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# Services Contribution to a Circular Economy

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# The world is changing...

## Key market shifts and trends



### Way of working

Availability of digital technologies and growing acceptance of data sharing

Aging workforce and changing workspace (expertise & behavior)



### Sustainability becomes relevant

Decarbonization

Circularity



# Circular economy

## A definition

“In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste – the process is linear. In a circular economy, by contrast, we stop waste being produced in the first place.”

The Ellen MacArthur foundation (viewed May 2022)

“A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals and aims for the elimination of waste through the superior design of materials, products, systems and business models.”

World Economic Forum (viewed May 2022)

“In a circular economy, waste does not exist, and products and raw materials are (designed to be) reused as long and intensive as possible over and over again. Waste is the new raw material.”

Government of the Netherlands (viewed May 2022)



# Circular economy is proposing an alternative to the linear “take-make-waste”



Design out waste and pollution

## Design for circularity

Waste and pollution as a result of design choices: 80% of environmental impacts are determined at the design stage

Products should be **designed with a focus on reuse, repair, refurbishment and recycling**



Keep products and materials in use

## Circular business models

We can't keep wasting resources in a world with finite resources

While in-use, products should be maintained, repaired and upgraded to **maximize their lifetime and being given a second life** through take back strategies when applicable



Regenerate natural systems

## Resource management

From “doing less harm” to “doing good” for the environment

**Renewable, reusable, non-toxic resources** should be utilized as materials and energy in an efficient way across the entire lifecycle

Create a thriving economy that can benefit everyone within the limits of our planet

# ABB Circularity framework

80% of our products and solutions covered by a circularity approach and to send zero waste from own operations to landfill

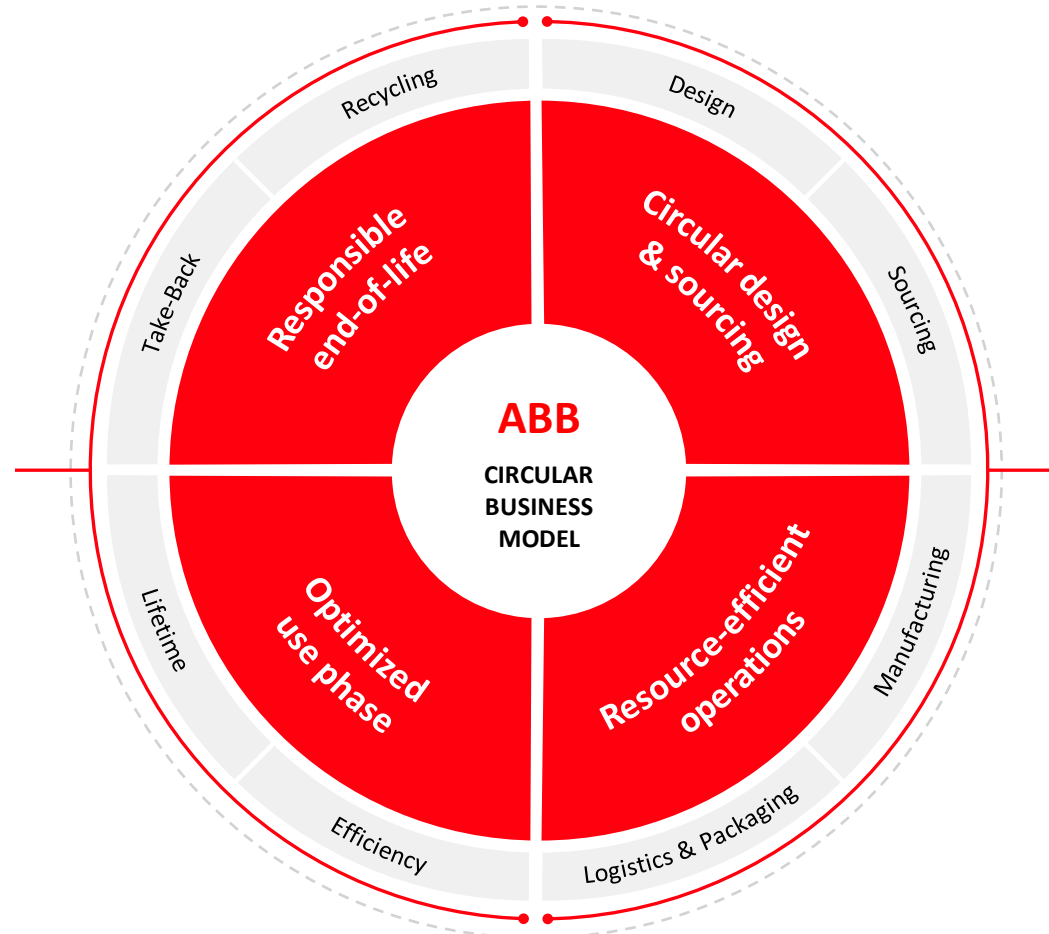
We assure our customers that their equipment will be dismantled, recycled or reused responsibly

## WHAT WE ENABLE Circular customer solutions

We help our customers becoming more energy and resource-efficient, by enabling lower downtime, avoiding material loss, and offering modernization services

### ABB circular business model

We promote the transition to a more circular economy by constantly innovating the way we operate, partnering with our customers, suppliers and distributors, and leveraging digitalization & traceability along the entire value chain



We design our offering to enable a circular life cycle and avoid the use of unsustainable materials by closely collaborating with our suppliers

## WHAT WE DO ABB circular operations

We go beyond carbon neutral operations and aim to eliminate and recycle the waste generated from our manufacturing, service and logistics operations

# The role of services in a circular economy





## Circularity in the services context

Maintaining value and not creating waste in the process

The circular economy, or circularity, is an economic model that follows the three Rs: Reduce, Reuse and Recycle.<sup>1</sup>

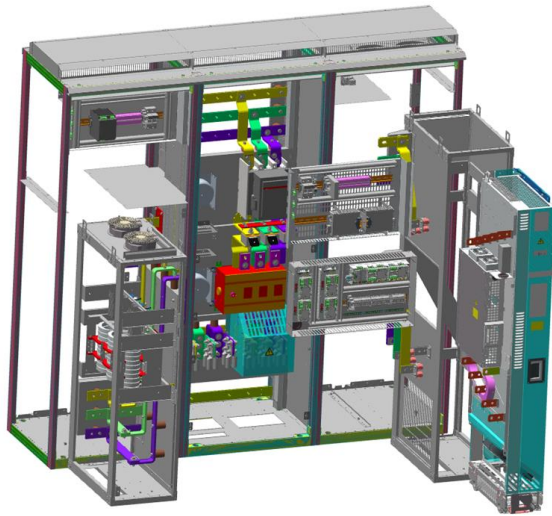
Circular economy aims to retain the lifespan of products through repair and maintenance, reusing, modernizing, or recycling.

# **Modernization and Performance improvement services**



## Modernization and Performance improvement services

## LV drives modernization: extending the lifetime, optimizing performance and reducing waste



## Lifetime extension



## Modular approach



## Green logistics



## Digital access



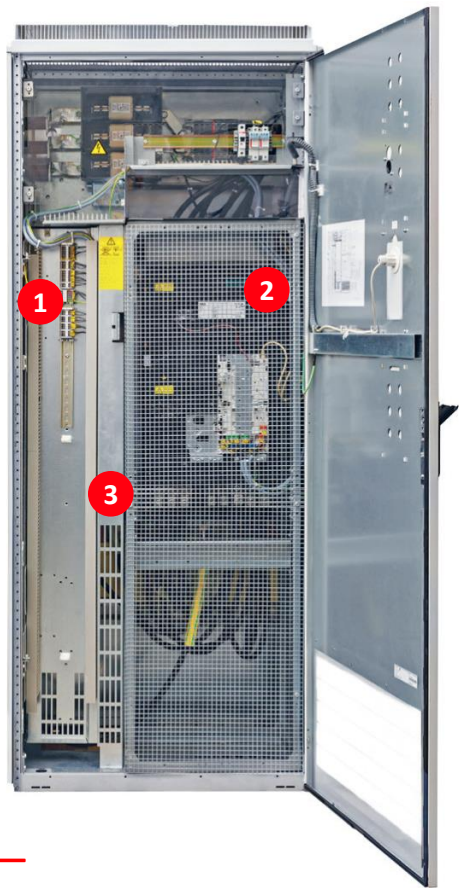
## Retrofit solution for the ACS600 drive units used in Mondi's paper machines

Mondi SCP installed ABB's ACS880 retrofit solution on their paper machine PM17, as its existing ACS600 drive units were coming to the end of their lifecycle.

ABB helped the customer in selecting the best timing and scale for modernization actions, based on the lifecycle phase of the existing drives.







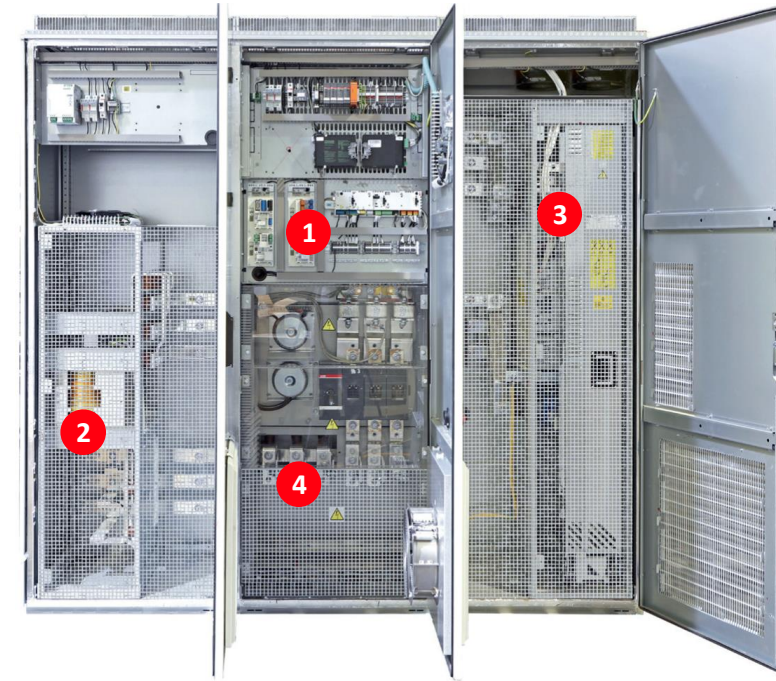
**What does an ACS607 cabinet look like after upgrading to ACS880U?**

1. The old IO-connections remain, while the upgrade kit includes ready-to-use wire sets to connect control signals to the ACS880 control board.
2. The ACS880-01 module, together with the mechanical fitting kit, ensures you get the full benefit of the ACS880 technology.
3. The upgrade kit provides busbars so that incoming and motor cable connections remain in exactly the same position as the old ACS607.



**What does the ACS607 cabinet look like after an ACS880R retrofit installation?**

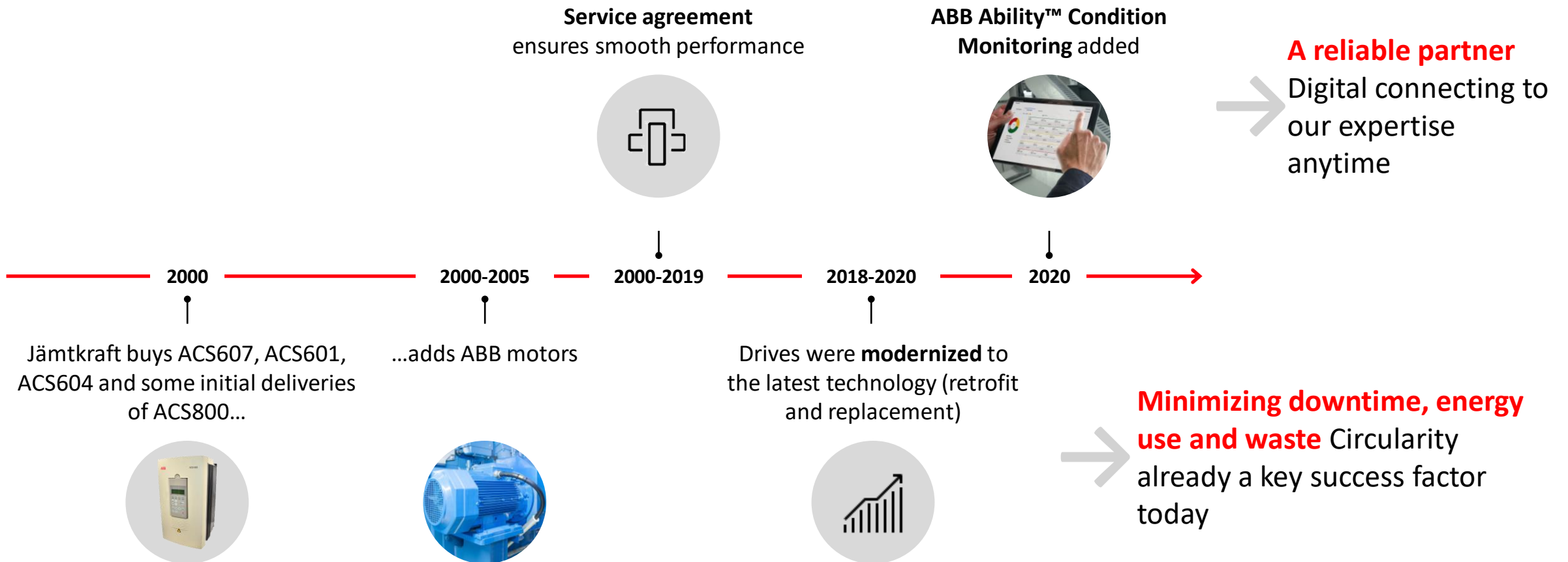
1. All components excluding the drive module are ready installed in a frame to be pushed into the cabinet on site.
2. Pre-wired control wiring minimizes the time needed for installation.
3. The frame is designed so that there is no need to change incoming or motor cable positions inside the cabinet.



**What does the ACS607 (parallel connected) cabinet look like after an ACS880R retrofit installation?**

1. Control connections with new ACS880 options are placed in the middle cabinet providing convenient access for service and maintenance.
2. The optional du/dt filter is pre-assembled in a frame which is then installed in the left cabinet.
3. The ACS880-04 module slides easily into the frame delivered with the retrofit solution.
4. Incoming and motor cables remain in exactly the same place as the original ACS607, eliminating the need for cable work during the modernization.

## Partnering up to extend lifetime of customers' assets & reduce waste | Jämtkraft, a Swedish-based utility company







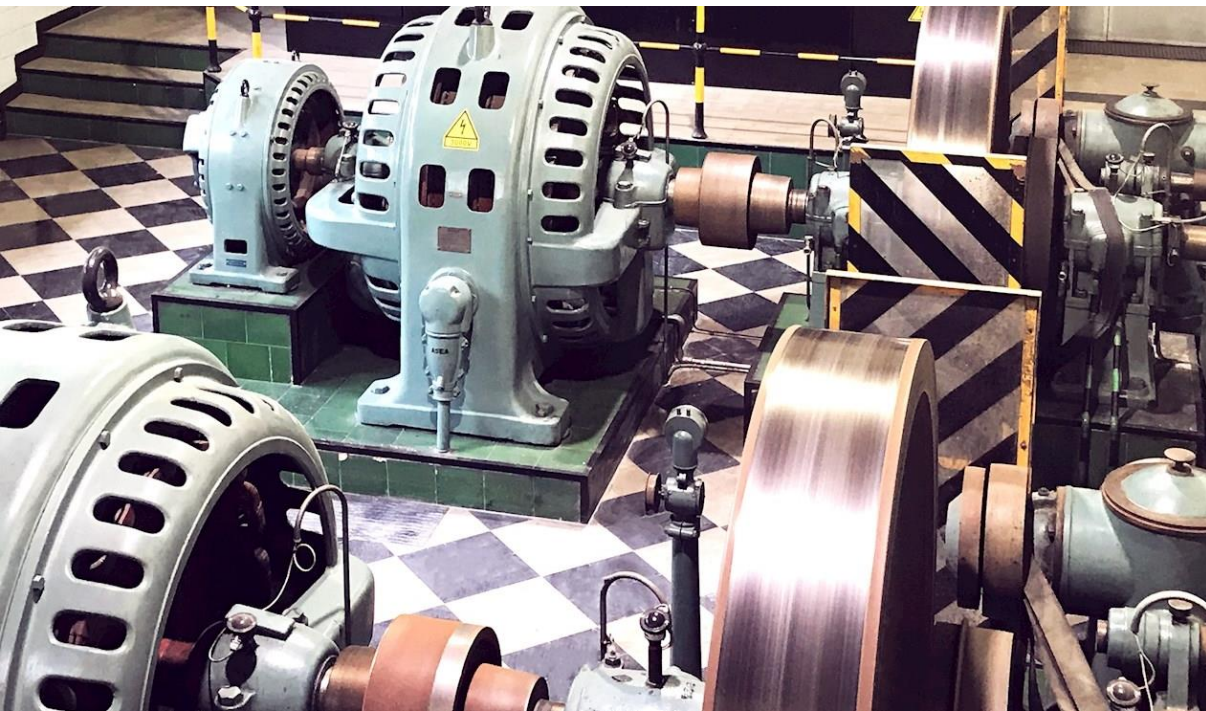




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## Hydropower plant in Spain improves power output by ~25% with ABB's modernization services

FIL-GENESIS, a power generation company based in Barcelona, modernized its plant by adding a new full-power ACS880 drive with embedded ABB Hydropack turbine control software between its hydropower plant's generator and grid, improving power output by around 25% in low water flow ranges.





# **Data and Advisory services**

## Deeper insight into the health of the powertrain for effective life-cycle management

Better decision making through real-time data on the life cycle state and operating conditions of the powertrain to:

- 01 Reduce energy consumption and improved energy efficiency
- 02 Avoid unplanned downtime thus loss of resources
- 03 Keep products and components in use for longer periods of time while still preserving and maximizing their performance



# Better decision making through data insights and service expertise

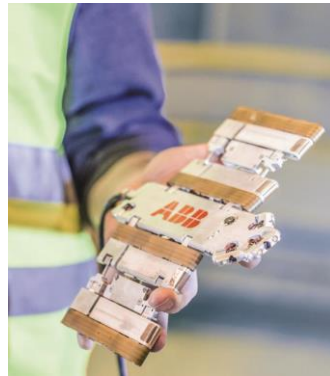
## ABB Ability™ LEAP for HV motors and generators

Analyzes the condition and expected lifetime of the stator winding insulation – the most uptime critical component in high voltage motors and generators.



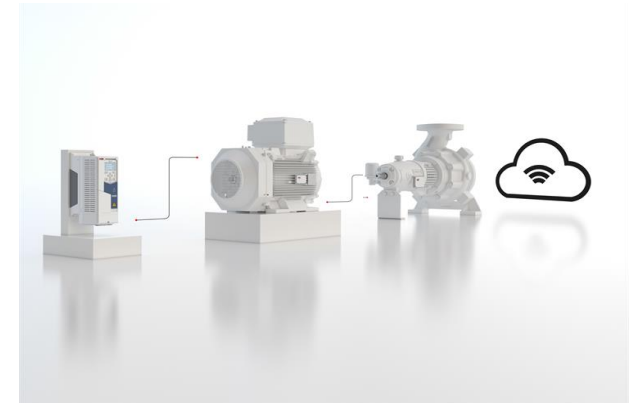
## ABB Air Gap Inspector

The service provides a visual inspection of the stator core, rotor core and winding without the need to remove the rotor.



## ABB Ability™ Condition Monitoring for powertrains

ABB Ability™ Condition Monitoring for powertrains enables full transparency on all parameters for drives, motors, mounted bearings and pumps.





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## ABB's Condition Monitoring services help Chinese refiner prevent \$150k damage in waste during lockdown

For Xianglu Petrochemicals Zhangzhou, three ACS1000 variable speed drives at the Fujian plant play a key role in stirring petrochemical materials.

If the downtime of these drives exceeds more than 24 hours, the raw material in the mixer will solidify, impacting the production process. The customer will have to then clean the mixer, potentially facing a damage of \$150k only in waste, but even more so because of the stopped production time.

Looking at the data provided by condition monitoring, the ABB experts tracked down the faulty drive and were quick in identifying and sourcing the spare parts needed to solve the problem within a turnaround time of only four hours.



# Summary

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## Partnering for a more sustainable and greener planet



ABB and HKS The Metal Company join forces to reduce energy consumption by choosing the direction of circularity – helping reduce emissions through recycling.

Through the partnership, ABB and HKS are closing the loop of the lifecycle of the electric motor, helping drive forward circularity in the industry.





## ABB's recycled motors provide significant environmental savings



If all industrially manufactured products were recycled, carbon dioxide emissions in the world could be reduced by 20%.

With ABB, Stena Recycling and SCA now closing the circle of motor recycling, the environmental savings are above expectations.

“We will recycle the end-of-life motors in a sustainable way in a separate recycling flow. Recycling of aluminium, copper and iron provides an energy-saving of between 75 and 95 per cent compared to new production of these metals. The metals are then reused in new products”, says Fredrik Pettersson, Managing Director of Stena Recycling in Sweden.

# Global support available locally

At your service



Over **130**  
years servicing  
our customers



Over **1,200**  
field service  
engineers



~ **600**  
service  
partners



services in more  
than  
**70 countries**



~ **50**  
service workshops



# Key takeaways



Services are at the core of circular economy by extending the lifetime of products already in use



Keeping the equipment running peak performance for longer is important for preventing unnecessary waste



Focus shifting from take-make-waste approach towards sustainable systems



**ABB**