

# CECIMO Factsheet on Sustainable Manufacturing



## What is a Machine Tool?

According to **ISO standard 14955-1:2017**, a machine tool is a mechanical device used to process metal workpieces through a process that can be mechanical, controlled by humans or by computers.

There are two major categories of machine tool processes:

- ▶ **Cutting processes** (milling, grinding or boring) using a tool with one or more cutting edges.
- ▶ **Forming processes** (stamping, bending or punching) applying force with specially shaped tools.

**Machine tools** are a key enabling technology since they are the starting point of almost every industrial value chain, and thus can have a direct impact on the production processes of most industrial sectors, namely including automotive, aerospace, medical and energy sectors.

## Enabling the Green Transition

In recent years the environmental factor has gained more and more traction among the European Union's policymakers, leading to an unprecedented political momentum towards achieving a green transition at the European level.

This historic transition will require European industries to undertake fundamental shifts throughout their value chains, ranging from product design and production to waste management and the use of raw materials.

Given its critical position in the European industrial ecosystem, the machine tool manufacturing sector can effectively lead and support this transition by providing technologies that enable sustainable manufacturing processes in other sectors, and it is already rising to the challenge.



## Sustainable Best Practices

According to a CECIMO Survey (2022), numerous actors are embracing sustainable solutions, as more than half of manufacturers actively engage in at least one sustainable best practice, mainly including:



**DESIGN** processes that facilitate disassembly, repairing and remanufacturing to extend machines' lifetimes and to improve energy efficiency during their use phase.



**PREDICTIVE MAINTENANCE** techniques designed to determine real-time conditions of machines and provide early detection mechanisms for technical failures, embraced by 80% of machine tool manufacturers.



**RETROFITTING** process to restore or improve a machine's original specifications by replacing components, modules or integrating additional technologies, embraced by 80% of machine tool manufacturers.



**REMANUFACTURING** methods to rebuild a machine tool using a mix of recycled, reused and new parts" following the repair or replacement of obsolete components, embraced by 50% of machine tool manufacturers.

# Key Statistical Evidence from the Machine Tool Manufacturing Sector

\*All the statistical evidence presented in this document has been retrieved from a CECIMO Survey (2022) and two previous CECIMO publications – “The Lifetime of Machine Tools” (2022) and “The European Machine Tool Sector and the Circular Economy” (2019).\*

Sectoral data shows that **80%** of machines are still in service ten years after installation, while **65%** are still in service after 20 years, thereby providing evidence of great durability and high propensity for extended lifetimes.

Over recent years, the reduction of energy use achieved by machine tool manufacturers ranges from **10%** to **40%** while the reduction in waste has been around 10% for most manufacturers.

Around **83%** of machine tools consist of cast iron, welded steel, and other metallic materials that can be recycled up to 99% and can be reused with no loss of quality.

Around **80%** of machine tools are retrofitted and refurbished when they are between 5 and 15 years old.

Average recycling rates in our sector can range from **5%** up to **99%** for an increasing number of manufacturers.

CNC retrofitting, involving the replacement of the CNC, servo and spindle systems, can reduce machines' electricity consumption by as much as **30-50%** while increasing machines' uptimes.

Recycling scrap metals to produce new machine tool components can save up to **91%** of total energy consumption compared to conventional methods.

Use of predictive maintenance enables manufacturers to reduce total machine downtime **30-50%** and consequently increase the machine's lifetime.