

Paper 53

Decarbonizing the Industrial Sector: New Technologies and Processes

As the global climate crisis intensifies, decarbonizing the industrial sector has become a crucial goal for achieving sustainable development. Industry is one of the major sources of greenhouse gas emissions, accounting for approximately one-third of global emissions. Therefore, driving the decarbonization of the industrial sector is not only necessary for addressing climate change but also key to economic and energy transformation. The introduction of new technologies and processes provides effective solutions for industrial decarbonization.

In recent years, many emerging technologies and processes have emerged to accelerate the decarbonization of the industrial sector. Digital technologies, advanced manufacturing techniques, carbon capture and storage (CCS), and hydrogen energy are gradually becoming focal points in the industry. For instance, digital technologies can optimize production processes through smart sensors and big data analysis, improving energy efficiency and reducing waste emissions. Meanwhile, hydrogen energy, as a clean energy carrier, is being widely applied in heavy industries such as steel and chemicals to replace traditional fossil fuels.

Carbon capture and storage (CCS) technology is also considered a key technology for achieving industrial decarbonization. By capturing carbon dioxide from industrial processes and safely storing it, significant reductions in emissions can be achieved. Additionally, some companies are exploring the conversion of biomass and waste into renewable energy, thereby promoting circular economy goals.

Despite the many possibilities offered by new technologies, challenges remain in their implementation. These challenges include technological costs, investment risks, and the adaptability of policy and market environments. Therefore, governments and industry organizations need to strengthen collaboration, formulating favorable policies and incentives to promote the research and application of new technologies.

In summary, decarbonizing the industrial sector is a complex and important task. Through continuous innovation and the promotion of technology, the industrial sector can achieve sustainable development while contributing to global climate goals. In the future, as new technologies and processes continue to advance, the prospects for industrial decarbonization will become increasingly promising.