Chemical Industry as an Enabler across Sectors

TECHNOLOGY BRIEFS:
Publication Summary

Chemical products and materials are embedded throughout modern value chains, often performing functions that are not visible in the final product. By influencing how materials are converted, separated, protected, or used to store and transfer energy, chemistry can shape the efficiency, durability, reliability and resource use of wider systems. The chemical industry's contribution therefore extends beyond its own production processes to technologies that can support lower-emission and more resource-efficient solutions across other sectors.

This publication illustrates the enabling role across five sectors: **Industry & Production, Building & Housing, Mobility & Transport, Nutrition & Agriculture, and Power Generation & Storage.** Across these areas, established and emerging technologies show how chemical capabilities can improve existing applications, enable new ones and support more efficient and lower-emission systems.

KEY TAKEAWAYS BY SECTOR

Industry & Production
Chemical capabilities in catalysis, separation, process chemistry, alternative feedstocks, carbon management and circular material flows can improve process efficiency, reduce material losses and enable new production routes.

Building & Housing
Advanced polymers, insulation materials, coatings, sealants, additives and building-integrated energy materials can improve energy performance, durability and material efficiency while supporting lower-impact construction and circularity.

Mobility & Transport
Battery materials, fuel-cell components, hydrogen technologies, lightweight materials and alternative fuels support electrification, energy efficiency and lower-emission options across road, rail, aviation and maritime transport.

Nutrition & Agriculture
Fertilizer technologies, nutrient-management solutions, biotechnology, feed additives, packaging and biomass conversion can improve resource efficiency, reduce losses and support more efficient food and agricultural value chains.

Power Generation & Storage
Electrochemistry, advanced materials, batteries, hydrogen technologies, membranes, catalysts and renewable-energy materials support electricity generation, energy storage, grid flexibility and links between power and other sectors.

IMPLICATIONS FOR INDUSTRY

The publication highlights that the chemical industry's enabling role is not defined by any single product or technology, but by a broad portfolio of materials, functions and process capabilities that can be adapted to different applications. Turning this potential into practical impact depends not only on technical performance, but also on infrastructure, energy and feedstock availability, manufacturing capabilities, integration with existing systems, economics and regional conditions. Future opportunities are therefore likely to emerge through portfolios of technologies and stronger collaboration across value chains rather than through a single prescribed pathway.

