



HYDRO

Technology: Continuous step-changes

Klaus Vieregge



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- 1 Vision
 - 2 Competitive edge
 - 3 Step Changes
 - 4 Industry trends

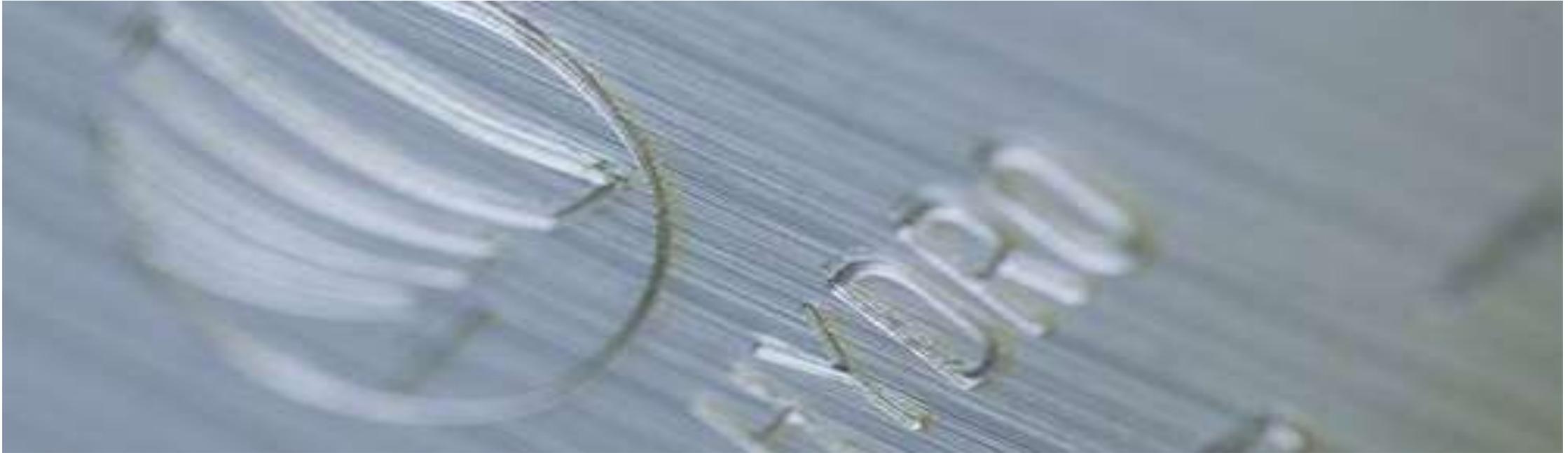


1 Vision

2 Competitive edge

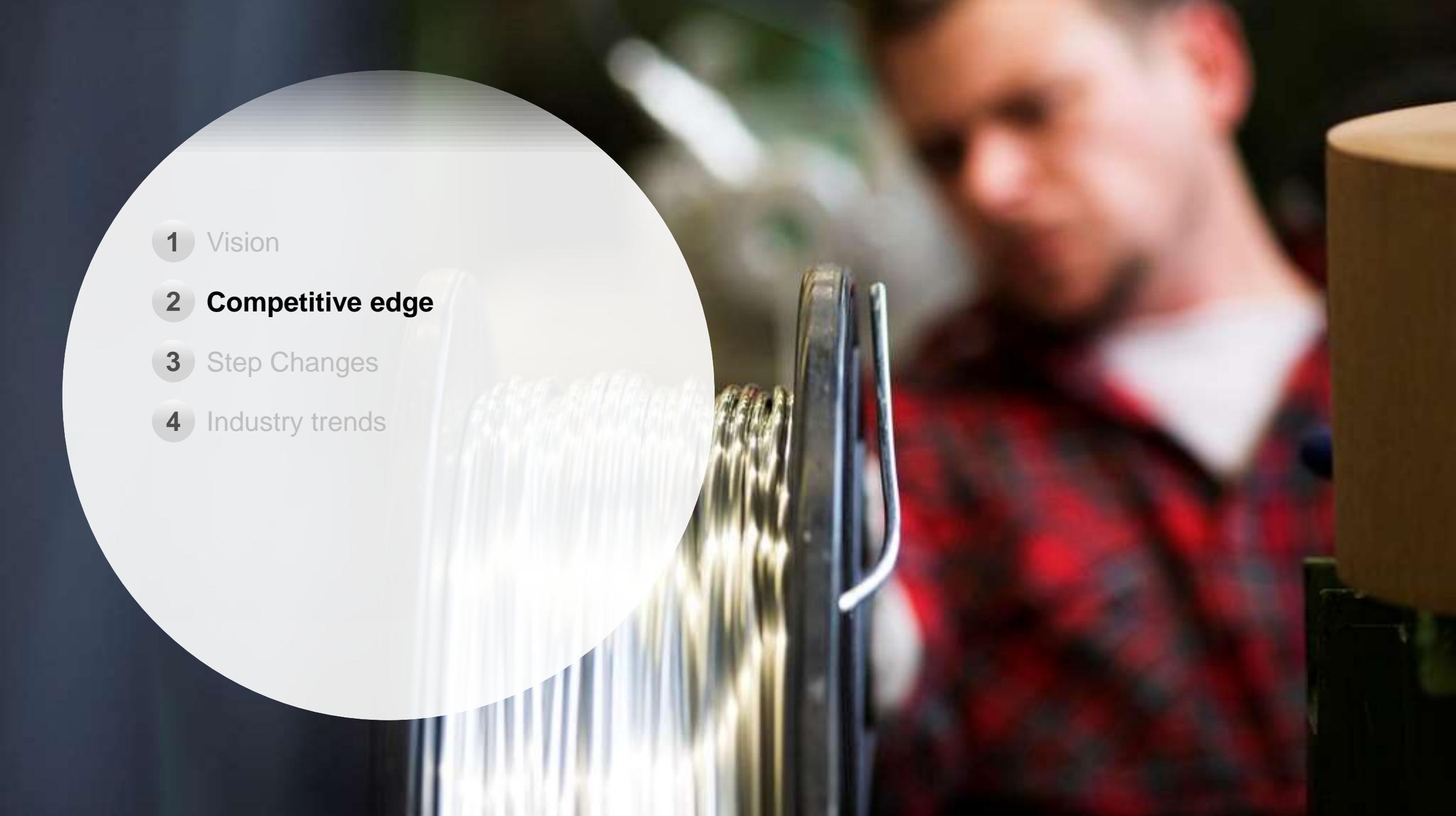
3 Step Changes

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Vision

Innovative and customer-oriented Research and Development with unique competence and flexibility for the whole process chain of the rolling of Al materials.



1 Vision

2 **Competitive edge**

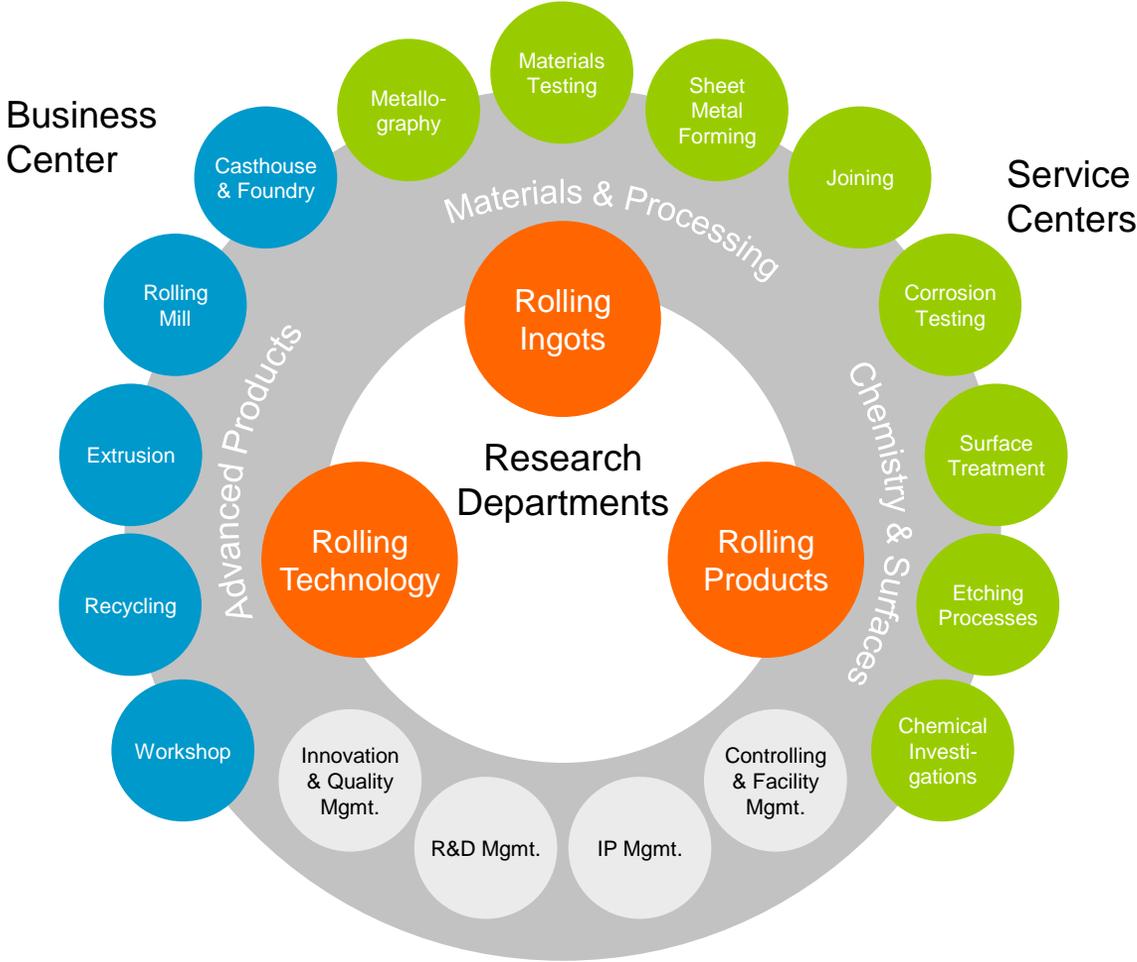
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Organisation



All under one roof!



Missions



Research Departments:

- Development and optimization of products and processes to preserve existing and to open new markets.
- Support the operative units to improve the productivity of processes and the quality of products.

Service Centres:

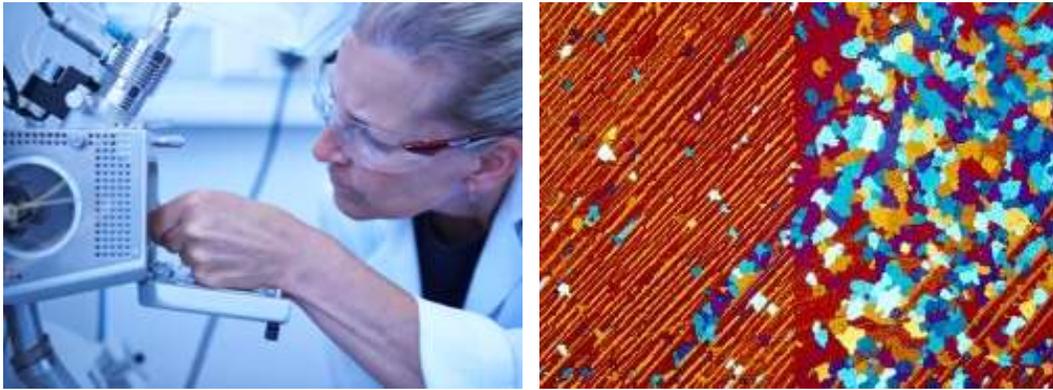
- Support project work by providing first class lab services.

Business Centre:

- Preserve the major labs which are strategically important for R&D through the production of advanced products.

Missions – Service Centres & Business Centre

State-of-the-art analytic equipment



Unique laboratory equipment



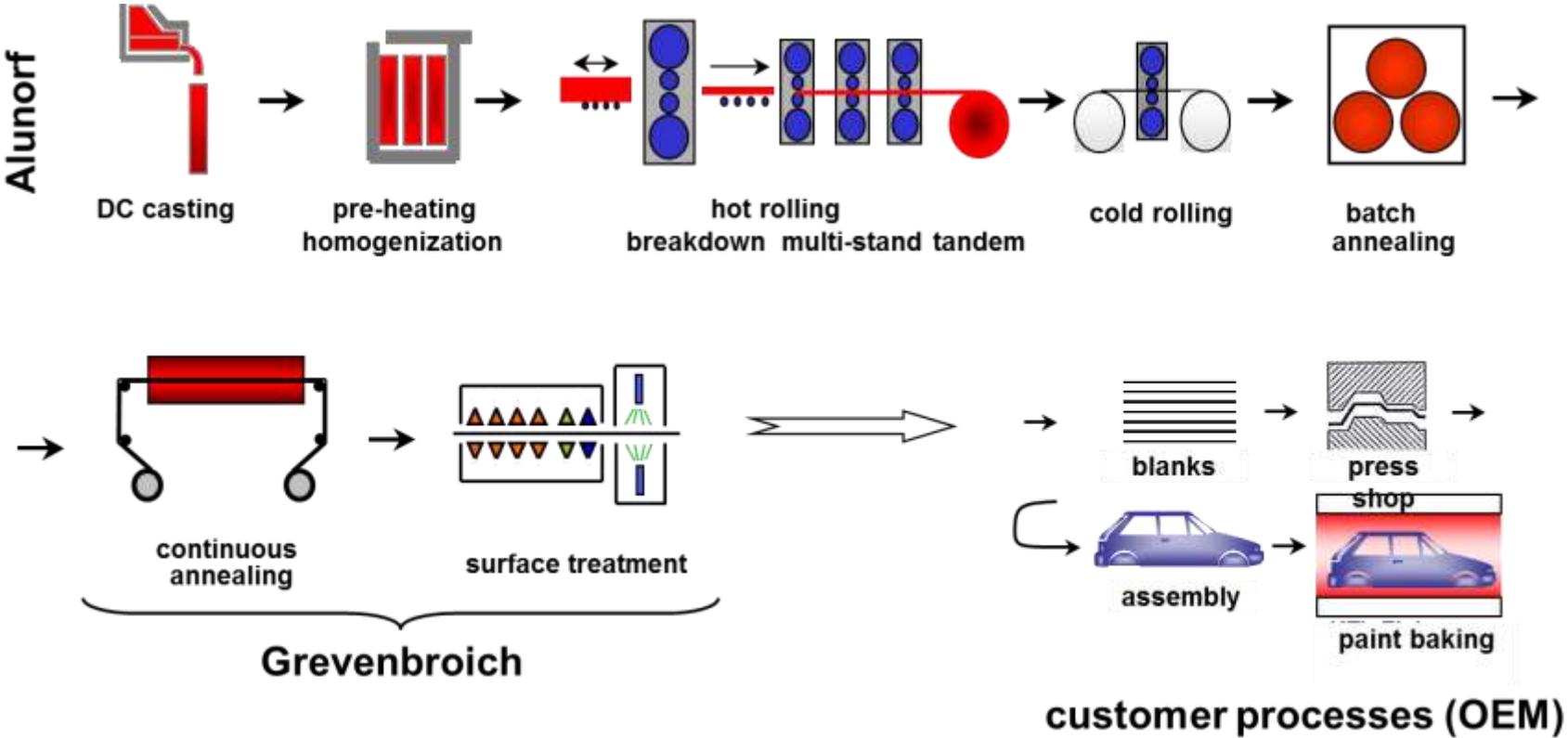
Strategy – Our Assets

Increased focus on innovation and implementation:

- **Efficient innovation process and fast commercialization**
 - Focus on **Step Change** projects
- **Strong involvement of R&D in product and process developments** with Rolled Products' customers, and their customers
- **Pre-competitive research with industry and university partners** (Open Innovation)
 - Growing involvement in University/Industry Cluster **AMAP** (Advanced Metals and Processes) at Aachen University
- **Increased transfer** of existing, leading know-how **into operational performance improvements** at Rolled Products plants
- **Enhanced internal and external networking**

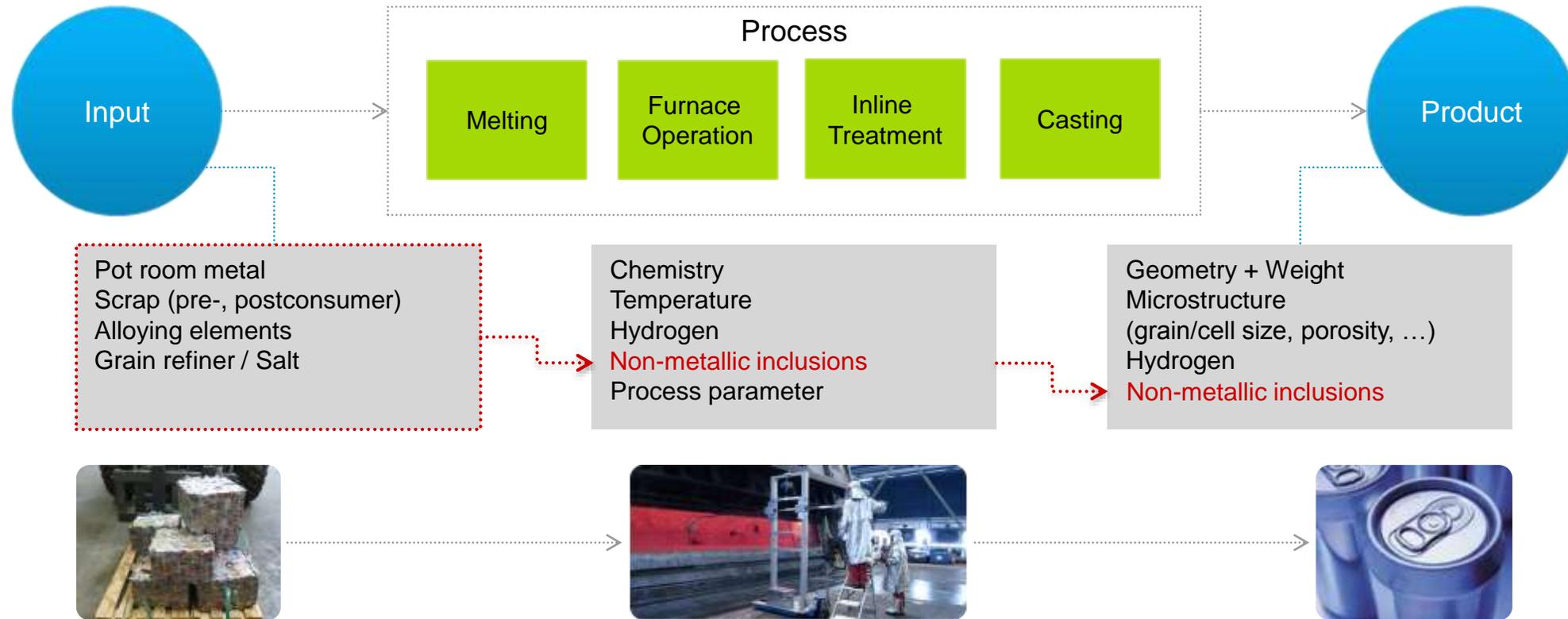
Strategy – Involvement of R&D

Example: Automotive

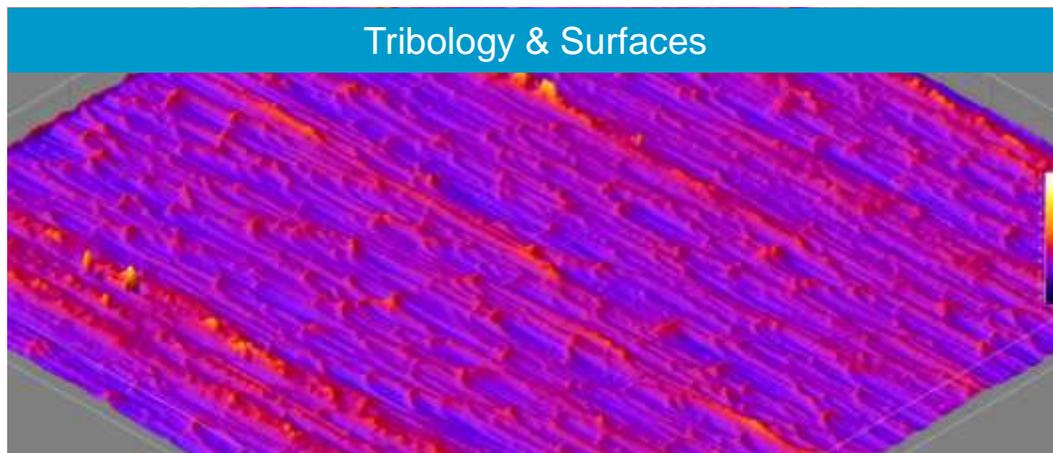
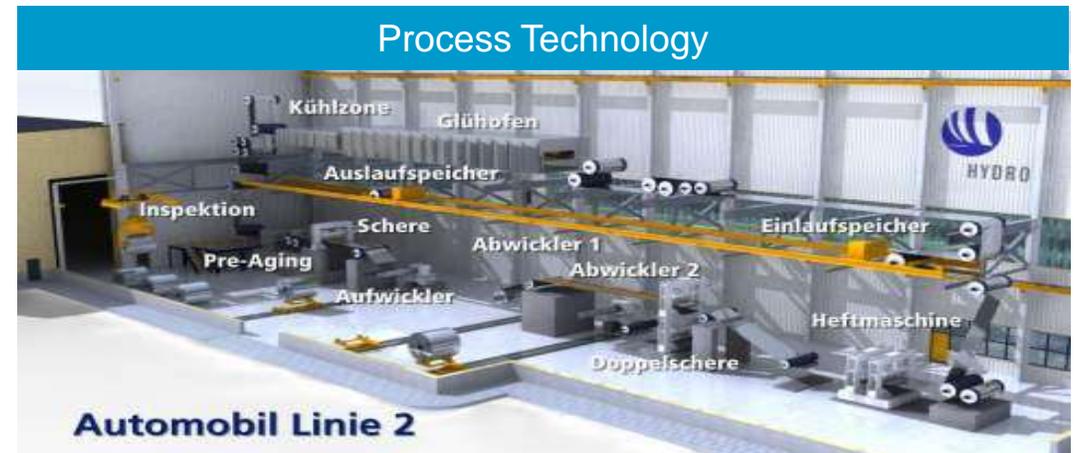
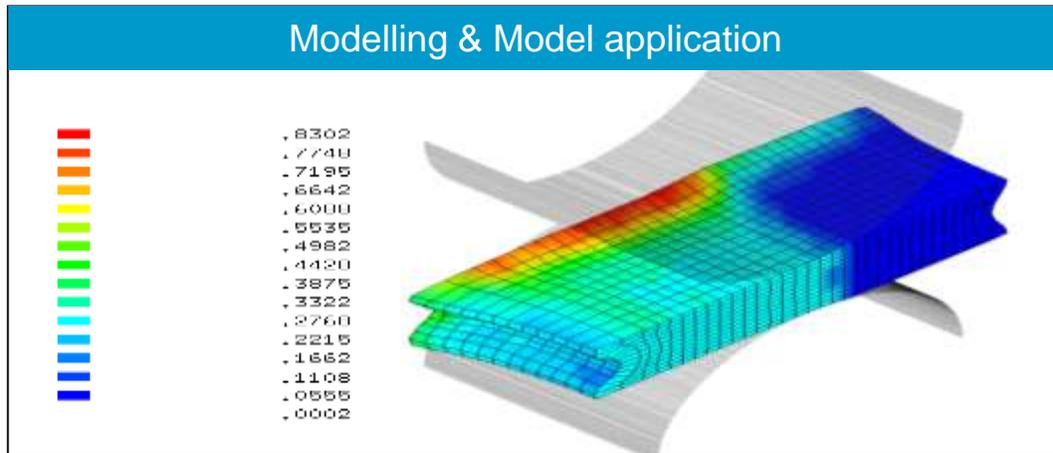


Strategy – Plant Support

Quality Monitoring in HARP Cast Houses



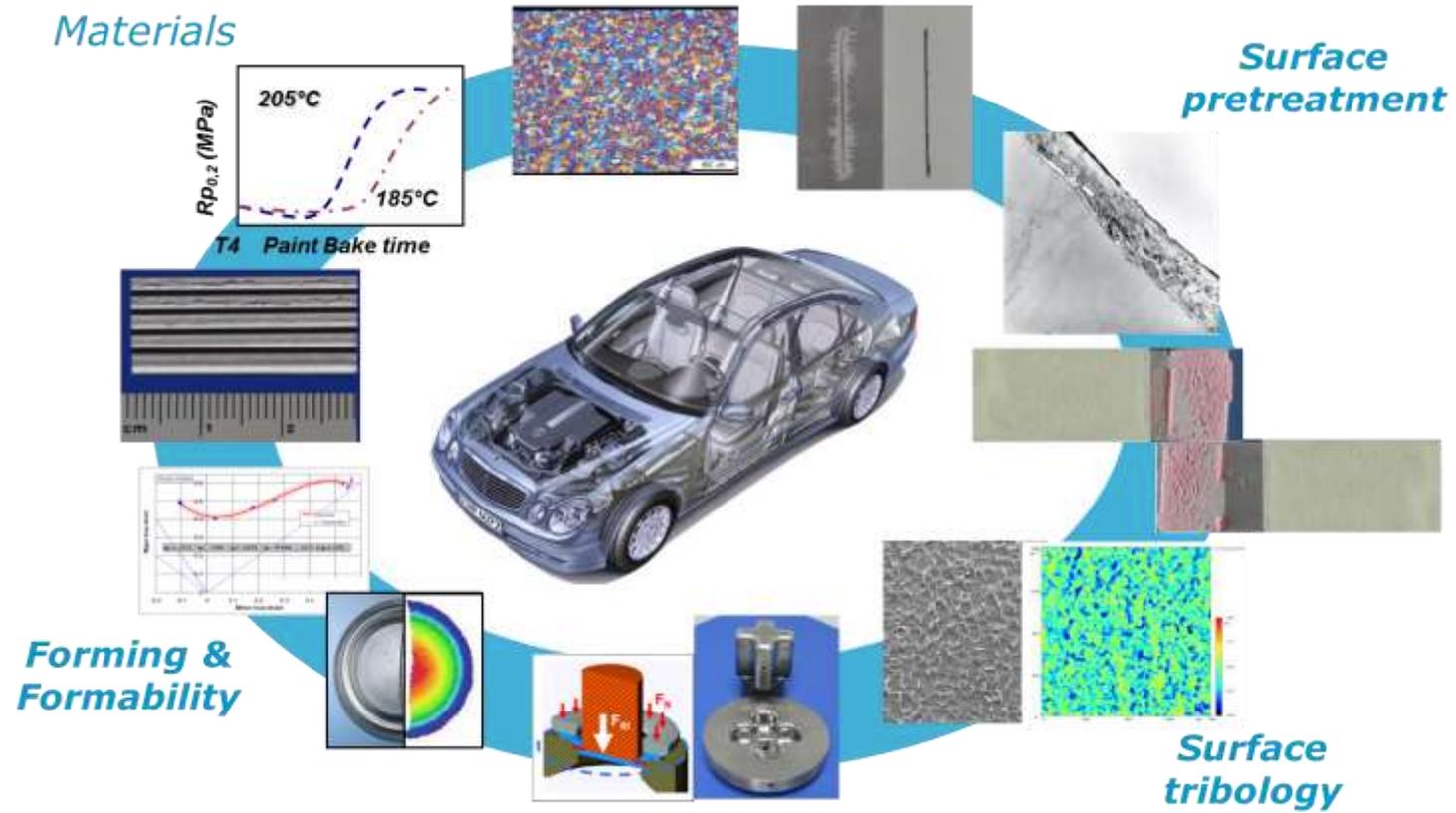
Strategy – Process Development / Modelling



N.B. Human Hair: 40 – 120 µm

Strategy – Product Development

Example: Automotive



Strategy – Contacts and Networks



- Membership in Hydro internal Networks
- Membership in Associations and Committees
 - EAA (European Aluminium Ass.)
 - GdA (Association of the German Aluminium Industry)
 - ...
- Cooperation with Universities
 - RWTH Aachen
 - AMAP Cluster (Advanced Metals and Processes)
 - ...

Strategy – Contacts and Networks



AMAP
Advanced Metals
and Processes

Research-Cluster
for NF-Metals
at RWTH Aachen

Open Innovation Research Cluster





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Step Changes – Definition

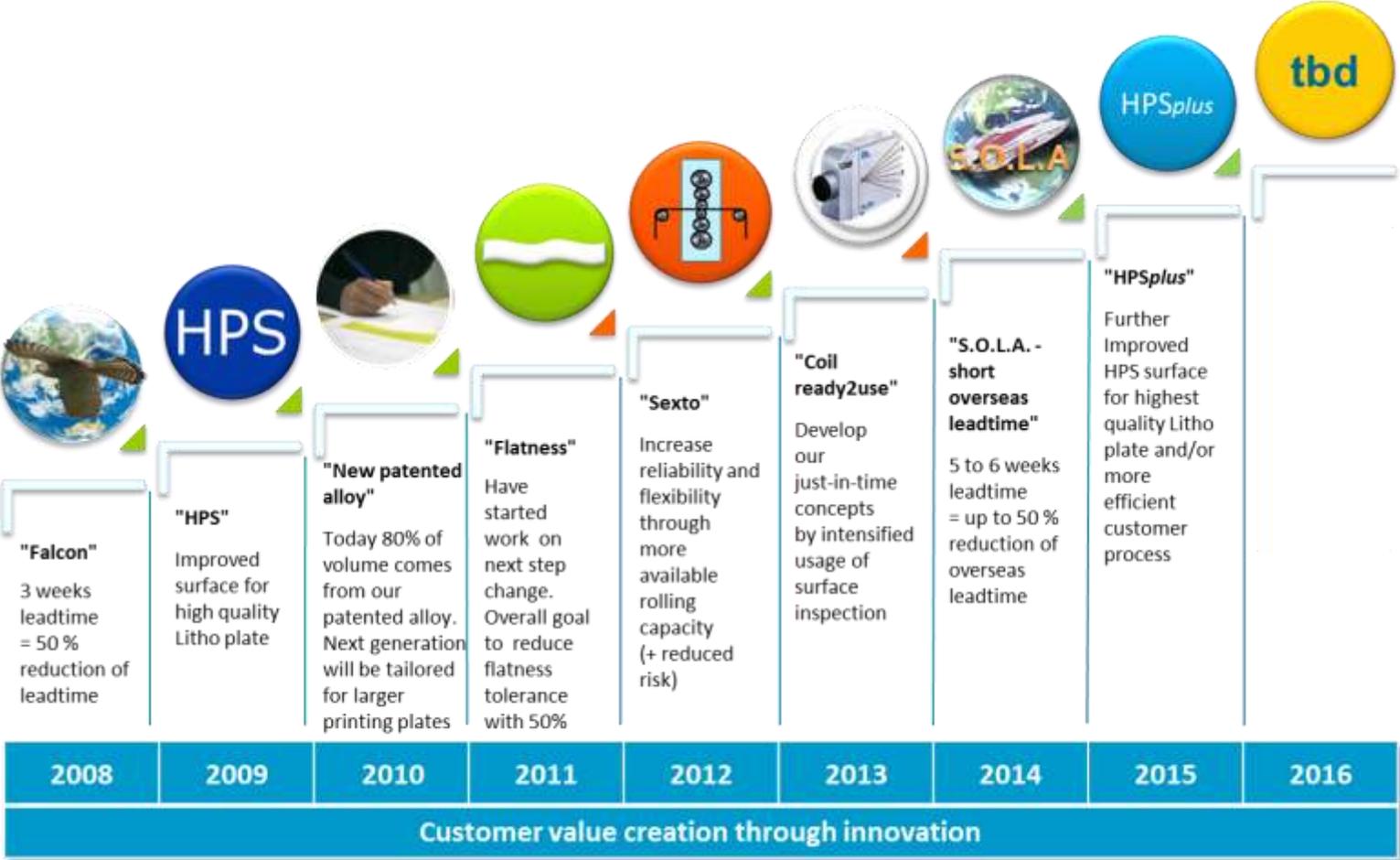
Step Change:

Definition: Development of next generation of current operating processes, existing products, respective novel processes and products.

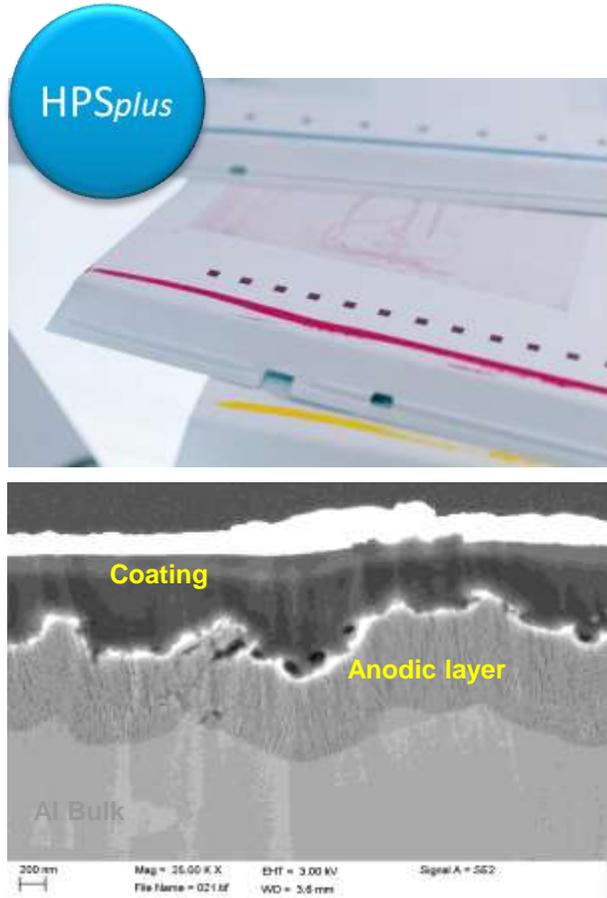
Potential: Medium to high business potential, medium risk, medium efforts, medium to long term.



Step Changes – Lithography



Step Changes – Lithography



HPS (Hydro Pre-treated Surface)

Dedicated surface treatment for lithographic sheets to improve the product quality and the customer's processes (production of offset printing plates)

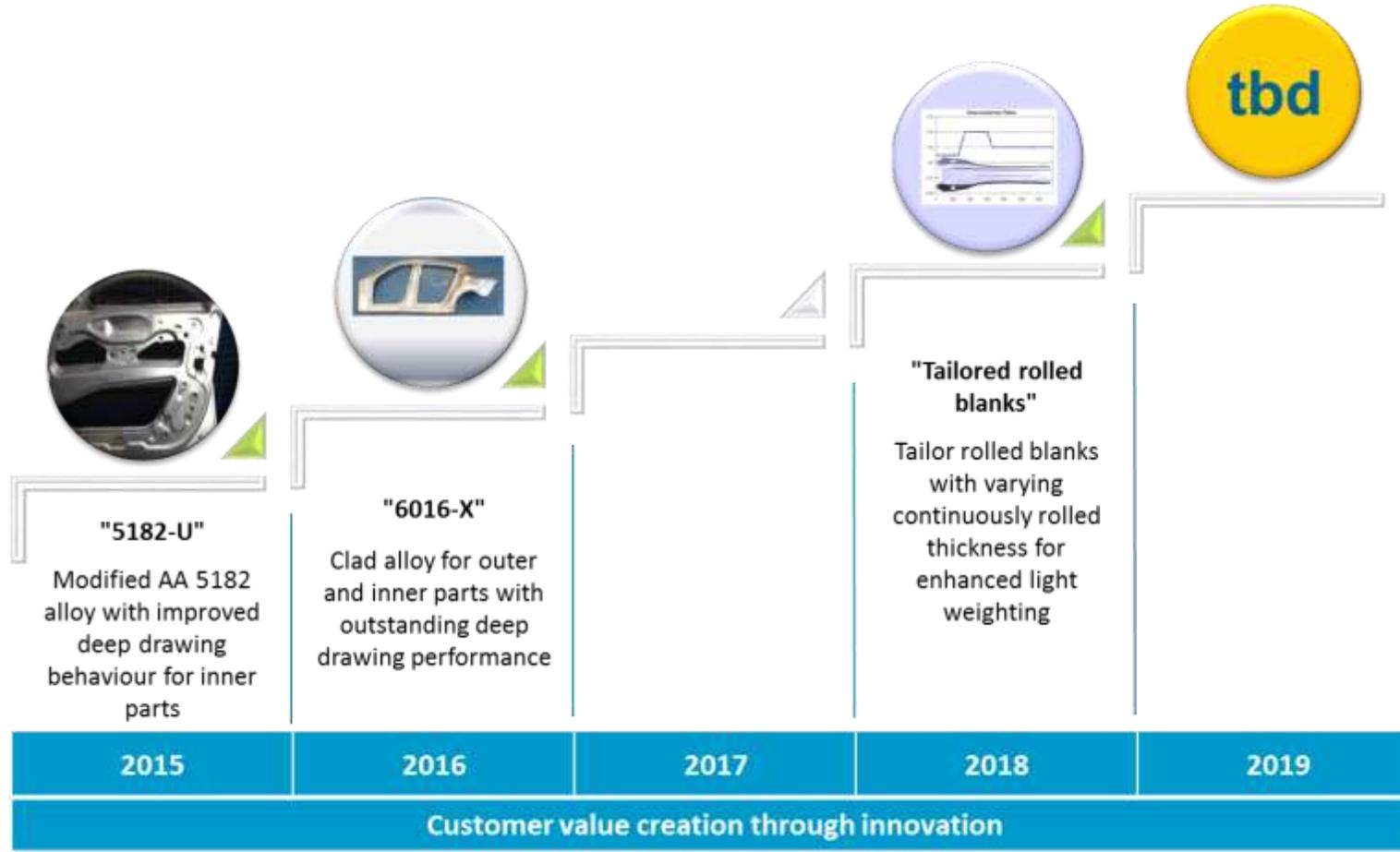
Optimized HPS processes HPSplus

- Higher cost efficiency and greener: less energy consumption, higher customer process speed
- Further improved graining performance and lower number of surface defects in the processes of our customers

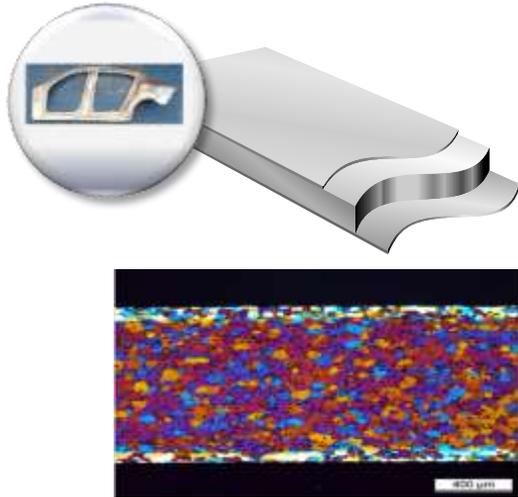
Status

- Prove of concept in ongoing customer trials
- Further evaluation of positive effects

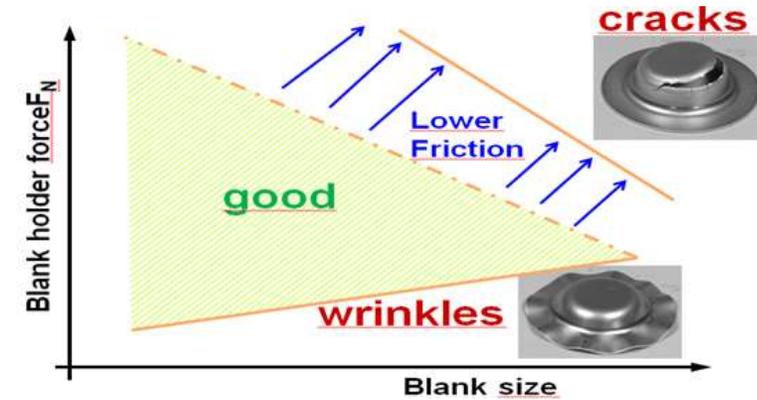
Step Changes – Automotive



Step Changes – HA 6016-X



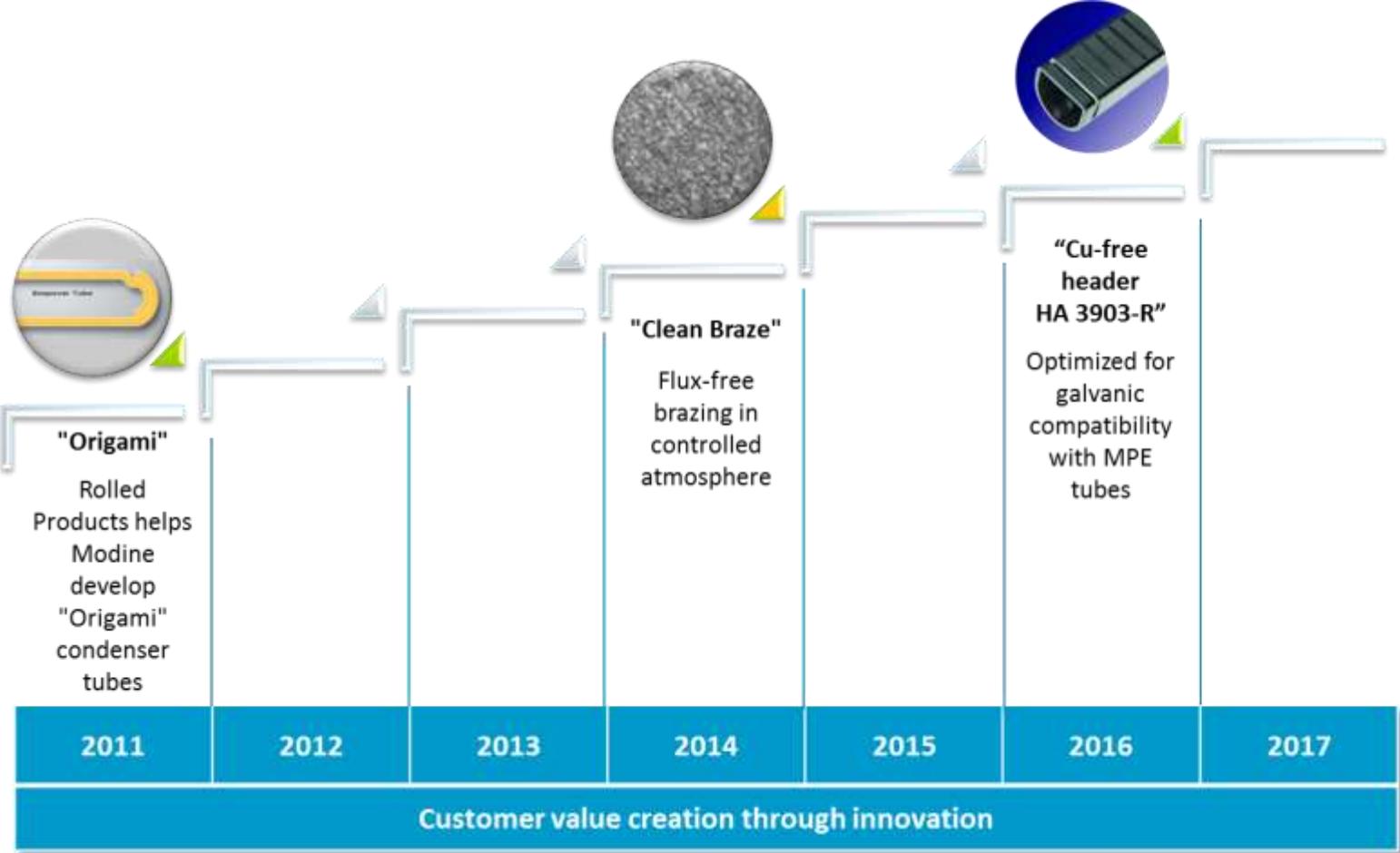
Functional Al-layers



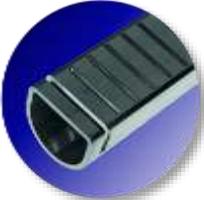
Press trial with HA 6016-X on die designed for steel, radii changed for aluminium

- New clad alloy significantly improves formability
- Enhancing freedom of design
- Cost advantages over multi piece solutions on customer side
- Compatible alloys - no downgrading of existing recycling concepts

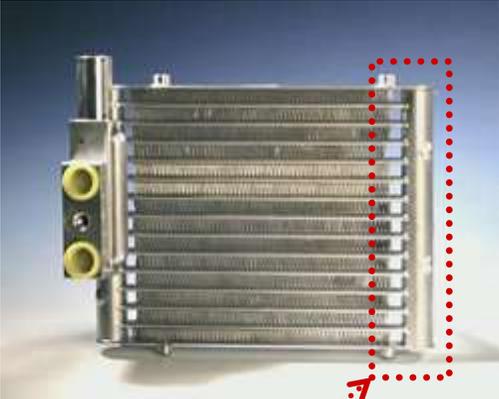
Step Changes – Heat Exchanger



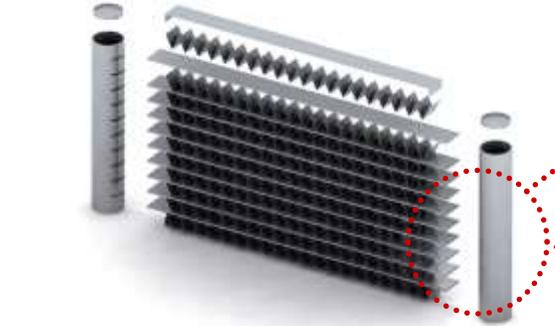
Step Changes – Heat Exchanger



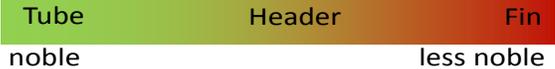
Cu free header HA 3903-R
Optimized material combination to enhance corrosion resistance



Header



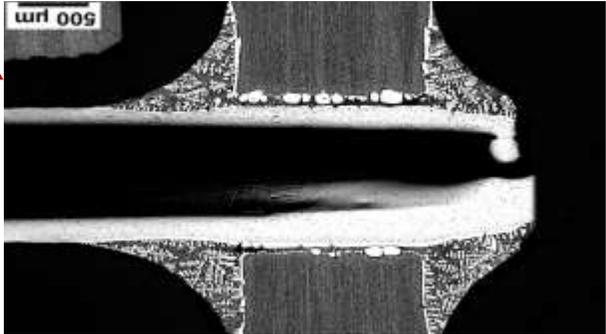
Corrosion potential



Cross section after severe corrosion test (SWAAT)

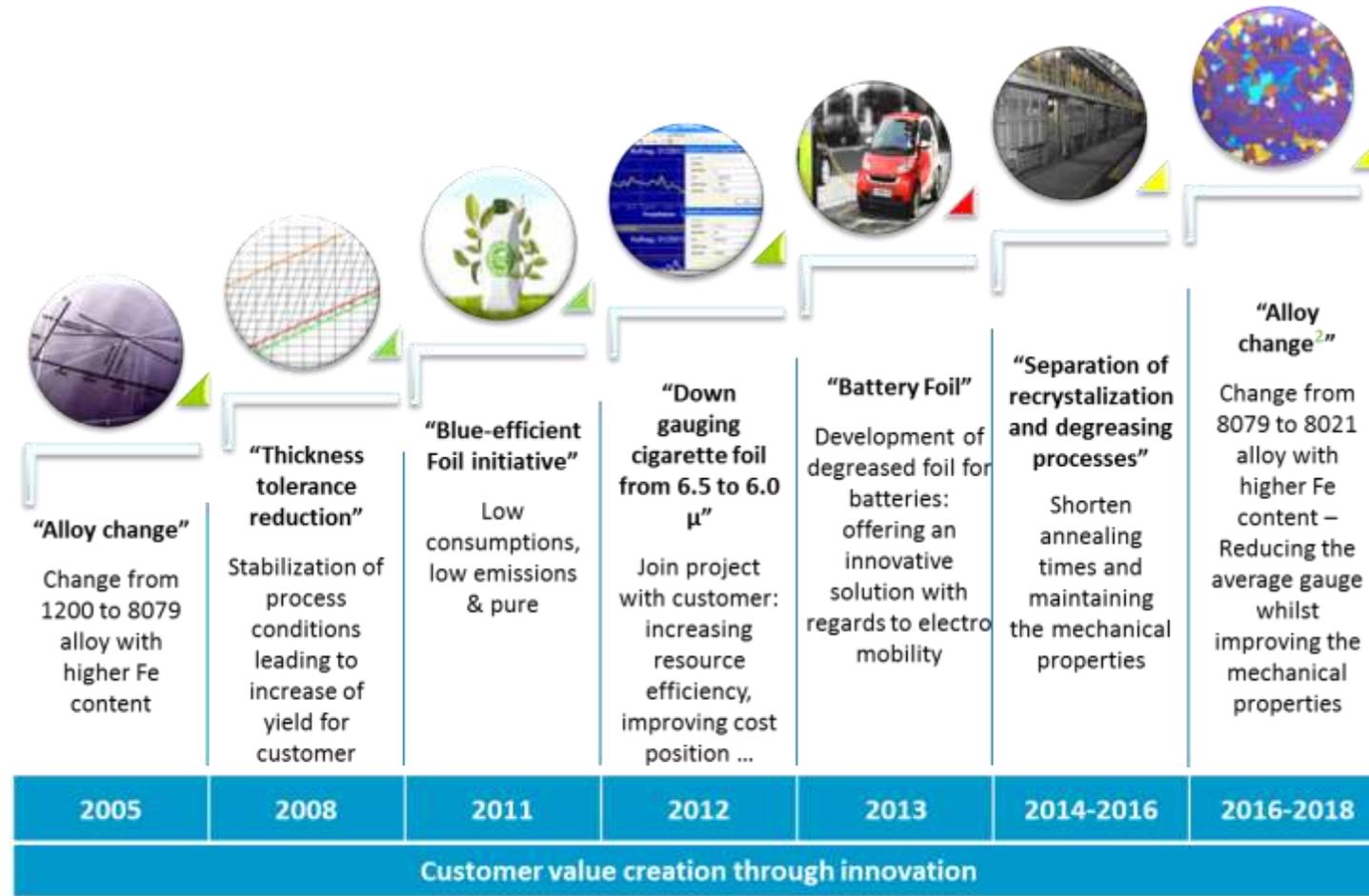


Standard

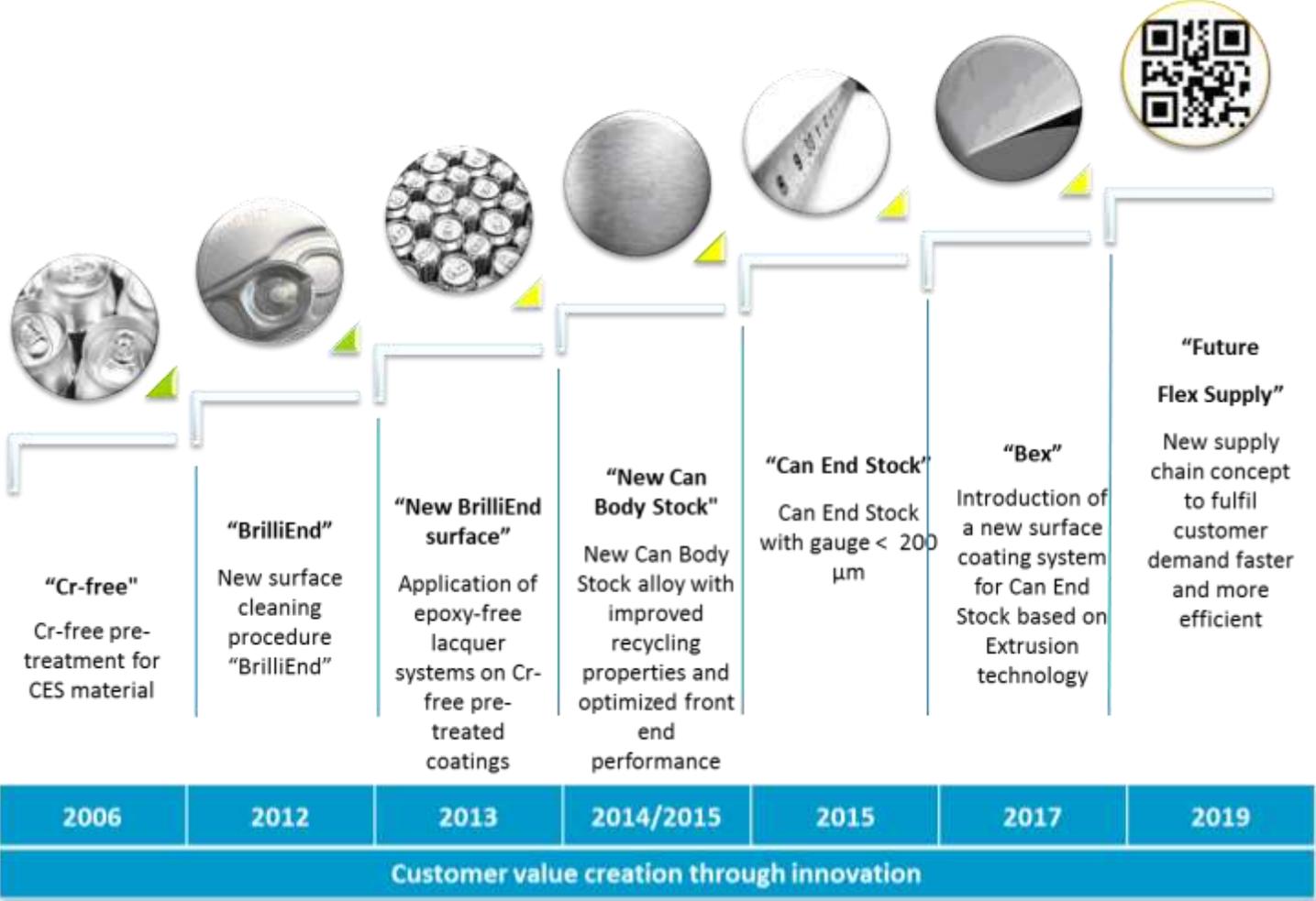


HA 3903-R

Step Changes – Foil



Step Changes – Can



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Industry Trends

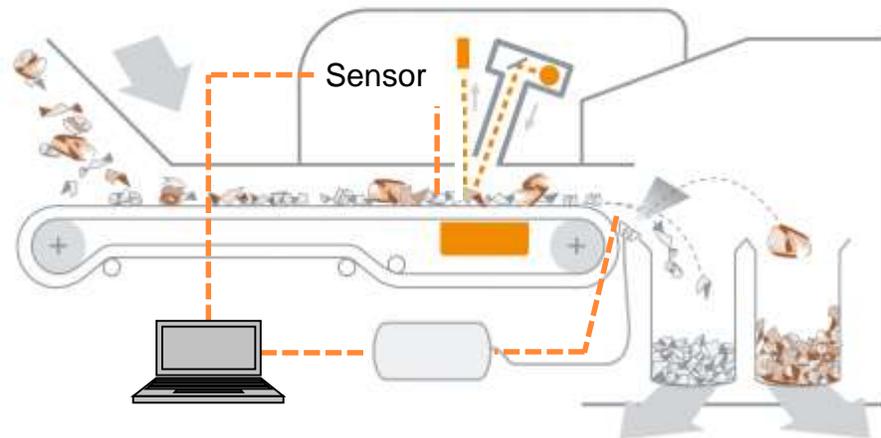


- Advanced materials
 - Materials designed to have superior characteristics or functionality
- Life cycle assessment
 - Recycling
- Cloud technology
- 3D printing
- Big data (Industry 4.0)

Industry Trends - Flashlights

Full Aluminium Concept

- Extrusions
- Bended extrusions
- Tailor Rolled Tube
- Hydroforming
- Cast nodes



Light weight designs

- Enabling the substitution of steel by aluminium for vehicles with design roots in steel
- Enabling freedom of design for new aluminium based BIW design
- Show-up potential of light weighting in hybrid and full electric vehicles

Sustainability

- Sorting technologies

