





Vision & innovation

WITH

Industrial solutions

**For a better future**

# Our Identity

The CRM Group (Center for Research in Metallurgy) is the result of the merger of independent & private research centers. Since 1948, our activities have been focused on processes, products & solutions for metallurgical applications



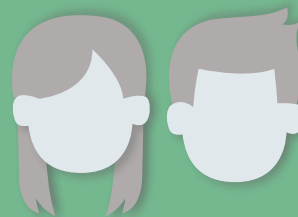
For a better future

# CRM Group

Independent  
Research organization founded in 1948



290+  
researchers



49M €  
Global budget



Capex budget  
> 4M €/year



Liège & Ghent

Lab surface >  
20.000 m<sup>2</sup>



# Our mission? Innovate!

## 01.

Support you, innovate and  
provide you with new  
industrial solutions

## 02.

Create value through  
innovation, participate in  
your transformation and  
generate new markets

# Our Vision

Empower metals in the societal,  
environmental and economic  
challenges of our world





# Our Values

Attachment to **innovation**, professional conscience,  
**collective** intelligence & **independence**

# Our Unique Approach

- Holistic product – process – application approach
- From lab scale over pilot lines to industrialization
- Multi-sectorial approach – cross-pollination



# CRM Group in the world

- Global presence with activities & customers all over the world
- Unique skills developed by more than 265 engineers



# Our services

- Research project with extensive experience and assistance in project call preparation (Regional and European)
- Industrial technical assistance and senior expertise in material evaluation
- Prototyping, design and realisation of simulation test benches
- Licensing of new in-house developed technologies
- Exclusive advantages thanks to CRM Group Membership



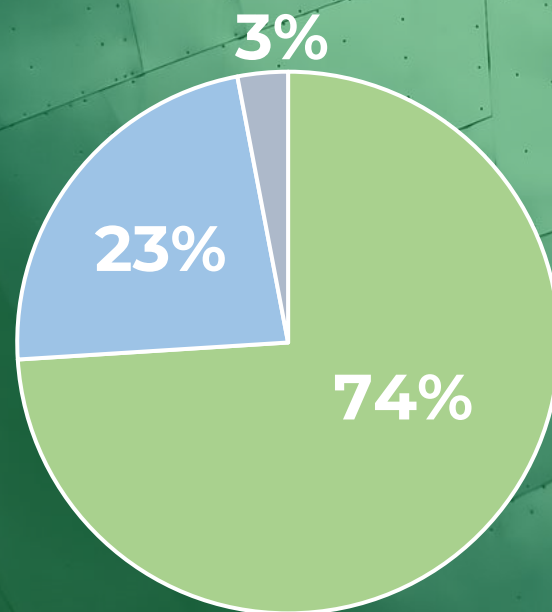
# Industrial members & clients

- More than 45 members
- More than 350 clients / year
- Over 100 small & medium companies





# Income by financing



- European Grants
- National & Regional Grants
- Industrial collaboration

**Total income : 45,9 Mio. EUR**

## Financial leverage thanks to

- Collective research programmes
- Regional, Belgian & European funds through calls for projects
- French tax credit for research activities

# Our development axes

Vision & innovation with industrial solutions

PROCESS – PRODUCT –  
APPLICATION  
DEVELOPMENT

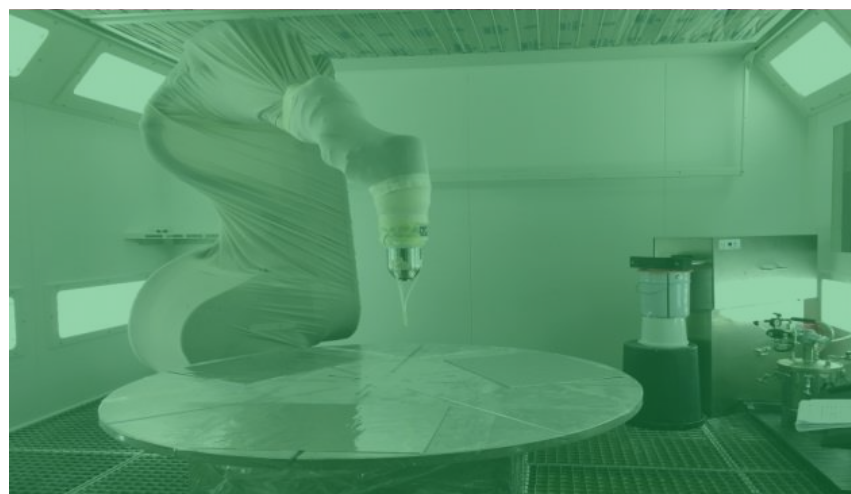
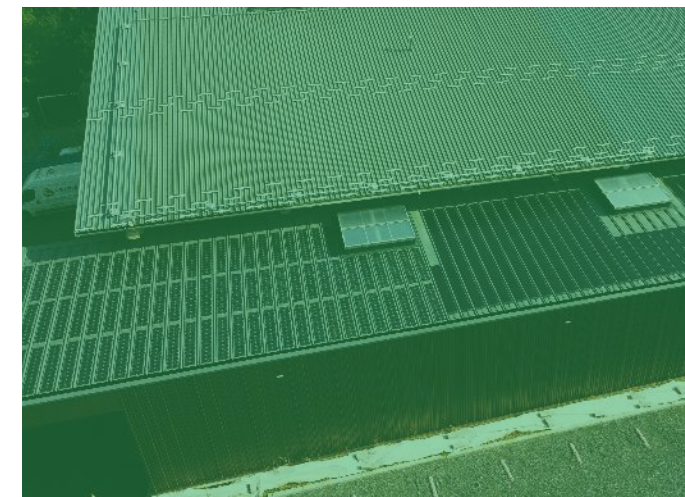
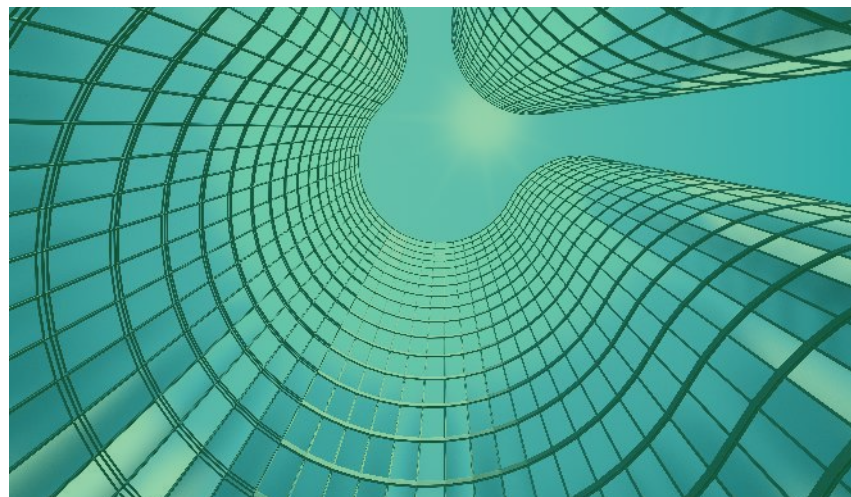
ENERGY SHIFT

ADVANCED  
MANUFACTURING

INDUSTRY 4.0 &  
DIGITALISATION

CIRCULAR ECONOMY

CONSTRUCTION



For a better future

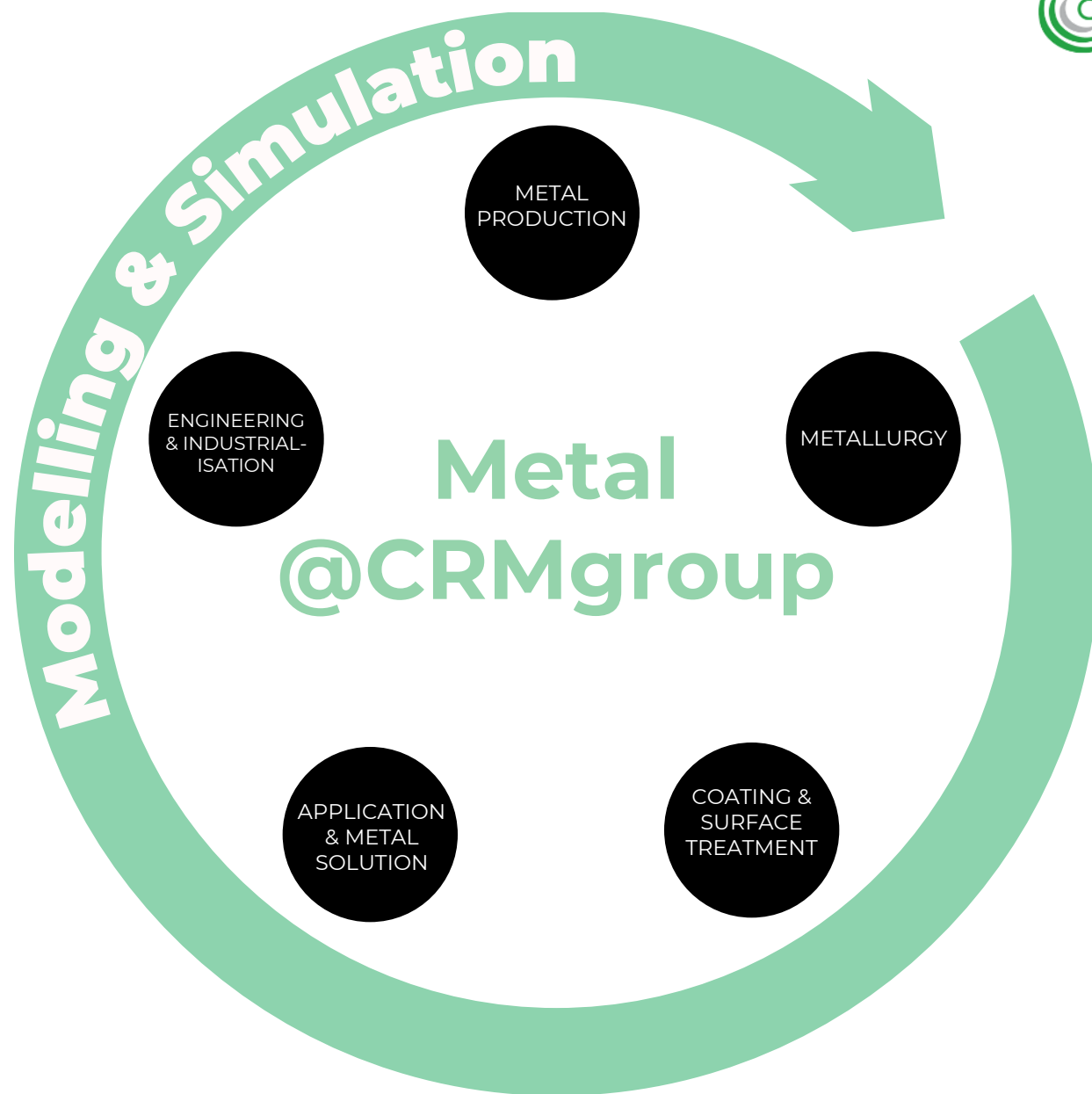


# Our core business

For a better future



# Metal



# Metal @CRMgroup

In practice



From lab to market

## Lab facilities for product, process, development

..., alloy design, metallic & organic coatings, vacuum deposition, surface treatment & formulation,...

## Pilot facilities & home made engineering

Iron & steel making, casting, rolling, annealing, galvanising, vacuum, electroplating, surface treatments, painting, printing, ...

## Industrial breakthrough

Online measurement monitoring, cooling technologies (mulpic, tempcore,...), (HJN), Jet vapor deposition

## Products & solutions success

Innovative sandwich panels, hybrid surface treatments, ZnAlMg based coatings, coil coating

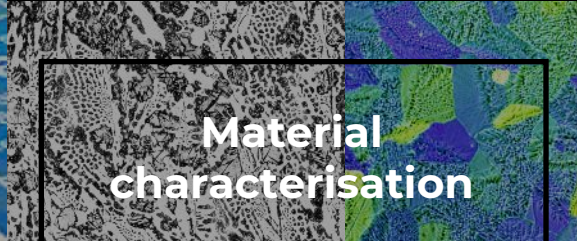
# Services 4Materials @crmgroup

In practice



## Material knowledge

- Material physics
- Physical Metallurgy
- Material selection
- Library
- Norms



## Material characterisation

- Macro to nano
- Mechanical properties
- Analytical chemistry
- Metallography
- Material constants



## Material modelling & in-use properties

- Modelling tools
- In-use properties testing
- Material evaluation
- Forming & assembling
- Corrosion



## Material in-service

- On-site analyses
- Non-destructive tests
- Expertises (product, process, homologation, flaws and defects)



# Our platforms



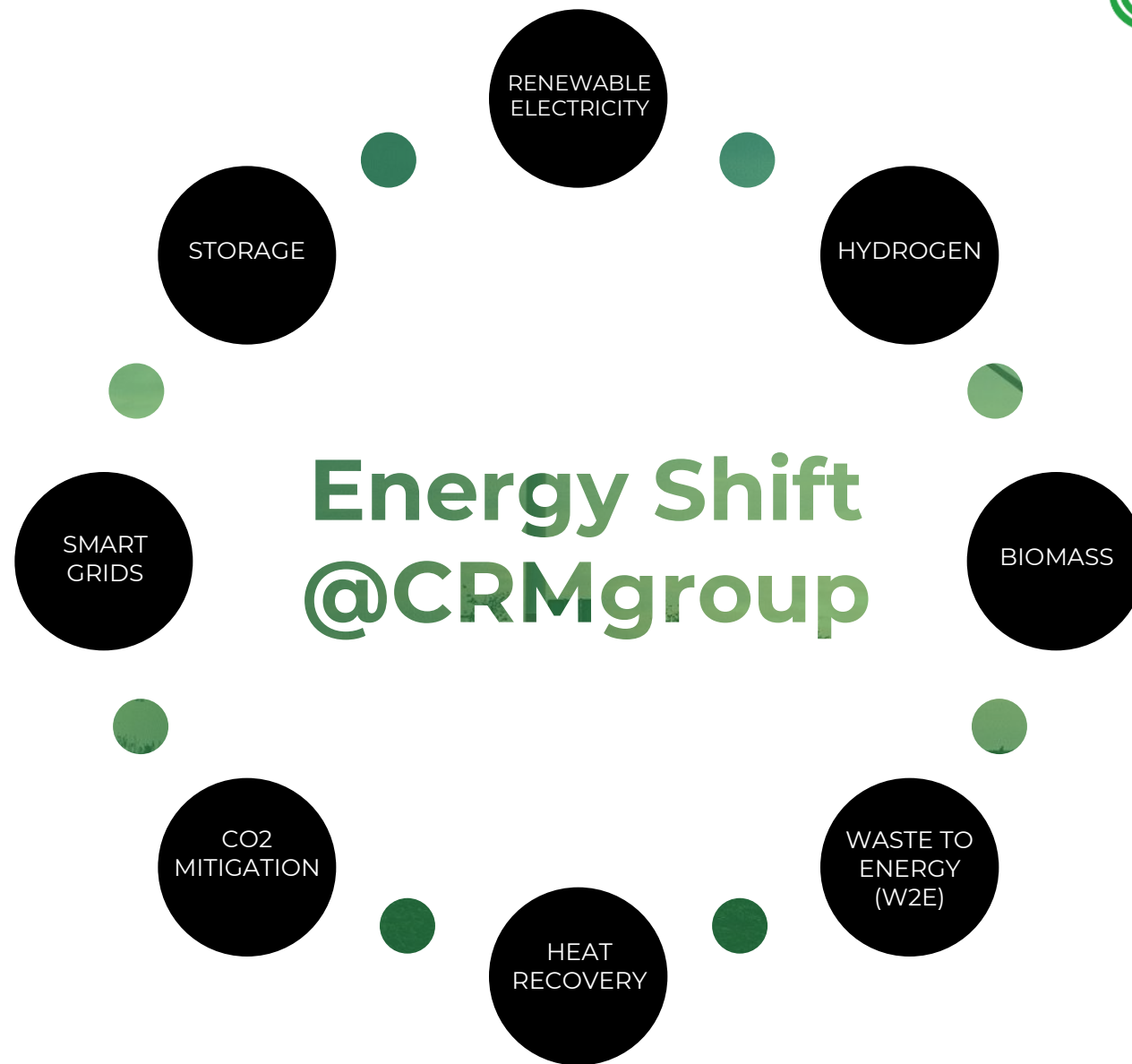


# Energy Shift



# Energy Shift

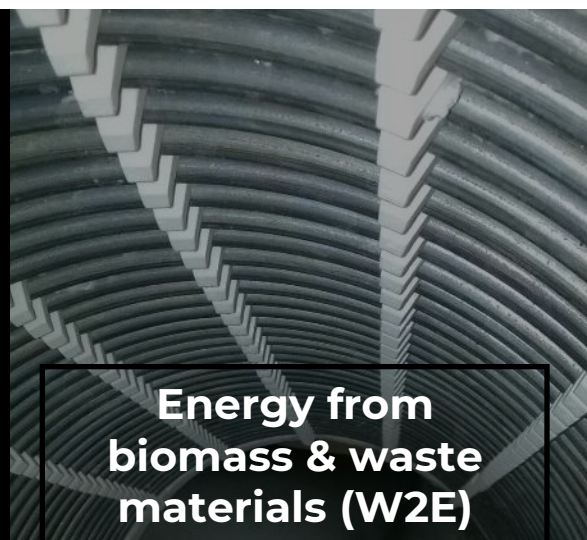
A competence pool to support the necessary shift to green energy and low impact industry





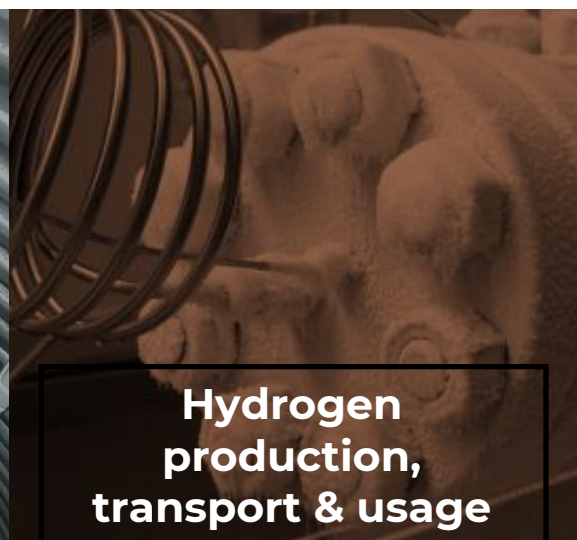
# Energy Shift @CRMgroup

In practice



## Energy from biomass & waste materials (W2E)

Conditioning, pre-treatment, carbonisation, gasification  
Industrial CO<sub>2</sub> mitigation  
CCUS, synthetic fuels



## Hydrogen production, transport & usage

Unique testing tools  
Materials, coatings and assembly solutions for water electrolysis, pipes, storage tanks and fuel cells



## Renewables, energy storage and local power management

PVs, solar concentration, wind, batteries, smart grids  
Technology, materials, coatings, structures, user-oriented solutions



## Analysis, overall assesment and integrated systems

Heat recovery and re-use  
Heat integration  
Phase-change materials  
Holistic optimisation of CO<sub>2</sub>, energy efficiency and costs



# Advanced Manufacturing



# Advanced Manufacturing

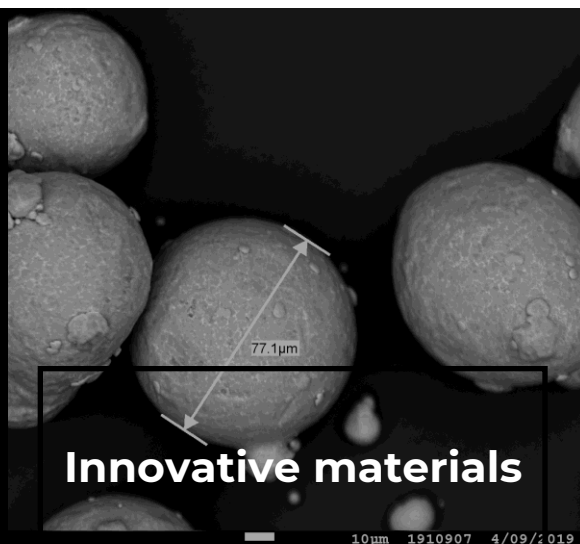
Driven by industry and active on all the value chain





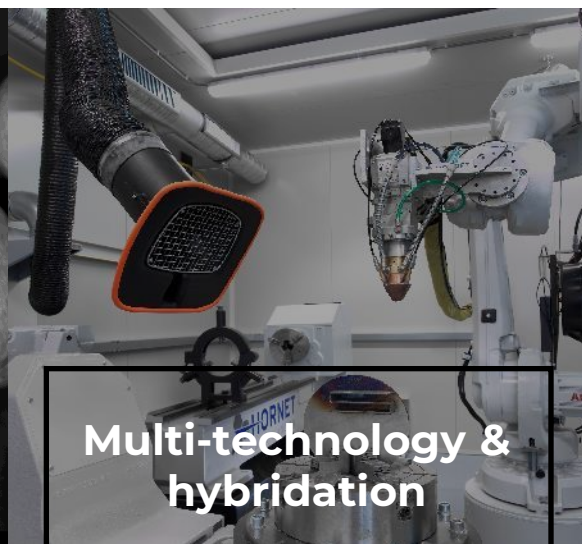
# Advanced Manufacturing @CRMgroup

## In practice



**Innovative materials**

Design, casting, processing of innovative alloys for additive manufacturing



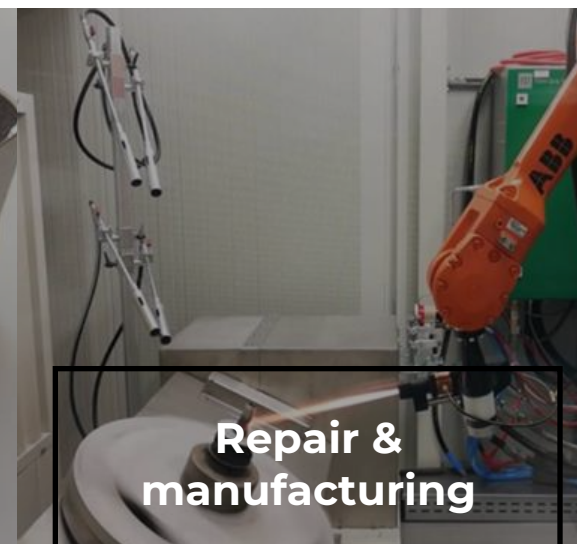
**Multi-technology & hybridation**

Optimisation of manufacturing technologies for large parts using wire or powder



**Post treatments**

Development and industrialisation of surface treatments of AM parts



**Repair & manufacturing**

Repair of industrial parts to improve life durability

# Digitalisation

# Industry 4.0

In harsh  
environment

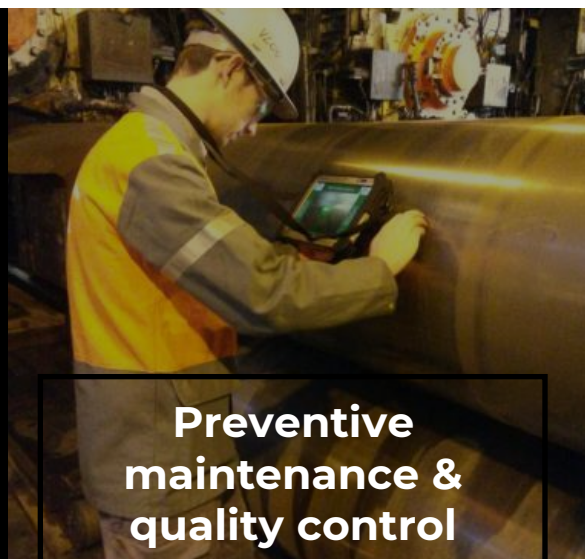
**Smart** metal  
products and  
solutions





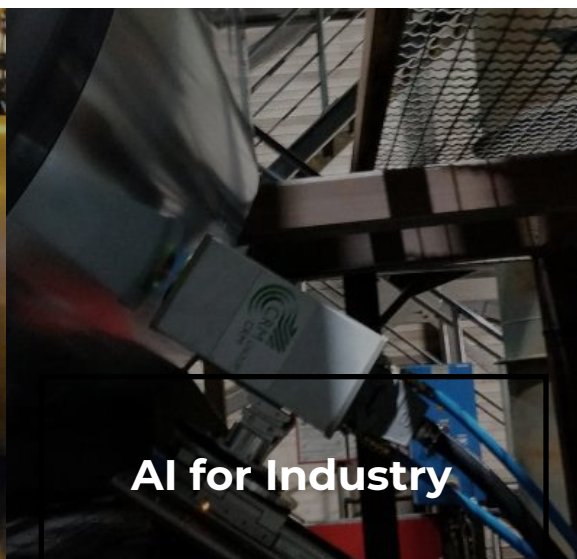
# Digitalisation @CRMgroup

## In practice



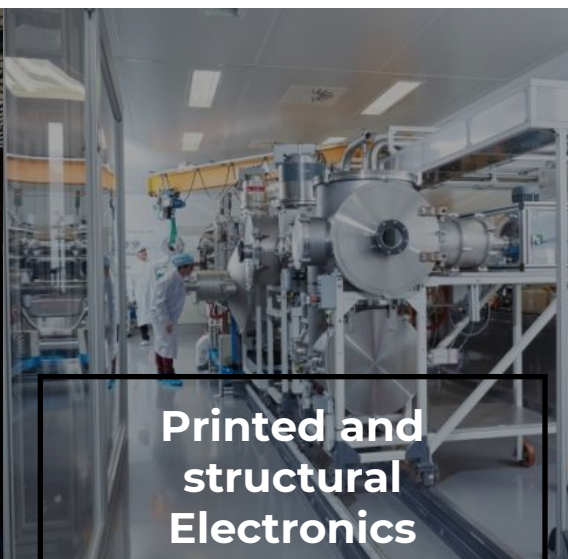
### Preventive maintenance & quality control

Tablets and sensors to support operators



### AI for Industry

Compact sensor integration coupled with data analytics



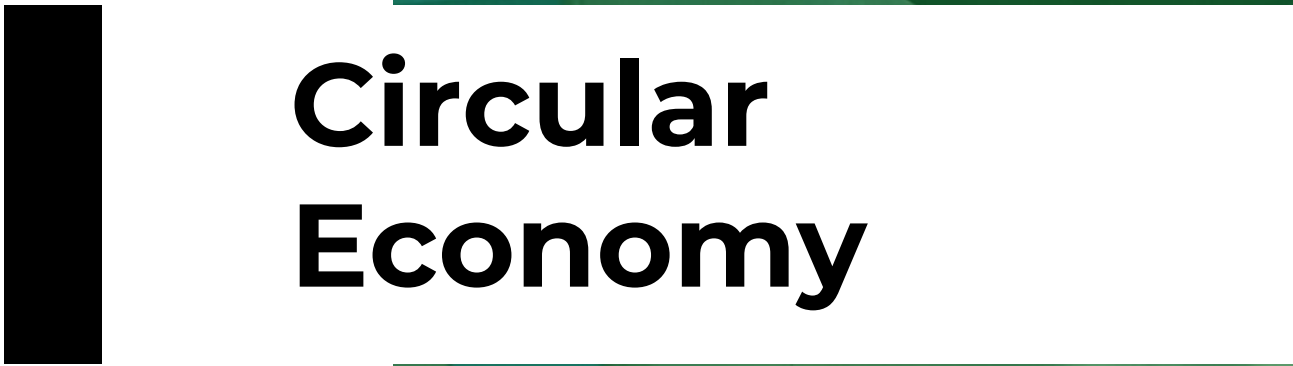
### Printed and structural Electronics

Optoelectronics, sensors, connectivity  
Homemade materials & coatings



### Smart solutions

Connected steel building panels, IR stealth for defence, Printed conductive tracks for automotive...

A graphic consisting of a solid black vertical rectangle on the left and a white rectangular box on the right containing the text "Circular Economy".

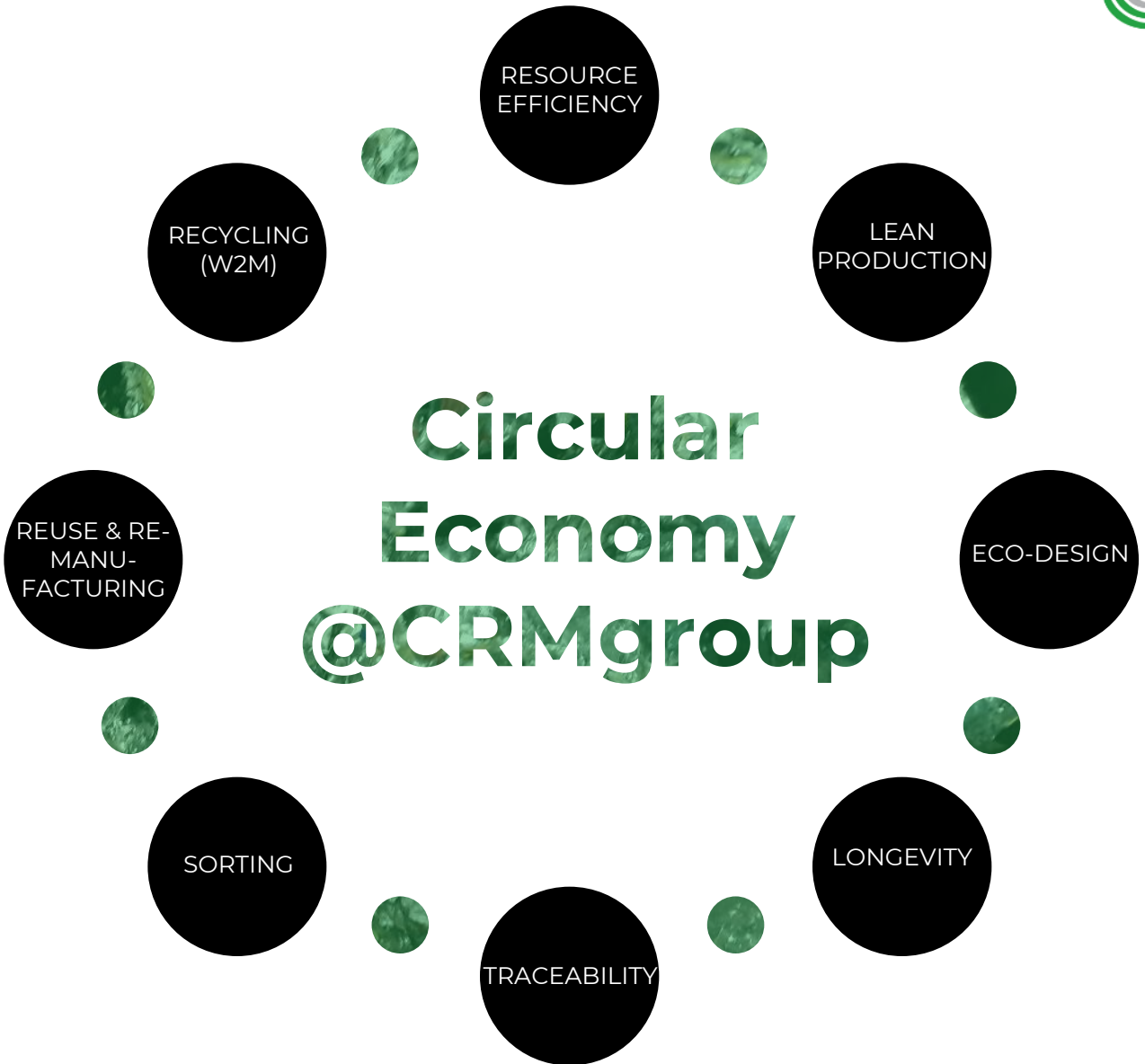
# Circular Economy



# Circular Economy

To maximise and retain the value in use of metals, by supporting the necessary shift towards more circular materials and products

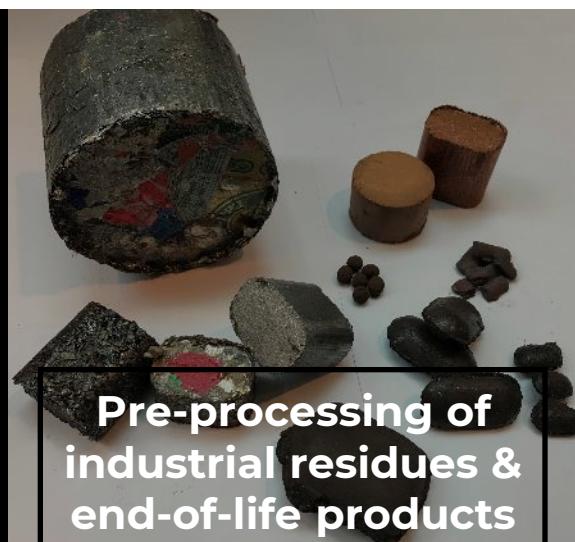
## Circular Economy @CRMgroup





# Circular Economy @CRMgroup

In practice



**Pre-processing of industrial residues & end-of-life products**

Sorting, size reduction, solid-liquid & magnetic separation, intensive mixing and agglomeration



**Resource efficient metal recovery**

Pyrolysis, vacuum distillation, reduction & (s)melting; high yield processes through AI and sensors



**Design & manufacturing of circular products**

Lean use of alloying elements, durability, traceability, reuse and remanufacturing



**Added value materials from secondary resources**

REEs for e-drives & wind mills, special metals for batteries & PV panels, geopolymers for insulation, AM powders, ...

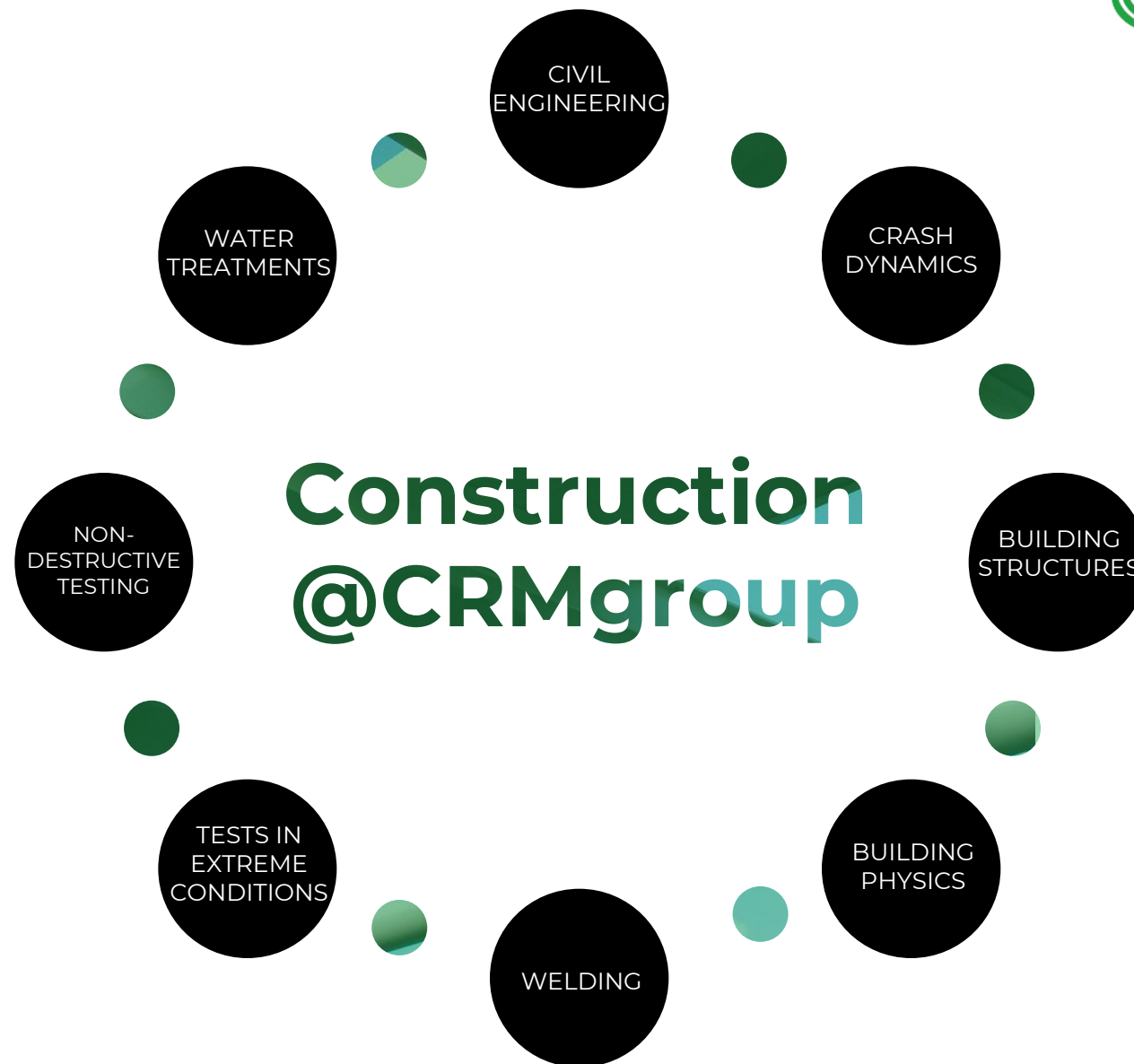
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# Construction




# Construction

Advanced design solutions to meet societal challenges of the Construction market: "High Performance & High Value" along with "Greener & Affordable"



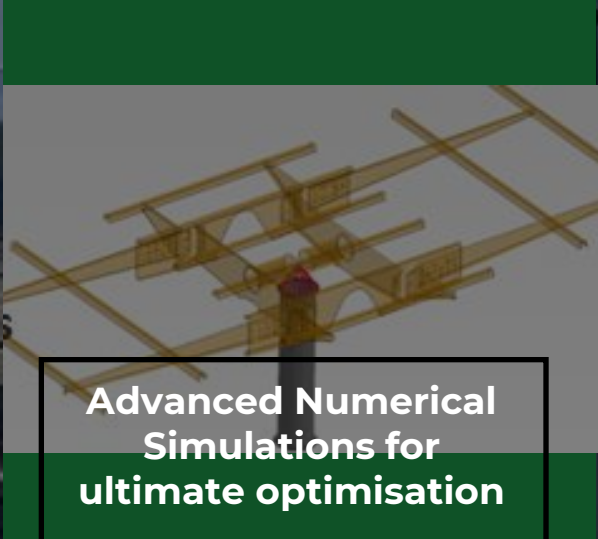
# Construction @CRMgroup

## In practice



### Best in class design solutions for mature and emerging markets

We follow a disruptive but realistic methodology to find the solution that will make the difference for your business. We encourage new designs to enhance the future.




### Advanced Numerical Simulations for ultimate optimisation

We perform advanced modelling to push innovation at its peak. Simulations include detailed structural analysis and all types of loadings including extreme loads as crash dynamics.



### Test rigs also including extreme conditions

We develop test rigs for structural solutions and building physics. This also includes extreme conditions such as fire, cryogeny, high pressure, vacuum, and impacts.



### Solutions for on-site assembly and erection operations

We integrate on-site assembly and erecting operations in all design optimisation processes: Manufacturing, crane operations, painting and coating, welding assembly and transportation.



# THANK YOU

[www.crmgroup.be](http://www.crmgroup.be)



[BDServices@crmgroup.be](mailto:BDServices@crmgroup.be)