



Funded by
the European Union

FIREFLY



**Sustainable
catalyst-based**

chemical industry

KEY FACTS ABOUT THE CHEMICAL INDUSTRY

The chemical industry helped build the 20th century. Currently, it accounts for **7%** of the global GDP, and supports the production of **96%** of manufactured goods.

According to the European Chemical Industry Council (CEPIC), the chemical industry supports **120 million** jobs worldwide.

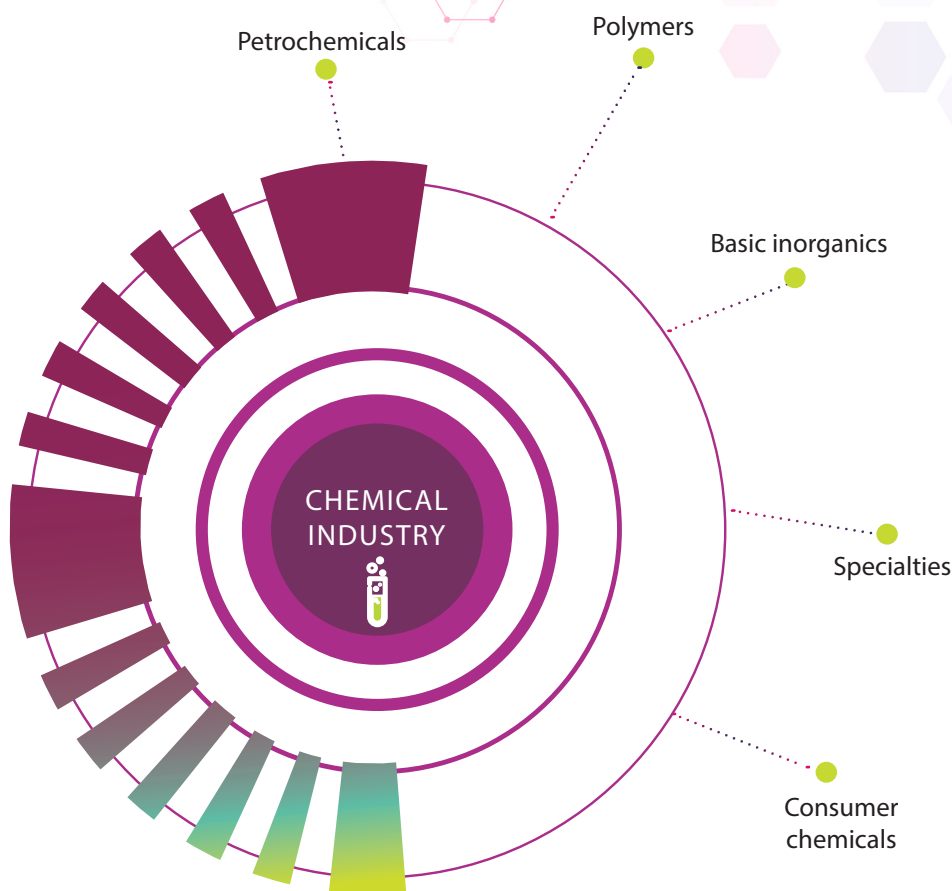
Europe is the second-largest chemicals producer in the world.

In 2021, EU chemicals sales increased significantly to **€594 billion**; one third being generated from exports (34%).

THE CHEMICAL INDUSTRY: THE LYNCHPIN IN EVERY SECTOR'S SUCCESS

More than half of EU chemicals are supplied to the industry:

- Health & social work 17%
- Agriculture, forestry, fishing 8%
- Other 19%
- Rubber & plastics products 16%
- Construction 5%
- Paper prod., printing & publishing 4%
- Petroleum prod. & nuclear fuel 4%
- Textile prod. & footwear 4%
- Consumer Packaged Goods 3%
- Vehicles 3%
- Basic metals 3%
- Computer, electronic & optical equipment 2%
- Fabricated metal products 2%
- Electrical equipment & machinery 2%
- Other non-metallic mineral prod. 2%
- Machinery & equipment 2%
- Manufacturing n.e.c.; recycling 2%
- Other manufacturing 2%



Source: CEPIC, ICCA report 2019, Catalyzing Growth and Addressing Our World's Sustainability Challenges (Oxford Economics)



We cannot have a #sustainable chemical industry with unsustainable practices. Electrochemistry is not only the future. It is the solution.

Dr. Xochitl Dominguez Benetton, (VITO)
Firefly Project Coordinator

#SUSTAINABLE CATALYST-BASED CHEMICAL INDUSTRY

Benefits of catalysts

- The development and use of powerful catalysts have revolutionised the chemical industry, leading to new and improved products that benefit society and the environment.
- Accelerate the chemical reactions and reduce the required temperature or pressure for the reaction to begin.
- Enhance the efficiency of chemical reactions, enabling atoms in molecules to break and form chemical bonds.
- Can be used to generate entirely new materials with novel applications and potential uses.

Around 90% of chemical processes and 60% of industrial products rely on the use of catalysts.

HOW WILL FIREFLY SUPPORT THE #SUSTAINABLE EVOLUTION OF THE CATALYST-BASED CHEMICAL INDUSTRY?

Power-to-catalysts and chemicals fostered via electrochemical recycling

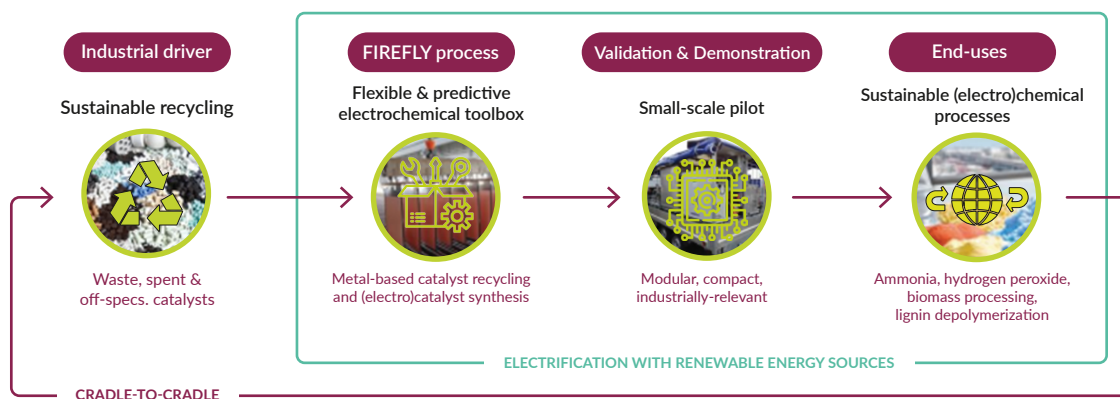
The current production of metal-based catalysts relies mainly on procedures that are not sustainable, as they intensively consume chemicals and non-renewable energy, under harsh operating conditions. As a pioneer in catalyst technology, Europe has the important responsibility to green the catalyst production and recycling.

The FIREFLY project is the pioneering research initiative set off to drive the catalyst-based chemical industry towards electrification and to reduce external reliance on metals and fossil fuels.

The FIREFLY concept uses electricity generated from RES to manufacture (electro)catalysts from secondary resources, in a new sustainable approach that will significantly reduce production costs.

Platinum Group Metals (PGMs)

| | | | | | | |
|---------------------------------------|--|--------------------------------------|---------------------------------------|-------------------------------------|--|--------------------------------------|
| 45 Rh RHODIUM 102.91 | 46 Pd PALLADIUM 106.42 | 77 Ir IRIDIUM 192.22 | 78 Pt PLATINUM 195.08 | 47 Ag SILVER 107.87 | 79 Au GOLD 196.97 | |
| 22 Ti TITANIUM 47.867 | 27 Co COBALT 58.933 | 28 Ni NICKEL 58.6934 | 29 Cu COPPER 63.546 | 30 Zn ZINC 65.38 | 42 Mo MOLYBDENUM 95.95 | 74 W TUNGSTEN 183.84 |



| | |
|--|----------------|
| | €11,078,742,50 |
| | 48 MONTHS |
| | 16 PARTNERS |
| | 7 COUNTRIES |



COORDINATION TEAM

VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V. (VITO)



WEBSITE

<https://www.firefly-project.eu/>



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