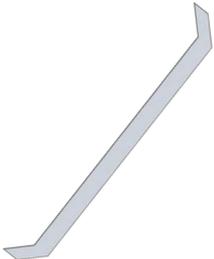
Support Frame



Recycled-based Omnix®:

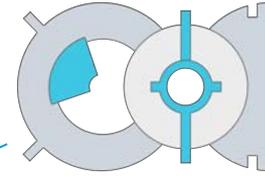
- High stiffness
- Easy to mold
- Lower moisture absorption vs standard PA
- Low GWP

Front Exterior Part



Recycled-based Omnix®:

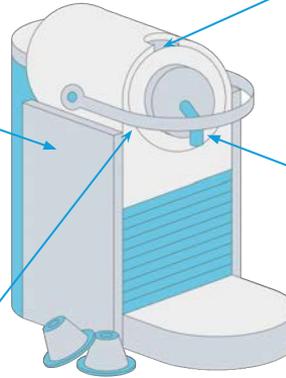
- Excellent surface quality
- High flowability
- High stiffness
- Low GWP



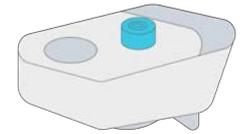
Gear Box

Recycled-based Omnix®:

- High stiffness
- High dimensional stability
- Outperforming standard PA
- Low GWP



Capsule holder



Recycled-based Omnix®:

- Excellent surface quality
- Easy to mold
- Outperforming standard PA
- Low GWP

Recycled-based Omnix® for Kitchen Robots & Food Processors



Kitchen robot chassis

Replacing

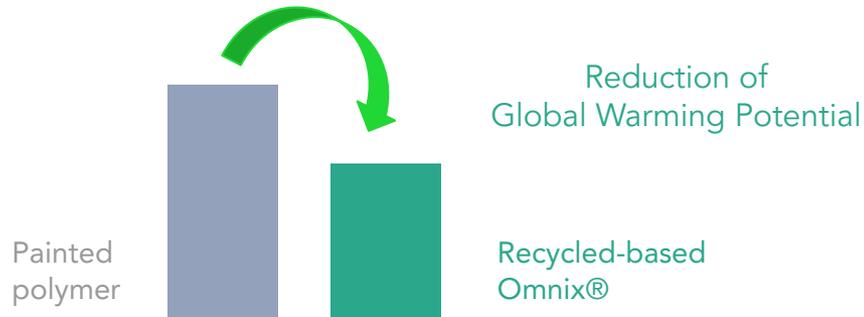
- Aluminium dies cast
- Painting on plastic



Solvay Value Proposition

New recycled-based Omnix® offers a unique combination of performances:

- high stiffness (50% Glass Fibre)
- colorability and surface appearance (no painting)
- meeting cost & sustainability targets



Enhancing Circular Economy



Maintaining High Performance for a Second Life Cycle of our PolySulfones Solutions

Udel® PolySulfone

- Transparent
- Tough
- Tg of 190 °C
- +100 autoclave cycles
- FC and medical approvals
- Healthcare and Consumer

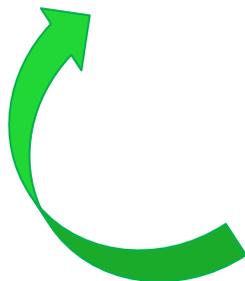
Virgin Udel® resin

Injection molding +
100+ autoclave cycles

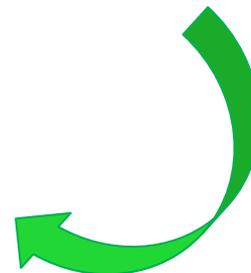


End-of-life Udel® parts

Closing the loop
with new applications



Recycled Udel® resin



Mechanical recycling
and regranulation

Enhancing Circular Economy



Maintaining High Performance for a Second Life Cycle of our PolySulfones Solutions



Recycled Udel® PSU maintains excellent properties, while allowing a significant decrease of environmental impact



Customer Excellence through Application Engineering



We are your partner in the commercial journey providing added value with specialty polymers

Our
expertise

Wide and differentiated portfolio of specialty polymers
Consumer market expertise
Clearly laid out life cycle view

Solution
proposal



Prototyping



Mold Design,
Definition and
Testing



Part
processing
Support



Field follow
up and
Support

Material solutions that enhance the overall value for the customer

Virtual: expertise in Software based quick overview of application performance

Physical testing

Mold and part design review

Implementation of specific customer testing procedures

On-site support during processing (molding, extrusion) trials

Direct support to molders and processors

QC review and failure analysis (fractography, IR, etc)

Key Factors to Success



- Apply team approach
- Clarify sustainability target
- Eco-conception, simulation and prototyping to validate functionality and processability
- Select the right polymer for the job



Well-Designed Part Made from the Correct Polymer
Can Bring both Performance and Sustainability



Conclusion

To Summarize



WHY

Our Vision

Create Sustainable shared value for all

Be the Leaders in Sustainable high performance materials

HOW

Our Strategy

We continue:

Investing in energy transition and operations efficiency

Developing renewable raw materials & circular loops

Promoting partnerships along the value chain

Solvay One Planet

Sustainability goals

Climate

Resources

Better life

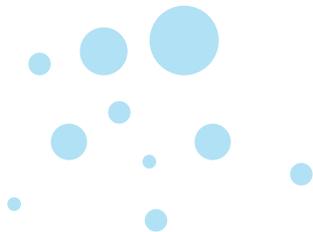
WHAT

Our Solutions

We align our technologies to customer and societal needs

We focus on markets where we are uniquely positioned to make a positive difference and a profit at the same time

Questions?



Progress beyond

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