



ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS

2023 REPORT



Clean Energy Solutions

Amid growing concerns over the dwindling of freshwater resources due to climate change, exploration of alternative hydrogen production technologies such as seawater electrolysis has become imperative. Our world-class research teams have successfully developed a system to produce pure green hydrogen through seawater electrolysis. The purification and recycling of wastewater from facilities is also a key focus area in keeping with the SDGs. The fundamental technology to do this has been developed by another research team while creating a nanocomposite material in an experiment to remove pollutants from construction materials.



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The seawater electrolysis catalytic system developed presents a new idea about industrial-scale hydrogen production, which is expected to significantly contribute to the actualization of offshore hydrogen production and transportation.

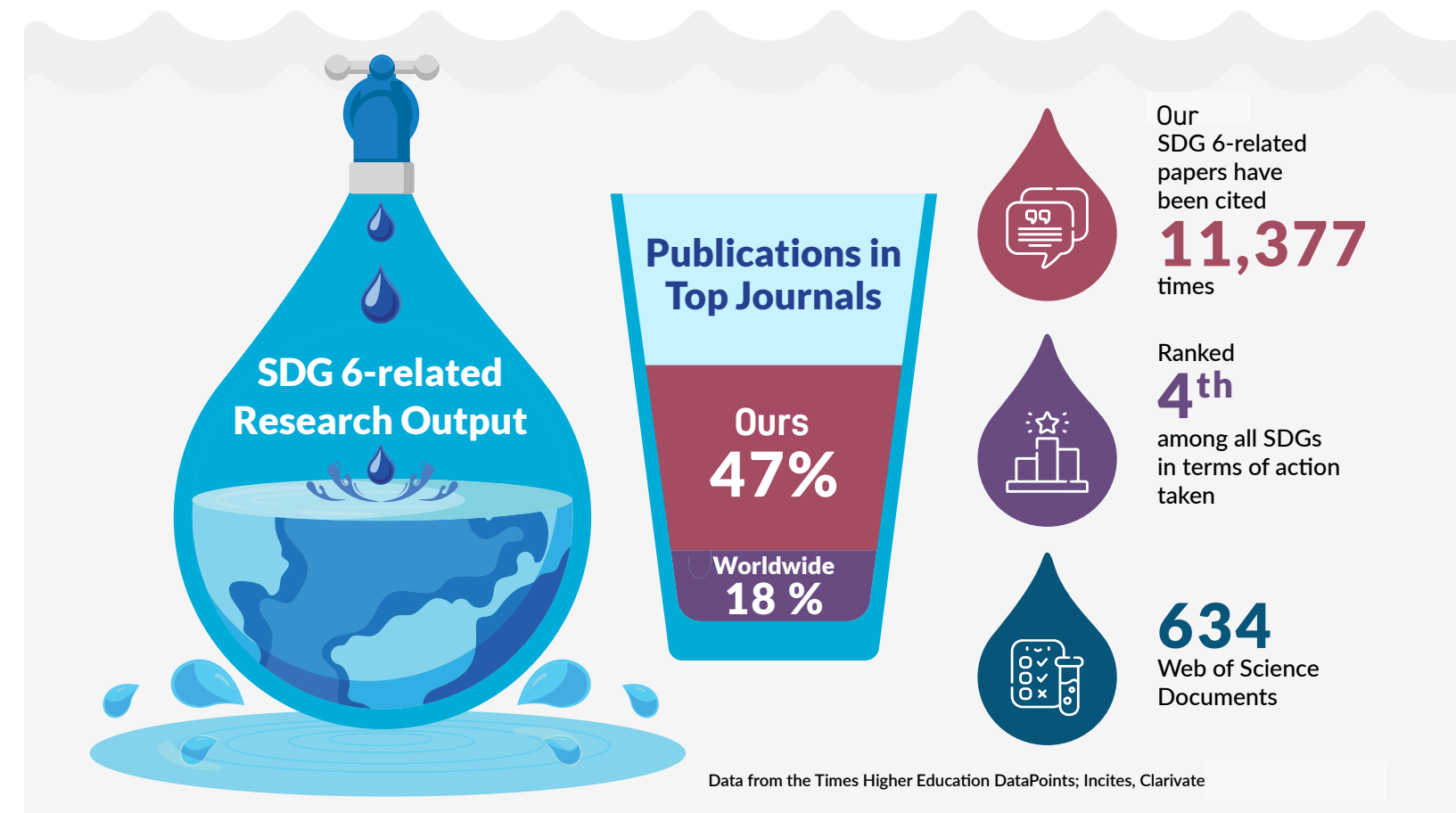
Professor John Smith
Department of Energy Engineering

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Hydrogen from Seawater

Hydrogen is garnering interest as a fuel owing to its unique characteristic of emitting no carbon dioxide upon combustion. A research team, led by Professor John Smith developed a membrane-free catalytic system to efficiently produce green hydrogen from seawater, via electrolysis.

The team's triple-catalyst setup could generate 100% pure hydrogen, offering a cost-effective and practical solution for large-scale offshore hydrogen production. The research results were published in the journal *Applied Catalysis B: Environmental*.



Wastewater Purification Technology

Prof. Lee Dongeun (Architecture), Prof. Cho Wangeun (Intelligent Construction Automation Research Center), and Dr. Shrenda, in collaboration with Dr. Kasala Prabhakar Reddy (University of South Carolina, USA) and Dr. Satyanarayana (Vellore Institute of Technology, India), established a method to manufacture a porous nanocomposite material with exceptional charge transfer and photocatalytic performance. The technique involves making porous polymeric carbon nitride sheets and WO₃ nanorods with a 3D heterostructure and special crystal facets to efficiently remove pollutants from construction materials under low-energy visible light exposure. This material holds promise for wastewater purification and recycling. The research was published in the journal *Applied Surface Science*.



Marine Sustainability Partnerships



We actively seeks out collaborations and agreements that can facilitate change within the realm of environmental protection. Through its synergistic alliances, the University seeks to actively discover and develop new projects with the Environment, Social, Governance (ESG) perspective.



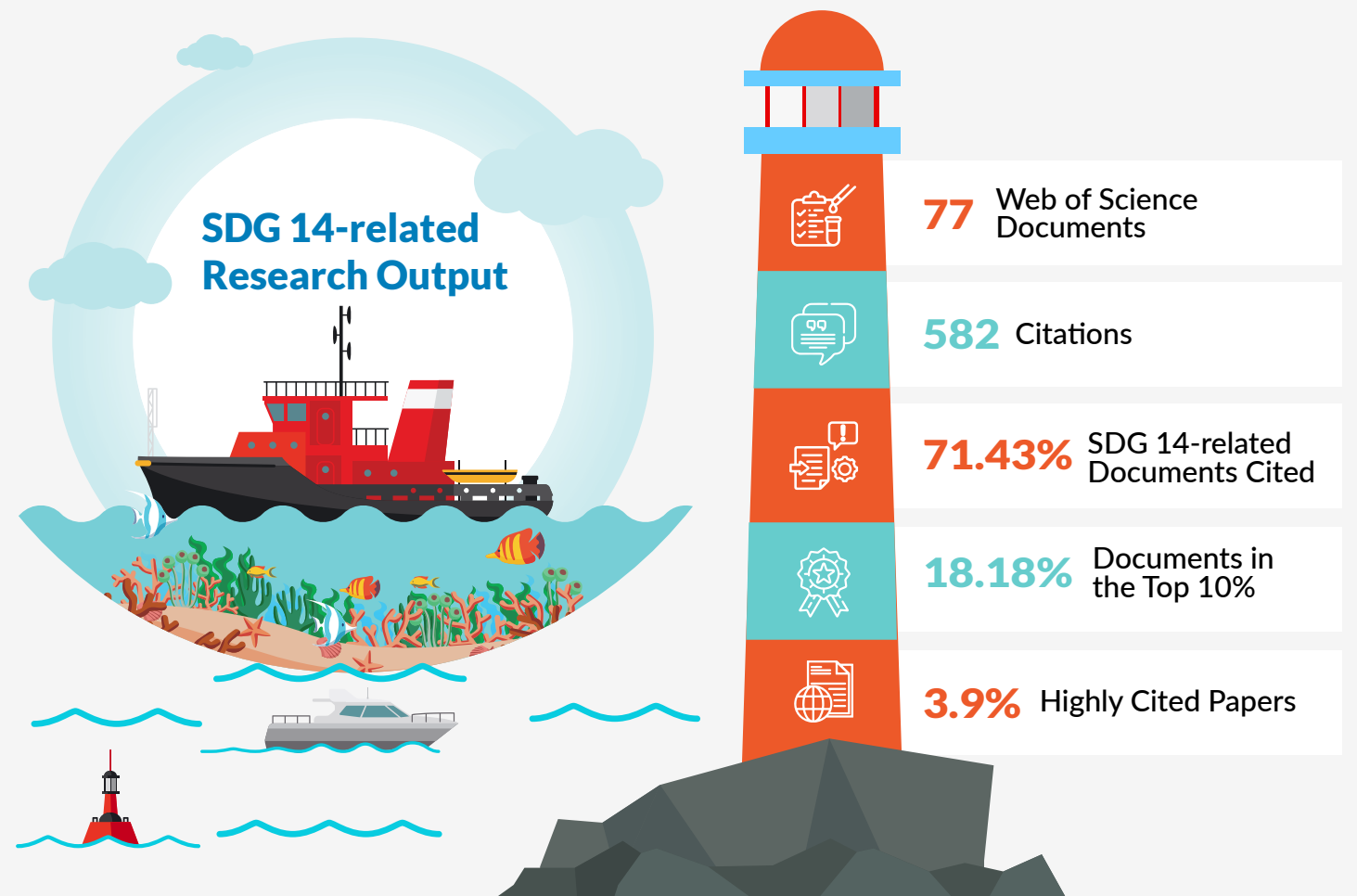
“ Unlike the Yellow Sea and the South Sea, as the East Sea allows facile accesses to deep water, it is the optimal location for researching blue carbon studies regarding marine algae with high carbon sequestration. If the blue carbon center in Korean East Sea Rim is established, it will play a role as a hub for blue carbon-related research, education, and policies within the East Coast region. We will also actively cooperate to cultivate young marine talents and develop the East Sea areas. ”

Jane Doe
Director, SDGs



Blue Carbon Center

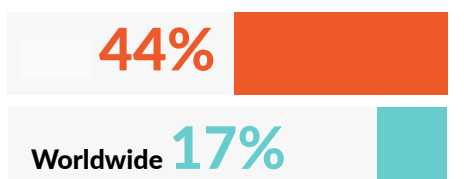
Pohang City, North Gyeongsang Province has collaborated with us to achieve carbon neutrality by creating a marine blue carbon center in Korean East Sea Rim. To this end, we are planning to establish the Donghae Campus in Pohang. Marine blue carbon refers to the carbon absorbed by salt plants (plants that grow in high-salinity areas) such as beach silvertop. It is a huge carbon sink in the marine ecosystem. This center will aid in achieving sustainable carbon neutrality in line with global climate goals, promoting synergy with ongoing research projects.



Research Partnership

CJ Cheiljedan are collaborating to develop and commercialize a PET plastic biodegradation enzyme; while Zyen Co., Ltd. will produce and improve the enzymes, CJ Cheiljedang will develop technologies for their mass production by utilizing their world-class microbial fermentation technology and R&D infrastructure. The "biological recycling" technique, promoted under this agreement, is eco-friendly during the decomposition process, consumes less energy, and produces high-quality recycled materials.

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