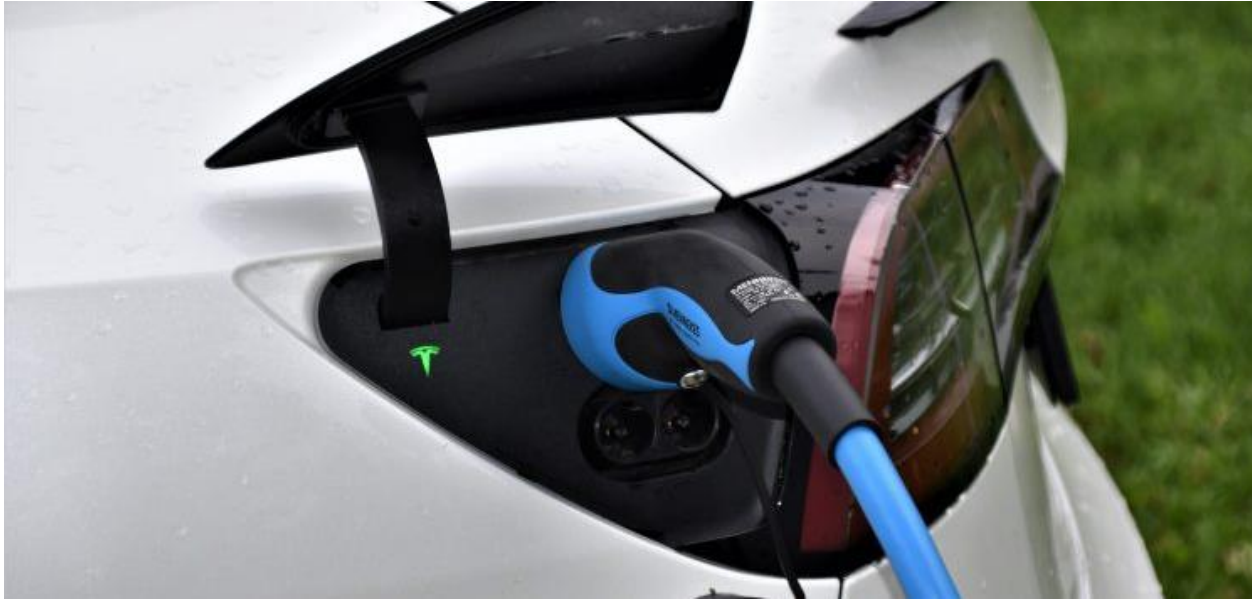


Webinar Batterijen voor e-mobility

Moderatie: Florens Slob



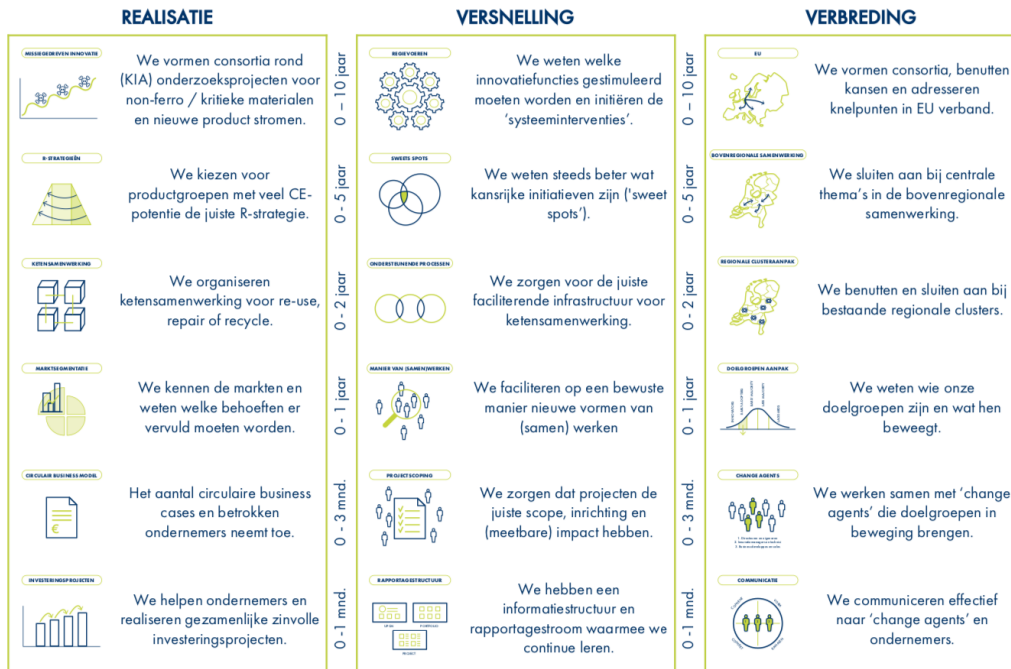
Programma

- Intro door moderator, Florens Slob
- Circo track fietsbatterijen. Uitkomsten en vervolgprojecten, Linda Louwisen, trainer bij Circo en Nout Neijmeijer, batterij expert bij Felyx.
- Nationaal Batterij Programma, Rutger van Poppel, international business developer bij Brainport Development.
- Belangrijkste kennis- en innovatie uitdagingen voor recycling van batterijen, Piet Jan Vet, business developer bij Metalot.
- Q&A sessie i.s.m. presentatoren en Hans van der Weijde (Tata Steel en lid regieteam UPCM)
- Wrap up en vervolgacties.

UPCM - Uitvoeringsprogramma Circulaire Maakindustrie

- Vergroten waarde behoud producten/diensten maakindustrie
- Verlagen milieudruk producten/diensten maakindustrie
- Vergroten voorzieningszekerheid (kritieke) grondstoffen

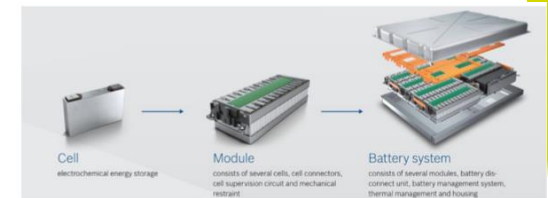
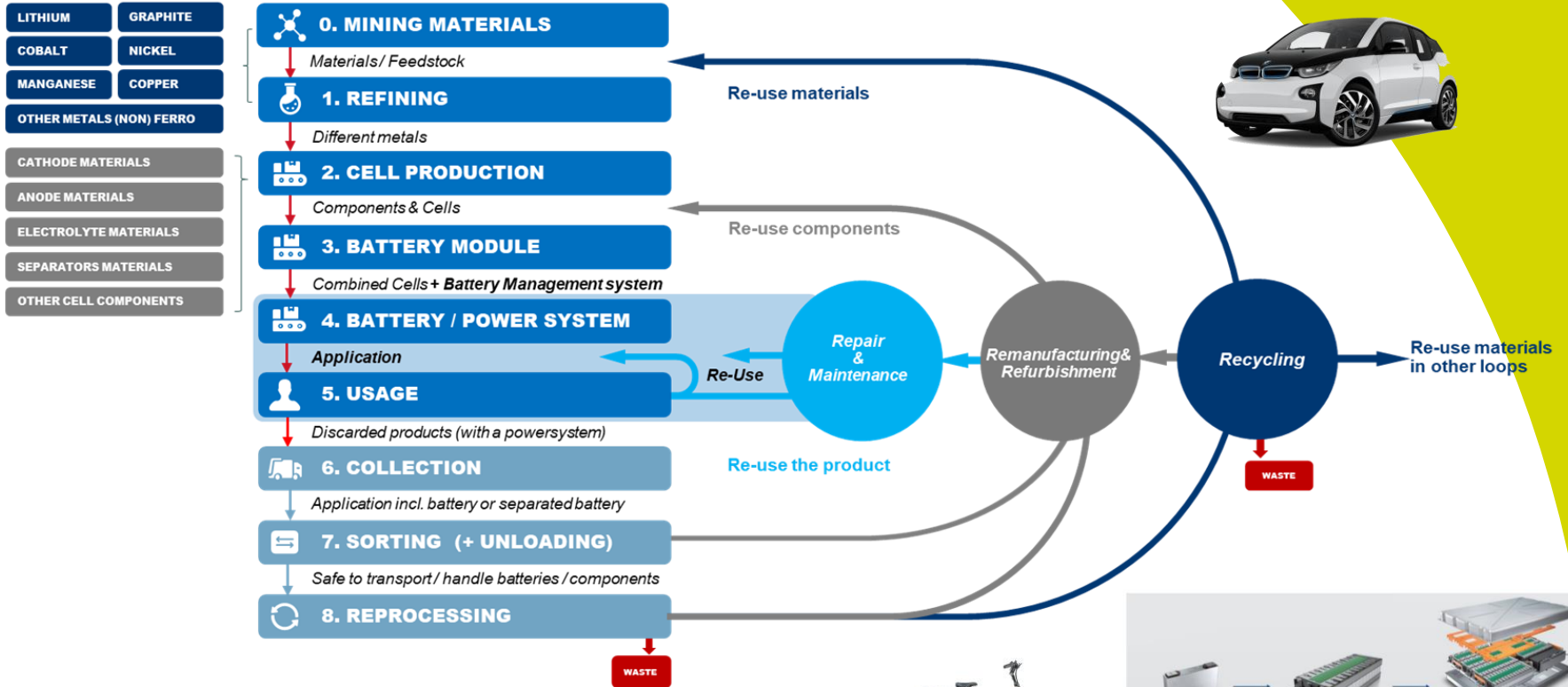
UPCM – aanpak



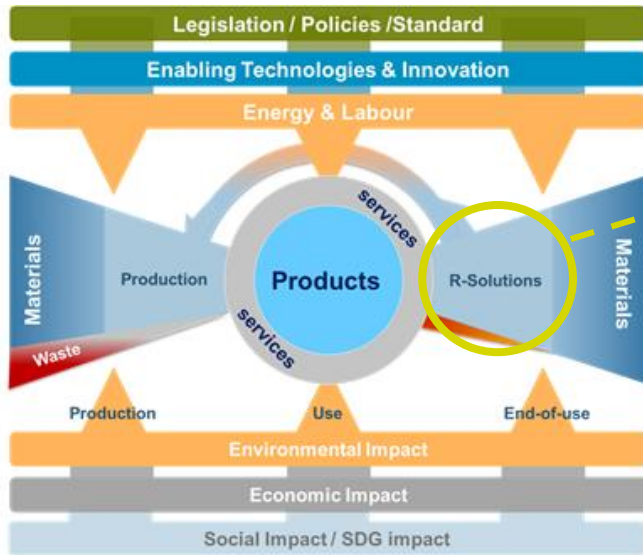
Meer weten: www.circulairemaakindustrie.nl

Schrijf je in voor de nieuwsbrief
volg ons op LinkedIn / Twitter

Batterijen in een circulair systeem



R-strategie kiezen op basis van impact



- Vergroten waarde behoud producten/diensten maakindustrie
- Verlagen milieudruk producten/diensten maakindustrie
- Vergroten voorzieningszekerheid (kritieke) grondstoffen

Value mainly in product content	Product-service system			Value mainly in service content
	Service content (intangible)			
	Product content (tangible)			
Pure Product	A: Product oriented	B: Use oriented	C: Result oriented	Pure service
	1. Product related 2. Advice and consultancy	3. Product lease 4. Product renting/sharing 5. Product pooling	6. Activity management 7. Pay per service unit 8. Functional result	

Product (as a) Service Systemen
(Tukker, 2004)

WELKOM

CIRCO Ketentrack Batterijen – Elektrisch (licht) vervoer uitkomsten en vervolgprojecten



Rijksoverheid

Linda Louwisen, CIRCO trainer & sectorlead Maakindustrie

Ketentrack Lithium-Ion fietsbatterijen

- ⇒ Lithium-Ion batterijen is één van de focusthema's vanuit het Uitvoeringsprogramma Circulaire Maakindustrie.
- ⇒ Deze focus sluit aan op het Meerjarige Missiegedreven Innovatie Programma 6: Sluiten van industriële ketens.
- ⇒ Kortom: de ketentrack is onderdeel van een groter programma.

Uitkomsten

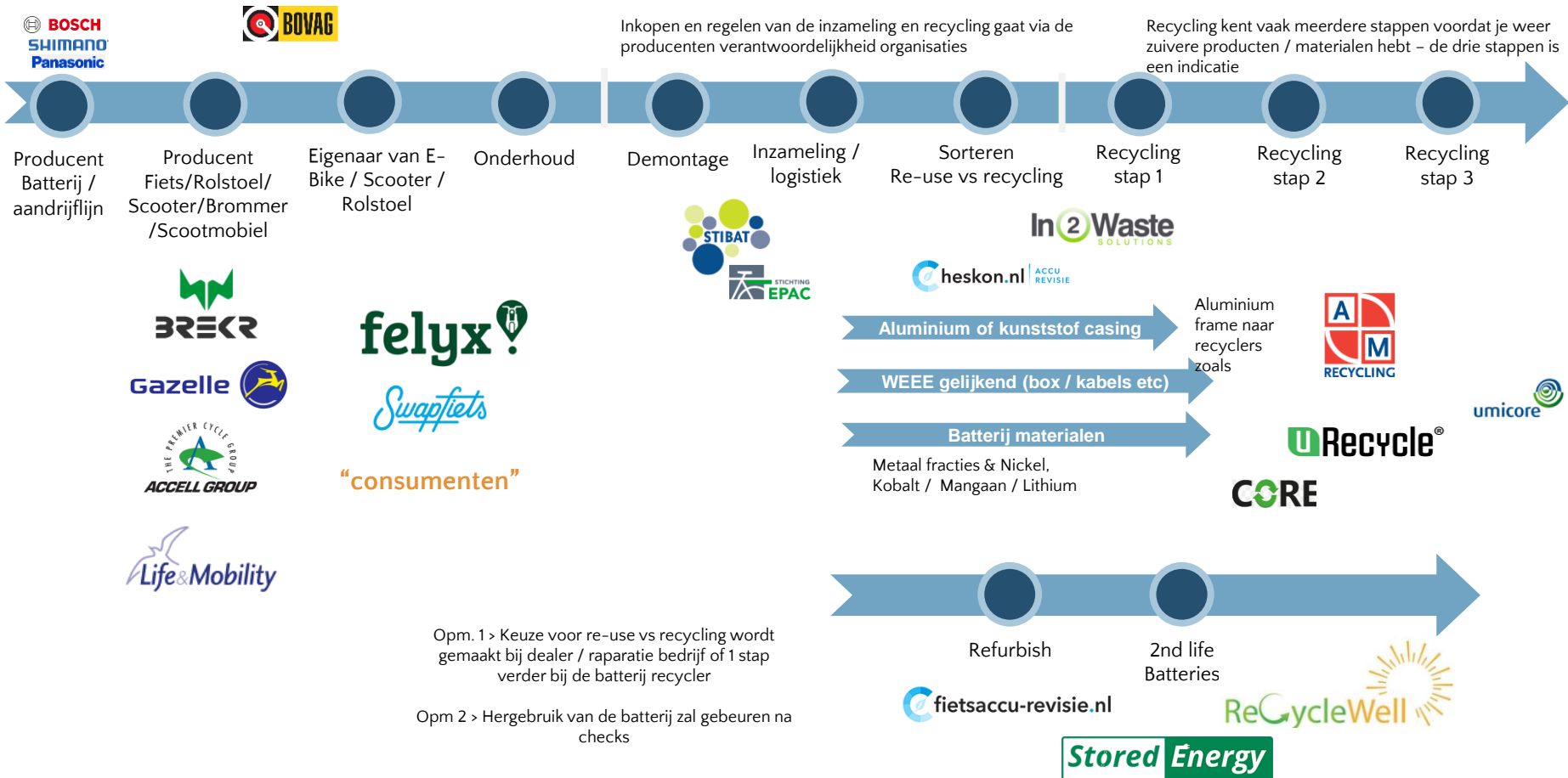
⇒ Individeel/bedrijfsniveau: Eigen circulaire propositie en roadmap.

⇒ Samenwerking: Opgestart tussen A&M Recycling, Felyx en StoredEnergy.

⇒ Collectieve thema's & uitdagingen:

- Certificerings systeem batterijen / re-use / re-pair
(incl. kunnen meten van degeneratie vd cel - inzichtelijk maken conditie - garantie; Wet- en regelgeving (aanvullend covenant))
- Verbeteren inzamelsysteem (incl financiële prikkel)
(Slimme retour logistiek met als doel verschillende R-strategies als optie te houden)
- Designregels, normen & standaardisatie
(tbv veiligheid / garantie / repareerbaarheid / hergebruik etc)

BATTERIES TOWARDS A CIRCULAR VALUE CHAIN



THEMA: CERTIFICERING RE-USE/REFURBISH/REPAIR



Er wordt een versnellingsstafel gepland om te komen tot gedragen gestandaardiseerde afspraken over re-use, refurbishment & repair van de batterijen. Belangrijke partijen hierbij zijn naast de directe stakeholders (bedrijven) ook BOVAG en techniek NL.



checks

Stored Energy

THEMA: VERBETEREN INZAMELSYSTEEM; FINANCIËLE PRIKKEL



Bij de ontwikkeling van nieuwe batterijen ligt de focus op de prestatie van de batterij (capaciteit / snelheid laden en ontladen / gewicht). Hoe vervolgens met financiële prikkels circulariteit te bevorderen is een breder vraagstuk geworden (eea is verankerd in Europese wet- en regelgeving). Het zal structureel opgepakt worden vanuit een kennis- en innovatieagenda binnen de MMIP's waar we actief mee samenwerken.



checks



THEMA: DESIGNREGELS, STANDAARDISATIE, NORMERING



Battery upcycling

Developing an energy storage system out of used batteries

Nout Neijmeijer, battery expert



01/08/20



Felyx offers shared e-scooters in NL and BE

8 different cities in NL and BE



25 km/hr & 45 km/hr



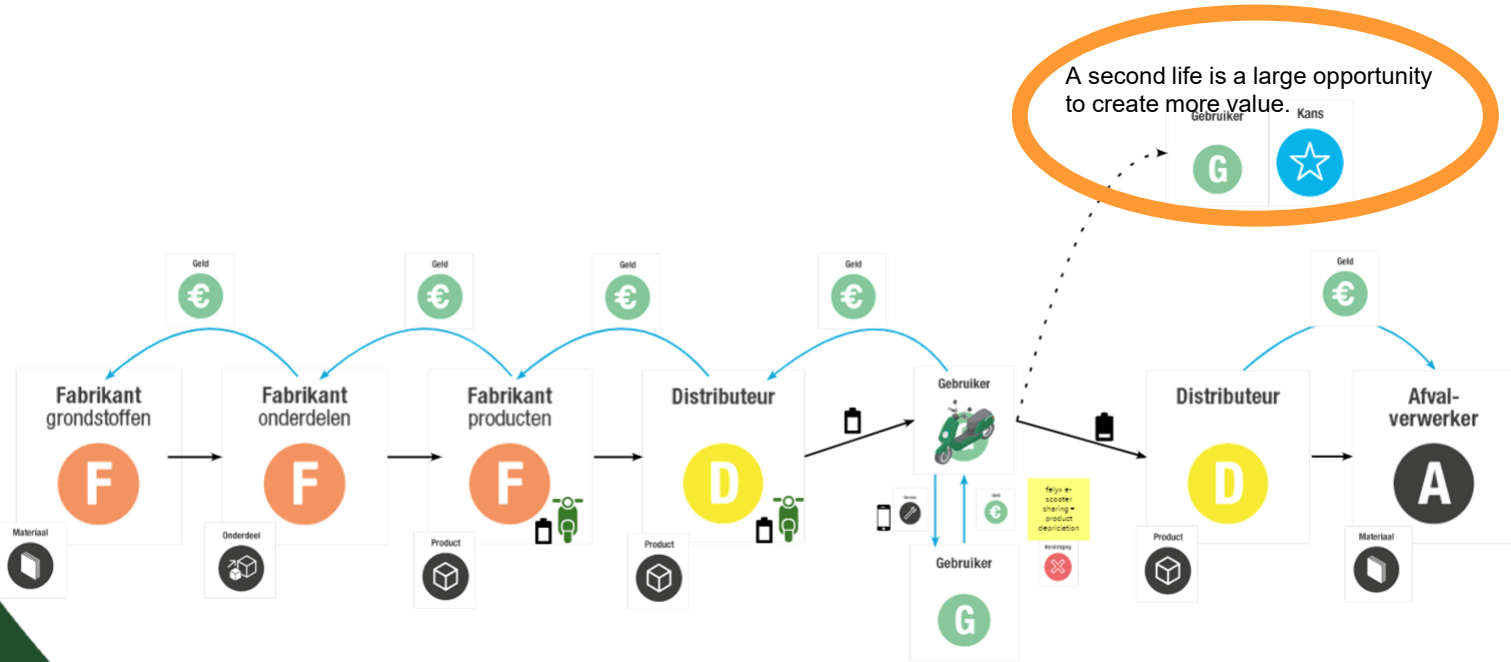
Vehicle with helmets

Booking via phone

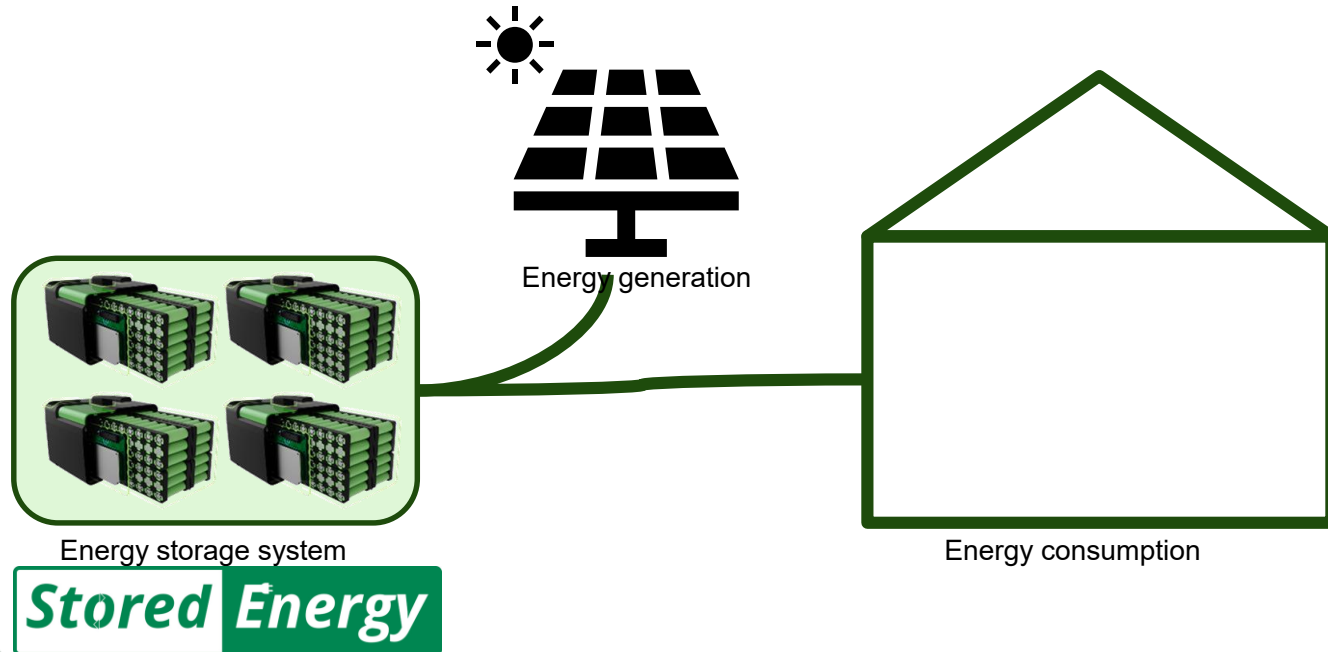


Battery-pack

Usage of batteries decreases its capacity, however these batteries can still be used



Batteries can have a second live in an energy storage system



Thank you!

felyx[®]



Introduction to Brainport Eindhoven

A man in a light blue shirt is adjusting a glowing blue robotic arm. The arm is illuminated with a bright cyan light. In the background, another man in a white shirt is looking on. The scene is set in a dark environment, possibly a laboratory or workshop.

Brainport Development - economic development agency of Brainport Eindhoven

Rutger van Poppel, Project Manager Battery

One of the Cornerstones of Dutch Economy

Amsterdam Airport

(trade, services, legal, finance, tourism, arts)

Rotterdam Seaport

(logistics, oil/chemicals, commodities)

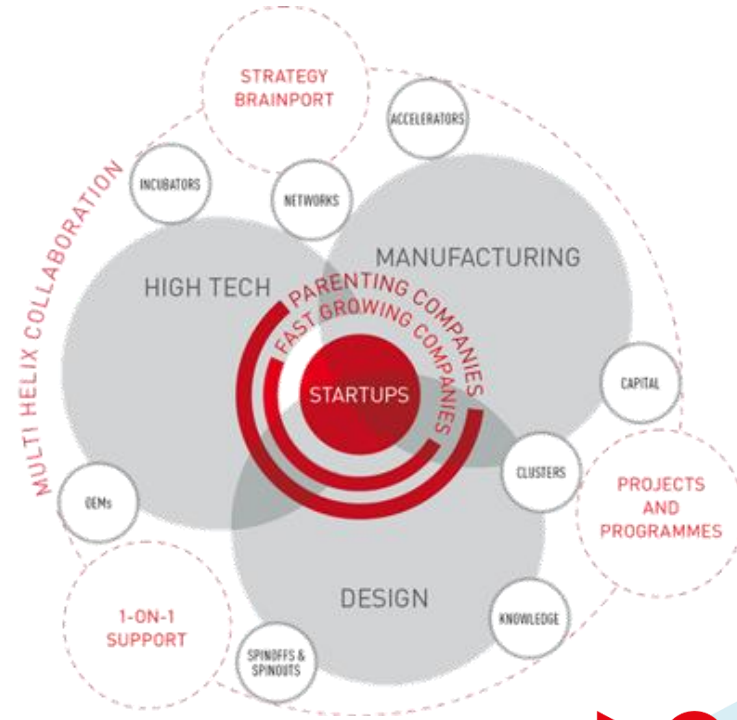
Brainport Eindhoven

(hightech, electronics, design)



Wat doet Brainport Development?

- **WHY:** Onderhouden en versterken van het Brainport ecosysteem. Samen met partners uit onderwijs, overheid en bedrijfsleven werken wij aan een goed werkend ecosysteem, waar innovatie plaatsvindt door samenwerking.
- **HOW:** Als onafhankelijke organisatie zetten wij onze organisatiekracht en kennis van het netwerk in om mensen en mogelijkheden aan elkaar te verbinden.
- **WHAT:**
 - Ontwikkeling strategie voor en met de regio
 - Branding
 - Lobby
 - Ontwikkeling van projecten en programma's
 - Individueel bedrijfsadvies financieren/verbinden/aanjagen



Europa afhankelijk van Aziatische batterij toeleverketen



Schone energie

Europees batterijproject krijgt 3,2 miljard euro van EU-landen

De Europese Commissie wil op het gebied van batterijen minder afhankelijk zijn van Azië en steekt 8 miljard euro in een pan-Europees-batterijproject.

Audi Hit With 10% Price Increase On LG Batteries Due To High Demand

Twitter

LinkedIn

Facebook

October 22nd, 2018 by [Kyle Field](#)

May 27, 2019 - 05:20 pm

Volkswagen's battery supply may be in trouble

BATTERIES | BATTERY CELLS | SAMSUNG SDI | SUPPLIERS | VOLKSWAGEN



of less than 5 GWh.

There are concerns at Volkswagen that a supply contract with Samsung SDI worth around 50 billion euros could be called off. The Koreans are said to have originally agreed to supply battery cells with a total capacity of just over 20 GWh to VW.

However, the deal now appears to have got down to a mere 5 GWh, reports *Bloomberg*, citing insiders. According to the news agency, Volkswagen and Samsung SDI have different ideas about the production volume and schedule, which is why Samsung's delivery commitment could ultimately fall to a volume

Internationaal investeringen in elektrificatie

Sep 4, 2020 - 03:43 pm

PSA launch the ACC battery cell joint venture

The project benefits from the financial support of the French and German authorities to the tune of 1.3 billion euros and has received the approval of the European institutions through an [IPCEI](#) project. The whole project will represent an investment of more than 5 billion euros.

TECHNOLOGY NEWS JANUARY 23, 2019 / 3:01 PM / UPDATED 2 YEARS AGO

Germany to fund research facility for EV battery technology

Anja Karliczek said her ministry would invest 500 million euros (\$568 million) to support research into both existing and next-generation EV battery cell technology.

“The German car industry shouldn’t depend on Asian suppliers,” Karliczek told a business conference in Berlin. “This is not only a question of independence, but also a question of keeping the German economy competitive.”

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Sweden: European backing for Northvolt's battery gigafactory

EN SV

29 July 2020 . [Twitter](#) [Facebook](#) [LinkedIn](#) [Email](#) [Print](#)



©Northvolt

- ▶ EIB supports Northvolt's gigafactory for lithium-ion battery cells in Skellefteå, Sweden, with backing from the Investment Plan for Europe.
- ▶ EIB financing of \$350 million follows the successful financing of Northvolt's demo line in 2018, which the EIB supported with a €52 million loan.

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▶ +352 4379 - 89076

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▶ +352 4379 - 21000

Related pages

Dutch market for heavy-duty vehicles



DAMEN



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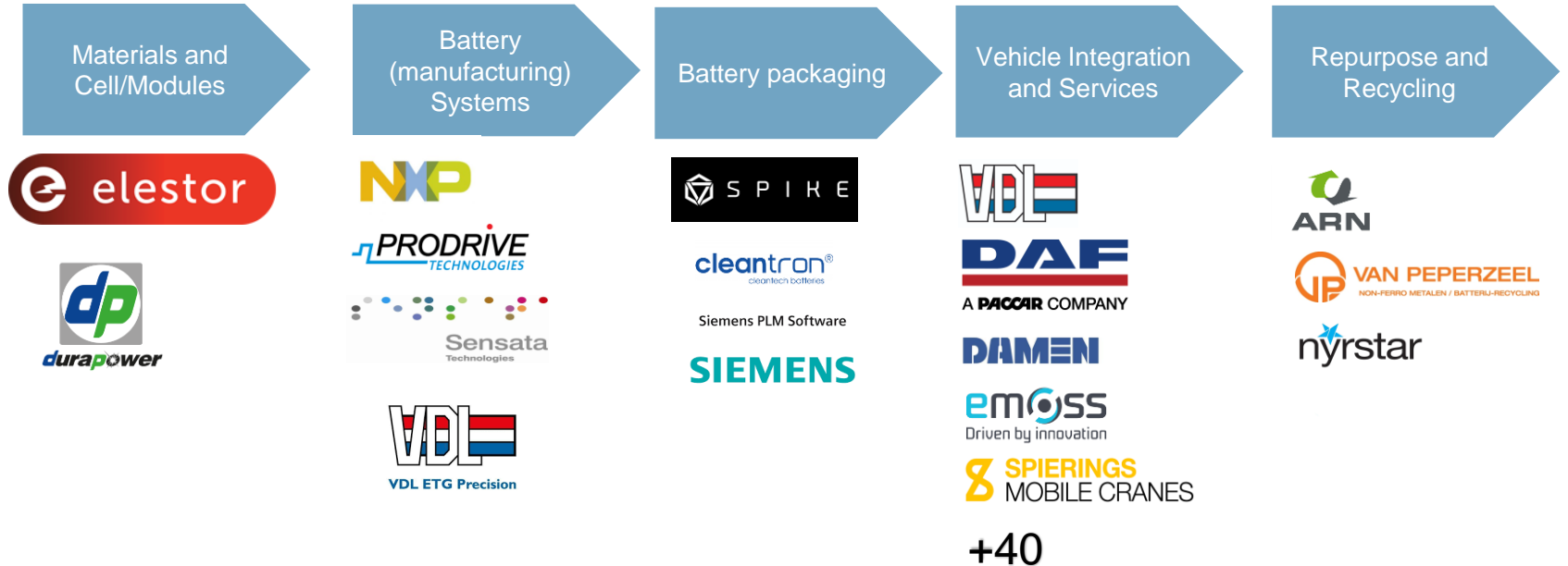


Over 40 others...



De Nederlandse batterij value chain

› Gefragmenteerde informatie en kennis, en op dit moment onvoldoende toeleveranciers in de batterijketen.

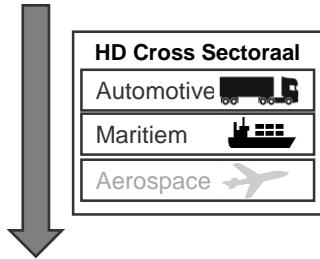


Future batteries

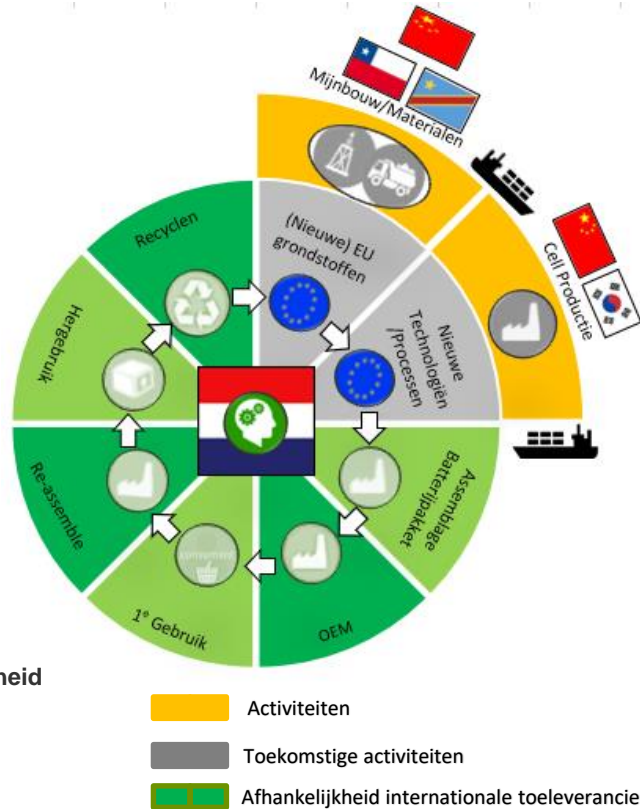
World leading high-tech ecosystem for future battery solutions



Battery Knowledge charges Circular economy



- CO2 Footprint
- EU Behoeftes
- Invloed / Flexibiliteit
- Competenties
- Werkgelegenheid
- Economische onafhankelijkheid



National Battery Program
Field Lab & Assembly plant



AUTOMOTIVE INDUSTRY NL

BRAINPORT EINDHOVEN

NETHERLANDS MARITIME TECHNOLOGY

Rijksoverheid

TU/e
Eindhoven University of Technology

UNIVERSITY OF TWENTE

TNO
innovation for life

TU Delft
Delft University of Technology

Holst Centre
Open Innovation by imec and TNO

LeydenJar
ENERGING TECHNOLOGIES

SALD
The Spatial ALD Provider

E-mag

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SPIERINGS
MOBILE CRANES

SPIKE

Etrucks europe

DAMEN

Note: Logo's are used as example of potential participants



Q&A

- Brainport Development
- Rutger van Poppel – Project Manager Battery
- r.vpoppel@brainportdevelopment.nl



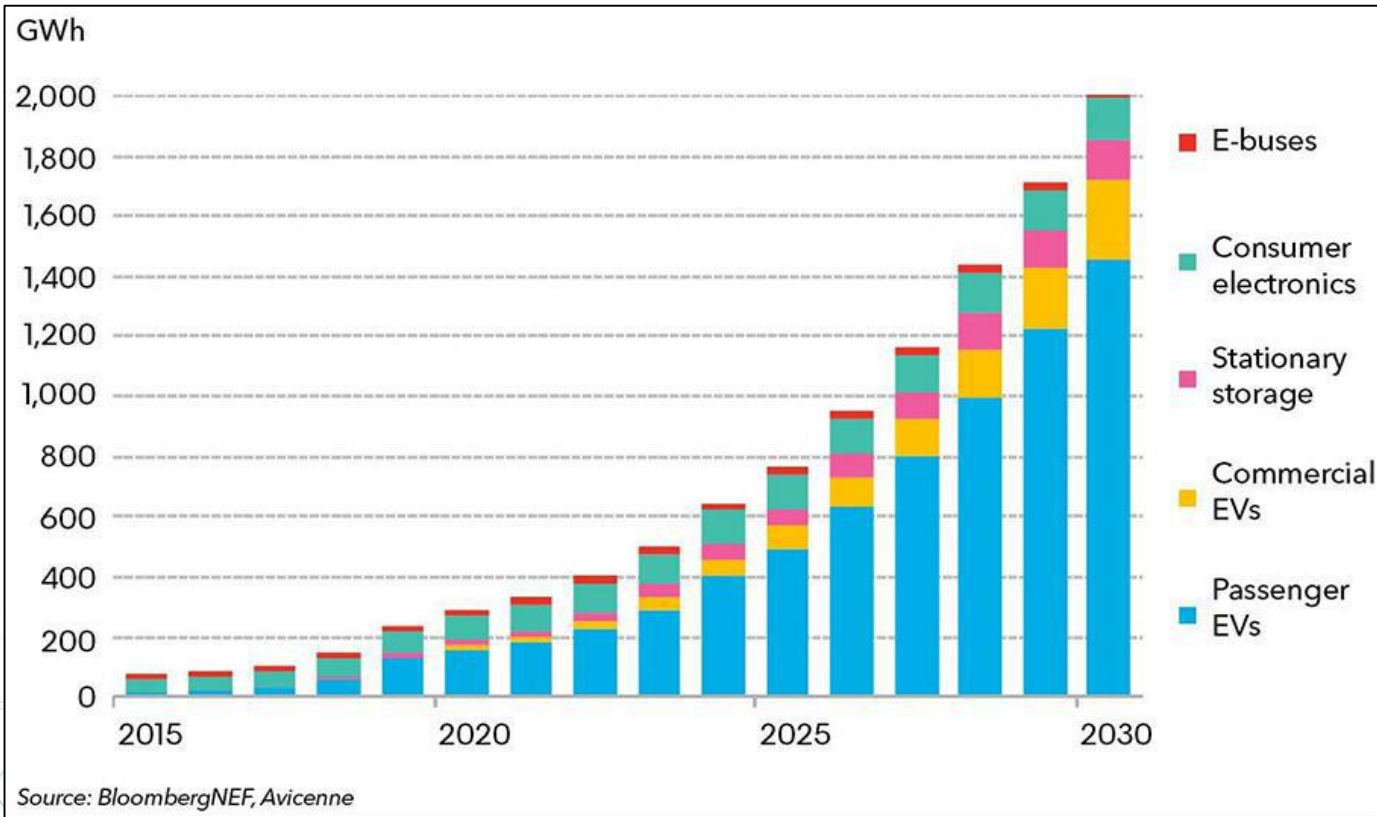
Batterij workshop – 2 februari 2021

Introduction to recycling of used EV batteries

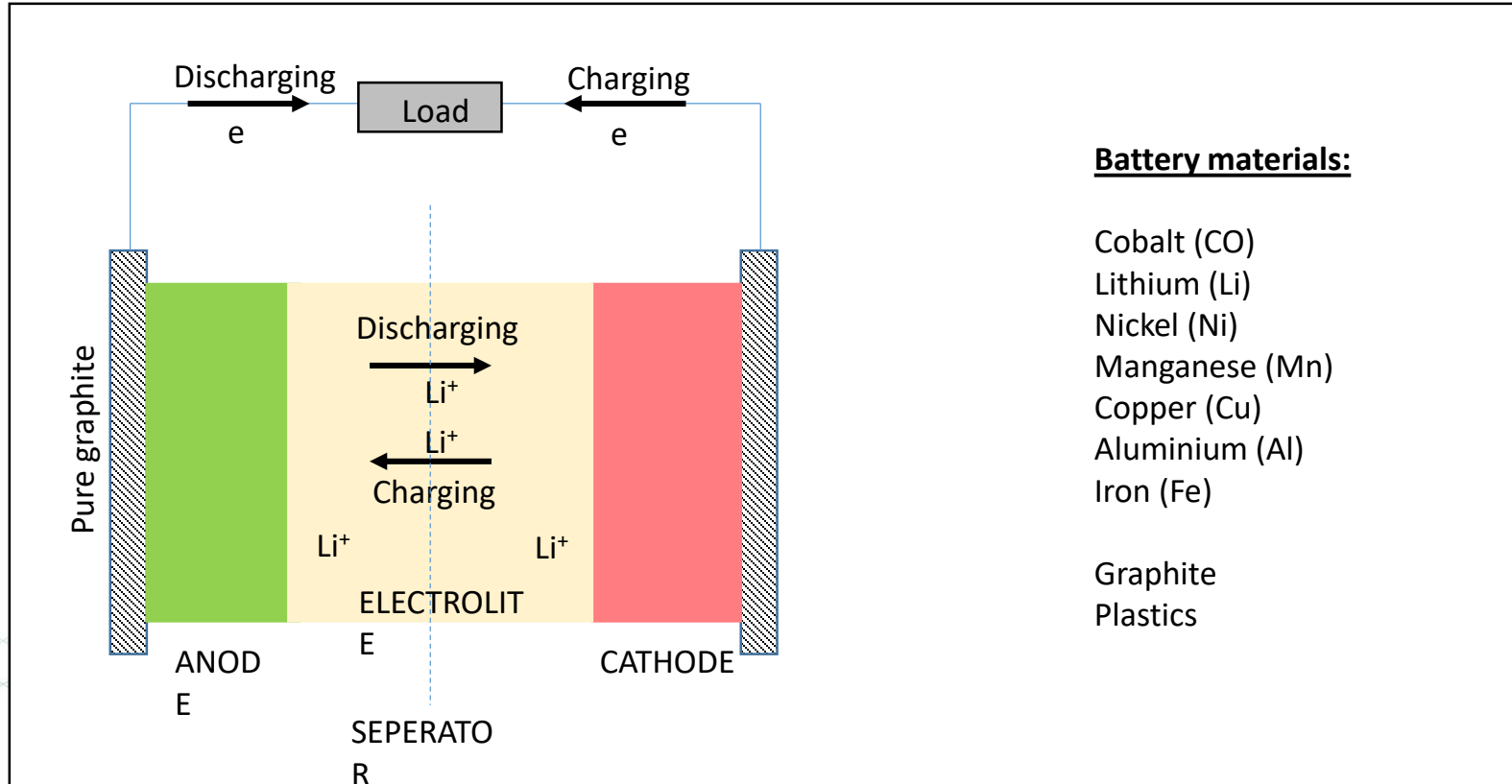
Piet-Jan Vet



Global annual demand for Lithium-ion batteries

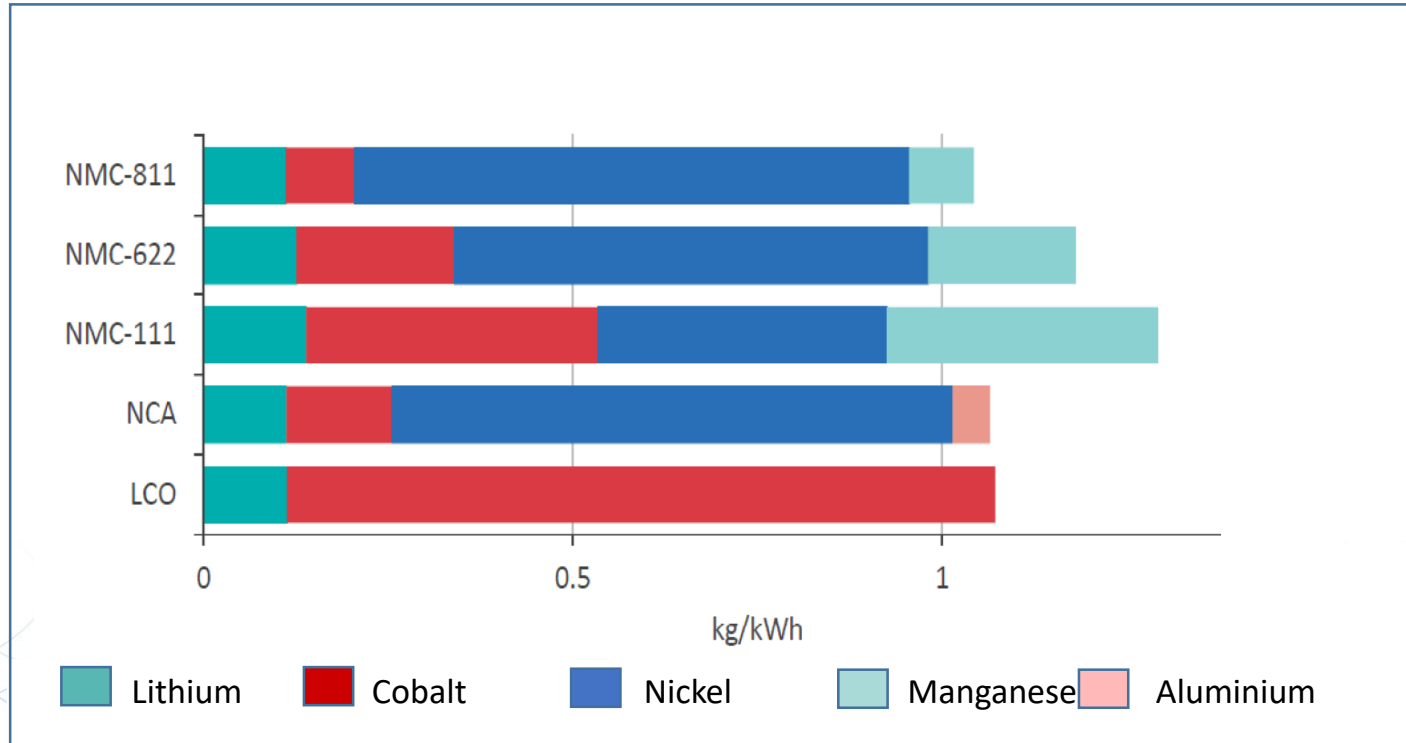


Materials used in Li-ion batteries



Metal content Li-ion battery cathodes

Nickel is becoming the major element



Source: JRC, Olivetti

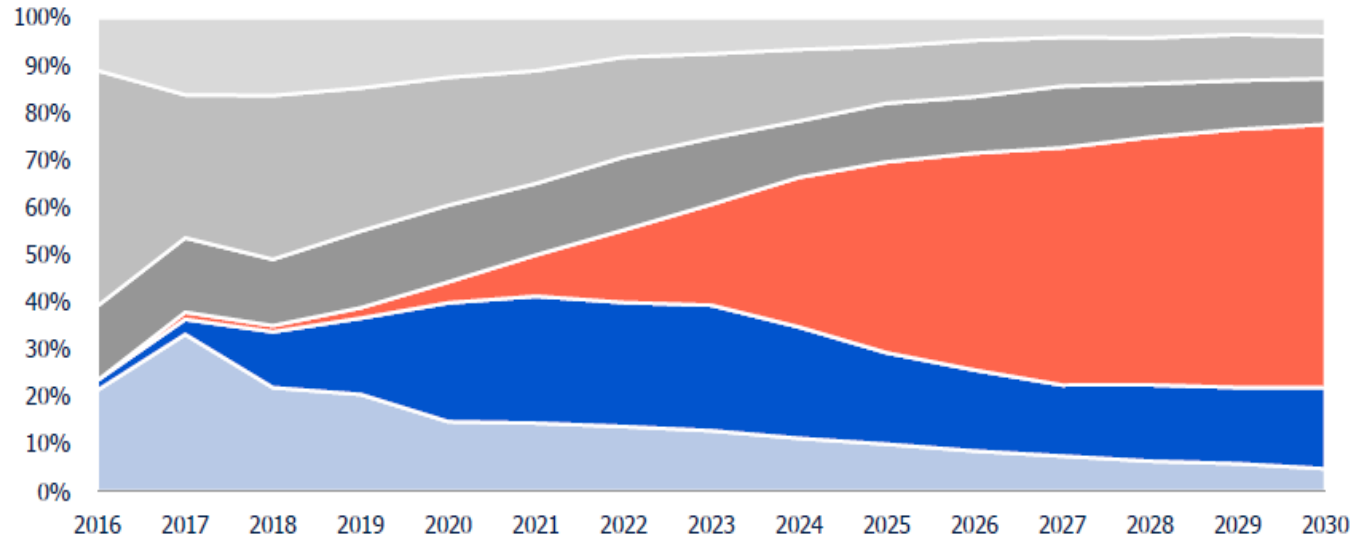
Demand lithium-ion batteries by chemistry



Conservative battery chemistry mix for large batteries (without new chemistry)

Battery Chemistry for CV+PV+ESS

■ NMC 111 ■ NMC 532/622 ■ NMC 811 ■ NCA ■ LFP ■ LMO/LTO

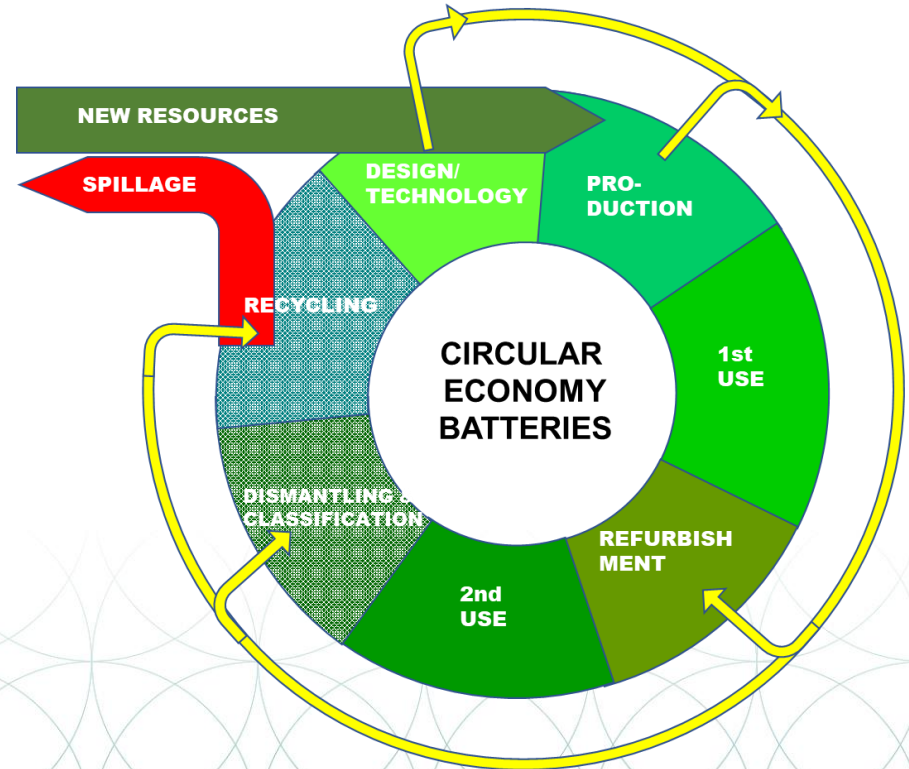


Source: Bernstein, February 2018

Life cycle of (EV) batteries

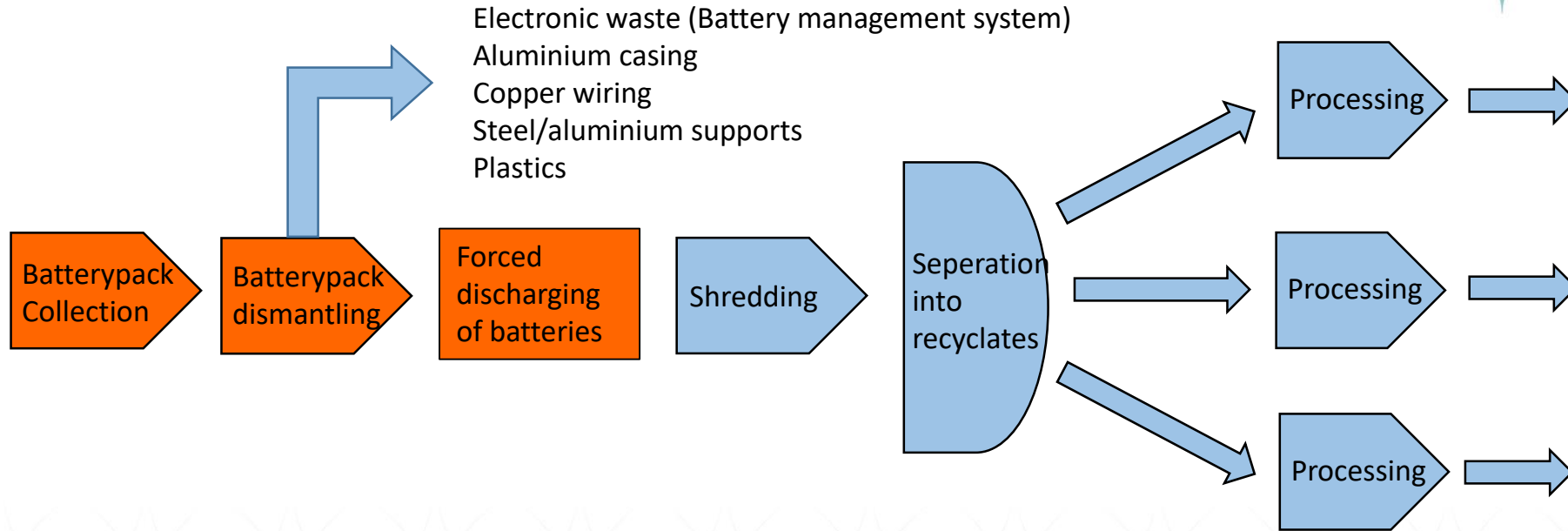
Most current developments are focused on improved battery performance, cost reduction and new battery concepts, while recycling is not yet getting the required attention:

- Battery recycling should become an integral part of battery design and production.
- Design phase should include solutions for 2nd use opportunities and end-of-life recycling
- Innovative and economic battery recycling techniques need to be developed that deliver better recoveries, have a low energy usage and have a minimum environmental impact (CO₂ and NO_x emissions)
- A study is needed to establish a battery recycling infrastructure for the Netherlands with potential opportunities for the Dutch industry.



Schematic infrastructure and recycling steps for end-of-life batteries

metalot



Risks in case of damage/short cut

- Fire
- Explosion
- Toxic fumes

Separation in reciclates and recovery of battery materials:

- Ferro/non ferro metals
- Graphite,
- Plastics,
- Etc

Closing the cycle of battery materials for re-

use



- **Current strong demand of EV batteries will lead to a growing number of used batteries after 2030.**
 - ❖ Based on the annual sales number of cars/trucks in the Netherlands the recycling volume of battery materials will grow to >100-150 kton/a after 2030 (EU: > 2,000 kton/a?)
 - ❖ A recycling infrastructure in the Netherlands needs to be developed with opportunities for the industry
- **Batteries are still in a development phase with changes in technology, composition and design, aiming for better performance and lower cost.**
 - ❖ This leads to (unknown) changes in future composition of the recycling mix.
 - ❖ The industry needs to invest in new recycling technologies and installations.
 - ❖ Use of less valuable metals used in future batteries will challenge the recycling industry to cover the cost for recycling with the return from the recovered metal value.
- **Type/technology of batteries (composition) differ per application and vehicle manufacturer (OEM)**
- **Safety aspects like fire, explosions and toxic fumes during collection, disassembly, transport, and breaking/shredding are complicated and costly (Li-ion batteries remain energized after use)**
- **Alignment of EU regulation is needed for cooperation between the industry and allow cross border solutions for the treatment of recyclates.**



Thank you for your attention

Q&A sessie met presentatoren en Hans van der Weijde (Tata Steel en lid regieteam UPCM)

**Voor vragen, deelname of projectbespreking
neem contact met ons op:
Uitvoeringsprogramma Circulaire
Maakindustrie (UPCM)**

**Via contactformulier van de website
www.circulairemaakindustrie.nl of neem
contact op met Bart Jeroen Bierens,
E: bart.bierens@rvo.nl**