Hydrogen Technologies Association

BULLETIN

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MESSAGE FROM THE PRESIDENT

Dear Friends of Hydrogen,

As we leave 2024 behind, we have suffered a loss that has deeply saddened us all. We lost our Honorary President T. Nejat Veziroğlu, known as the "Father of Hydrogen". We will always remember him with longing. However, our responsibility is now even greater, because his mission, the concept of "Hydrogen Society", has become an important goal throughout the world today. We must carry this vision forward in our country and ensure that Turkey becomes a world leader in this field.

Our association, which has a very valuable brainpower and leading staff, has the potential to make serious contributions to the hydrogen move of our country and has adopted this mission as a principle. Our distinguished teams, who have been working on hydrogen technologies for many years, are an important address for hydrogen solutions. Our stakeholders who form the basis of this great success are professionals from the sector and our individual members. Because these precious people will be the architects of the transition from the carbon era to the hydrogen era.

We should not forget that we have gained great momentum in hydrogen technologies in the past year. Our belief in a carbon-free energy future is getting stronger every day with investments, innovative projects and international collaborations. Hydrogen will be the key to an era that will transform not only the energy sector but also many other areas such as industry, transportation, agriculture and defense.

Throughout 2024, as the Hydrogen Technologies Association, we took part in many national and international events. We developed new strategies and closely followed the innovations in the sector and shared them with you. Working closely with important institutions of our country, such as TENMAK, we aimed to produce solutions for the needs of our country. We also contributed to public institutions at both individual and corporate levels. We continue to support Turkey's 2053 net zero carbon targets, especially with our projects for sustainable development. Our goal is to stand by everyone to realize clean energy and hydrogen solutions for a cleaner future.

2025 will be a year when hydrogen will become even more important on a global scale. With the 9th International Hydrogen Technologies Congress (IHTEC-2025), which we will organize in Izmir in May, we will bring together the world of academia and industry to further share knowledge and experience.

I wish that the New Year brings us all health, happiness and success, and I look forward to exploring together the opportunities that hydrogen offers in the clean energy transition.

Yours sincerely,

Prof. Dr. İbrahim Dinçer

President of Hydrogen Technologies Association

EDITOR'S LETTER

Dear Hydrogen Friends

As we welcome 2025, we wish you the best for the new year. We expect all of us to be filled with hydrogen energy and to have healthy, happy, and enjoyable days in the new year. We expect the increase in the use of renewable energy sources in the future to contribute to world peace and the well-being of humanity, as well as the positive effects it will have on the environment.

The research, technological developments, and investments made in 2024 have strengthened our belief in a carbon-free hydrogen future. In this issue, we present a news item we selected from World Hydrogen News: "Beyond hype: Hydrogen is getting serious." In this article, you will read that the realization of the Hydrogen Age is approaching step by step.

While preparing the E-Bulletin, we also present news from the World and Turkiye with their titles and links in the News Section of our web page. We want to thank our Assistant Editor, Prof. Dr. Nihal Tüzün, who has been compiling news since our first issue, for her efforts. E-Bulletin new Assistant Editors Assoc. Dr. Bilge Coşkuner Filiz and Dr. Mustafa Tan gathered September-December 2024 World News and Turkiye News. We would also like to thank Fatma Taşcı and Hasan Küçük, who organized our website.

Assoc. Prof. Dr. Bilge Coşkuner won the TÜBA Outstanding Young Scientist Award this year. We congratulate her and wish her continued success. She also received our Association's Young Researcher Award.

We await your contributions to the E-Bulletin with your articles and news.

HAPPY NEW YEAR.

Best regards

İnci Eroğlu

Hydrogen Action Plan Preparation Meeting Held

On November 21, 2024, during a stakeholder consultation meeting attended by Prof. Dr. Bestami Özkaya, a member of the Hydrogen Technologies Association Board, TENMAK, affiliated with the Ministry of Energy and Natural Resources of Turkey, announced the initiation of efforts to prepare an action plan for the development of the hydrogen sector in collaboration with the World Bank. The purpose of the meeting was to identify the key challenges in the hydrogen sector, examine various solutions, and ensure stakeholder participation to better understand the current situation in Turkey.

During the meeting, World Bank officials provided information about funds such as IBRD, IDA, IFC, and MIGA. It was noted that public sector support is provided for low and middle-income countries, while the IFC offers technical assistance, preferential financing, and risk mitigation mechanisms for private sector support. Additionally, it was stated that the World Bank Group, in partnership with 189 member countries, provides consulting services under the "Hydrogen for Development Partnership."

It was emphasized that emissions from products exported to the EU under the Carbon Border Adjustment Mechanism (CBAM) would need to be reported in 2025, and from 2026 onwards, this process would be subject to taxation. This situation creates uncertainty

and concern across all sectors. Participants highlighted the necessity of incentive mechanisms for clean hydrogen investments. Furthermore, it was expressed that support should be extended not only for hydrogen production but also for sub-sectors and initiatives.

The meeting also discussed the need to develop a regulatory framework that includes hydrogen certification, blending hydrogen with natural gas, export regulations, safety standards, and grid integration policies to promote the growth of the hydrogen market. Barriers such as the lack of carbon trading markets and the absence of a regulatory legal framework for the development of the hydrogen sector were also discussed.

Finally, the results of the Stakeholder Participation Survey on the Development of Clean Hydrogen in Turkey were shared. There was a general consensus among participants regarding the potential use of hydrogen in mobile applications (cars, buses, trucks, etc.) and energy applications (backup power, renewable energy storage, etc.). However, challenges in implementation and the need for the development of incentive mechanisms were also highlighted.

9th International Hydrogen Technologies Congress (IHTEC-2025)

We invite you to the 9th International Hydrogen Technologies Congress (IHTEC-2025), a leading multidisciplinary international event by Dokuz Eylül University and the Hydrogen Technologies Association. The congress will occur from May 25 to 28, 2025, in Izmir, Türkiye.

IHTEC-2025 will serve as a forum for the exchange of technical knowledge, the dissemination of high-quality research, and the presentation of new policies and scientific advancements in the field of hydrogen energy. The congress will cover a broad range of topics related to the hydrogen ecosystem, including production, storage, distribution, utilization, safety, and policy. We warmly welcome participation from academia and industry, and we hope that the conference will foster effective and fruitful discussions and collaborations among participants from various disciplines, institutions, and sectors worldwide.

We look forward to welcoming you to IHTEC-2025 and sharing with you the unique Turkish hospitality and the stunning historical, cultural, and natural beauty of Izmir.

https://ihtec2025.org/

Congress Chairs
Prof. Dr. C. Ozgur Colpan
Prof. Dr. Azize Ayol

Don't forget to apply to our Association for IHTEC2025 Awards.

https://ihtec2025.org/awards/

NATIONAL HYDROGEN ASSOCIATION TÜRKİYE
AWARDS

Nejat Veziroğlu Special Award

This award was created on behalf of Prof. Dr. Nejat Veziroğlu, who is an international leader in hydrogen energy, the father of hydrogen technologies, and the permanent honorary president of the Hydrogen Technologies Association. It is given to people who have proven themselves in the field of hydrogen energy and technologies both domestically and internationally and have made internationally recognized contributions.

Service Award of Hydrogen Technologies Association

This award is given to the people who have dedicated themselves to hydrogen energy and have served for at least 20 years in the development and application of this field, have contributed to the communal, social, technological, and economic development of the country in this field, have been a pioneer in the education and training of youth, have made institutional contributions and are active in industrial applications.

Technology Award

This award has been created for institutions that work effectively on hydrogen energy technologies and develop technologies. It is given to institutions that develop a product for the development of hydrogen technology, establish a pilot or industrial facility in the field of hydrogen energy and technologies, have patents in the field of hydrogen energy and technologies or support technology development.

Young Researcher Award

This award has been created for researchers, who are under the age of 35 (not less than 35 years old as of the date of IHTEC-2025 conference, where the award will be given) and have at least a master's degree. It is given to people who have done successful studies on hydrogen energy technologies that are recognized at the national and international levels.

Student Researcher Award

This award is given to undergraduate, graduate, or doctoral students. Candidates are expected to be under the age of 30 as of the date of the IHTEC-2025 conference, where the award will be given. The candidates who will be nominated for this award or who will apply themselves, will be preferred for this award if they have developed an invention, a new application, or a unique method for hydrogen technologies

The winners of these awards will be invited to the conference where they will attend the award ceremony. Conference registration fee and accommodation expenses will be covered by the association.

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More information and application:
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The 29th United Nations Climate Change Conference (COP29) occurred in Baku, Azerbaijan, on November 2024.

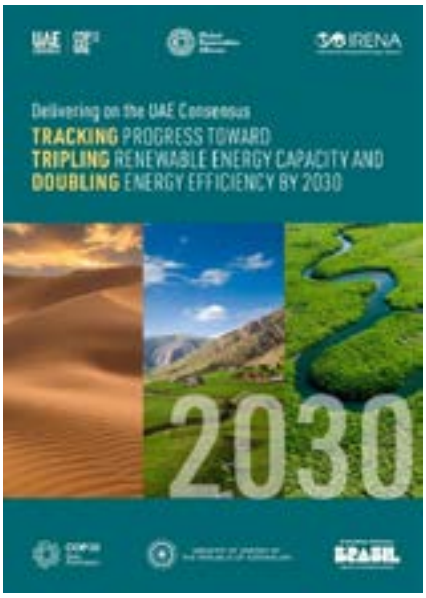
The COP29 brought together 200+ countries, companies, civil society organizations, NGOs, academics, youth, and other stakeholders to discuss paths to limit global warming to 1.5°C while leaving no one behind. The event aims to drive commitment to ambitious national plans and focus on the critical role of finance—a key tool for turning ambitions into actions.

In early 2024, IRENA was designated the custodian agency for tracking progress on tripling renewable power capacity by the 2030 goal outlined in the UAE Consensus. The report, "Delivering on the UAE Consensus: Tracking progress toward tripling renewable energy capacity and doubling energy efficiency by 2030", was released in partnership with COP28, COP29, and COP30 host Brazil and the Global Renewables Alliance (GRA) at a pre-COP event in Baku.

The report shows that despite the rapid growth of renewable energy in 2023, progress falls short of the goal to triple capacity by 2030, with current national plans expected to achieve only half the needed growth. Annual investments must rise from USD 570 billion in 2023 to USD 1.5 trillion by 2030 to meet the 1.5°C target.

Significant regional disparities persist, with the Global South increasingly being left behind in the energy transition. To address these challenges, overcoming structural barriers by focusing on key enablers: modernizing and expanding infrastructure, implementing supportive policies, developing institutional and human capacities, scaling up financing, and fostering robust international cooperation is key.

For more information, please click here.



Erdemir successfully conducted a hydrogen injection trial in the 1st Blast Furnace

Erdemir took an important step towards green transformation and successfully conducted a hydrogen injection trial in the 1st Blast Furnace. With this study, Erdemir became the third steelmaker in Europe to implement this technology. The trial was carried out in cooperation with Erdemir Engineering and Linde. Linde transported approximately 2.2 tons of liquid hydrogen in tankers, while additional hydrogen was provided from Erdemir's hydrogen facility. During the trial, Linde's automation systems were used for gasification and pressure reduction processes.

Hydrogen injection was initiated from the Erdemir Hydrogen Facilities at 250 Nm^3/h flow rate. Later, Linde's liquid hydrogen tanker was put into operation, and hydrogen was supplied to the 1st Blast Furnace at a flow rate of 2,000 Nm^3/h. While 0.6 kg of hydrogen was injected per ton of liquid crude iron in the trials, this rate was later increased to 1 kg. According to theoretical calculations, this rate can be increased to 28 kg per ton in blast furnaces, directly reducing carbon emissions by 15-16%.

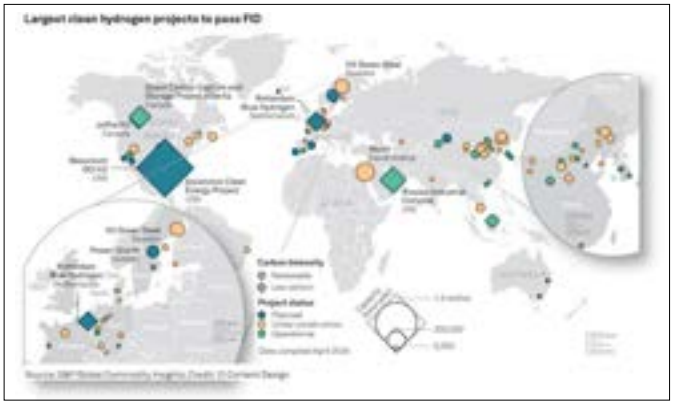
This success has enabled Erdemir to contribute to the use and availability of low-carbon hydrogen gas in Turkey. It has also paved the way for the applicability of this process in other blast furnaces within OYAK Mining Metallurgy. Erdemir has once again demonstrated its commitment to sustainable development and continued to support Turkey's 2053 net zero carbon targets.

This news is a strategic turning point for Turkey in integrating hydrogen technology into the industry. This development sets an example in reducing carbon emissions and transitioning to environmentally friendly technologies.

Click here to see more.

WORLD HYDROGEN SECTOR NEWS

Beyond the hype: hydrogen gets serious.



Hydrogen, touted as key to the energy transition, has faced many hype cycles and is yet to deliver at scale. "Hydrogen is the fuel of the future…and always will be," goes the industry joke. But hydrogen is now getting serious.

Low-carbon projects are finding a pathway to final investment decisions (FIDs) through careful renewable power procurement, matching hydrogen production with anchor offtake agreements, and state support. At the same time, the outlines of a global market for low-carbon hydrogen and its derivatives are taking shape as early movers sign supply contracts and conduct trial shipments.

This all comes despite policy uncertainty, cost inflation, and difficulty securing competitive offtake agreements. For sure, the nascent sector still faces enormous challenges. Just 7% of announced global clean hydrogen projects have taken positive FIDs. Electrolyzer costs have risen 20%-45% since 2021, with reductions of only 15%-30% expected by 2030, according to an S&P Global Commodity Insights analysis.

But there are bright spots, and concrete progress is being made around the globe, albeit slower than initially envisaged and slower than developers would like to see. Incumbent producers, companies tapping subsidies, and industries where the end-product cost increase is small are making the first moves.

The US leads with blue hydrogen

Generally, blue hydrogen produced using steam methane reforming (SMR) with carbon capture and storage (CCS) is cheaper than green hydrogen produced via electrolysis. Platts assessments showed grid-based alkaline electrolysis costs in the Netherlands averaging $5.38/kg in July versus $2.69/kg for SMR with CCS. Platts is part of Commodity Insights.

Incumbents such as industrial gas and fertilizer companies need low-carbon hydrogen volumes associated with existing SMR assets to avoid the costs of developing an entirely new production pathway.

As such, some of the largest clean hydrogen projects to have taken positive FIDs are in North America, with two operational carbon capture-enabled plants in Canada and more planned in the US.

Air Products' Louisiana blue hydrogen and ammonia facility is planned to produce over 750 MMcf/day, capturing 95% of CO2 emissions when it comes online in 2027. The company already supplies hydrogen to customers through its Gulf Coast pipeline, where there was "significant demand for blue hydrogen," CEO Seifollah Ghasemi said.

However, US project developers now face similar issues to those in Europe grappled with a few years ago, with uncertainty around policy stalling investment decisions. Proposed tax credits under the Inflation Reduction Act offer subsidies of up to $3/kg but require strict additionality criteria for renewables and hourly power matching, which industry representatives say could choke off the US hydrogen industry in its infancy.

First mover advantage

In Europe, the finalization of a hydrogen policy and demand mandates has given developers more certainty in underlying economic decisions. At the same time, the European Commission's approval for state support programs unlocks private sector investments.

The EU and national governments such as Denmark and the UK have also awarded the first subsidy schemes, and developers are securing offtake agreements from early movers looking to decarbonize operations. The electrolyzer industry is scaling up, with hydrogen project developers increasingly focused on medium-sized projects of 100 MW and above that are better placed to weather the cost increases of recent years and take advantage of economies of scale, learning from smaller pilot plants.

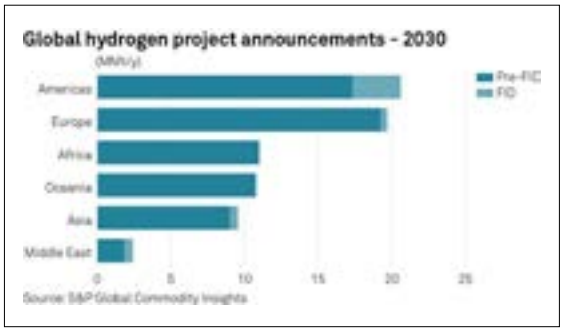
Hy24, a joint venture between investment manager FiveT Hydrogen and private equity firm Ardian, is among the backers of Sweden's H2 Green Steel 700-MW hydrogen project, one of the first in Europe to reach FID with agreed loans now in the administrative phase. Such projects typically do not need third-party funding from public or private entities and can progress more quickly toward FID and construction, executives at electrolyzer supplier Thyssenkrupp Nucera said. Industry participants said the premium for green hydrogen was a small part of the end product cost, with low power costs supporting the business model.

Export-oriented plants

Meanwhile, project developers in India, the Middle East, and other regions are eyeing hydrogen and ammonia exports to demand centers in Europe and East Asia. In Saudi Arabia, Air Products is part of the state-backed 2-GW Neom green hydrogen project now in construction. In the Middle East, the Abu Dhabi National Oil Company has sent a test cargo of blue ammonia from its existing Ruwais plant to Germany, with plans to expand CO2 capture and storage at the site.

Low-cost loans from Indian government companies REC and Power Finance Corp. have helped developers reach financial close. ACME's 1.2 million metric tons per year Oman renewable ammonia project is under construction after reaching FID for the first phase with the help of a $487 million loan from REC in July 2023. ACME subsequently

WORLD HYDROGEN SECTOR NEWS



secured an offtake agreement with Yara.

ACME, Greenko, and Reliance were among the winners of India's $2.4 billion hydrogen subsidy plan and have pledged to accelerate their projects. ACME also has an offtake agreement with Japan's IHI Corporation from its 1.3 MMt/y renewable ammonia project in Odisha, India, with commissioning expected by early 2027.

Emerging global trade flows

Even as the low-carbon hydrogen and ammonia production landscape takes shape, front-runners are testing the waters with early shipments. Outline contracts and trial shipments indicate potential future trade flows, with production centered in the Middle East, Australia, the US, and India.

Exporters target demand in Europe, Japan, and South Korea, where energy decarbonization policy drives market formation. Ammonia is the preferred means for transporting hydrogen over long distances, using existing infrastructure and avoiding the technical challenges of handling hydrogen, which requires temperatures of minus 253 C for liquification, compared with a balmy minus 33 C for ammonia.

For now, however, non-binding agreements dominate deal-making. As of May, announced volumes from strategic partnerships since 2020 amounted to 8.9 MMt, including non-binding memorandums of understanding, letters of intent, joint studies, and joint ventures. A further 1.7 MMt of binding deals have been struck for low-carbon hydrogen and ammonia under tenders and firm offtake agreements.

Commodity Insights analysts see two principal blue hydrogen export hubs developing in the US Gulf Coast and the Middle East.

"Both regions have low-cost gas, port infrastructure, and sequestration geology," said Brian Murphy, senior analyst at Commodity Insights. "Projects in these two regions explicitly consider exports as key early-stage markets, and many have companies from abroad directly involved in project development."

Since 2020, over 25,000 metric tons of low-carbon hydrogen and derivatives have been shipped globally, mostly in the form of ammonia produced with CCS and mainly from the Middle East. One demonstration shipment of liquid hydrogen has also been from Australia to Japan. Most activity in AsiaPacific is centered around Japan and South Korea, which have plans to co-fire ammonia with coal in power generation.

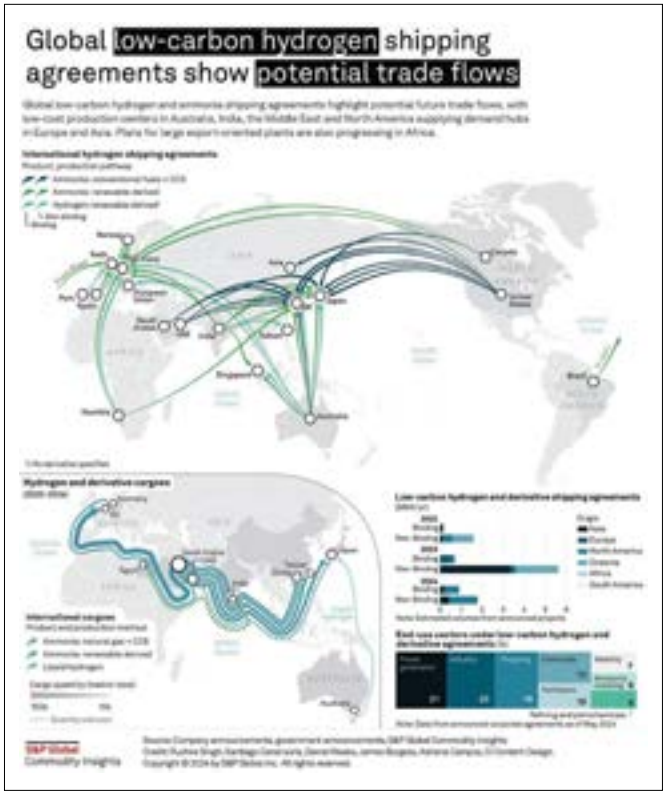
Market transparency improves as participants seek to assess market value and stimulate growth.

Producers are also eyeing the fertilizer industry and new sectors, such as marine fuels, but remain cautious.

"We continue to explore green hydrogen projects, but we don't anticipate spending any meaningful capital until we have a high-quality contract that ensures low risk and higher than portfolio average returns," an executive at India's ReNew said. The company signed an agreement with Japanese power generation company JERA in April to supply renewable ammonia.

Though in its early days, the low-carbon hydrogen market is developing in a more realistic phase. The hype bubble may have burst, but the leading projects are now gathering steam, poised to power the sector as it matures.

Click here for more



Please see further world hydrogen news on our website.

The 15th International Exergy, Energy and Environment Symposium (IEEES-15)

The 15th International Exergy, Energy and Environment Symposium (IEEES-15) was hosted by Atlas University on December 19-21, 2024 with an intense participation. Hydrogen Technologies Association also contributed to the event by opening a booth at the symposium.

Critical issues such as renewable energy technologies, artificial intelligence applications and environmental technologies were discussed at the symposium. Delivering the opening speech, **Prof. Dr. Zafer Utlu**, Vice Rector of Atlas University, emphasized the importance of sustainable energy technologies and environmental awareness and shared the vision of the university in this field with the participants.

Dr. Yusuf Elgörmüş, Chairman of the Board of Trustees of Atlas University, presented certificates of appreciation to those who contributed to the symposium and expressed his gratitude to all participants who contributed to the organization of the event.

In the symposium sessions; current and important topics such as smart cities, green buildings, e-mobility, CO2 reduction technologies, biological waste utilization were discussed in detail.

Prof. Dr. İbrahim Dinçer, Chairman of the Board of Directors of the Hydrogen Technologies Association, underlined that the symposium is a critical platform for sustainable energy targets. In his speech, he drew attention to the importance of energy transition and emphasized the contribution of technological developments in this field to global energy use.

During the event, academics, industry representatives and participants discussed topics such as energy policies, hydrogen technologies and carbon neutrality in depth.

6 December 2024 - Konya Selçuk University Seminar

As part of the "Hydrogen Technologies 2 Seminar" organized by the Faculty of Technology at Selçuk University, our Board Member Prof. Dr. Aysel Kantürk delivered a presentation titled "Hydrogen Ecosystem and Boron Strategies." During the event, our organization was introduced, and our mission and vision were shared with the participants. Additionally, key reports prepared by our organization, which contribute significantly to the fields of hydrogen technologies and boron strategies, were presented. The presentation provided a detailed analysis of the strategic importance of boron-based applications within the hydrogen ecosystem and highlighted the latest developments in this field.

Invitation to Exergy and Applications Summer School

We are pleased to invite you to the "Exergy and Applications Summer School", which will be hosted by Dokuz Eylül University between April 19-21, 2025. Designed for academics, graduate students and industry professionals who want to gain in-depth knowledge on energy efficiency and exergy analysis, this program will be presented by expert instructors. The "Exergy and Applications Summer School", which first started in Izmir in 2004 and has been held in different universities every year, is being organized for the 21st time this year. In the past years, it has been successfully organized at institutions such as Istanbul Commerce University, Marmara University, Trakya University and Pamukkale University. The program will include lectures and workshops on the basic principles of exergy analysis, its application areas and its importance in energy systems. Participants will have the opportunity to gain experience with practical applications as well as theoretical knowledge. For registration and detailed program information, please visit www.ekserji2025.com. Do not miss this opportunity to increase your knowledge on energy efficiency and exergy and meet experts in the field.

We will be happy to see you among us.

Date: April 19-21, 2025

Location: Dokuz Eylul University, Izmir

Contact: ekserji2025@gmail.com