NEEST

NEW ENERGY & ENVIRONMENTAL SOLUTIONS AND TECHNOLOGIES

# COMPANY OVERVIEW

Dr. Manos Zoulias, Partner & Technical Director

# GENERAL INFO - HISTORY

- NEW ENERGY & ENVIRONMENTAL SOLUTIONS AND TECHNOLOGIES (NEEST) (www.neest.eu) provides specialized consulting services in the fields of “Green Energy”, environmental protection, techno economic analyses and feasibility and viability studies. NEEST produces know-how and develops innovative tools in the above sectors, by investing in R&D actions through its participation in EU and national research projects.
- The basic focus of NEEST company lies in integrated RES and energy storage technologies (hybrid power systems), aiming to increase RES penetration (accompanied with CO2 emissions reduction) and reduce $CO_2$ footprint. NEEST hold a long-experience in fuel cell and hydrogen technologies both in the transport sector and in stationary power systems

# Experience and Know-How

- The executives of the company possess a long-term experience and expertise in the design, engineering, techno-economic analysis, implementation and commissioning of integrated RES – Energy Storage power systems, mainly focusing on hydrogen and battery energy storage technologies, both on stationary and transport applications. The company executives participated in the team developing one of the first wind energy driven – hydrogen production and storage facilities (aiming to supply a hydrogen refueling station) in Europe.

# Experience and Know-How (2)

- In addition to the high level know-how in the development of Green energy hybrid power systems, NEEST has successfully supported municipalities in the preparation of carbon-free energy policy strategies and in the development of respective plans. The experience of NEEST in this sector includes the following: 1) Preparation of Sustainable Energy and Climate Action Plans (SECAP) in the context of the Covenant of Mayors, and 2) Provision of consulting services to Municipalities in order to support their participation in the European Fuel Cells and Hydrogen Regions and Cities Initiative.

# Experience and Know-How (3)

- NEEST participated in the development and construction of the 1st green hydrogen refueling station for vehicles in Greece, in the context of a National Research Project (see more details below).
- Moreover, NEEST has a wide portfolio of services and products related to decarbonization efforts, including: 1) Integrated Plans for clean energy mobility (hydrogen and battery electric vehicles), 2) Energy Saving studies for municipalities and the industry, and 3) Integrated energy studies (including simulations and techno-economic analysis) for private investors targeting in the development of RES-based hybrid power systems in Greek islands.


# Projects/Activities

- TRIERES (HORIZON-JTI-CLEANH2-2022-2) Project (nr. 101112056) – Small-Scale Hydrogen Valley including real-scale hydrogen production and applications in many sectors, such as road transport, maritime and industry
- TETHYS (HORIZON-WIDERA-2023-ACCESS-02) TWINNING FOR EXCELLENCE IN FLOATING WIND TURBINE AND HYDROGEN SYSTEMS
- H2TRANS - Development of an autonomous hybrid system integrated RES & Hydrogen technologies for transport applications, Sep 2019 – Sep. 2022, Greek General Secretariat of Research & Technology programme, Project Nr. Τ1ΕΔΚ – 05294
- SFERA - Smart Factory EnterpRise Analytics, June 2020 – Dec 2022, Greek General Secretariat of Research & Technology programme, Project Nr. Τ2ΕΔΚ – 02840
- Private Contract with the Operator of the Greek Natural Gas Network: Study for the transformation of DESFA's Natural Gas Grid into “Hydrogen – ready”, July 2020 – Jan 2021
- Private contract with AEONORASIS S.A.: Complete energy study and techno-economical analysis for a pharmaceutical company, aiming to reduce carbon footprint through the implementation of an integrated PV and H2 technologies power system in its facilities

# Projects/Activities (2)

- Alimos, Vrilissia and Kalymnos Municipalities; Provision of consulting services to support Municipality's participation in the FCH JU Initiative for Hydrogen Regions and Cities, 2017 – 2018
- Private Contract with the Greek Regulatory Energy Authority (RAE) for implementing a Feasibility Study on the use of alternative fuels (including hydrogen) in ports and ships
- Vrilissia Municipality: Support in the Implementation of the European Union City Facility (EUCF) project aiming at developing:
  - Municipal H2 refueling stations with storage capacity
  - RES (PVs with virtual net metering) for hydrogen production
- Private Contract with AVIN OIL S.A.: Provision of consulting and engineering services related to the development of a Hydrogen Refueling Station in Agioi Theodoroi, Greece

# Projects/Activities (3)

- Energy consultant of PETROGAZ S.A. supporting the obligations of Greek fuel and energy companies to increase energy efficiency
- Energy audit of PETROGAZ S.A. implemented in 2019 – already having signed contract for the updated audit to be submitted to Ministry of Energy during the 2nd quarter of 2023
- Support of PETROGAZ S.A. in Health, Safety and Environmental Protection
- Support of TERNA ENERGY S.A in the development of a Health and Safety Plan for their pumped – hydro installation in Amfilochia, Greece
- Support of LAMDA DOMI–GOLDEN HALL and of LAMDA Olympian Village in Health and Safety issues (ISO 45001)
- Scientific Consultant of Vrilissia Municipality in the implementation of the European Union City Facility (EUCF) project

# Relative Publications


- Nikolaos Chalkiadakis, Athanasios Stubos, Emmanuel Stamatakis, Emmanuel Zoulias, Theocharis Tsoutsos, “A review on hydrogen compression methods for hydrogen refuelling stations”, Hydrogen Electric Vehicles, publisher WILEY-Scrivener, USA (2022)
- Martin Dornheim, et al. “Research and Development on Hydrogen Carrier Based Solutions for Hydrogen Compression and Storage”, Progress in Energy, IOP Publishing, Prog. Energy 4 042005 DOI 10.1088/2516-1083/ac7cb7
- Emmanuel Stamatakis, Ewald Perwög, Ermis Garyfallos, Mercedes Sanz Millán, Emmanuel Zoulias and Nikolaos Chalkiadakis, “Hydrogen in Grid Balancing: The European Market Potential for Pressurized Alkaline Electrolyzers”, Energies 2022, 15(2), 637; https://doi.org/10.3390/en15020637
- Nikolaos Chalkiadakis, Athanasios Stubos, Emmanuel Zoulias and Emmanuel Stamatakis, “Pilot autonomous hybrid hydrogen refueling station utilizing a metal hydride compressor covering local transportation needs”, E3S Web of Conferences 334, 06002 (2022); https://doi.org/10.1051/e3sconf/202233406002
- E. Stamatakis, Zoulias, C. Christodoulou, G. Karagiorgis, A. Stubos, “Integration of metal hydride hydrogen compressors in hydrogen refueling stations: Bench-marking & market deployment aspects”, 8th European Fuel Cell Technology & Applications Piero Lunghi Conference - EFC19, Napoli, December 11-14, 2019, proceedings, p. 217-218.

# Relative Publications (2)

- George Tzamalis; Emmanouel Zoulias; Emmanouel Stamatakis; Eli Varkaraki; Evripides Lois; Fanourios Zannikos, “Techno-economic analysis of an Autonomous Power System integrating hydrogen technology as energy storage medium”, Renewable Energy, 2011, Vol. 36, pp. 118-124
- O.-S. Parissis, E. Zoulias, E. Stamatakis, K. Sioulas, L. Alves, R. Martins, A. Tsikalakis, N. Hatziargyriou, G. Caralis, A. Zervos, “Integration of wind and hydrogen technologies in the power system of Corvo island, Azores: A cost-benefit analysis”, International Journal of Hydrogen Energy, 2011, doi:10.1016/j.ijhydene.2010.12.074
- G. Krajačić, N. Duić, AG Tsikalakis, E. Zoulias; G. Caralis, E. Panteri, Maria da Graça Carvalho, “Feed in tariffs for promotion of energy storage technologies”, Energy Policy 39 (2011) 1410–1425
- **International Book: E.I ZOULIAS**, Editor and author of the book: “Hydrogen-based autonomous power systems: Techno-economic Analysis of the Integration of Hydrogen in Autonomous Power Systems” published by Springer – Verlag Ltd (ISBN: 978-1-84800-246-3).

# Key Personnel

**Dr. Manos Zoulias: He holds a PhD in Engineering (National Technical University of Athens – 2002), and a Diploma of Chemical Engineer (NTUA 1996). He is currently the Technical Director and Partner of NEEST company and has been working on the design and implementation of RES – H2 power systems since 2002. Area of expertise and experience:**

- **Techno-economic analysis, simulation, optimization, design and implementation of hybrid power systems.**
- **Held the Secretariat of the Greek Hydrogen and Fuel Cells Technology Platform.**
- **Co-ordinated the realization of the 1st real-scale RES&H2 Technologies Laboratory in Greece.**
- **He was the coordinator of the "Greek Green Island project – Ai Stratis" aiming to achieve over 85% RES penetration through energy storage in an isolated island power system**
- **He was the coordinator of the IEE project: "Addressing barriers to storage technologies for increasing the penetration of intermittent energy sources – STORIES"**
- **He was also a member of the co-ordination team of the EU – funded project entitled: "Technology Innovation for the Local Scale, Optimum Integration of Battery Energy Storage – TILOS".**
- **He is the scientific co-ordinator of H2TRANS project, in the context of which the 1st green hydrogen refuelling station for vehicles in Greece is being developed**
- **He is also the company's co-ordinator of TRIERES project, in the context of which the 1st Greek Hydrogen Valley will be developed**

# Key Personnel (3)

**Mrs. Sofia Kavvada: She holds a Diploma from the School of Administration and Economics of the Technical Educational Institute of Peloponnese (1999). Mrs Kavvada is the CEO of NEEST and has participated as a Partner in green energy and environmental protection companies since 2007. She has a long - term experience in the development of green energy business plans, feasibility studies and techno-economic analyses. She is also experienced in attracting financing and funding for green energy projects through provision of specialized consulting services, as well as in dissemination and promotion activities. She also participates in the research teams of TRIERES, H2TRANS and SFERA projects**

# Key Personnel (4)

**Dr. George Tzamalis: He holds a 5-year diploma and a Ph.D. in Chemical Engineering from the National Technical University of Athens (NTUA). Both of his thesis topics are related to hydrogen technologies and hybrid RES-hydrogen power systems.**
**Experienced with strong technical and engineering background in RES and Hydrogen Technologies integration to hybrid power systems including among others modelling, simulations, optimization and techno-economic analysis of such systems.**
**Hands-on experience has been also gained on electrolysis, hydrogen compression, hydrogen storage and fuel cell units through the years of work with on-site performance evaluation of such systems and participation in national (Greece, Cyprus) and international research projects.**
**He has over 20 publications related to RES, hydrogen and energy storage. Recent activities include the study for the transformation of the Hellenic Gas TSO's (DESFA) natural gas grid into "Hydrogen ready" and the development, construction, optimization and operation of a thermal, metal hydride based, hydrogen compressor applicable to Hydrogen Refueling Stations (HRS). He has been also actively involved in the energy consulting of PETROGAZ S.A. and Vrilissia Municipality, as well as in the implementation of a Feasibility Study on the use of alternative fuels (including hydrogen) in ports and ships for the Greek Regulatory Energy Authority (RAE).**

# Thanks for your interest!