National Hydrogen Association

NEWSLETTER

July 2022 E- Newsletter:13

23rd World Hydrogen Energy Conference WHEC-2022 accomplished successfully





As the conference chairman of the 23rd World Hydrogen Energy Conference (WHEC2022), it was my great pleasure to cordially invite you to Istanbul to attend this prestigious conference. WHEC is a unique event for all researchers, scientists, academicians, and professionals working in the field of hydrogen energy systems, from production to storage and end-use options such as fuel cells. This conference provided a useful platform for contributions to the development and enhancement of hydrogen energy systems and a place to interact with researchers from all around the world to gain a better understanding of the use of hydrogen energy systems for a sustainable future.

Much like past WHECs, WHEC2022 will not only provide an outlook on the current research activities but also will shape the future of hydrogen energy systems. As a city that connects two continents, Istanbul has always been strategically important. Hosting the 23rd WHEC in Istanbul got researchers from different continents together to promote hydrogen energy systems and share their innovative ideas. Turkey is dedicated to increasing the shared of renewables in its energy supply, and hydrogen energy systems are promising candidates. Therefore, Turkey has expanded its research, innovation, and technology development activities to produce, store, and use hydrogen in an affordable, reliable, safe, clean, and sustainable manner. Given these activities as well as the financial investment and dedication to hydrogen energy systems in Turkey; Istanbul is undoubtedly the perfect host city for this event. Given the influence of the prestigious International Association of Hydrogen Energy (IAHE), the support of the Turkish National Hydrogen Association, International Energy Agency (IEA) and International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), the reputation of the WHECs, the launch of Hydrogen Council, and the historic and strategic importance of the beautiful host city, Istanbul, it is expected that WHEC2022 will turn out to be a success story with strong participation and global influence.

All contributors to WHEC 2022 congratulations.

Prof. Dr. Ibrahim Dincer
Chairman of WHEC2022
Vice President for Strategy, International Association for Hydrogen Energy
Vice President, World Society of Sustainable Energy Technologies
President, Turkish National Hydrogen Association



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Women in Green Hydrogen, WHEC 2022

Fossil fuels and nuclear energy have been the main actors since the beginning of the 20th century. However, it has been proven that fossil fuels are one of the primary source of the negative consequences of global warming, with the awareness of human beings about the environment and the ratification of the "Paris Climate Agreement" by almost all states. Measures to be taken by countries to reduce the impact of global warming in the long term have been determined. The importance of renewable energy sources has come to the fore at the beginning of the measures to be taken by the countries. In particular, renewable energy sources have begun to compete with traditional energy sources economically with hydrogen storage in batteries and high-pressure tanks as liquid or gas. The throne of oil has already started to shake. Today, hydrogen is an important energy carrier and has begun to be considered the future oil.

For this reason, it is essential to draw the attention of public and private institutions, especially our universities, to research and development (R&D) studies in hydrogen energy and technologies. In this context, the National Hydrogen Association (Hydrogen Technologies Association) operates in our country. Under the leadership of Prof. Dr. İbrahim Dinçer and the support of the Turkish Republic Ministry of Energy and many public and private institutions, the International "23. World Hydrogen Energy Conference (WHEC2022) was held at the Istanbul Congress Center between 26-30 June 2022. A very successful organization was held with the participation of many national and international delegates. More than 800 participants presented their research, 600 face-to-face and 200 virtually discussed their findings on hydrogen energy and technologies, hydrogen economy, and the future of hydrogen energy. In addition, a women-only "Women in Green Hydrogen" panel was held at this congress, where the "Importance of Hydrogen in Sustainable Developments" was discussed to understand the past better, present, and future of hydrogen energy. Prof. Dr. Ilgi Karapınar moderated the panel, and the panelists Prof. Dr. Inci Eroglu, Dr. Dilara Gulcin Caglayan, Prof. Dr. Selmiye Alkan Gursel, Dr. Sara Shahmohammadi, and Dr. Mary-Rose de Valladares discussed "Hydrogen for Sustainable Developments." The effects of hydrogen energy on society and the environment are discussed. It is clear that female researchers who are essential scientists in the field of hydrogen energy and technologies in our country and the world play a pioneering role. It has been demonstrated by the academicians and delegates attending this conference that the role of women is significant in hydrogen energy as in every other field.

Narrator: Prof. Dr. Mehmet Karakılçık, Çukurova University Physics Department Adana



A picture after the Women in Green Hydrogen Panel: From Left to right: Dr Dilara Gülçin Çağlayan, Dr. Mary-Rose de Valladares, Prof. Dr. Selmiye Alkan Gürsel, Prof. Dr. İnci Eroğlu, Miray Dinçer, Prof. Dr. İbrahim Dinçer, Dr. Sara Shahmohammadi, and the moderator Prof. Dr. İlgi Karapınar.

YOUTH VIEW ON WHEC 2022 EVALUATION

Fırat Kurt
Istanbul Technical University, Chemical Engineering Department 2nd Year Student

The post-pandemic process, which has the potential to be a clear indication that we have passed into the hydrogen age, has shown us the need for many new life requirements. Especially wars to take advantage of the power of energy resources, changing climatic conditions becoming more problematic to human health, and a livable world are some of the main factors pointing to system change. I think the savior is the move to be made on the hydrogen energy system. The basis of this lies in the fact that hydrogen applies to every country, peaceful, civilized, and humane. In addition, instead of using fossil resources in the transportation sector, which takes place in a wide range, I believe that hydrogen, which has no carbon emissions, is a highly efficient and clean energy source and is a very suitable tool.

At this point, I think that as Turkish students, we should put hydrogen at the forefront of our work to close the trade deficit, which is one of the biggest problems in the development of our country. For this, it should also give importance to commercialization and ensure the coexistence of the industry sector and the academy. I think that the Hydrogen Technologies Association, which has pioneered work, has fulfilled this solution method quite well with the 23rd World Hydrogen Energy Conference (WHEC-2022). The congress I participated in enthusiastically for four days; has taught me many realities with hundreds of scientists, professional sector employees, and academicians it contains and enabled me to return from here with remarkable gains. Following the studies in the sector more closely, adopting the hydrogen energy perspective, having the courage to make plans for the future, and having the opportunity to meet the esteemed participants who innovatively lead their work are just a few of these benefits.

I believe that we should not fear new technologies in connection with all these thoughts. Since we have great potential as Turkey, I gained more motivation to work thanks to WHEC-2022 to be among the leading countries and achieve tremendous success. Considering that governments that control advanced technology can manage the future better, many more students like us must give importance to hydrogen technologies at this point. I want to express my gratitude to our association, one of the main organizers of WHEC-2022, a very prestigious and proud meeting point, which has an impact on shaping all this thinking.

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Russia-Ukraine War strengthens hydrogen alternative in energy

SOURCE



After the war started by Russia in Ukraine, many countries, especially the European Union (EU), are considering the hydrogen alternative in their energy portfolio.

According to the information compiled by the AA correspondent from the sector reports, the number of projects targeted and implemented in the world with a focus on green hydrogen since 2020 is calculated as 1120 in total.

Ninety-five percent of the hydrogen produced worldwide is still obtained from fossil fuels such as natural gas, coal, and oil. Hydrogen produced from this species is classified as grey, brown, and black.

The fuel, known as green hydrogen, is obtained from only the remaining 5 percent by water electrolysis. A certain amount of electrical energy is needed to produce hydrogen with this method.

The electricity to produce green hydrogen must be entirely from clean energy. Only 1.5 percent of the green hydrogen obtained by the water electrolysis method consists of clean energy.

Hydrogen is considered an alternative option with the highest energy content per unit mass among available fuels. In addition, it stands out as a sustainable energy option because it provides higher efficiency than petroleum derivatives, is environmentally friendly, and does not contain carbon.

EU aims to produce 5.6 million tons of green hydrogen by 2030

The EU aims for 5.6 million tons of green hydrogen production by 2030 under the "Fit for 55" agreement, in which it commits to reducing greenhouse gas emissions by 55 percent.

In addition, within the scope of the REPowerEu action plan, in March, the EU aims to be completely independent of Russian natural gas before 2030. It aims to produce an additional 15 million tons of greener hydrogen in the Fit for 55 plan. Thus, it is calculated that 25 to 50 billion cubic meters of natural gas annually purchased from Russia can be substituted. After Russia's Ukraine war, many countries, especially the EU, are considering the hydrogen alternative in energy. More than 100 countries worldwide have identified a hydrogen strategy or roadmap. The USA, Canada, the United Kingdom, Germany, France, Spain, South Korea, Chile, China, and India announced their strategies.

Turkey's role is vital to the EU's hydrogen targets

It is stated that Turkey has a high clean energy production quality among European countries and can produce clean energy more competitively in terms of cost compared to others.

Turkey, a country rich in energy resources such as wind and solar, is among the countries that will meet a specific part of the EU's green hydrogen needs.

"There has been a rapid transformation in hydrogen in the last two years."

President of the Hydrogen Technologies Association, Prof. Dr. İbrahim Dinçer, said that the Russia-Ukraine War accelerated the efforts on resource diversity, especially in Europe, and became the driving force in the steps to create a hydrogen economy.

Dinçer pointed out that Germany has withdrawn the work on the hydrogen market planned for 2030 to 2024.

Dinçer stated that incentives, support programs, and legislation studies for the use of hydrogen have accelerated.

"There has been a rapid transformation in the hydrogen issue in the last two years. Along with Germany, France is among the countries that put nuclear and hydrogen at the forefront in this period. We conducted and completed a study for Turkey before the Russia-Ukraine War. We directed the efforts to create a hydrogen farm. We are trying to give our best efforts to provide renewable energy resources in almost every city in Turkey. We have carried out studies for this. We sought an answer to the question: Can Turkey be a hydrogen exporting country? We realize that green hydrogen production is possible, thanks to different sources such as solar, wind, geothermal, hydroelectric, and biomass in seven regions of Turkey."

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It is possible to produce 615 million tons of hydrogen per year with "hydrogen farms"

SOURCE

President of the Hydrogen Technologies Association, Prof. Dr. İbrahim Dinçer, "There are renewable energy sources required for hydrogen production in all seven regions of Turkey," made a statement.

President of the Hydrogen Technologies Association, Prof. Dr. İbrahim Dinçer, stated that there are renewable energy sources required for hydrogen production in all seven regions of Turkey and said, "Our studies show that we have the potential to produce 615 million tons of hydrogen annually with



electricity generation from many clean sources such as wind, solar, geothermal and hydroelectricity in hydrogen farms to be established throughout Turkey " said.

Dinçer told the Anadolu Agency (AA) that, especially after the Russia-Ukraine War, the energy crisis affecting Turkey and the world, climate change increased the trend toward alternative energy sources, and the economic and environmental importance of hydrogen increased gradually.

Expressing that the kilogram value of hydrogen in the global hydrogen market is 5-6 dollars for green hydrogen and 2-3 dollars for hydrogen produced from fossil sources, Dinçer said, "Assuming that Turkey produces 615 million tons of hydrogen annually, even if its kilogram is 1 dollar, it is 615 billion dollars. We calculate that this amount will contribute to the Turkish economy," he said.

The first step was taken from Teksis and Petronet to cooperation on green fuel production



Having an important place in their sectors with the domestic and national projects they have realized, Petronet and Teksis are joining forces for the dissemination of Hydrogen Energy Technologies, which play a very important role in fulfilling the commitments undertaken with the Paris Climate Agreement. The cooperation protocol was signed by Petronet Chairman of the Board Haluk Gemici and Teksis General Manager Hüseyin Devrim.

As the Hydrogen Technologies Association, we attended Petroleum, LPG, Mineral Oil, Equipment and Technologies Istanbul International Fair.

Member of the Board of our Association, Prof. Dr. Adnan Midilli reemphasized the importance of Hydrogen with his detailed presentation on Storage and Filling Stations.





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NATIONAL HYDROGEN ASSOCIATION 2022 AWARDS

NATIONAL HYDROGEN ASSOCIATION

NEJAT VEZİROĞLU SPECIAL AWARD 2022:

Prof. Dr. Yılser Devrim



Prof. Dr. YILSER DEVRİM won the National Hydrogen Association 2021 Nejat Veziroğlu Special Award. We congratulate her and wish her succsess in future studies.

Prof. Dr. Yılser Devrim completed her master's degree in Hacettepe University Department of Chemical Engineering in 2000 and continued her doctoral studies by working on Hydrogen Energy and Fuel Cells. Prof. Dr. Yılser Devrim completed her post-doctorate research in hydrogen energy and fuel cells at the Department of Chemical Engineering at METU between 2007 and 2011. Dr. Yılser Devrim worked as the R&D Manager at TEKSİS, one of the companies in the METU Teknokent Defense Industry Cluster, between 2011 and 2013 and was involved in many international and national projects in the field of hydrogen energy and fuel cells. Since 2013, working as a faculty member at Atilim University, Department of Energy Systems Engineering, Prof. Dr. Yılser Devrim has been working as the Dean of the Faculty of Engineering.

Several projects and scientific publications have been carried out on hydrogen energy technologies and hybrid renewable energy systems since she established the Hydrogen Energy and Fuel Cell Research Laboratory in 2014. Prof. Dr. Yılser Devrim took part in 32 national and international projects and published 69 SCI index articles and 106 international and national peer-reviewed articles in prestigious journals.

Prof. Dr. Yılser Devrim was awarded the "Mustafa Parlar Foundation Technology Encouragement Award" in 2019 by the METU Mustafa Parlar Foundation and the "Nejat Veziroğlu Special Award" by the National Hydrogen Technologies Association in 2022.

HYDROGEN AND FUEL CELL STUDIES AT ATILIM UNIVERSITY

Atilim University Hydrogen Energy and Fuel Cells Research Laboratory, which Prof. Dr. Yılser Devrim established in 2014, has undertaken many projects in hydrogen energy and fuel cells and contributes to the national development of these technologies. Single-cell and stack proton exchange membrane (PEM) fuel cell test stations, liquid fed NaBH4/DMFC fuel cell test station, electrochemical Hydrogen compressor test station, membrane and catalyst synthesis equipment, impedance analysis spectrometer, and software and hardware for fuel modeling and simulation are available in the advanced laboratory infrastructure.

In the research laboratory, design and manufacture of high-quality materials and components [membrane, electrocatalyst, metallic bipolar plate, membrane electrode assembly (MEA)] for low and high-temperature PEM fuel cells, production of PEM fuel cell stacks with different power ranges for military and civilian use, fuel cell modeling and simulation, PEM fuel cell analysis studies are carried out. Electrochemical hydrogen compressor development, sodium boron hydride, ammonium borane-based hydrogen production techniques, and green hydrogen-based hybrid energy systems studies are performed regarding the production and storage of the hydrogen value chain.

We aim to develop membranes for low and high-temperature PEM fuel cells with longer lifetimes, high performance, and features that can be an alternative to commercial membranes. Polybenzimidazole (PBI) based membranes, specially developed for high-temperature PEM fuel cells, have achieved high performance and durability in PEM fuel cells and electrochemical hydrogen compressor applications. With these studies, research continues the development of technologies that will increase the efficiency of the fuel cell and the cost reduction. Successful results have been obtained in hydrogen production and fuel cell integration with the prepared carbon nanotube, graphene, and metal-organic framework (MOF) based on smart and functional materials.

As a result of our research, an electrochemical hydrogen compressor has been developed, purifying and pressurizing hydrogen, prepared with unique components. Research support by TUBITAK; includes electrochemical hydrogen compressor design, material development, and testing methods for hydrogen purification and pressurization, especially from reformat gas mixtures containing impurities such as carbon monoxide and carbon dioxide. Within the scope of the project, in which the first high-temperature electrochemical hydrogen compressor prototype, sub-components such as membrane, catalyst, bipolar plates, and stack were developed nationally.

Atilim University Hydrogen Energy and Fuel Cells Research Laboratory successfully carry out R&D projects with industrial organizations and universities. Researches are essential in material development and commercialization in large-scale projects.

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NATIONAL HYDROGEN ASSOCIATION

2022 SERVICE AWARD



Prof. Dr. Tayfur Öztürk

PROF. DR. TAYFUR ÖZTÜRK received the 2022 SERVICE Award from the Hydrogen Technologies Association. We congratulate our esteemed professor, who is also an active member of our association, and wish him continued success.

Prof. Tayfur Öztürk's perhaps most important contribution as the Dean of Graduate School of Natural and Applied Sciences METU was the initiation of the so-called OYP program. This program initiated by METU and four participating universities is a human resources program whereby young graduates, through a selection procedure, were accepted to graduate programs at METU on research topics proposed by faculty members who were employed as faculty members at graduation from their respective universities. This program supported by DPT, which subsequently enlarged to 12 universities, was intensely pursued between 2001 and 2010. Nearly 800 Ph.D. students have graduated from this program. Many similar programs have been initiated over the years, but perhaps the most productive in terms of resources allocated and the outcome achieved. The program was interdisciplinary; hydrogen and fuel cell was important concentration area. Many faculty members who are now our colleagues benefitted from this program and headed their research groups on energy storage and conversion at different universities.

Prof. Tayfur Öztürk, following his term in office at the graduate school, was the chair of the Department of Metallurgical and Materials Engineering. First, with a project on a thermal power plant supported by State Planning Organization (DPT), he was active in renovating the research infrastructure. That was followed by the project on energy materials prepared together with OYP universities. They designed a comprehensive infrastructure for material research in energy storage and conversion. An important innovation in this period was the introduction, in 2005, of two elective courses on Material Research-I and II in the undergraduate program. Those have opened up an opportunity for undergraduate students to join the ongoing research projects in the department. That was also a period of intense research carried out with OYP graduate students. An FP6 integrated project on solid-state hydrogen storage, NESSHY, perhaps the most comprehensive program ever on hydrogen storage, followed by COST actions, were highly productive activities.

Prof. Tayfur Öztürk's other significant contribution is the initiation of the International Symposium on Materials for Energy Storage and Conversion, mESC-IS. During the final meeting of MP1103, a cost action on solid-state hydrogen storage 2011-2015, the format of the Final Meeting was slightly modified and was re-structured as a symposium plus a comprehensive summer school. The activity was innovative in terms of content and structure. The symposium format provided a medium where scientists addressed both battery research and hydrogen and fuel cell research under a single roof. Based on the positive feedback from the participants, the organizers have decided to continue the event as a regular activity. mESC-IS is now a well-established series of symposia and summer schools taking place yearly, odd years in Turkey, and even years in one of the participating countries.

An important outcome of mESC-IS 2015 was a decision to establish a research center, ENDAM, The Center for Energy Materials and Storage Devices, coordinating research efforts on materials for energy storage and conversion. It was initiated as the State Planning Organization (DPT) project. They enriched existing infrastructure with additions made possible by DPT funds and were reorganized to address the needs of researchers in this fast-expanding area. The center was established in 2018 at METU with participants from the related departments across METU as well as Erciyes, Boğaziçi, and Muğla Sıtkı Koçman Universities. The center is now playing a leading role in research in the area of energy materials and storage devices.

Tayfur Öztürk graduated from Istanbul Technical University in 1973 with Bachelor's degree in Metallurgical Engineering. He joined Darwin College, Cambridge, where he pursued graduate studies at Cambridge University, from which he obtained his Ph.D. in 1978. Following brief post-doctoral periods at Sheffield University and Istanbul Technical University, he joined METU in 1980. While at METU, he was a visiting scholar at McMaster University in 1990 and Los Alamos National Laboratory, the Center for Materials Science in 1991.

Prof. Tayfur Öztürk's early work was on material processing, emphasizing structure and texture evolution. He moved on to his current area, where his activities focus on combinatorial material chemistry, thermal plasma processing of materials, solid-state hydrogen storage, hydrogen separation membranes, IT-solid oxide fuel cells, and aqueous batteries. Prof. Öztürk is currently a director at Innovascope Materials Technology, his startup firm established at METU Technopark, specializing in products and services originating from his research on combinatorial material chemistry. He is also a part-time instructor in several undergraduate and graduate programs at METU and an advisor at ENDAM.

NATIONAL HYDROGEN ASSOCIATION

2022 TECHNOLOGY AWARD

Ragıp KIZILTAŞ

Ragıp KIZILTAŞ was deemed worthy of the Technology Award given by the National Hydrogen Association with the "Hydrogen Fuel Cell Vehicle" developed within the scope of the project carried out in 2022 with the cooperation and coordination of TENMAK BOREN, TÜBİTAK MAM, and GEN Otomobil.

Ragıp KIZILTAŞ graduated from Gazi University, Department of Chemical Engineering, in 2012. He completed his master's degree in boron-based chemical hydrogen storage materials at Gazi University, Department of Chemical Engineering, in 2019. He continues his doctorate studies in hydrogen technologies at Gazi University. He started his professional career in the international supervision sector and continued as an inspector and expert inspector in this sector between 2013 and 2015. He began to work as a researcher at the Boron Research Institute (BOREN) of the Turkish Energy, Nuclear and Mineral Research Agency (TENMAK) at the beginning of 2016 and took part in various projects in the field of hydrogen technologies carried out within the organization and with-

in the scope of cooperation. He still works at the Hydrogen Technologies Laboratory of Clean Energy Research Institute (TEMEN), contained within TENMAK. In addition, he is participating as a member of the Advisory and Evaluation Board within the scope of TÜBİTAK Efficiency Challenge competitions in 2021 and 2022.

With the cooperation of TENMAK Boron Research Institute (BOREN) and TÜBİTAK MAM, which was started in 2004, it is aimed to develop product and production technology that has predictable commercialization potential and can provide a competitive advantage in the boron-based energy sector, and to create the necessary knowledge, experience and system for the commercial application of the developed technology. Various application projects, primarily vehicle concepts, were carried out with manufacturers and operators. Within the scope of the "Hydrogen Fuel Cell Vehicle" project, that was commenced in the last quarter of 2019, an electric vehicle that is produced entirely domestically by GEN Otomobil was transformed into a fuel cell vehicle concept by a 10 kW fuel cell system on the purpose of longer travel time without need charging. They charged the vehicle's battery system using pressurized hydrogen (350 bar) in the fuel cell system; thus, the available range of 300 km increased by an additional 150-200 km. Besides that, since electricity is produced by hydrogen in fuel cells, the system has only water vapor as a waste product, thus preventing any harmful emissions to the environment. Nowadays, vehicle companies such as Toyota, Hyundai, Honda, Ford, and BMW produce fuel cell vehicles and perform their life tests. With this project, a similar technological level and know-how information have been achieved in our country by integrating domestic and nationally developed fuel cell technology into a new generation of electric vehicles.



Hidrojen Yakıt Hücreli Araç

NATIONAL HYDROGEN ASSOCIATION

YOUNG RESEARCHER AWARD 2022

Dr. Ahmet Bulut

Dr. AHMET BULUT won the National Hydrogen Association 2022 Young Researcher Award We congratulate and wish him success in his future studies. Dr. Ahmet Bulut conveyed his resume to us as follows:

"I graduated from Van Yüzüncü Yıl University Chemistry Department in 2013 and continued with graduate education in the same department. My master's thesis was based on Pd-based heterogeneous catalysts for hydrogen production from formic acid. During my master's education, I took part in the TÜBİTAK 3501 Career Project as a scholar. After graduating with my master's degree in 2017, I started my doctorate in the Department of Chemistry at Van Yüzüncü Yıl University. In my doctoral thesis, I worked on synthesizing hydrazine borane, a boron compound, and developing heterogeneous catalysts for the complete decomposition reaction. During my doctoral education, I received scholarship support within the scope of YÖK 100/2000 Priority Area (Renewable Energy Resources) and worked as a researcher on many projects. After completing my doctorate education in 2021, I started to work as a Dr. Lecturer at Bartın University. I continue my studies in catalysis, nanomaterials, and energy. I have 25 research articles within the scope of SCI and in journals with high impact (such as the International Journal of Hydrogen Energy, Applied Catalysis B: Environmental, ACS Catalysis, New Journal of Chemistry and Inorganic Chemistry), and most of these articles are related with hydrogen production and storage. I have made presentations at international and national conferences, and I have two book chapters published in international publishing houses. I was awarded the 2022 "Young Researcher Award" of the National Hydrogen Technologies Association for my work in the field of heterogeneous catalysts that we developed for the recovery and storage of hydrogen. I want to thank the National Hydrogen Technologies Association for honoring me with this award, which is an excellent motivation source for working on hydrogen."

NATIONAL HYDROGEN ASSOCIATION

2022 STUDENT RESEARCHER AWARD

Furkan Kartal

FURKAN KARTAL is the winner of the National Hydrogen Association 2022 Student Researcher Award. We congratulate him and wish him success in his future studies.



Furkan Kartal completed his undergraduate education at T.C. Marmara University, Department of Chemical Engineering, in 2019 and is currently a graduate student at the same university and department. He has been an active member of the "Modeling Laboratory" team since 2018, founded and managed by Assoc. Prof. Uğur Özveren. Under the consultancy of Assoc. Dr. Uğur Özveren carries out studies in the fields of energy and machine learning and mainly works on process modeling, process simulation, gasification, renewable energy sources, energy conversion systems, and the integration of these systems with machine learning algorithms. The undergraduate thesis named "Investigation of Catalytic Gasification in Thermodynamic Simulation Program" was supported by TÜBİTAK within the scope of the University Students Research Projects Support Program. The master's thesis named "The Design and Development of Artificial Intelligence Controlled Laboratory Scale Fluidized Bed Gasifier" was also supported by TÜBİTAK at 2210/C Priority Areas and has been awarded support within the scope of the Graduate Scholarship Program. He has worked on thermogravimetric analysis and thermal and kinetic characterization in addition to modeling and simulation studies. He published more than ten papers in prestigious international journals on process modeling, description, and machine learning/deep learning during his undergraduate and graduate studies. He also performed over 15 oral and poster presentations at several national and international conferences and symposiums in Turkey and abroad. He received five honors in various categories as a result of his efforts.

NEW INSTITUTIONS AND COMPANIES MEMBER OF NATIONAL HYDROGEN ASSOCIATION

AKSA ENERJİ

Kazancı Holding ranks among the leading companies in the energy industry, with operations in energy production, electricity distribution and sales, natural gas distribution, and generator production via affiliates who are leaders in their respective sectors. The company has built and operated more than 30 power plants using various energy sources, including coal, fuel oil, biogas, natural gas, wind, and hydroelectricity. Taking its experience abroad with power plant installations in countries that require urgent energy, Aksa Energy provides fast and reliable solutions in much energy.

For more information please click the link.

ZORLU ENERJİ

Zorlu Enerji is an energy company that aims to operate in different fields of the energy sector, providing a global scale integrated service. Zorlu Enerji, which is a subsidiary of Zorlu Enerji companies and the only publicly open company operates on various fields of the sector with an integrated corporate combination including electricity and steam generation and their retail, electricity sales, electricity distribution, solar panel sales and installation, natural gas sales and distribution, construction, management and maintenance of power plants and EV charging stations network.

Established in 1993, Zorlu Enerji operates in various fields of the sector with its experience of 25 years. In our areas of operation, we combine our well-established expertise with our corporate values and make a difference among other sector players in engineering, supply, construction, management, maintenance, and repair.

For more information please click the link.

GK ENERJİ

With more than 20 years of project planning and application management experience in the energy sector, on behalf of the development of our country's industry and industry; It started its activities under the name of GK Energy to provide consultancy, consultancy, and project implementation services in Energy Generation, Transmission, Distribution, and Management. It is a consultancy and contracting firm founded by Gürsel Kızıloğlu. With the experience gained by taking part in hundreds of project activities, it aspires to present the solutions needed by the investors whose paths somehow cross with energy, develop projects with high added value in this field, and be one of the leading institutions in this its field.

For more information please click the link.

OZENERGY

Headquartered in Izmir, OzEnergy operates in local and international energy markets. In addition to projects in Turkey, OzEnergy is actively involved in projects in various world regions such as Ukraine, Albania, the Turkish Republic of Northern Cyprus, Iraq, and Ethiopia. With OzEnergy's fast, flexible and expert photovoltaic professionals and industry-renowned installation, analysis, and security partner network, it offers all services for the building and profitable operation of solar power plants. As of 2021, OzEnergy experts have been actively involved in the engineering, procurement, installation, and operation maintenance processes of more than 300 MWp solar power plant projects in total. OzEnergy is the authorized regional partner of German Enerpac AG, which is the largest EPC and investor in Europe.

For more information please click the link.

ASPİLSAN ENERJİ A.Ş

ASPİLSAN ENERJİ, was established in Kayseri Organized Industrial Zone on May 21, 1981 with the donations made by the citizens of Kayseri. The company started with the aims to meet the basic needs of the Turkish Armed Forces, charged nickel cadmium batteries and has made great improvements in the past time, increasing its product range to more than 150 types of batteries which has been used for all kinds of civil and military requirements.

Main Products and Service Areas:

- All Kinds of Ni-Cd, Ni-MH, Li-Ion, Li-Po Batteries
- Solar Cell, Thermal Cell and Fuel Cell
- Renewable energy
- Energy Storage Systems
- Chargers
- Battery / Battery Laboratory Test Systems
- Nickel Cadmium Complete Aircraft Batteries and Cells