Dokuz Eylül University · SDG Progress Report Series 2025

SDG 9: Industry, Innovation and Infrastructure — Progress Report 2025

Comprehensive Institutional Evidence Dossier on DEPARK Technopark, DETTO Patent & IP Commercialization, Research & Industry Grant Income, Aerospace & Defense Partnerships (TUSAŞ, TEI), TEKNOFEST & Student Engineering Teams (Roket9, Sferon UAV, Team Solaris, DİYYOJEN), Marine Science & Subsea Technologies (R/V Koca Piri Reis), and Graduation Exhibitions

Attribute	Institutional Specification
Institution	Dokuz Eylül University (DEÜ), İzmir, Türkiye (Scopus ID: 60012686; ROR: https://ror.org/00dbd8b73)
Reporting Period	1 January 2025 – 31 December 2025 (with 2021–2024 multi-year baselines and 2026 continuity records)
THE Impact Standing & Scope	Ranked in the Global Top 200 for SDG 9 in THE Impact Rankings 2026; aligned with THE 2027 Metrics 9.1 (11.6%), 9.2 (15.4%), 9.3 (34.6%), and 9.4 (38.4%)
Technopark & Spin-Off Hub	Dokuz Eylül Technology Development Zone (DEPARK, https://depark.com/): 41,248 m² across 3 zones (Central Campus Alfa & Beta TGB-1; 15 Temmuz Zeytin TGB-2), 150+ R&D firms, 2,000+ researchers, >TRY 1.25B R&D revenue, 39 incubated startups in 2025 (18 new)
Research Budget & Patents	3-Year Total Research Funds: USD 109,877,170 (Avg: USD 36,625,723/yr; 54.0% sustainability-focused = USD 19,779,424/yr; 2025 Research Expenditure: TRY 514,604,731.42). 182 cumulative AVESİS patents; 106 patents in 2021–2026 (peak of 63 patents in 2025); 6 ISIF'25 + 3 ISIF'26 medals
Flagship Engineering & Marine Assets	R/V Koca Piri Reis Ocean Research Vessel (DBTE); Roket9 (TEKNOFEST 2025 Türkiye 1st Place); Sferon GPS-Denied Combat UAV (Best Design Award); Team Solaris (S1–S14 Solar Cars & Sasol 2024); Solar Boat 'DİYYOJEN'; AUV/ROV Subsea Systems
Governance & Policy Framework	Sustainable Investment Policy (2026); Artificial Intelligence Usage Procedure (PR.37, April 2025); DETTO IP & Licensing Directive; DEPARK Operational Regulations (Ver. 11); KALBİS & Integrated Management System (ISO 9001, 14001, 50001, 22000; YÖKAK 5-Year Accreditation)
Public Portals & Evidence	https://greencampus.deu.edu.tr/ · https://depark.com/ · https://detto.deu.edu.tr/ · https://imst.deu.edu.tr/ · https://eng.deu.edu.tr/ · https://avesis.deu.edu.tr/ · https://bapsis.deu.edu.tr/

Executive Summary (2025 SDG 9 Breakthrough Performance): Placed in the Global Top 200 for SDG 9 in the Times Higher Education (THE) Impact Rankings 2026, Dokuz Eylül University (DEÜ) scaled its industrial innovation, technology transfer, aerospace, and marine technology ecosystem to historic peaks in 2025. Operating across 41,248 m² in three technology zones, the Dokuz Eylül Technology Development Zone (DEPARK) hosted 150+ R&D companies and 2,000+ researchers generating over TRY 1.25 billion in R&D revenue across 1,100+ completed projects and 2,000+ commercialized products. In 2025, DEPARK's BAMBU Incubation Centre expanded by 56% to host 39 early-stage ventures (welcoming 18 new start-ups in calendar year 2025 and 16 sustainability/high-tech start-ups in May 2025–April 2026), trained 213 entrepreneurs free of charge (up from 184 in 2024), and channelled TRY 3,600,000 in direct TÜBİTAK 1812 BİGGSİNERJİ seed grants to 4 deep-tech spin-offs (up 33.3% from TRY 2,700,000 in 2024). Over 2023–2025, DEÜ mobilized USD 109,877,170 in total research funding (USD 36,625,723/year average; TRY 514,604,731.42 central-budget research project expenditure in 2025), with 54.0% (USD 19,779,424.38/year) dedicated directly to sustainability R&D. Managed by the DEÜ Technology Transfer Office (DETTO), patent output surged to an all-time peak of 63 published/granted patents in 2025 (106 across 2021–2026; 182 cumulative in AVESİS) and earned 6 International Medals at ISIF'25 (1 Gold, 2 Silver, 3 Bronze) plus 3 Medals at ISIF'26 (1 Gold, 2 Bronze). In student engineering and aerospace, DEÜ's Roket9 Team (BORDO145-ROKET9) won 1st Place in Türkiye among 324 teams in the TEKNOFEST 2025 Vertical Landing Rocket Competition, Sferon Aerospace won the TEKNOFEST Combat UAV Best Design Award for its GPS-denied carbon-fiber UAV (and 1st Place at the Efes Exercise Defense Tech Competition), Team Solaris competed globally with its solar vehicles, and R/V Koca Piri Reis led national subsea fault mapping, underwater archaeology (TÜBEP Blue Heritage), and İzmir Bay hypoxia/pollution monitoring.

1. Strategic Governance, Policy Architecture and THE 2027 SDG 9 Master Scorecard

Dokuz Eylül University governs industrial collaboration, intellectual property creation, entrepreneurship, and resilient campus infrastructure through an integrated policy and quality assurance architecture anchored in the DEÜ Strategic Plan (2024–2028) and the YÖKAK 5-Year Full Institutional Accreditation framework. Key regulatory instruments in force during 2025–2026 include: (1) the DEÜ Sustainable Investment Policy (published by the DEÜ Sustainability Office, 2026, https://greencampus.deu.edu.tr/); (2) the DEÜ Intellectual Property Rights and Technology Transfer Directive administered by the DEÜ Technology Transfer Office (DETTO); (3) the DEPARK Operational Directive (Version 11, 2025, https://depark.com/); (4) the University–Industry Application and Research Center (ÜSAMER) consultancy and industrial R&D regulations; and (5) the university-wide Artificial Intelligence Usage Procedure (PR.37, enacted in April 2025 under the Information Security Management System [ISMS] and Law No. 6698 KVKK; GreenMetric Report 2026, Section [7.13], p. 159).

All institutional R&D, patent, spin-off, and societal impact outputs are tracked in real time across DEÜ's interconnected digital governance platforms: the Academic Data Management System (AVESİS, https://avesis.deu.edu.tr/), the Scientific Research Projects Information System (BAPSİS, https://bapsis.deu.edu.tr/), the Quality Information System (KALBİS, featuring a Peer Evaluation Module, Social Contribution Monitoring Module, and PDCA improvement tracking; GreenMetric Report 2026, p.

154), the Institutional Data Management System (KAYA), and Executive Business Intelligence Dashboards integrated with Elsevier SciVal. In parallel, the Social Contribution Coordination Office (Toplumsal Katkı Koordinatörlüğü, established 23 July 2024, https://toplumsalkatki.deu.edu.tr/) documented 531 'Technology and Science' public outreach and industry-engagement activities across 55 DEÜ academic and administrative units in its annual reporting cycle, alongside the comprehensive 06.06.2026 UN SDGs Social Contribution Activity Report (https://toplumsalkatki.deu.edu.tr/duyurular/birlesmis-milletler-surdurulebilir-kalkinma-hedefleri-dogrultusunda-dokuz-eylul-universitesi-toplumsal-katki-faaliyet-raporu-06-06-2026/).

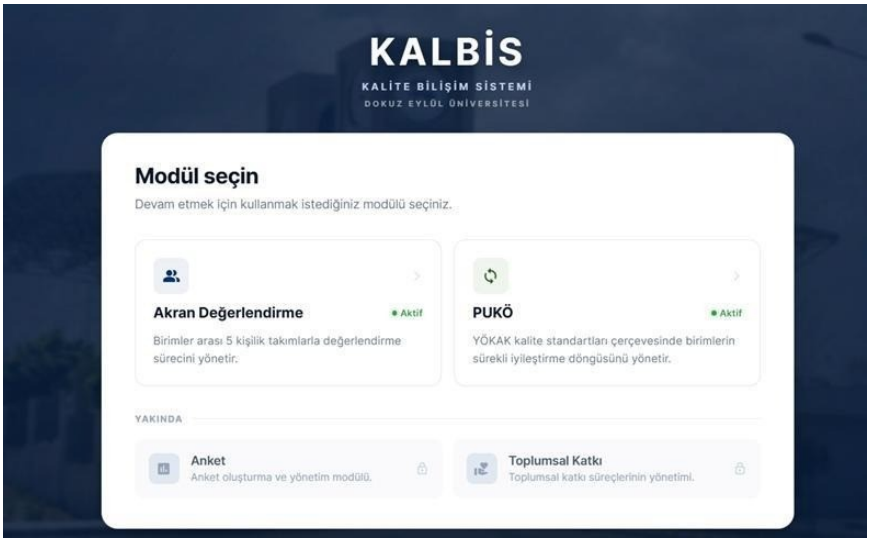

Figure 1. DEÜ Quality Information System (KALBİS) digital governance portal integrating Peer Evaluation (Akran Değerlendirme), PDCA (PUKÖ), Survey, and Social Contribution (Toplumsal Katkı) monitoring modules (GreenMetric Report 2026, p. 155).

THE 2027 Metric / Code	Weight	DEÜ 2025 Verified Institutional Performance & Primary Evidence	Verification Source
9.1 Research on industry, innovation & infrastructure (9.1.1)	11.6%	Scopus Affiliation ID 60012686 & SciVal SDG 9 portfolio; 226 SDG 9-tagged outputs in AVESİS for 2025–2026 (128 publications, 12 projects, 11 events, 24 conference papers, 18 theses, 24 courses); 2,250 Google Scholar sustainability publications in 2025 (0.79 per academic across 2,855 faculty).	Elsevier Scopus / SciVal; AVESİS; GreenMetric [6.8]–[6.10]
9.2 Patents citing university research (9.2.1)	15.4%	182 cumulative patents recorded in AVESİS; 106 patents granted/published in 2021–2026 with a historic surge to 63 patents in 2025 alone (37 Engineering/SDG 9, 15 MedTech/SDG 3, 8 Circular Economy/SDG 12, 2 Marine Tech/SDG 14, 1 Clean Energy/SDG 7); 6 ISIF'25 medals + 3 ISIF'26 medals.	DETTO; TÜRKPATENT; GreenMetric [6.20] Patent-SDG Analysis (p. 145)

THE 2027 Metric / Code	Weight	DEÜ 2025 Verified Institutional Performance & Primary Evidence	Verification Source
9.3 University spin-offs (9.3.1)	34.6%	DEPARK Technopark (41,248 m² across 3 zones; 150+ R&D firms; 2,000+ researchers; >TRY 1.25B R&D revenue); 39 incubated start-up ventures in BAMBU in 2025 (up 56% from 25 in 2024); 18 new start-ups founded in 2025 + 16 sustainability/high-tech spin-offs in May 2025–Apr 2026; 8 TÜBİTAK 1812 BİGGSİNERJİ company Incorporations.	DEPARK (2025, 2026); 2025 Admin. Activity Report Table 101; GreenMetric [6.16] & [6.20]
9.4 Research income from industry & commerce per academic staff (9.4.1)	38.4%	3-year total research funding (2023–2025): USD 109,877,170 (Avg: USD 36,625,723/yr; 2025: USD 18,730,354 across 2,855 academics = USD 6,560.54/academic in 2025; USD 12,828.62/academic 3-yr avg). Sustainability research = 54.0% (USD 19,779,424.38/yr; 2025 external TÜBİTAK/industry + EU grants = USD 5,749,783.75; central-budget research line = TRY 514,604,731.42).	Strategy Development Dept. (2026); BAPSİS; ÜSAMER; GreenMetric [6.5]–[6.8] & [7.2]
Campus Smart Infrastructure & Digitalization (GreenMetric 1.19, 2.3, 7.12, 7.13)	Supporting	17 certified Smart Buildings covering 236,009 m² (28.7% of 821,049 m² total building area); 26.05M kWh campus renewable energy generation; AI Usage Procedure PR.37 (April 2025); KALBİS, AVESİS, BAPSİS, KAYA, BKMYBS & İLYAT digital governance.	GreenMetric Report 2025–2026, pp. 33–38, 50, 153–159

2. DEPARK Technopark, BAMBU Incubation, BİGGSİNERJİ and Start-Up Financing (Metric 9.3)

2.1 Dokuz Eylül Technology Development Zone (DEPARK) Infrastructure and R&D Output

Established in 2013 under Technology Development Zones Law No. 4691 as Türkiye's first health-specialized technopark, the Dokuz Eylül Technology Development Zone (DEPARK, https://depark.com/) serves as DEÜ's primary engine for university spin-offs, research commercialization, and high-value-added industrial clustering across İzmir and the Aegean Region. Operating across a total designated area of 41,248 m² distributed across three specialized campus zones—the Central Campus Alfa and Beta Buildings (TGB-1, comprising 17,413 m² of certified smart-building R&D infrastructure) and the 15 Temmuz Health and Art Campus Zeytin Building (TGB-2, comprising 10,487 m² of smart-building biomedical and clinical R&D space adjacent to the 1,131-bed DEÜ Hospital and İzmir Biomedicine and Genome Center [İBG])—DEPARK hosts over 150 active R&D and technology companies employing more than 2,000 researchers, engineers, and software specialists (GreenMetric Report 2024–2025, Section [6.20], p. 132; GreenMetric Report 2025–2026, Section [6.16], p. 139).

Cumulatively, DEPARK member companies have successfully completed more than 1,100 R&D projects, developed and commercialized over 2,000 innovative products and software platforms, and generated more than TRY 1.25 billion in R&D revenue across software, artificial intelligence, biotechnology, medical

devices, pharmaceuticals, aviation and defense automation, marine technologies, electronics, energy, and digital gaming. Under Article 11 of the DEPARK Operational Regulations (Version 11), academic founders and student/alumni entrepreneurs establishing spin-off ventures in the BAMBU Incubation Centre receive a 50% rental discount on furnished offices and wet/dry laboratories (increased up to 75% for women entrepreneurs under DEÜ's gender-equity entrepreneurship scheme), alongside free high-speed fiber internet, legal/IP mentoring, and access to DEÜ's central prototyping and test laboratories. As the partner of DEPARK, Dokuz Eylül University provides significant amount of research income in industry.

2.2 BAMBU Incubation Centre, BAMBU+ Acceleration, BİGGSİNERJİ & Direct Seed Funding (2023–2025)

In 2025, DEÜ and DEPARK significantly expanded both the training pipeline and direct seed-capital financing for early-stage deep-tech start-ups (2025 Administrative Activity Report, Table 101; DEPARK Corporate Information Report 2026):

- **56% Growth in Hosted Incubation Firms (39 Ventures in 2025):** The number of early-stage technology start-ups hosted inside the DEPARK BAMBU Incubation Centre increased by 56.0%, rising from 25 incubated firms in 2024 to 39 incubated firms in 2025, with 18 new incubation firms commencing operations during calendar year 2025 (up from 17 new firms in 2024).
- **BAMBU Entrepreneurship Office, BAMBU+ & Free Community Training (213 Trainees in 2025):** Between 20 May and 20 September 2025, the BAMBU Entrepreneurship Office delivered its structured General Entrepreneurship Training Programme (covering business model canvas, financial modelling, market validation, investor pitching, and IP protection), followed by the launch of the intensive BAMBU+ Acceleration Programme on 18 November 2025 (https://www.depark.com/bambu-go/). In parallel, DEÜ experts delivered free TÜBİTAK BiGG module training and proposal-writing mentoring between 2 October and 2 December 2025, and the Continuing Education Centre (DESEM) hosted the public seminar 'Entrepreneurship for the New Generation' on 30 April 2025. Total participation in free entrepreneurship education rose from 184 participants in 2024 to 213 participants in 2025 (+15.8%).
- **TÜBİTAK 1812 BİGGSİNERJİ Consortium & TRY 3,600,000 Direct Seed Capital in 2025:** As the coordinating implementing organization of the TÜBİTAK 1812 Investment-Based Entrepreneurship Support Programme (BİGGSİNERJİ Consortium, jointly with Teknopark İzmir and İzmir University of Economics; https://www.depark.com/biggsinerji-lansman-etkinligimizde-paydaslarimizla-bir-araya-geldik/), DEPARK evaluated 264 business idea applications across the 2023–2025 cycle, trained and mentored 336 entrepreneurs through 50 hours of structured training and 249 hours of 1-on-1 expert mentoring, and enabled 8 deep-tech start-ups to win the TÜBİTAK Seal of Excellence (Mükemmeliyet Mührü) and incorporate as joint-stock companies. Direct seed investment disbursed to winning ventures rose by 33.3% from TRY 2,700,000 across 3 ventures in 2024 to TRY 3,600,000 across 4 ventures in 2025 (TRY 900,000 per venture; cumulative TRY 6,300,000 in 2024–2025).
- **Erasmus+ ECOMINIMIZE Green Entrepreneurship Project (€60,000) & Flagship Impact Spin-Offs:** Under DEPARK Project Management Office coordination, DEÜ executed the €60,000 Erasmus+ 'ECOMINIMIZE' project to equip young entrepreneurs with circular-economy and green transformation business models. Prominent 2025 DEPARK spin-offs (52 firms) include SmartOceanics Marine Technologies A.Ş. (accelerated via BAMBU GO and BİGGSİNERJİ using shared DEÜ marine

engineering labs to build autonomous oceanographic monitoring systems) and Biop Biotechnology (incubated at DEPARK TGB-2 Zeytin with clinical mentorship from DEÜ Hospital and İBG for diagnostic kit validation).

DEPARK / DETTO Entrepreneurship & Incubation Indicator	2024 Verified	2025 Verified	Multi-Year / Cumulative Context & Source
Total Designated Technopark Area (TGB-1 Alfa/Beta & TGB-2 Zeytin)	**41,248 m²**	**41,248 m²**	**17,413 m² TGB-1 + 10,487 m² TGB-2 certified Smart Buildings**
Active R&D & Technology Companies in DEPARK	150+ firms	150+ firms	>2,000 R&D personnel; >1,100 completed R&D projects
Cumulative Commercialized Products & Annual R&D Revenue	2,000+ products	>TRY 1.25 Billion	GreenMetric Report 2024–2025, Section [6.20], p. 132
Early-Stage Firms Hosted in BAMBU Incubation Centre	25 firms	39 firms (+56.0%)	2025 Admin. Activity Report, Table 101; SDG 1.4.1 dossier
New Start-Up Companies Admitted to Incubation	17 new firms	18 new firms	16 sustainability/high-tech start-ups in May 2025–Apr 2026 cycle
Spin offs	44	52	
Participants in Free Entrepreneurship Training (BAMBU / DESEM)	184 people	213 people (+15.8%)	336 entrepreneurs trained in BİGGSİNERJİ (50h training, 249h mentoring)
Entrepreneurs Mentored for TÜBİTAK 1812 BiGG Applications	6 people	15 people (+150%)	264 total business idea applications across 2023–2025 BİGGSİNERJİ
Start-Up Ventures Receiving Direct Seed Capital Grants	3 ventures	4 ventures	8 total TÜBİTAK BiGG Seal of Excellence incorporations (2023–2025)
Total Direct Start-Up Seed Financial Support Disbursed (TRY)	**2,700,000 TRY**	**3,600,000 TRY (+33.3%)**	**TRY 900,000 per venture in 2025 (TRY 6,300,000 in 2024–2025)**

Table 3 below lists the verified technology and sustainability start-up companies admitted to the DEPARK innovation ecosystem across the 2025–2026 reporting cycle (GreenMetric Sustainability Report 2025–2026, Section [6.16], pp. 139–140; GreenMetric Report 2024–2025, Section [6.20], pp. 132–133):

No.	Start-Up / Spin-Off Company Name	DEPARK Admission / Foundation	Technology Domain & SDG 9 Innovation Focus
1	Meta Technology Software Automation Inc.	September 2025	Aviation Technologies — Aerospace automation & flight software
2	SmartOceanics Marine Technologies Inc.	August / September 2025	Marine Technologies — Autonomous ocean sensors & coastal monitoring
3	AI4VISION Health Technologies Inc.	August 2025	AI & Medical Software — Computer vision for clinical diagnostics
4	Academic Surgical Health Technologies Edu. & Cons. Ltd.	June 2025	Medical Technologies — Surgical simulation & clinical R&D
5	Broad Sight Medical Materials and Technologies Ltd.	July 2025	Health Technologies — Advanced biomaterials & medical devices
6	Karsin Health Technologies Inc.	December 2025	Health Technologies — Oncology & biomedical diagnostic systems
7	Orthoplanz Health Services Industry and Trade J.S.C.	January / May 2025	Health Technologies — Digital orthopedic surgical planning & implants
8	YES Artificial Intelligence and Software Services Inc.	September 2025	Software & Artificial Intelligence — Enterprise AI decision systems
9	Aylara Power Solutions Joint Stock Company	January 2025	Electronics & Power — High-efficiency power electronics & energy systems
10	Megalith Engineering Joint Stock Company	January 2025	Engineering & Architecture — Structural & geotechnical R&D
11	Alcanex Software and Technology Inc.	September 2025	Software Engineering — Cloud & industrial automation platforms
12	DojoNode Software, Hardware & Computer Systems Inc.	August 2025	Embedded Systems & Hardware — IoT hardware & computing consultancy
13	Embedra Technology Services Inc.	January 2026	Embedded Software — Microprocessor & industrial control software
14	Softwise Software Elec. Mach. Const. Eng. R&D Inc.	September 2025	Multidisciplinary Engineering — Mechatronics, ICT & construction R&D
15	Patron Technology Joint Stock Company	July 2025	Information Technologies — Enterprise data & workflow automation
16	Career Pusulam Software and Consultancy Ltd.	January 2025	ICT & EdTech — Digital career analytics & talent matching software

No.	Start-Up / Spin-Off Company Name	DEPARK Admission / Foundation	Technology Domain & SDG 9 Innovation Focus
17	Drama Software Services Inc.	May 2025	Software Development — Digital media & interactive software
18	Ninova Game Software and Marketing Inc.	June 2025	Interactive Simulation & Gaming — 3D graphics & game engines
19	Snack Games Game Software Ltd.	May 2025	Software & Gaming — Mobile simulation & interactive entertainment
20	Madpoly Games & Time Reactor AI Systems J.S.C.	Nov 2024 – Jan 2025	AI & 3D Animation — Generative AI systems & digital twin animation



Figure 2. DEPARK Technology Development Zone in Central Campus (TGB-1, 17,413 m² certified smart building) with the DEÜ Solar Boat Team ('DİYYOJEN') vessel exhibited at the entrance (GreenMetric Report 2026, p. 38).



Figure 3. DEPARK Health-Themed Technology Development Zone in 15 Temmuz Health and Art Campus (TGB-2 Zeytin Building, 10,487 m²) hosting biotech, medical device, and AI start-ups (GreenMetric Report 2026, p. 38).

3. Research Budget, Industry & External Grant Income and Internal Funding Hubs (Metric 9.4)

3.1 Three-Year Research Funding Trajectory and Sustainability R&D Share (GreenMetric 6.5–6.8 & 7.2)

THE Metric 9.4 (38.4% of the SDG 9 score) evaluates research income from industry, commerce, and competitive grants normalized per academic staff member across STEM, Medicine & Health, and Social Sciences/Humanities. As documented in the UI GreenMetric 2025–2026 Sustainability Report (Sections [6.5]–[6.8], pp. 111–113, and Section [7.2], p. 148) and the 2025 Administrative Activity Report, DEÜ mobilized USD 109,877,170 in total research funding across the three-year window 2023–2025 (USD 69,168,400 in 2023; USD 21,978,416 in 2024; and USD 18,730,354 in 2025), corresponding to an annual three-year average of USD 36,625,723 per year.

Of this total research portfolio, USD 59,338,273.13 over three years—or an annual average of USD 19,779,424.38 per year (54.0% of all university research funding, up from 51.6% [USD 18,430,848/year] in the 2022–2024 cycle)—was dedicated directly to sustainability-related research projects addressing clean energy, industrial innovation, marine technology, climate resilience, and advanced healthcare. In calendar year 2025 alone, DEÜ's sustainability research project funding reached USD 14,000,754.78, comprising: (1) USD 8,250,971.03 in projects supported by institutional own revenues, Scientific Research Projects (BAP), and Research University Support Program (ADEP) grants; (2) USD 2,610,197.23 in competitive European Union grants (Horizon Europe, Erasmus+, COST, PRIMA, Water4All); and (3) USD 3,139,586.52 in externally funded national R&D contracts (TÜBİTAK 1001, 1004, 1005, 1505 University–Industry Cooperation, TÜSEB, and direct industrial R&D protocols via ÜSAMER and DEPARK). In Turkish Lira terms, DEÜ's audited central-budget expenditure on Research Projects rose by 87.3% over two years, from TRY

274,736,420.00 in 2023 to TRY 446,871,501.03 in 2024 (+62.7%) and TRY 514,604,731.42 in 2025 (+15.2%; GreenMetric Report 2026, p. 148). Across DEÜ's 2,855 full-time academic staff in 2025 (966 professors [33.83%], 448 associate professors [15.69%], 426 assistant professors [14.92%], 487 lecturers [17.06%], and 528 research assistants [18.49%]), total research funding equates to USD 6,560.54 per academic staff member in 2025 and USD 12,828.62 per academic staff member on a three-year annual average.

Research Funding Category / Budget Line	2023 Actual	2024 Actual	2025 Actual	3-Year Total / Average & Share
Own-Revenue, BAP & ADEP Sustainability Research Projects (USD)	6,877,592.63	8,241,590.57	8,250,971.03	3-Yr Total: USD 23,370,154.23 (Avg: USD 7.79M/yr)
European Union Funded Sustainability Research Projects (USD)	20,656,416.72	4,375,110.99	2,610,197.23	3-Yr Total: USD 27,641,724.94 (Avg: USD 9.21M/yr)
Externally Funded TÜBİTAK, TÜSEB & Industry R&D Projects (USD)	3,522,041.36	1,664,766.08	3,139,586.52	3-Yr Total: USD 8,326,393.96 (+88.6% YoY in 2025)
Total Sustainability-Dedicated Research Funds [6.5] (USD)	**31,056,050.71**	**14,281,467.64**	**14,000,754.78**	**3-Yr Total: USD 59,338,273.13 (Avg: USD 19,779,424.38)**
Total University Research Funds Across All Fields [6.6] (USD)	**69,168,400.00**	**21,978,416.00**	**18,730,354.00**	**3-Yr Total: USD 109,877,170.00 (Avg: USD 36,625,723.33)**
Ratio of Sustainability Research to Total Research Funding [6.7]	**44.90%**	**64.98%**	**74.75%**	**3-Yr Average Share: 54.00% (up from 51.6% in 2022–24)**
Central-Budget Research Projects Expenditure [7.2] (TRY)	274,736,420.00	446,871,501.03	514,604,731.42	+87.31% cumulative growth (2023–2025); +15.16% in 2025
Central-Budget Facility, Lab & Infrastructure Investment [7.2] (TRY)	620,388,108.00	729,799,798.15	1,310,499,344.50	2025: TRY 194.51M Infra + TRY 990.83M Equip + TRY 125.17M Lab
Total Research Funding per Academic Staff Member (2,855 FTE in 2025)	**24,658.97 USD**	**7,835.44 USD**	**6,560.54 USD**	**3-Yr Average: USD 12,828.62 per academic staff member**

3.2 Thematic Mapping of Externally and Institutionally Funded Research Hubs (2021–2026)

In 2025–2026, DEÜ completed two university-wide project mapping audits—the Externally Funded Projects SDG Mapping Report (2021–2026) and the Institutionally Funded Research Projects (IFRP / BAP–ADEP) SDG Mapping Report (2021–2026) (GreenMetric Report 2026, pp. 145–147)—demonstrating that SDG 9 (Industry, Innovation and Infrastructure) is one of the top five dominant research pillars across both external grants (TÜBİTAK, TÜSEB, Horizon Europe, Erasmus+) and internal BAP/ADEP investments. Flagship SDG 9 internal and external R&D hubs include: (1) Design and Production of an Autonomous Underwater Vehicle (AUV) at İzmir Vocational School and the Faculty of Engineering (SDG 9 Innovation Hub); (2) Development of a Three-Filament Specialized Yarn Production System at the Department of Textile Engineering (SDG 9 & SDG 12 Industrial Manufacturing Hub); (3) TÜBİTAK-funded project on illite/$Al(OH)_3$ flame-retardant polymer nanocomposites for industrial safety; (4) AI-based gene discovery and 3D bioprinting for personalized medicine at İBG and the Faculty of Medicine; and (5) paleoseismology, active marine tectonics of the Foça–Karaburun coast, and seismic characterization of the Bornova Basin.

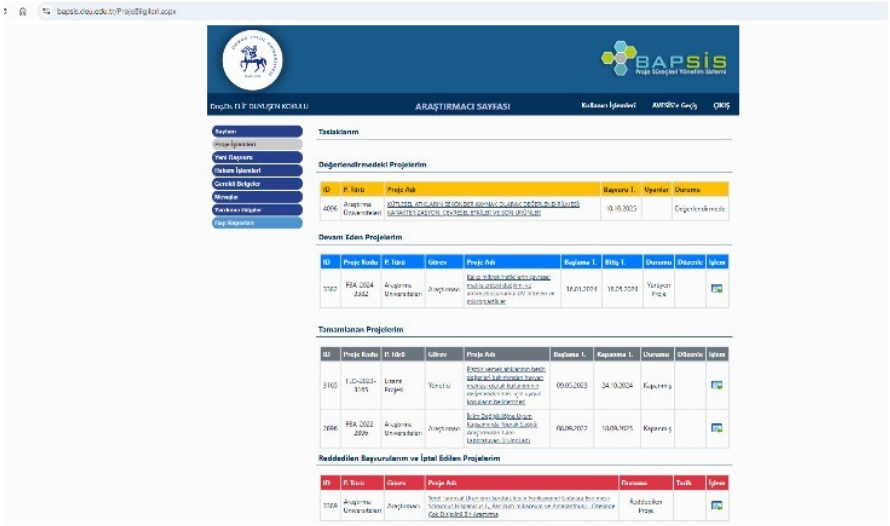

Figure 4. DEÜ Scientific Research Projects Process Management System (BAPSİS, https://bapsis.deu.edu.tr/) used to monitor internal BAP/ADEP and external R&D project budgets and SDG alignments (GreenMetric Report, p. 138).

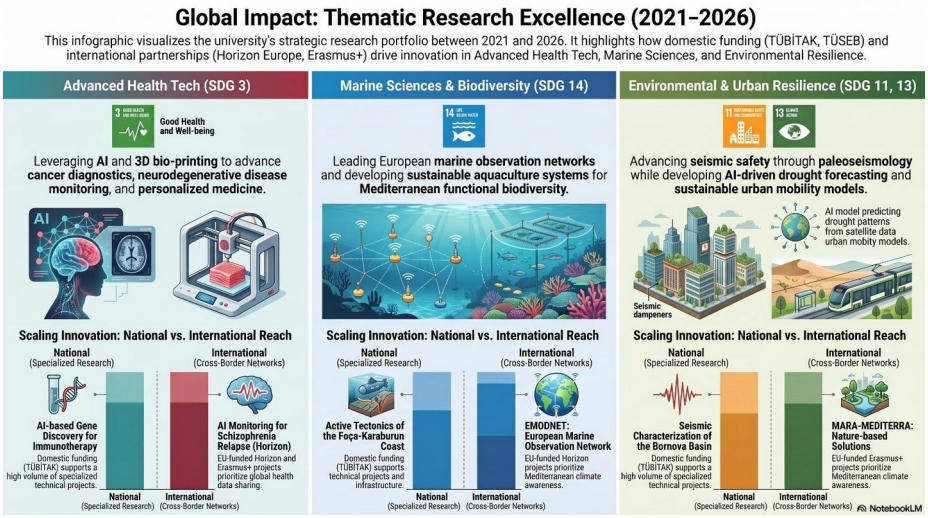

Figure 5. Global Impact: Thematic Research Excellence (2021–2026) showing DEÜ's externally funded TÜBİTAK, TÜSEB, Horizon Europe (EMODNET, MARA-MEDITERRA), and seismic/marine engineering research portfolio (GreenMetric Report 2026, p. 146).



Figure 6. DEÜ Faculty Research Excellence: Internal BAP & ADEP Funding Hubs (2021–2026) highlighting Autonomous Underwater Vehicle (AUV) design (SDG 9) and Three-Filament Yarn Production Systems (GreenMetric Report 2026, p. 147).

4. DETTO Technology Transfer, Patent Surge (2025 Peak) and ISIF Invention Medals (Metric 9.2)

4.1 DETTO Intellectual Property Portfolio and the 2025 Patent Surge (106 Patents in 2021–2026)

THE Metric 9.2 (15.4% of the SDG 9 score) tracks the number of patents citing university research and the university's direct patent and licensing output managed by the Dokuz Eylül University Technology Transfer Office (DETTO, https://detto.deu.edu.tr/). Across its institutional history, DEÜ records 182 granted and published patents in the AVESİS repository. As documented in the Patent–SDG Mapping Analysis (2021–2026) in the UI GreenMetric 2025–2026 Sustainability Report (p. 145), DEÜ generated 106

published/granted patents between 2021 and early 2026, achieving an extraordinary five-fold surge in calendar year 2025 to 63 patents in a single year (up from 8 in 2021, 5 in 2022, 10 in 2023, and 13 in 2024, plus 7 in early 2026).

- **SDG 9 Core Engineering & Industrial Systems Patents (37 of 63 Patents in 2025 — 58.7%):** In 2025, 37 of DEÜ's 63 newly published/granted patents focused on core SDG 9 mechanical, mechatronic, materials, electronics, and civil/mining engineering technologies, headed by the 2025 patented 'Active Balancing System and Method for Rotating Machines' (eliminating industrial rotor vibration in high-speed turbines and machine tools), microprocessor-controlled specific-heat measurement systems, and nitinol shape-memory alloy actuator mechanisms.
- **SDG 3 Biomedical Devices & Oncology Diagnostics Patents (15 Patents in 2025; 29 across 2021–2026):** Covers invasive bladder cancer biomarkers, lung cancer combination therapies, ovarian cancer nanoparticles, intraperitoneal chemotherapy infusion pumps, mobile respiratory devices, integrated blood-glucose monitors, and sleep apnea diagnostic hardware.
- **SDG 12 Green Chemistry & Circular Recovery Patents (8 Patents in 2025; 11 across 2024–2026):** Covers industrial waste upcycling technologies, including glass-foam insulation manufactured from waste laminates, phosphorus recovery from biochar, and high-surface-area activated carbon synthesized from biochar ash.
- **SDG 7 Clean Energy & SDG 14 Marine Technology Patents (3 Patents in 2025; 8 across 2021–2026):** Includes photovoltaic module power-efficiency enhancers, nanoparticle-catalyzed hydrogen gas production from marine macroalgal waste, underwater optical/acoustic sensors for aquatic ecosystems, microcapsule antifouling coatings for aquaculture nets, and collision-resilient ship hull structures.

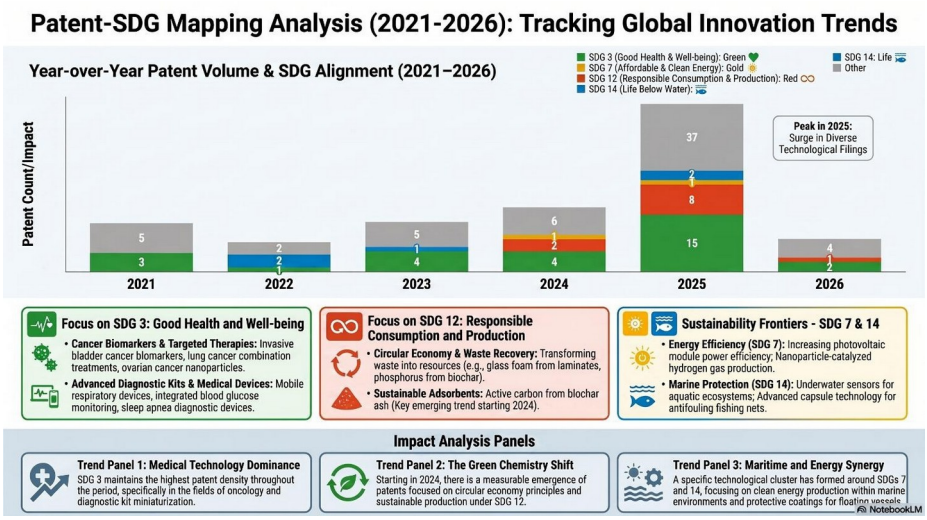

Figure 7. DEÜ Patent–SDG Mapping Analysis (2021–2026) documenting the surge to 63 granted/published patents in 2025 (106 total over 2021–2026) across SDG 9, SDG 3, SDG 12, SDG 7, and SDG 14 (GreenMetric Report 2026, p. 145).

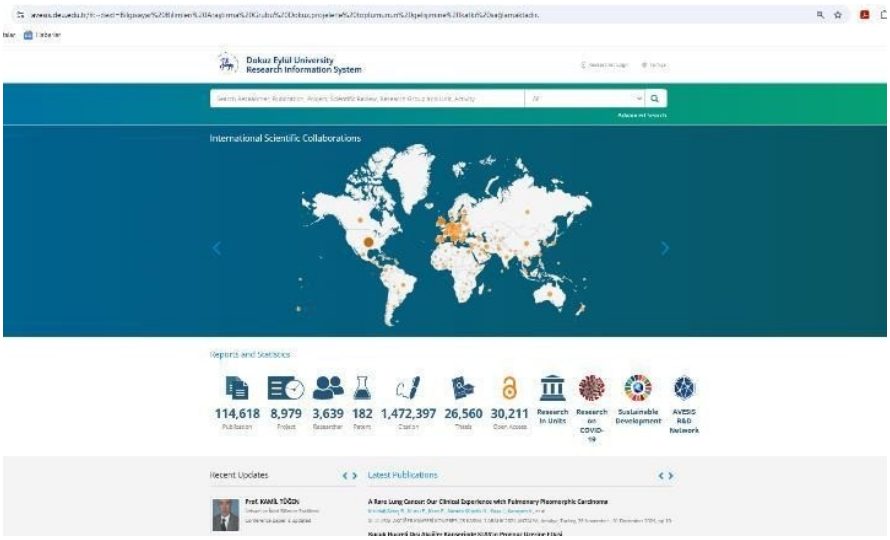

Figure 8. DEÜ Academic Data Management System (AVESİS, https://avesis.deu.edu.tr/) tracking 114,618 publications, 8,979 research projects, 3,639 researchers, 182 cumulative patents, and 226 SDG 9 records in 2025–2026 (GreenMetric Report, p. 138).

4.2 International Invention Fair Awards: 6 Medals at ISIF'25 and 3 Medals at ISIF'26

Demonstrating the commercial readiness and international competitiveness of DETTO's patent portfolio, DEÜ inventors won 6 medals (1 Gold, 2 Silver, 3 Bronze) at the 10th Istanbul International Invention Fair (ISIF'25, held 17–21 September 2025 at İstanbul Atatürk Airport under TEKNOFEST 2025, where DEÜ exhibited 12 patented projects: 5 from the Faculty of Engineering, 4 from İBG, 2 from Bioİzmir, and 1 from the Institute of Marine Sciences and Technology; https://haber.deu.edu.tr/deuden-teknofest-sampiyonlugu-ve-isif25-madalyalari/), followed by 3 additional medals (1 Gold, 2 Bronze) at the 11th International Invention Fair (ISIF'26, held 30 September–4 October 2026 at TEKNOFEST Güneydoğu; https://haber.deu.edu.tr/dokuz-eylul-universitesi-teknofest-guneydogudan-odullerle-dondu/):

Invention Fair & Medal	Patented Invention Title	DEÜ Inventors & Academic Unit	Industrial, Environmental & Societal Impact (SDG Alignment)
ISIF'25 — Gold Medal	Intraperitoneal Infusion Pump System	Berke Manoğlu, Batu Manoğlu (Faculty of Medicine / Bioİzmir)	Targeted intraperitoneal chemotherapy infusion pump delivering oncology drugs directly to tumor sites (SDG 3 & SDG 9).
ISIF'25 — Silver Medal	A Ship Construction That Prevents Environmental Disasters in Collision	Prof. Dr. Kadri Turgut Gürsel (Institute of Marine Sciences & Technology — DBTE)	Energy-absorbing double-hull naval architecture preventing catastrophic oil/chemical spills during maritime collisions (SDG 9 & SDG 14).

Invention Fair & Medal	Patented Invention Title	DEÜ Inventors & Academic Unit	Industrial, Environmental & Societal Impact (SDG Alignment)
ISIF'25 — Silver Medal	A Functionalized Biosensor to Detect the 2HG Metabolite Due to IDH Mutation	Aleyna Yıldız Gültekin, Gamze Tunç, Ahmet Okay Çağlayan, Gül Hüray İşlekel (İBG / Medicine)	High-sensitivity electrochemical biosensor detecting 2-hydroxyglutarate in IDH-mutant gliomas and acute leukemias (SDG 3 & SDG 9).
ISIF'25 — Bronze Medal	Nanoparticle Catalyzed Hydrogen Gas Production Using Marine Wastes	Prof. Dr. Levent Çavaş, Sema Doğmaz (Faculty of Science — Dept. of Chemistry)	Clean hydrogen fuel generation from invasive marine biomass/macroalgal wastes using metallic nanoparticle catalysts (SDG 7, SDG 9 & SDG 14).
ISIF'25 — Bronze Medal	Capsule Technology for Providing Antifouling Feature to the Fishing Nets	Gülşah Ekin Kartal, Prof. Dr. Ayşe Merih Sarıışık, Prof. Dr. Levent Çavaş (Textile Eng. & Chemistry)	Eco-friendly microencapsulated antifouling textile coating extending aquaculture net lifespan without toxic biocide leaching (SDG 9, SDG 12 & SDG 14).
ISIF'25 — Bronze Medal	Economic Biosurfactant Production from Renewable Industrial Waste	Prof. Dr. Raziye Öztürk Ürek, Gürkan Baş (Faculty of Science — Biochemistry)	Circular bio-manufacturing of biodegradable industrial biosurfactants from agro-industrial waste streams (SDG 9 & SDG 12).
ISIF'26 — Gold Medal	Motion Control Technology Based on Energy Exchange Between Nitinol & Mainspring for Solar-Responsive Facade Shading	Dr. Pelin Kılıç, Prof. Dr. Müjde Altın (Faculty of Architecture)	Zero-energy smart kinetic building facade actuated autonomously by Nitinol shape-memory alloys under solar heating (SDG 7, SDG 9 & SDG 11).
ISIF'26 — Bronze Medal	Artificial Joint Capsule for Hip Prostheses (Kalça Protezleri İçin Yapay Eklem Kapsülü)	Assoc. Prof. Dr. Bora Uzun (Biomechanics / Healthcare Tech)	Biomechanical prosthetic joint capsule preventing post-operative hip dislocation and wear (SDG 3 & SDG 9).
ISIF'26 — Bronze Medal	System and Method for Measuring Specific Heat Capacities Using Uninsulated Vessels & Microprocessors	Prof. Dr. Mustafa Erol (Physics / Materials Engineering)	Rapid, low-cost microprocessor calorimetry system eliminating bulky thermal insulation in industrial material testing (SDG 9).

Dokuz Eylül University Receives Six Awards at the International Inventions Fair (ISIF 2025)

Dokuz Eylül University (DEU) demonstrated its research and innovation capacity at the International Inventions Fair (ISIF 2025), held in Istanbul, receiving a total of six medals: one gold, two silver, and three bronze. The awarded inventions reflect the University's contributions to technological innovation, healthcare, environmental sustainability, and industrial applications. The gold medal was awarded for the development of an innovative drug delivery pump system designed for cancer treatment. The two silver medals recognized a novel ship design aimed at preventing environmental disasters resulting from maritime collisions and a biosensor technology developed for the detection of genetic mutations. The three bronze medals were awarded for innovative technologies focusing on hydrogen production from marine waste, environmentally sustainable fishing nets, and biosurfactant production from industrial waste. These achievements highlight the University's multidisciplinary research capabilities and its commitment to translating scientific knowledge into practical technological solutions that address critical challenges in healthcare, maritime safety, environmental protection, and sustainable industrial development.



Figure 8A. DEÜ researchers and inventors receiving 6 International Medals (1 Gold, 2 Silver, 3 Bronze) at the 10th Istanbul International Invention Fair (ISIF'25, September 2025)

5. Industry Partnerships, Aerospace & Defense Moves (TUSAŞ, TEI), ÜSAMER & EBSO Summit

In 2025–2026, DEÜ executed a coordinated series of high-level industrial, aerospace, defense, and clean-energy partnerships designed to convert academic R&D into export-oriented industrial technologies:

- **İzmir R&D Ecosystem Summit with EBSO ÜSKK (7 November 2025):** Hosted by DEÜ Rector Prof. Dr. Bayram Yılmaz in partnership with DEPARK, the DEÜ Scientific Research Projects (BAP) Coordination Unit, and the Aegean Region Chamber of Industry University–Industry Cooperation Coordination Board (EBSO ÜSKK, chaired by Ali Arda Yüksel), the 'İzmir R&D Ecosystem Summit: University–Industry–Entrepreneur Fair' convened on 7 November 2025 (https://haber.deu.edu.tr/dokuz-eylulden-ar-ge-hamlesi-bilim-ve-sanayi-ayni-masada-bulustu/ and https://www.depark.com/izmir-ar-ge-ekosistemi-zirvesi-tamamlandi/). Bringing together 11 leading regional industrial enterprises, R&D centers, DEPARK spin-offs, and DEÜ project leaders around interactive B2B matchmaking tables, the summit launched joint TÜBİTAK 1505/1707 industrial R&D pipelines aimed at transforming İzmir into a net high-technology exporter.
- **National Aviation Move — TUSAŞ (Turkish Aerospace Industries) Cooperation Protocol:** Under the bilateral R&D and talent-development protocol signed between DEÜ and Türk Uçak Sanayii A.Ş. (TUSAŞ / TAI, https://haber.deu.edu.tr/deuden-milli-havacilik-hamlesi-tusas-ile-is-birligi-protokolu-imzalandi/), DEÜ engineering faculty and students collaborate on indigenous aerospace composite materials, structural fatigue analysis, embedded avionics software, and national aircraft development programs.
- **Strategic Defense & Aircraft Propulsion Partnership with TEI (TUSAŞ Engine Industries):** Advancing DEÜ's aerospace and defense industry roadmap, a senior delegation led by DEÜ Vice-Rector Prof. Dr. Hamdi Şükür Kılıç and DEPARK General Manager Prof. Dr. Zeki Âtıl Bulut conducted a comprehensive technical summit at TEI – TUSAŞ Motor Sanayii A.Ş. with TEI Deputy General Manager Emre Saylan (https://haber.deu.edu.tr/deu-ile-tei-arasinda-stratejik-is-birligi-adimi/). Inspecting TEI's aviation gas-turbine engine design, precision manufacturing, assembly, and test facilities, the two institutions structured joint R&D projects in advanced aerospace alloys and propulsion manufacturing, co-supervised graduate theses, and long-term Workplace Vocational Training (İME / 8.4.1) engineering placements at TEI.
- **ÜSAMER Industrial Consultancy, IHTEC-2025 Hydrogen Congress & COST Mic2Food:** Through the University–Industry Application and Research Center (ÜSAMER), DEÜ faculty delivered accredited testing, finite-element structural verification, and process optimization consultancy to regional manufacturers across İzmir's organized industrial zones (İAOSB, ESBAŞ, Torbalı, Kemalpaşa, Pancar, and Tire OIZs). Internationally, DEÜ co-organized the International Hydrogen Technologies Congress (IHTEC-2025, 25–28 May 2025) with the Hydrogen Technologies Association and joined the European Cooperation in Science and Technology (COST) Action 'Mic2Food' (2025–2029) on innovative food-processing biomanufacturing.



8B. (Left) İzmir R&D Ecosystem Summit co-organized by DEÜ, DEPARK, BAP, and EBSO ÜSKK on 7 November 2025; (Right) DEÜ–TUSAŞ and TEI (TUSAŞ Engine Industries) aerospace R&D and propulsion manufacturing summit.

6. TEKNOFEST Championships, UAV (İHA) Design, Rocketry, Team Solaris & Student Vehicles

A hallmark of DEÜ's SDG 9 ecosystem is its hands-on student engineering culture—supported by 149 active student communities (organizing 52 sustainability and technology events in 2025–2026; GreenMetric Report 2026, Section [6.12], pp. 123–126), dedicated prototyping hangars in the Faculty of Engineering and İzmir Vocational School, and BAP/DEPARK sponsorship. In 2024–2026, DEÜ's student aerospace, rocketry, solar-car, autonomous marine, and robotics teams achieved national and international acclaim:

- **TEKNOFEST 2025 Vertical Landing Rocket Competition — Türkiye 1st Place Champion (Roket9 Team / BORDO145-ROKET9):** Competing against 324 university engineering teams nationwide at TEKNOFEST 2025, the DEÜ Faculty of Engineering's Roket9 Team (BORDO145-ROKET9) won the Türkiye 1st Place National Championship in the Vertical Landing Rocket Competition (Dikey İnişli Roket Yarışması; https://haber.deu.edu.tr/deuden-teknofest-sampiyonlugu-ve-isif25-madalyalari/ and GreenMetric Report 2024–2025, p. 124). The multidisciplinary team—comprising Mechanical Engineering students Ahmet Kurt, Melih Gürses, Özkan Hancıoğlu, Arda Agat, Adem Çakan, Berke Önlü, and Erdem Ardahan, Electrical-Electronics Engineering student Ahmet Fevzi Pazarlıklı, and Computer Engineering student Furkan Türker Yılmaz—designed, manufactured, and flight-tested an indigenous rocket integrating custom flight-control avionics, cold-gas/pneumatic reaction-control thrusters, active attitude stabilization algorithms, and mechanical landing gear to execute a pinpoint, soft vertical touchdown.
- **SFERON Aerospace & Robotics Team — Combat UAV (Savaşan İHA) Best Design Award & Efes Exercise 1st Place:** Founded in 2020 at DEÜ as 'Synchronized Flying Explorations and Robotic Operation Networks' (SFERON, https://ogrencitopluluklari.deu.edu.tr/sufai-ogrenci-toplulugu/) under the academic supervision of Prof. Dr. Şahin Yavuz (Department of Computer Engineering), the Sferon

Havacılık ve Uzay Ekibi won the Best Design Award (En İyi Tasarım Ödülü) in the TEKNOFEST Combat UAV Competition (Savaşan İHA Yarışması; https://haber.deu.edu.tr/dokuz-eylul-universitesi-teknofest-guneydogudan-odullerle-dondu/). Sferon's award-winning fixed-wing combat UAV features an ultra-lightweight, modular all-carbon-fiber airframe for rapid field assembly and an onboard computer-vision and inertial navigation suite capable of autonomous flight and target lock-on in GPS-denied environments (GPS sinyali bulunmayan ortamlarda otonom uçuş). Prior to this award, Sferon also won 1st Place at the Efes Military Exercise Defense Science and Technologies Competition (Efes Tatbikatı Savunma Bilim ve Teknolojileri Yarışması Birinciliği), building on the legacy of DEÜ's SUFAİ Fixed-Wing UAV Team.

- **Solar Team Solaris (Güneş Arabaları Ekibi — S1 to S14) & Formula-G / World Solar Challenge Legacy:** Established in 2003 at the DEÜ Department of Mechanical Engineering in Central Campus (https://teamsolaris.com/tr/), Solar Team Solaris is one of Türkiye's longest-running student clean-vehicle engineering hubs. Across two decades and 14 vehicle generations (S1 through S14, including Formula-G solar racing prototypes and Cruiser/Challenger class carbon-monocoque solar cars), Team Solaris has achieved multiple podiums in the TÜBİTAK Formula G Solar Car Races, represented Türkiye in the 3,000 km Bridgestone World Solar Challenge across Australia, won awards at the iLumen European Solar Challenge in Belgium and the Moroccan Solar Race, and competed internationally in the Sasol Solar Challenge 2024 in South Africa (7–21 September 2024), sharing its telemetry, battery-management, and aerodynamic composite engineering lessons with DEÜ students at campus seminars in March 2025 (GreenMetric Report 2024–2025, p. 121).
- **DEÜ Solar Boat Team ('DİYYOJEN'), Autonomous Underwater Vehicle (AUV/ROV) & Automotive Design Awards:** Bridging solar mobility and naval architecture, the DEÜ Solar Boat Team designed and constructed the solar-powered composite vessel 'DİYYOJEN' (displayed outside DEPARK TGB-1; Figure 2). In subsea robotics, İzmir Vocational School and the Faculty of Engineering designed and fabricated an indigenous Autonomous Underwater Vehicle (AUV) funded by DEÜ's BAP/ADEP Internal Research Hub (Figure 6), while the DEÜ Mechanical Engineering Student Community earned accolades at the İYTE Future of Automotive Design Competition (23 October 2024) and the Teknofest Student Community conducted technical R&D expeditions to Bilişim Vadisi (IT Valley, 11 April 2025; GreenMetric Report 2026, p. 126).

DEÜ Student Engineering Team / Project	Competition / Programme & Year	Technical Innovation & Engineering Architecture	Verified Achievement / Award
Roket9 Team (BORDO145-ROKET9 — 9 Engineering Students)	TEKNOFEST 2025 Vertical Landing Rocket Competition	Integrated avionics, pneumatic thrust/attitude control, real-time telemetry & mechanical soft-landing system.	Türkiye 1st Place National Champion (out of 324 teams)
Sferon Aerospace & Robotics Team (Advisor: Prof. Dr. Şahin Yavuz)	TEKNOFEST Combat UAV (Savaşan İHA) & Efes Exercise Defense Tech	Modular all-carbon-fiber fixed-wing UAV with onboard AI visual navigation in GPS-denied environments.	TEKNOFEST Best Design Award & Efes Exercise 1st Place

DEÜ Student Engineering Team / Project	Competition / Programme & Year	Technical Innovation & Engineering Architecture	Verified Achievement / Award
Solar Team Solaris (Mechanical Engineering Dept., Est. 2003)	Sasol Solar Challenge 2024 (South Africa), World Solar Challenge & Formula G	14 generations (S1–S14) of carbon-fiber solar-electric vehicles, custom BMS, MPPT solar arrays & telemetry.	Multiple TÜBİTAK Formula G podiums; Sasol 2024 & WSC finalist
DEÜ Solar Boat Team ('DİYYOJEN')	Solar & Clean Marine Propulsion R&D Showcase (DEPARK TGB-1)	Lightweight composite hull powered by deck-integrated photovoltaic arrays and high-efficiency electric propulsion.	Permanent industrial showcase at DEPARK Central Campus
DEÜ Autonomous Underwater Vehicle (AUV) Team	BAP / ADEP Internal Research Funding Hub (2021–2026)	Indigenous torpedo-form AUV with subsea thrusters, pressure hull, depth/attitude sensors & autonomous control.	Highlighted SDG 9 Innovation Hub in GreenMetric 2026 (p. 147)
Mechanical Engineering & Teknofest Student Communities	İYTE Future of Automotive Design (Oct 2024) & IT Valley Tech Trip (Apr 2025)	CAD/CAE vehicle chassis/aerodynamics design, Formula/automotive prototyping & national R&D valley networking.	Automotive Design Award & 149-club student tech ecosystem

Dokuz Eylül University (DEU) hosted the İzmir Research and Development (R&D) Ecosystem Summit, bringing together representatives from academia, research institutions, and industry to foster collaboration, knowledge exchange, and innovation. Organized in cooperation with Dokuz Eylül University, Dokuz Eylül Technology Development Zone (DEPARK), the Scientific Research Projects Coordination Unit (BAP), and the Aegean Region Chamber of Industry (EBSO), the summit featured project presentations and interactive workshops aimed at identifying new partnership opportunities and strengthening university–industry collaboration. The event provided a platform for facilitating joint R&D initiatives, promoting knowledge and technology transfer, and enhancing cooperation between academic researchers and industrial stakeholders.



Figure 8C. DEÜ Faculty of Engineering Roket9 Team (BORDO145-ROKET9), Winner of the Türkiye 1st Place National Championship among 324 teams in the TEKNOFEST 2025 Vertical Landing Rocket Competition.

7. Marine Sciences, Subsea Mapping, Earthquake Geophysics, Underwater Archaeology & İzmir Bay

7.1 DEÜ Institute of Marine Sciences and Technology (DBTE) & R/V Koca Piri Reis Subsea Fleet

Established in 1975 and operating from İnciraltı and Urla campuses with 10 specialized MSc and PhD degree programmes (Living Marine Resources, Marine Geology and Geophysics, Marine Chemistry, Physical Oceanography, Coastal Engineering, Naval Architecture, and Underwater Archaeology; GreenMetric Report 2026, p. 111; https://imst.deu.edu.tr/), the DEÜ Institute of Marine Sciences and Technology (DBTE) is one of the Eastern Mediterranean's premier marine engineering and oceanographic research centers. DBTE operates the ocean-going research vessel R/V Koca Piri Reis, equipped with high-resolution multibeam echosounders (çok ışınlı batimetri) for 3D seabed topography, dual-frequency side-scan sonars (yanal taramalı sonar), multi-channel marine seismic reflection streamers, Chirp sub-bottom profilers, marine magnetometers, Rosette-CTD water-column profilers, sediment corers, and Remotely Operated Vehicles (ROVs). Through this instrumentation, DBTE serves as a leading Turkish partner in the EU Horizon Europe EMODNET (European Marine Observation and Data Network; Figure 5) and publishes the peer-reviewed Piri Reis Journal of Marine Sciences and Technology.



Figure 9. DEÜ Institute of Marine Sciences and Technology (DBTE, https://imst.deu.edu.tr/) in İnciraltı Campus, headquarters for R/V Koca Piri Reis oceanographic, marine geophysical, and underwater archaeological operations (GreenMetric Report 2026, p. 9).

7.2 Subsea Fault Mapping, 2025 Santorini–Aegean Seismic Research & Deep-Water Oceanography

- **2025 Santorini–Amorgos Seismic Crisis Analysis & Active Aegean Fault Mapping:** During the intense February 2025 Santorini–Amorgos submarine earthquake swarm in the southern Aegean Sea, DBTE marine geophysicists and the DEÜ Earthquake Research and Application Center (DAUM) synthesized multi-channel marine seismic reflection and multibeam bathymetry profiles collected by R/V Koca Piri Reis to evaluate submarine volcano-tectonic fault mechanics, tsunami propagation risks, and stress transfer toward the Western Anatolian coastal fault zones (https://haber.deu.edu.tr/deuden-aciklama-santorinideki-depremler-ege-icin-ne-anlama-geliyor/deu%CC%88-koca-piri-reis-aras%CC%A7tirma-gemisi/).
- **TÜBİTAK Active Tectonics of the Foça–Karaburun Coast, Bornova Basin Seismics & Gas Hydrates:** As highlighted in the GreenMetric 2025–2026 Report (pp. 119, 146; Figure 5), DEÜ geophysicists and marine geologists executed the TÜBİTAK-funded projects 'Active Tectonics of the Foça–Karaburun Coast' (mapping active submarine fault scarps at the entrance of İzmir Bay using high-resolution marine seismic reflection and side-scan sonar) and 'Seismic Characterization of the Bornova Basin', alongside hosting the 4 November 2025 engineering seminar 'Alternative Energy Sources: Gas Hydrates and Their Potential in Türkiye' investigating subsea methane hydrate reservoirs.
- **October 2025 North Aegean 9-Day / 22-Station Deep-Water Oceanographic Expedition:** In October 2025, R/V Koca Piri Reis (visited upon return at İnciraltı Pier by DEÜ Rector Prof. Dr. Bayram Yılmaz and scientifically briefed by Prof. Dr. Murat Gündüz) completed a 9-day oceanographic campaign across 22 deep-water stations in Turkish and international waters of the North Aegean Sea (https://www.aa.com.tr/tr/bilim-teknoloji/koca-piri-reis-arastirma-gemisi-kuzey-egedeki-bilimsel-osinografik-calismasini-tamamladi/3714093). Using CTD sondes and dissolved-oxygen sensors across the water column, the expedition quantified dense North Aegean deep-water formation, thermohaline circulation shifts, and climate-change impacts on eastern Aegean gulfs.

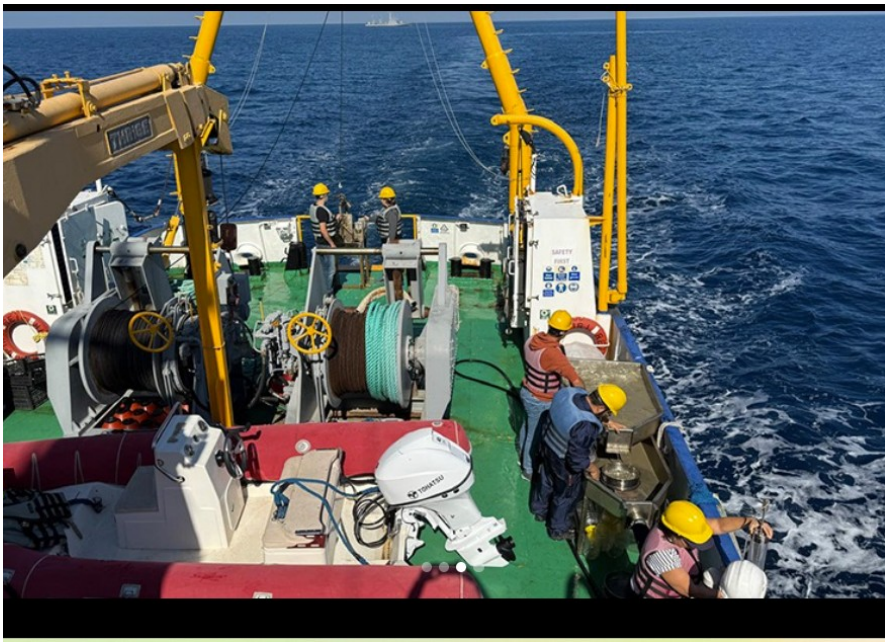

Figure 9A. DEÜ Research Vessel R/V Koca Piri Reis conducting multibeam 3D bathymetric seabed mapping, multi-channel marine seismic reflection profiling, and the October 2025 22-station North Aegean oceanographic expedition.

7.3 Technological Contributions to Underwater Archaeology (TÜBEP: Blue Heritage Project)

Combining marine geophysics, acoustic imaging, ROV robotics, 3D underwater photogrammetry, and archaeological diving, DBTE's Underwater Archaeology programme—led by Prof. Dr. Harun Özdaş and Assoc. Prof. Dr. Nilhan Kızıldağ with funding from the Presidency of Strategy and Budget (Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı) and collaboration from the Ministry of Culture and Tourism—leads the national 'Shipwreck Inventory Project of Türkiye: Blue Heritage (Türkiye Batık Envanteri Projesi: Mavi Miras — TÜBEP)' (https://haber.deu.edu.tr/su-alti-mirasimiz-deunun-katkilariyla-gun-yuzune-cikiyor/).

- **Subsea Acoustic & Photogrammetric Discovery of Shipwrecks from the Bronze Age to the Ottoman Era:** Operating aboard R/V Koca Piri Reis, the TÜBEP team uses side-scan sonar, multibeam bathymetry, sub-bottom profiling, and ROV inspection to detect, map in 3D, and inventory submerged harbors and shipwrecks along the Aegean and Mediterranean coasts. Landmark discoveries include a 4,000-year-old Bronze Age underwater cargo assemblage, Hellenistic/Roman amphora wrecks, the 24-meter 18th-century Ottoman warship wreck off Foça (containing iron cannons, hand grenades [humbara], muskets, gunpowder flasks, and copper galley cauldrons), and the Ottoman Kızlan shipwreck off Datça.
- **Underwater Cultural Heritage Library & December 2025 Science Café Aboard R/V Koca Piri Reis:** Anchored by the DEÜ Underwater Cultural Heritage and Maritime History Library established at DBTE (https://haber.deu.edu.tr/deuden-sualti-kultur-mirasi-ve-tarihi-kutuphanesi/), DEÜ brought its underwater archaeology inventions directly to the public on 26–30 December 2025 by hosting the 4th YÖK Science Café (Bilim Kafe) session aboard R/V Koca Piri Reis moored at İzmir Pasaport Pier, where Prof. Dr. Harun Özdaş presented 3D sonar reconstructions and artifacts from the Kızlan Ottoman shipwreck.

7.4 Marine Biology & Innovative Technological Solutions for İzmir Bay Pollution

In response to eutrophication, harmful algal blooms, mucilage risk, and acute dissolved-oxygen depletion in Inner İzmir Bay during 2024–2025, DEÜ mobilized its marine biology, marine chemistry, environmental engineering, and DEPARK startup teams to deliver both real-time oceanographic diagnostics and patented remediation technologies:

- **R/V Koca Piri Reis Emergency Hypoxia Cruises & 'Breath for İzmir' (İzmir'e Nefes) Platform:** Following the late-August and September fish mortality and hypoxia episodes along the Bayraklı–Turan–Karşıyaka–Bostanlı coastline, DBTE researchers led by Institute Director Prof. Dr. Esin Süzer deployed R/V Koca Piri Reis across Inner and Middle İzmir Bay to conduct high-density CTD, dissolved-oxygen, nutrient, chlorophyll-a, and phytoplankton stratification profiling (https://www.aa.com.tr/tr/gundem/koca-piri-reisin-arastirmacilari-izmir-korfezindeki-ikinci-seferde-karsiyakaya-yogunlasti/3326257). These datasets directly informed the Ministry of Environment, Urbanization and Climate Change's İzmir Bay Coordination Board and anchored DEÜ's technical leadership in the İzmir Bay Ecosystem-Based Management Platform ('Breath for İzmir' / 'İzmir'e Nefes') alongside İZSU and the İzmir Development Agency (İZKA)—highlighted by the 18 September 2025 multi-stakeholder workshop and the 28 November–18 December 2025 ecosystem monitoring study.
- **DEPARK Marine-Tech Spin-Offs & Patented Marine Pollution Countermeasures:** Translating marine science into commercial hardware and biotechnology, DEÜ incubated SmartOceanics Marine Technologies A.Ş. at DEPARK in August 2025 (via BAMBU GO and BİGGSİNERJİ) to manufacture smart oceanographic telemetry buoys and autonomous water-quality sensors. Concurrently, DEÜ researchers won three medals at ISIF'25 specifically for marine pollution prevention and valorization: (1) Prof. Dr. Kadri Turgut Gürsel's Silver-Medal patented collision-resilient ship hull architecture preventing oil/chemical spills; (2) Prof. Dr. Levent Çavaş and Sema Doğmaz's Bronze-Medal patented nanoparticle-catalyzed process converting nuisance marine macroalgal blooms/wastes into clean hydrogen gas; and (3) Gülşah Ekin Kartal, Prof. Dr. Ayşe Merih Sarıışık, and Prof. Dr. Levent Çavaş's Bronze-Medal patented microcapsule antifouling net technology eliminating toxic heavy-metal leaching into coastal waters.



Figure 9B. (Left) Subsea ROV and 3D photogrammetric documentation of Ottoman and Bronze Age shipwrecks under DEÜ DBTE's TÜBEP Blue Heritage Project; (Right) R/V Koca Piri Reis dissolved-oxygen and marine biology monitoring cruise in Inner İzmir Bay.

Marine Science & Subsea Technology Domain	Core DEÜ Platform / Vessel / Unit	Technological Instrumentation & Patented Inventions	2025–2026 Scientific & Regional Impact
Subsea Bathymetry & Active Fault Geophysics	R/V Koca Piri Reis; DBTE Marine Geology & Geophysics; DAUM	Multibeam echosounder, side-scan sonar, multi-channel marine seismic reflection, Chirp sub-bottom profiler, magnetometer.	Feb 2025 Santorini–Aegean seismic analysis; TÜBİTAK Foça–Karaburun active coastal tectonics; EU EMODNET seabed mapping.
Deep-Water Physical & Chemical Oceanography	R/V Koca Piri Reis; DBTE Physical & Chemical Oceanography	Rosette-CTD conductivity-temperature-depth profilers, dissolved O_2 sensors, ADCP current profilers.	Oct 2025 North Aegean 9-day / 22-station deep-water circulation & climate-change expedition (Prof. Dr. Murat Gündüz).
Underwater Archaeology (TÜBEP: Mavi Miras)	DBTE Underwater Archaeology Programme; R/V Koca Piri Reis	Side-scan acoustic anomaly detection, ROV visual/sonar inspection, 3D underwater photogrammetry & GIS inventory.	Discovery & 3D mapping of Bronze Age, Roman & Ottoman wrecks (Foça 18th-c. warship, Datça Kızlan wreck; Dec 2025 Bilim Kafe).
İzmir Bay Hypoxia, Eutrophication & Marine Biology	DBTE Marine Biology & Ecology; Environmental Engineering; İZSU/İZKA	Multi-depth hypoxia/DO mapping, harmful algal bloom taxonomy, TÜRKAK ISO 17025 water/sediment analysis (208 parameters).	Inner Bay fish-mortality & oxygen-depletion diagnostics (Prof. Dr. Esin Süzer); İzmir Bay 'Breath for İzmir' Platform (Sep–Dec 2025).

Marine Science & Subsea Technology Domain	Core DEÜ Platform / Vessel / Unit	Technological Instrumentation & Patented Inventions	2025–2026 Scientific & Regional Impact
Marine Robotics, Spin-Offs & Green Marine Patents	DEPARK (SmartOceanics A.Ş.); İzmir MYO; Faculty of Science & Eng.	Indigenous Autonomous Underwater Vehicle (AUV); SmartOceanics telemetry buoys; 3 ISIF'25 medal-winning marine patents.	Anti-spill ship hull (Silver), H_2 production from marine algal waste (Bronze), eco-antifouling microcapsule nets (Bronze).

8. Graduation Project Exhibitions, Smart Campus Infrastructure & 2026–2028 Targets

8.1 2024–2025 Graduation Project Exhibitions (Bitirme Projeleri Sergileri) & Industry Capstones

To bridge senior-year engineering and design education directly with industrial R&D needs, the DEÜ Faculty of Engineering organized the comprehensive 2024–2025 Academic Year Graduation Projects Exhibition (Bitirme Projeleri Sergisi, July 2025, https://eng.deu.edu.tr/tr/bitirme-projeleri-sergisi-2024-2025/) across all 11 engineering departments, publishing peer-reviewed department-level Capstone Project Abstract Volumes (Özetler Kitapçıkları):

- **Mechanical, Electrical-Electronics & Computer Engineering Capstone Exhibitions:** Showcased dozens of working prototypes and finite-element/AI engineering solutions—documented in the Mechanical Engineering Capstone Volume (https://eng.deu.edu.tr/wp-content/uploads/2025/07/makina_proje_ozetleri_2025.pdf) and Computer Engineering Capstone Volume (https://eng.deu.edu.tr/wp-content/uploads/2025/07/bilgisayar_proje_ozetleri_2025.pdf)—covering UAV/drone aerodynamic structural analysis, autonomous mobile robotics, EV battery thermal management, predictive maintenance AI, and industrial IoT.
- **Environmental, Civil, Geophysical, Geological, Mining & Textile Engineering Exhibitions:** Featured industry-sponsored capstones in the Environmental Engineering Exhibition (https://cevre.deu.edu.tr/tr/2024-2025-yili-bitirme-projeleri-sergisi/, covering advanced wastewater membrane bioreactors, İzmir Bay pollution control, and life-cycle assessment), Civil Engineering (https://insmuh.deu.edu.tr/wp-content/uploads/2025/07/Bitirme-Projesi-%C3%96zetler-K%C4%B0TABI-%C4%B0N%C5%9E2025_VFinal.pdf, seismic base isolation and sustainable pavement binders), Geophysical Engineering (https://eng.deu.edu.tr/wp-content/uploads/2025/07/Jeofizik_proje_ozetleri_2025.pdf, microzonation and marine seismic processing), Geological Engineering (`jeoloji_proje_ozetleri_2025.pdf`), Mining Engineering (`maden_proje_ozetleri_2025.pdf`), and Textile Engineering (`tekstil_proje_ozetleri_2025.pdf`, technical and medical textiles). Across the university, students reinforced these capstones through TÜBİTAK 2209-A and 2209-B Industry-Oriented Undergraduate Research Projects, the 7th Art Fair of the Faculty of Fine Arts, the

Architecture Student Society's 'Wearable Structure from Waste Materials' Competition (30 September 2025, 90 participants), and the 'Science and Technology Festival in the Footsteps of Twin Transformation' (25–27 September 2025).

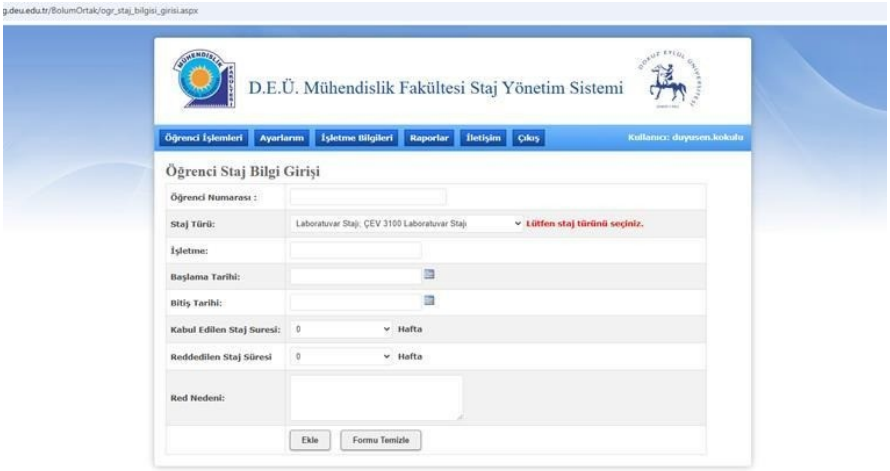

Figure 10. DEÜ Faculty of Engineering Digital Internship and Applied Training Management System (D.E.Ü. Mühendislik Fakültesi Staj Yönetim Sistemi) linking undergraduate engineering training with partner industrial enterprises (GreenMetric Report, p. 138).



Figure 10A. Student prototypes, poster presentations, and industry jury evaluations at the DEÜ Faculty of Engineering 2024–2025 Academic Year Graduation Projects Exhibition (July 2025).

8.2 Smart Campus Infrastructure (236,009 m²), Digital Governance & 2026–2028 Strategic Targets

As documented in the UI GreenMetric 2025–2026 Sustainability Report (Sections [1.18]–[1.19], [2.2]–[2.3], and [7.12]–[7.14], pp. 33–38, 153–159), DEÜ expanded its certified Smart Building stock in 2025 (with the addition of the new 2,462 m² Smart Large Experimental Animal Laboratory at 15 Temmuz Campus) to 17 smart buildings totaling 236,009 m² (28.7% of DEÜ's 821,049 m² total building floor area), equipped with automated BMS, HVAC, LED motion lighting, fire/safety sensors, and water-saving fixtures, alongside generating 26.05 million kWh of campus renewable energy (24.11M kWh solar PV across 7 campuses + 1.94M kWh closed-loop geothermal). Table 8 summarizes DEÜ's multi-year SDG 9 trajectory and 2026–2028 targets.

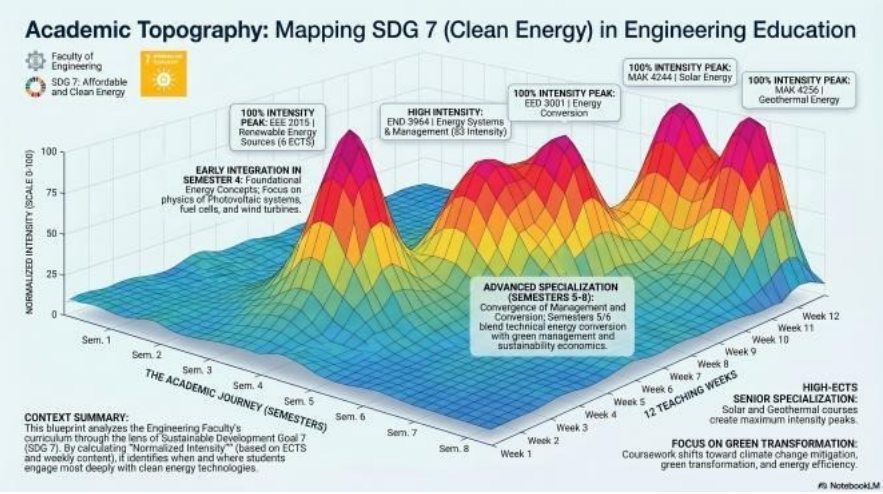

Figure 11. Academic Topography: Mapping Clean Energy and Engineering Innovation Intensity across the 8-Semester DEÜ Faculty of Engineering Curriculum (GreenMetric Report 2026, p. 144).



Figure 12. Aerial view of the DEÜ Central Campus Solar Power Plant—part of DEÜ's 7-campus renewable energy infrastructure generating 24,110,405 kWh/year of solar electricity alongside 1,943,670 kWh/year of geothermal heat (GreenMetric Report 2026, p. 43).

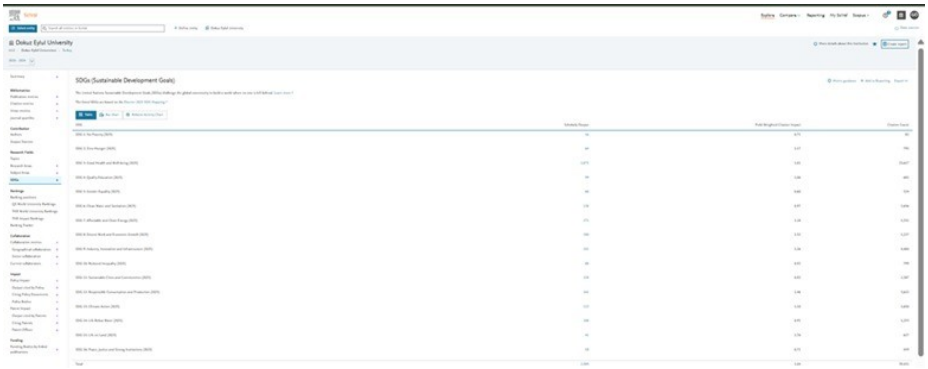

Figure 13. Elsevier SciVal SDG-Based Scholarly Output and Field-Weighted Citation Impact (FWCI) Analysis for Dokuz Eylül University (GreenMetric Report 2026, Section 7.12, p. 156).

SDG 9 Dimension & THE / GreenMetric Indicator	2024 Verified Baseline	2025 Verified Achievement	2026–2028 Institutional Target & Strategic Action Plan
9.1.1 SDG 9 Research & Scopus / AVESİS Output	639 Google Scholar env. pubs; Scopus ID 60012686	226 SDG 9 AVESİS records (128 pubs, 12 projects); 2,250 Google Scholar sust. pubs (0.79/academic)	Expand Q1 Scopus industrial co-authored publications by ≥20% via SciVal tracking & DEPARK–faculty joint R&D incentives.
9.2.1 Patents & International Invention Medals	13 published patents in 2024; cumulative IP portfolio	63 published/granted patents in 2025 (106 in 2021–26; 182 total); 6 ISIF'25 + 3 ISIF'26 medals	Maintain ≥50 annual patent filings/grants via DETTO and increase industrial patent licensing contracts by ≥30% by 2028.
9.3.1 DEPARK Spin-Offs, BAMBU & BİGGSİNERJİ	25 incubated firms (17 new); 184 trainees; TRY 2.70M aid	39 incubated firms (+56%; 18 new); 213 trainees; TRY 3.60M direct seed aid (8 BiGG awards)	Scale BAMBU+ and BİGGSİNERJİ to host ≥55 active incubated spin-offs and disburse ≥TRY 6.0M/year in seed funding by 2028.
9.4.1 Research Funds & Industry R&D Income	USD 21.98M total research (TRY 446.87M budget line)	3-Yr Avg: USD 36.63M/yr (54% sust. = USD 19.78M/yr); TRY 514.60M research expenditure (+15.2%)	Increase external TÜBİTAK 1505 / Horizon Europe / TUSAŞ / TEI / EBSO industrial contract income per STEM academic by ≥25%.
Student Engineering Teams (TEKNOFEST, Solaris, UAV)	Sasol Solar Challenge 2024; TEKNOFEST Adana awards	Roket9 Türkiye 1st Place (324 teams); Sferon GPS-denied UAV Best Design Award & Efes 1st Place	Establish dedicated DEPARK–Engineering Student Prototyping Fund to support ≥15 finalist teams at TEKNOFEST 2027–2028.

SDG 9 Dimension & THE / GreenMetric Indicator	2024 Verified Baseline	2025 Verified Achievement	2026–2028 Institutional Target & Strategic Action Plan
Marine Tech, Subsea Mapping & İzmir Bay R&D	R/V Koca Piri Reis İzmir Bay cruises & TÜBEP	Feb 2025 Santorini seismic analysis; Oct 2025 N. Aegean cruise; SmartOceanics & 3 ISIF'25 marine medals	Expand R/V Koca Piri Reis EMODNET, AUV/ROV subsea mapping, TÜBEP Blue Heritage & 'Breath for İzmir' real-time buoy network.
Smart Campus Infrastructure & AI Governance	16 Smart Buildings (231,867 m² = 28.4%)	17 Smart Buildings (236,009 m² = 28.7%); 26.05M kWh renewables; AI Procedure PR.37 (Apr 2025)	Reach ≥260,000 m² certified Smart Building area (≥31.5%) and expand AI-driven executive BI dashboards across all units.

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