# DOKUZ EYLÜL UNIVERSITY

## Dokuz Eylul University Patent Portfolio Analysis

## in Relation to the Sustainable Development Goals (SDGs)

## 2021–2026

Dokuz Eylül University's patent portfolio for the **2021–2026** period demonstrates the University's strong commitment to transforming scientific knowledge into innovative technologies that address major societal, environmental, and economic challenges. Beyond academic excellence, the University's intellectual property outputs contribute directly to the achievement of the **United Nations Sustainable Development Goals (SDGs)** by providing practical solutions in healthcare, clean energy, sustainable production, climate resilience, marine technologies, and industrial innovation.

To evaluate the University's sustainability impact, all patents granted or published during the period were systematically analyzed and mapped against the relevant SDGs. The analysis reveals that the University's innovation ecosystem contributes to multiple sustainability goals, with particularly strong representation in **SDG 3 (Good Health and Well-being), SDG 12 (Responsible Consumption and Production), SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 9 (Industry, Innovation and Infrastructure).**

### SDG 3 – Good Health and Well-being (Dominant Research Area)

The largest proportion of patents focuses on **biomedical innovations**, including cancer diagnostics and treatment, medical devices, biomaterials, and precision medicine. Major innovations include bladder cancer biomarkers, combination therapies for lung cancer, hybrid nanoparticles for cancer treatment, glucose monitoring kits for diabetes management, breast cancer nanoplatforms, and medical devices for the diagnosis of sleep apnea. These inventions contribute to improving healthcare quality, disease prevention, and patient outcomes while strengthening the University's leadership in health-related research and innovation.

### SDG 12 – Responsible Consumption and Production

**A significant number of patents support circular economy principles** through waste valorization and sustainable resource management. These include technologies for producing foam glass from waste vehicle windshields, manufacturing activated carbon from biochar ash, phosphorus recovery following gasification processes, and the development of gluten-free bread using edible food residues. These innovations promote resource efficiency, waste reduction, and sustainable production systems.


**SDG 7 – Affordable and Clean Energy**

The University's patent portfolio also demonstrates **substantial contributions to clean energy technologies**. Innovations include efficiency enhancement of photovoltaic modules, hydrogen production from marine biomass and marine-derived wastes, and electrochemical hydrogen compression technologies, supporting the transition towards renewable and low-carbon energy systems.


**SDG 11 – Sustainable Cities and Communities & SDG 13 – Climate Action**

Several patented technologies address **urban resilience and climate adaptation**. These include coastal protection systems against extreme wave events, high-capacity carbon dioxide absorbent materials for greenhouse gas mitigation, and structural damping systems designed to improve the seismic resilience and safety of buildings. Together, these innovations contribute to sustainable urban development and climate change mitigation.


**SDG 14 – Life Below Water**

Marine technologies constitute **another important research area** within the University's patent portfolio. Patented innovations include underwater contact sensing systems, environmentally friendly ship construction technologies aimed at preventing marine accidents and pollution, and antifouling capsule technologies for fishing nets designed to reduce environmental impacts on marine ecosystems.

## Patent Trends (2021–2026)

The temporal analysis demonstrates a clear evolution in the University's innovation priorities.

- **2021–2023:** Patent activity was primarily concentrated on industrial technologies, defence-related engineering, manufacturing innovations (**SDG 9**), and fundamental healthcare technologies (**SDG 3**).
- **2024–2025:** A significant expansion occurred in **Green Chemistry**, **Circular Economy**, **Waste Management (SDG 12)**, **Renewable Energy (SDG 7)**, and **Cancer Research (SDG 3)**, reflecting the University's increasing focus on sustainability-oriented innovation.
- **2026 (Granted/Published Patents):** Recent patents indicate a growing emphasis on advanced biomarker technologies, functional materials, nanotechnology, and high-value biomedical applications, demonstrating the continuous evolution of the University's research excellence.

## Contribution to the Sustainable Development Goals

Overall, the University's patent portfolio illustrates a balanced innovation ecosystem that combines scientific excellence with societal impact. The diversity of patented technologies demonstrates that Dokuz Eylül University **not only generates high-quality research outputs but also transforms research into innovative solutions supporting sustainable development, environmental protection, public health, resource efficiency, clean energy, and resilient communities.**

The accompanying infographic visualizes the distribution of patents according to both publication year and corresponding Sustainable Development Goals, providing an evidence-based overview of the University's contribution to the SDGs through innovation and intellectual property generation.