SOLVAY

Progress beyond

« Comment Solvay peut innover plus rapidement et en se dépassant, en partenariat avec ses clients »

24 Novembre 2020

Agenda

La nouvelle façon de faire de la recherche et de l'innovation chez Solvay, Nicolas Cudré-Mauroux, CTO

Les batteries, focus sur l'économie circulaire chez Solvay, Imre Horvath, Head of Strategic Development-Raw Materials & Recycling for the Battery Materials Platform

Quand la crise déclenche de l'innovation : Actizone™, une étude de cas, Jean-Christophe Castaing, Head of New Opportunities Novecare

La nouvelle façon de faire de la recherche et de l'innovation chez Solvay

BOLDER & FASTER

Evolving demography, resource constraints and climate change

G R O W

Our business strategy (Nov. ‘19)

SOLVAY ONE PLANET

CLIMATE RESOURCES BETTER LIFE

Our sustainability roadmap by 2030 (Feb. ‘20)

To create sustainable shared value for all,
including our employees, customers and shareholders

Our G.R.O.W. strategy

Drive profitable growth, create superior value for all our stakeholders while generating resilient cash flow

G — Accelerate Growth

We will prioritize investments in high margin Materials businesses with high **growth** potential, which are also our most sustainable solutions

R — Deliver Resilient cash

We will maximize cash flow generation from our **resilient** Chemicals businesses where we have a competitive advantage

O — Optimize returns

We will **optimize** our Solutions businesses to unlock value and increase returns

W — Win

We are creating a winning team and operating model to support a performance-driven culture and **win** with our customers — Solvay ONE

2030 Solvay One Planet goals

10 ambitious objectives to reduce our global impact

CLIMATE

Fight against climate crisis

Align GHG with Paris Agreement & commit to SBTi

Reduce by 30% (-2%/y)

Phase out coal

Achieve 100%

Reduce negative pressure on biodiversity

30% reduction

RESOURCES

Embed circular business

Increase Sustainable Solutions revenues

Achieve 65% vs 50%

Increase circularity

Achieve 15% vs 7%

Reduce non-recoverable industrial waste

30% reduction

Reduce intake of freshwater

30% reduction

BETTER LIFE

Improve quality of life

Safety is a priority

Aim for zero accident

Accelerate Inclusion & Diversity

Parity in 2035 vs 24% mid & senior management

Extend maternity leave time and open it to co-parents

16 weeks regardless of the gender in 2021

Strategy, Value creation, Sustainability: the compass for making R&I decisions

Accelerate innovation with highest-growth customers
Realize innovation synergies with Growth Platforms

Move resources to higher margin specialty products and solutions while protecting the competitiveness of commodities

Develop circular businesses with customers and brand owners

Spotlight on sustainable mobility trends

Solvay's 3 platforms positioned for growth

EV Batteries

- Materials for binders, electrolytes, separators and battery protection

Thermoplastic Composites

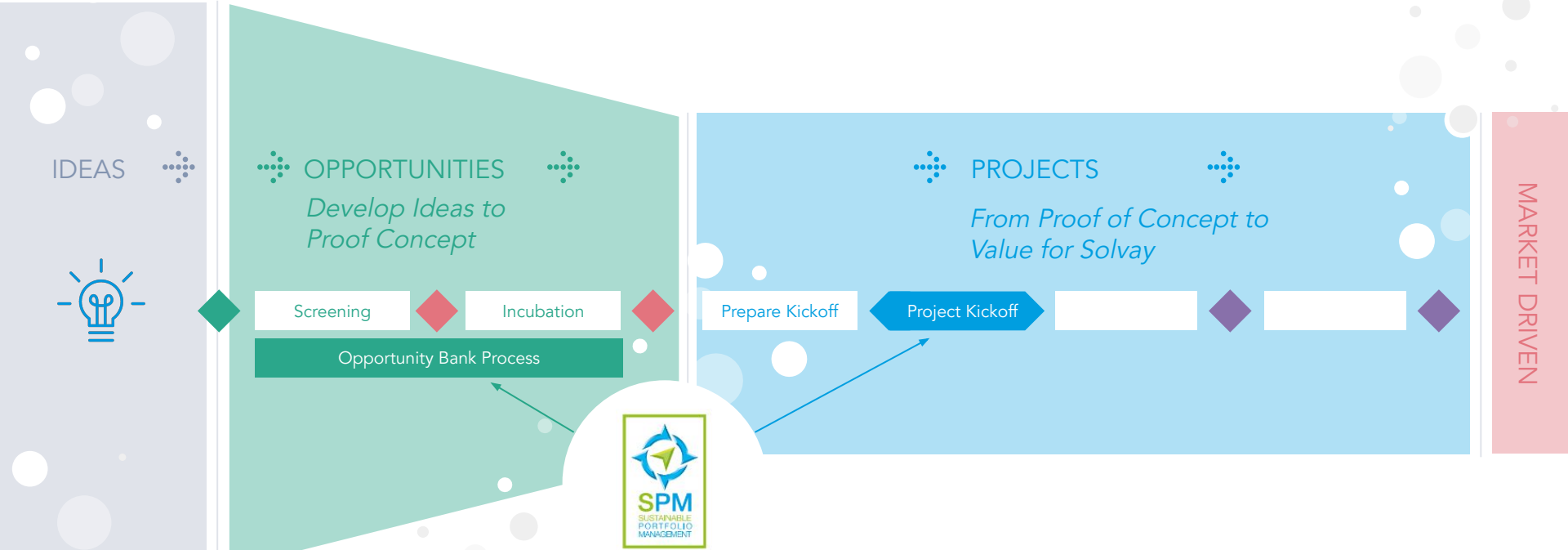
Combining our expertise in polymers and composites to develop unique solutions

Hydrogen & Clean Energy

Membranes & other materials for PEM electrolysers, fuel cells and hydrogen storage

Solvay Innovation Process

Combining AGILITY and RIGOR

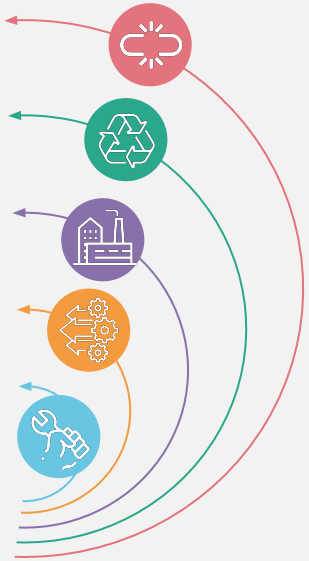


Solvay as an enabler of Circular Economy

THE LINEAR CHAIN

- Raw materials extraction
- Chemicals manufacturing
- Customer Industry
- Distribution & service
- User
- Incineration & landfill

THE CIRCULAR VALUE CHAIN: AN OPPORTUNITY FOR SOLVAY



SEPARATION
Only chemical industry is able to separate complex assemblies to recover raw materials
(e.g. metals from E-waste)

RECYCLING
Using of secondary raw materials to produce new chemicals / materials. Improving the recyclability:
(e.g. eco-design of polymers)

REMANUFACTURE
Enabling the remanufacturing of existing materials
(e.g. EV batteries)

REUSE REDISTRIBUTE
Enabling the reuse of materials
(e.g. regeneration of solvents)

MAINTAIN PROLONGE
Enabling a higher durability of goods
Supporting our customers

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SOLVAY BATTERY MATERIALS PLATFORM

Making circular economy of batteries a reality

IMRE HORVATH

Head of Strategic Development of Raw Materials & Recycling

BATTERY MATERIALS GROWTH PLATFORM

ONE SOLVAY FOR BATTERY

November 24th 2020

Los Angeles

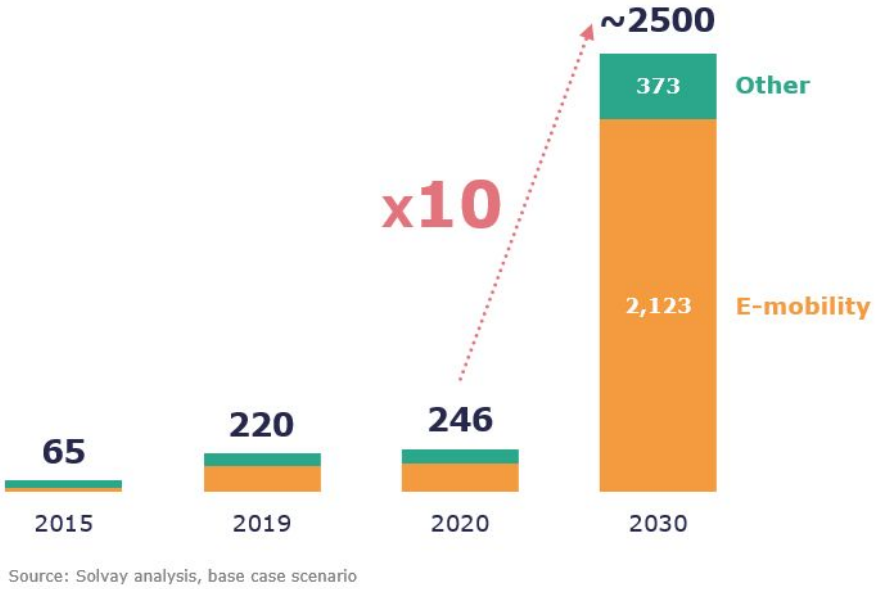
Jakarta

Venice

From combustion engines to e-mobility Point of no return is reached

Car electrification is a GAME CHANGER for the Li-ion battery industry and a source of unprecedented opportunities

Li-ion battery demand in GWh



Source: Solvay analysis, base case scenario

OUR MISSION

Enabling faster transition to e-mobility for a clean planet

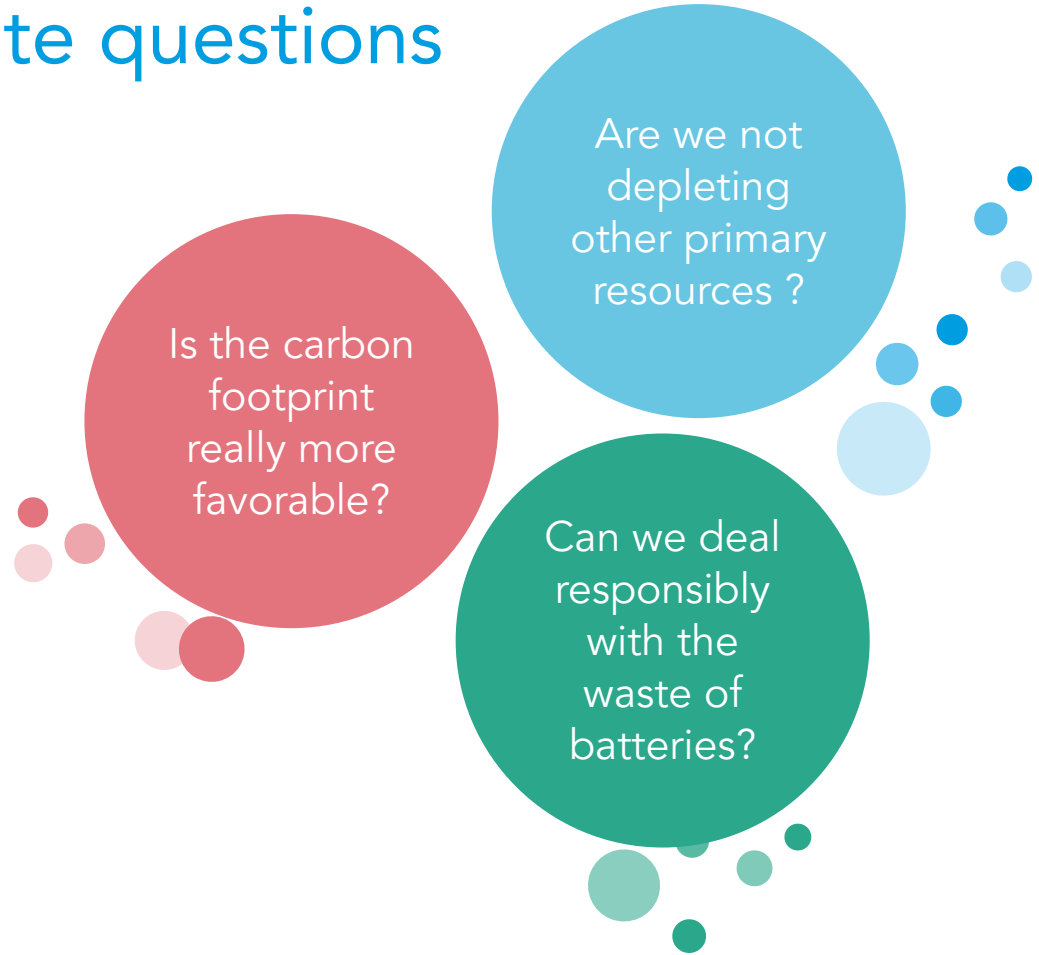
OUR AMBITION

ONE Billion Euro in 2030

OUR VISION

Provide advanced materials to unleash full potential of Li ion batteries

3 Legitimate questions
on e-mobility



3 Legitimate questions
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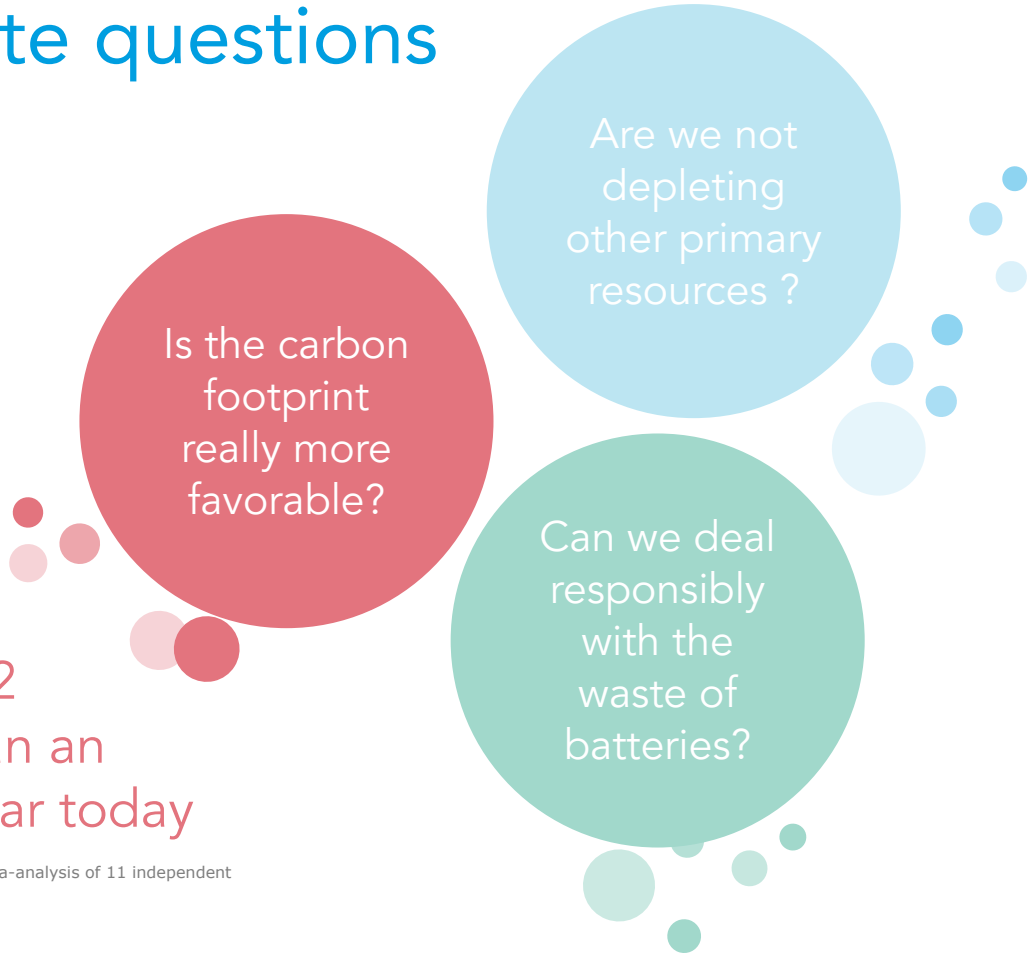


YES,
50% less CO2 emissions than an average EU car today

Source transportenvironment.org, meta-analysis of 11 independent LCA studies done in recent years

3 Legitimate questions
on e-mobility

Is the carbon footprint really more favorable?

YES,
50% less CO2 emissions than an average EU car today

Source transportenvironment.org, meta-analysis of 11 independent LCA studies done in recent years

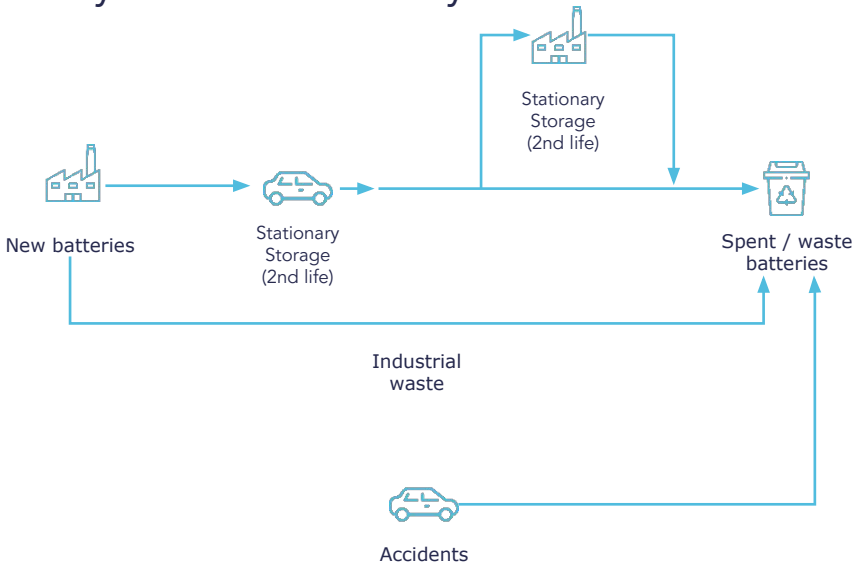
Are we not depleting other primary resources ?

Can we deal responsibly with the waste of batteries?

SOLUTION = circular economy of batteries

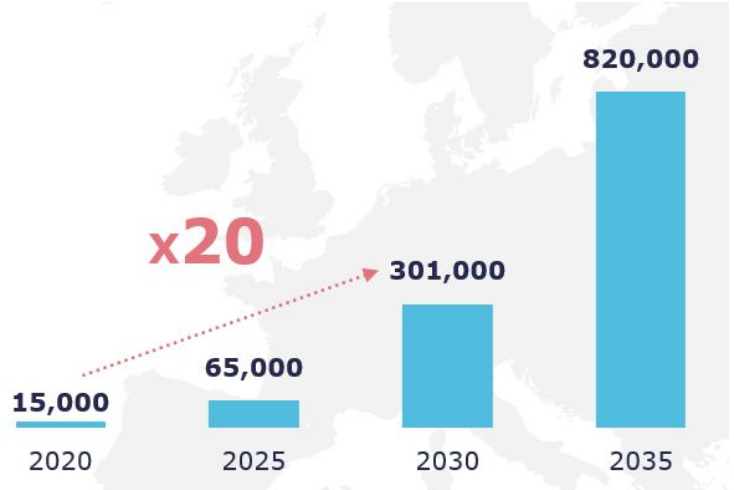
What is the life cycle of an EV battery and how much volumes of waste can we expect?

Life cycle of an EV battery



Volumes of waste to be treated over time

Tons of incoming spent / waste batteries in EUROPE



Is the European legislator engaged fully to address this upcoming challenge?

Major thrust on circular economy, waste management and use of secondary materials

Solvay products and know-how in primary mining versus secondary mining (“urban mines”) ?

PRIMARY MINING

3 Li Lithium

27 Co Cobalt

28 Ni Nickel

Typical Concentrations

x6

x20

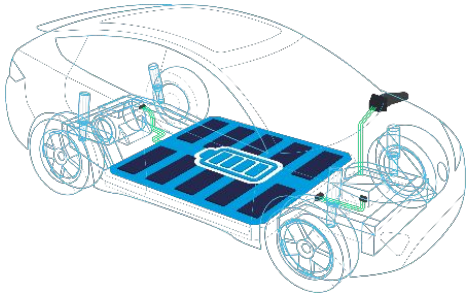
x6

3 Li Lithium

27 Co Cobalt

28 Ni Nickel

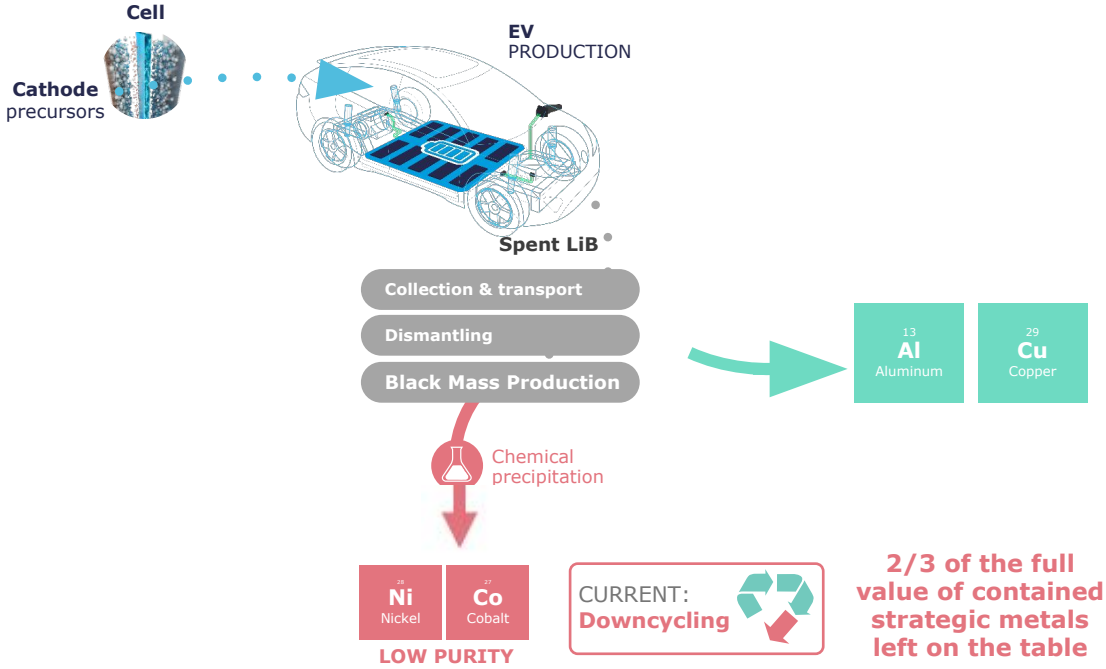
SECONDARY MINING



Solvay is the worldwide leader in metals extraction products and technologies for primary mining.
These can be leveraged directly to secondary mining.

How does a typical recycling process look like? (OPEN LOOP)

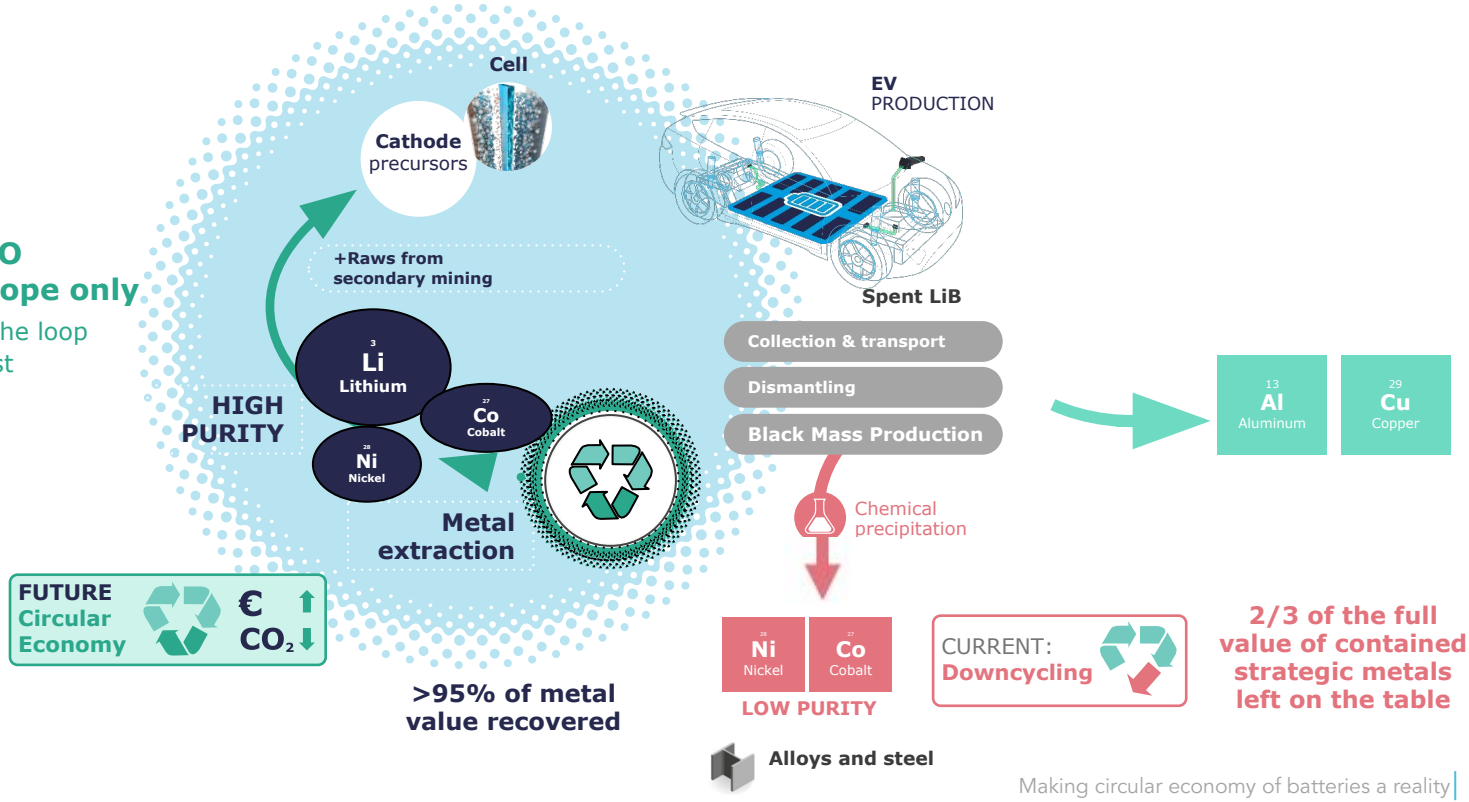
Unable to keep up with the ever more stringent requirements by the EU Legislator



How does a typical recycling process look like? (CLOSED LOOP)

2030:
ONE BILLION EURO opportunity in Europe only

Solvay enabling closing the loop and comply with the most stringent requirements !

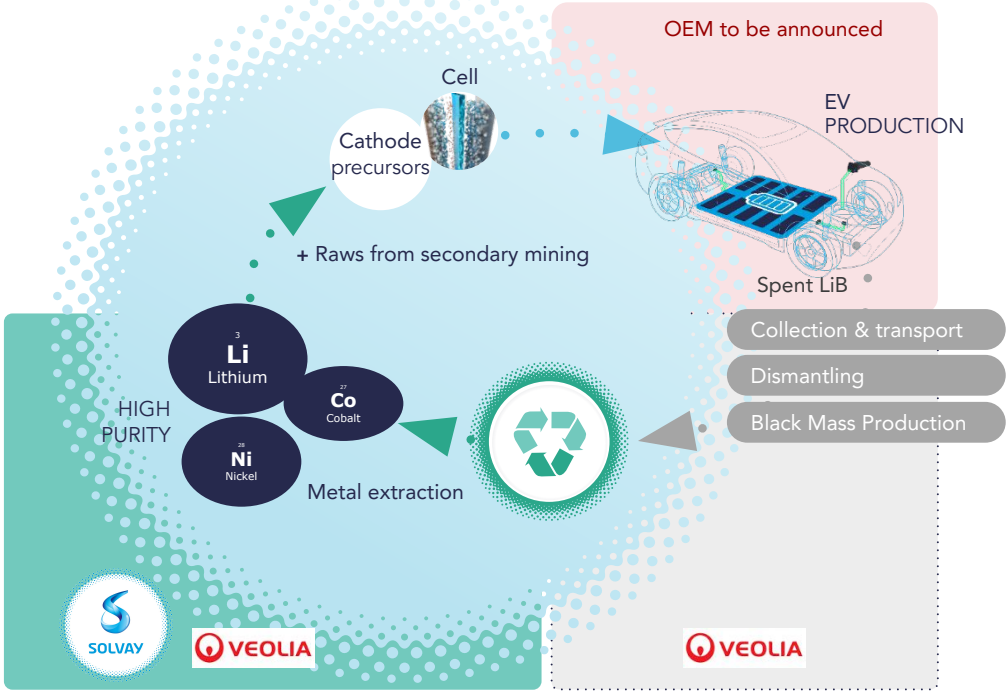


Opportunity for SOLVAY to engage strategically?

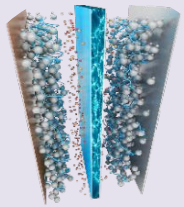
SOLVAY alliance with VEOLIA forming a circular economy consortium for EV batteries in Europe

FUTURE
Circular Economy
€ ↑
CO_2 ↓

Closing the loop



What are the benefits of a closed loop / circular economy of batteries?



Making the recycling chain more economically viable

€↑

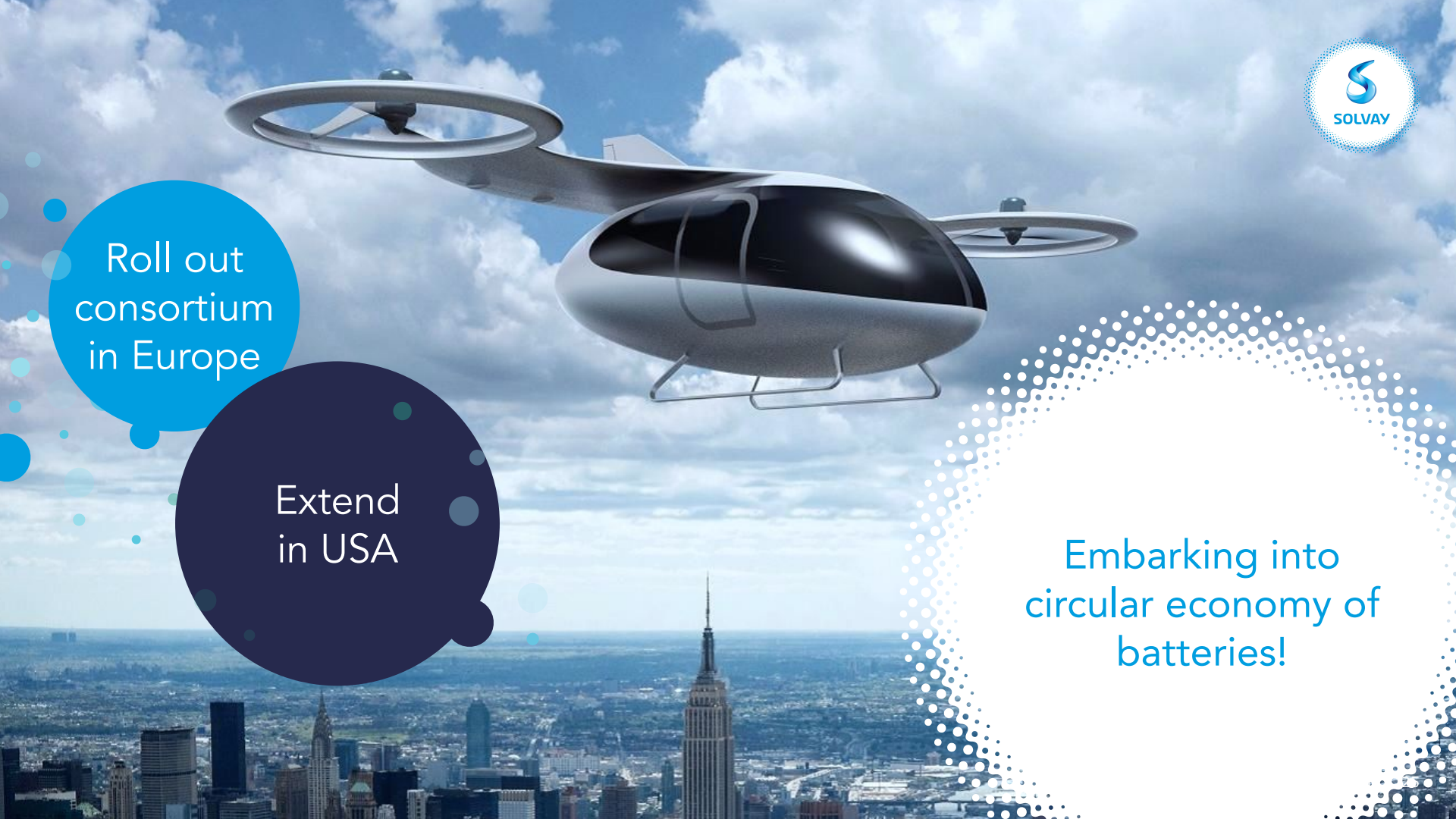
&

Getting more high value metals (Li, Ni, Co) from recycled battery cells

Helping alleviate some key societal and environmental challenges

CO_2↓

The winning model for a viable circular economy:
The Consortium


Roll out consortium in Europe
Extend in USA
Embarking into circular economy of batteries!
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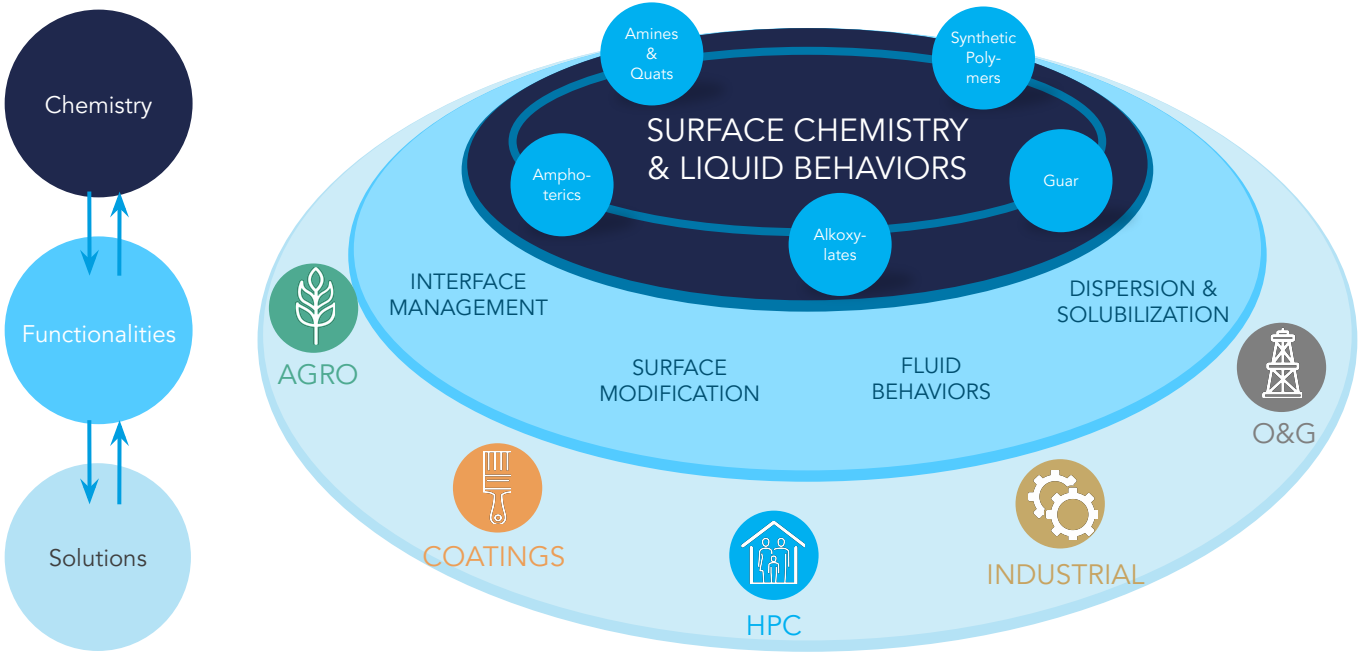
How Solvay can innovate faster and beyond with its customers ?

- *What is innovation in formulations ?*
- *When crisis triggers innovation: Actizone™, a case study*

JC Castaing, NOVECARE

Innovation in formulations at Novecare

A broad technology base and application knowledge



Strong Synergies

Same applicative science between our markets

Good understanding of our customers' applications

Unexpected solutions

Actizone™
Disinfection That Lasts

Introducing a Cleaner, Safer Future

SOLVAY

24-Hour Antimicrobial Protection

Actizone™ technology traps antimicrobial actives, forming an invisible abrasion-resistant protective film on surfaces, to offer 24-hour protection.

Fast Kills ≥ 99.9% of Germs

Actizone™ technology initially kills more than 99.9% of bacteria, yeasts fungi and viruses, including coronaviruses.

Optimal Cleaning Experiences

Actizone™ technology provides excellent shine and a residue-free finish on a range of surfaces.

Proprietary Technology

Actizone™ is a combines a proprietary long-lasting polymer, a state-of-the-art cleaning system and approved antimicrobial actives.

The steps towards Actizone™

Solvay develops original synthetic polymer technologies having specific interaction with surfaces for "Hard surface cleaning" (HSC) applications.

First contacts between Byotrol and Solvay. Discussions about a collaboration to expand this opportunity.

Solvay starts improving the technology.
-
PAS2424 EU/UK standard passed.

Extensive work on formulation redesign. Basic understanding at the molecule level of the mode of action.
-
RSS24 US standard passed.

Development of a portfolio of customer projects-
First sales in EU (Germany) and AP (Indonesia & Thailand).

Covid Crisis

2011

The small company Byotrol tests a Solvay HSC polymer in disinfectant formulations and takes a patent.

2015

JDA signed between Byotrol and Solvay

2017

Actizone™ is structured as an incubator, involving teams in application, in microbiology, in physical-chemistry, including support from academia (UPenn).

2018

Solvay acquires Byotrol patent.

2019

2020

2021

Leverage the position acquired on markets we know (hard surface disinfection) to explore new markets: disinfection in the Food industry and Hospitals.
-
Work on two new generations of formulations.

Progress beyond