

Conclusions on the on-line international workshop (D2.4)

Research infrastructures cooperation for energy transition between European and Latin American and the Caribbean countries.



Document Control Information

Settings	Value
Document Title:	Conclusions on the on-line international workshop
Project Title:	EULAC Energytran: Research infrastructures cooperation for energy transition between Europe and Latin-American and the Caribbean countries
Project Coordinator:	OEI
Deliverable leader:	TECNM
Number and type of deliverable:	D2.4 – R – Document, report
Work Package number:	WP2
Doc. Version:	Final version
Description:	Conclusions on the International Energytran Workshop
Dissemination level:	Public
Date:	15/11/2025

Deliverable (webpage) Approver(s) and Reviewer(s)

All Approvers are required. Records of each approver must be maintained. All Reviewers in the list are considered required unless explicitly listed as Optional.

Name	Role	Action	Date
EU Solaris / TecNM	Work package leader / Project participant	Elaboration	15/10/2025
General Assembly of the project	Decision-making body of the consortium	Review	15/11/2025

Deliverable (monography) history

The Deliverable Author is authorized to make the following types of changes on the deliverable without requiring re-approving:

- Editorial, formatting, and spelling
- Clarification

To request a change, contact the Document Author or Owner.

Changes on the deliverable (inventory) are summarized in the following table in reverse chronological order (latest version first).

Revision	Date	Created by	Short Description of Changes
Version 1	15/11/2025	TECNM	Final version included on the EU Portal and https://energytran.oei.int https://aguascalientes.tecnm.mx/energytran/

1. Introduction

This document summarizes the main activities and topics addressed at the International Energytran Workshop "Scientific Cooperation for Energy Transition," held from March 24 to 27, 2025, in a hybrid format (online and in-person) in Aguascalientes, Mexico. This event focused on promoting a fair and sustainable energy transition through the integration of advanced technologies, resource valorization, and exchange of international experiences with EULAC experts. It also highlighted the social dimension by addressing gender and inclusion challenges to connect science, industry, and society in the context of energy transition. This document provides an overview and conclusions to highlight the progress, challenges, and opportunities identified during this international workshop, with the aim of strengthening scientific and technological collaboration for an equitable and sustainable energy transition.

2. Event Description

The International Energytran Workshop was established as a space for strategic dialogue to address the technological, social, and political challenges of energy transition. During its sessions, EULAC experts agreed that, although technologies to decarbonize the energy system already exist, the main challenge is to achieve a social and political consensus that will accelerate this change. Social justice, inclusion, and international cooperation were the central pillars of the discussions, framing the transition as a technological process and a comprehensive project with cultural and economic impacts. The total number of attendees was 31 (in-person) and 24 (online). The agenda for this event is provided in Annex 1 of this document, which included the following activities:

March 24, 2025: #EnergytranPoster Conference

March 25, 2025: 2 technical courses

March 26 and 27, 2025: 4 plenary lectures and 2 round tables.

#EnergytranPoster Conference

Poster conference using the X (Twitter) platform, with the profile @EnergytranPost, to share and discuss the results and advances of research projects, innovations, technological developments, and graduate and undergraduate theses in energy transition. The best poster was awarded 300 dollars. The book "Scientific Cooperation for Energy Transition" was published containing 58 abstracts of posters presented at #EnergytranPoster Conference, which is reported in Annex 2 of this document.

Technical course: Assembly and industrial application of an alkaline electrolyzer: integration with solar energy and use in metal heat treatment furnaces

The course explored the design and application of alkaline electrolyzers, their integration with solar energy, and their industrial use. It addressed key topics such as green hydrogen production, materials optimization, and energy efficiency, highlighting the importance of technological innovation and applied research in driving the transition to clean energy.

Technical course: Best practices for the development of active nanomaterials and their evaluation with application in fuel cells, electrolyzers, and advanced batteries

The course addressed the development of nanomaterials for fuel cells, electrolyzers, and advanced battery systems. It analyzed the optimization of nanocatalysts, the reduction of precious metal costs, and the promotion of green hydrogen as an energy source. The importance of innovative nanostructured materials for improving efficiency and sustainability of the energy transition was emphasized.

Plenary lecture: Challenges for the industrial development of H2V and renewable derivatives in Chile

Chile's national green hydrogen strategy was presented, highlighting its leadership in renewable resources, with more than 75 ongoing projects. The challenges of scaling up and the importance of collaboration between industry, academia, and government were discussed.

Plenary lecture: Why do we need research infrastructure in photovoltaic (and energy) research?

The value of scientific infrastructure for validating technologies, developing talent, and transferring knowledge was discussed. The importance of strengthening these platforms in Latin America to close innovation gaps was underscored.

Plenary lecture: Nanoparticles and nanofluids for concentrated solar power processes

A sustainable approach was presented for obtaining advanced materials such as biogenic silica and pure silicon using concentrated solar power and agricultural waste. It was also emphasized that these nanostructures have applications in the fields of semiconductors and batteries.

Plenary lecture: Harnessing Coahuila's natural resources and biomass waste for use in hydrogen and advanced battery technologies

The importance of harnessing biomass and agro-industrial waste to produce materials for use in batteries and as electrocatalysts was discussed. This conference analyzed the conversion of waste into high-value technological resources.

Round table: Challenges and advances for the energy transition

Advances and challenges of renewable energy in EULAC were discussed, emphasizing the importance of green hydrogen, biofuels, and robust regulatory frameworks. Experts analyzed the need for greater public-private cooperation.

Round table: Gender, inclusion, and energy transition

The roundtable highlighted the gender gap and stereotypes in the energy sector and proposed inclusive policies and support networks. It was also emphasized that the energy transition must be a socially and culturally just process.

The *International Energytran Workshop* contributed to disseminate that the energy transition is not just a technological process but a comprehensive project that requires political commitment, social justice, and strong territorial roots.

3. Description of technical courses, plenary lectures, round tables and their conclusions

#EnergytranPoster Conference

The first edition of the #EnergytranPoster Conference was organized as an initiative for scientific dissemination in the field of energy transition within the framework of the EULAC Energytran project. This event was held on March 24, 2025, using the X platform (Twitter). #EnergytranPoster Conference is a new space for the dissemination of scientific and technological knowledge on energy transition, promoting cooperation in the scientific community. This forum is a public open access platform to share and discuss the results and advances in research projects, innovations, technological developments, in a poster format, promoting the exchange of ideas not only among specialists in the field of energy transition, but also among students, young researchers, and public and private stakeholders. Therefore, the objective of this academic forum is to create an inclusive and accessible space that would allow dialogue among stakeholders with different levels of experience and disciplines. The book "Scientific Cooperation for Energy Transition" was edited, which contains 58 abstracts of posters presented at the #EnergytranPoster Conference by EULAC authors. This compilation of abstracts addresses a wide range of topics related to energy transition, including the production and storage of green hydrogen, the development of efficient energy storage systems, the energy recovery from organic and inorganic wastes, the synthesis and characterization of catalysts for biofuel production, the modeling and optimization of renewable energy-based systems, and the study of advanced materials to improve the performance and efficiency of photovoltaic solar panels, fuel cells, lithium-ion batteries, and supercapacitors. The content of this book of abstracts will be useful for exploring new ideas and proposals to address current issues in energy transition and contribute to further developments in this relevant field. The list of posters presented at the #EnergytranPoster Conference is as follows:

HYDROGEN PRODUCTION FROM AGAVE ANGUSTIFOLIA HAW BAGASSE DERIVED FROM THE MEZCAL PRODUCTION PROCESS

J.A. Jiménez-Mendoza, F. Chiñas-Castillo, M. Caballero-Caballero, R. Álvarez-Ramírez

HIGH-ENTROPY METAL PHOSPHIDES BASED ELECTROCATALYSTS FOR COST-EFFECTIVE OXYGEN EVOLUTION REACTION

A.L. Higareda-Alvear

IMPACT OF MICROSTRUCTURAL ORDER ON EFFECTIVE TRANSPORT COEFFICIENTS AND EFFECTIVE CATALYST AREA IN THE PERFORMANCE OF ELECTRODES FOR ELECTROCHEMICAL HYDROGEN COMPRESSORS

A. Navarro-Montejo, R. Barbosa, C. Pacheco

ELECTROCATALYTIC ACTIVITY EVALUATION OF MANGANESE OXIDE SPONTANEOUSLY COATED ON CARBON FOR OXYGEN REDUCTION IN MICROBIAL FUEL CELLS

M.C. Fuentes-Albarrán, F.B. Alarcón-Hernández

INFLUENCE OF ETHYL ACETATE AS AN ANTISOLVENT ON THE EFFICIENCY OF MAPBI₃ PEROVSKITE SOLAR CELLS

J.E. Erro-Quiñonez, R. García-Gutiérrez

DECARBONIZATION OF THE CHEMICAL INDUSTRY: THE IMPACT OF RENEWABLE ENERGY ON GREEN AMMONIA PRODUCTION

C.A. Padilla-Esquivel, J.M. Ponce-Ortega

PROCESSABILITY AND FABRICATION OF ZnO-MODIFIED CARBON FIBERS FOR ENERGY STORAGE APPLICATION

J.J. Serralta-Macias, J.C. Tapia-Picazo, D. Alcalá-Sánchez

NEW SYNTHESIS ROUTE AND CHARACTERIZATION OF LITHIUM MANGANESE OXIDE POWDERS FOR APPLICATION IN LITHIUM-ION BATTERIES

S. Beltran-Torres, R. García-Gutiérrez

PHOTOVOLTAIC REACTOR FOR HYDROGEN PRODUCTION BY ELECTROLYSIS OF SALINE WATER

J. León-Trujillo, R. García-Gutiérrez

DYNAMIC MODELING OF HEAT TRANSFER IN AN ALUMINUM TUBE SOLAR COLLECTOR USING SCILAB

A.A. García-López, I.A. García-Montalvo, E. Hernández-Bautista, A.J. Díaz Barrita, M.L. González-Jiménez

OPTICAL CHARACTERIZATION OF GaN IN HEXAGONAL PHASE SYNTHESIZED BY PULSED LASER DEPOSITION

J.A. Cano-Salazar, D. Berman-Mendoza, R. García-Gutiérrez, J.G. Quiñones-Galván, C.M. Yee-Rendon

LOW POWER HEAT EXCHANGER: A SOLUTION FOR ENERGY EFFICIENCY IN REFRIGERATION

J. Ixta-Morales, G. Jiménez-Morales, C. Ramón-De los Santos, M. Olán-Ramos

INDUSTRIAL MACHINE MODEL FOR INSPECTION AND MEASUREMENT OF MAGNETIC FIELD BY COORDINATES FOR LITHIUM ION CELLS

J.J. Villegas-Saucillo, I. Aguilera-Navarrete, M.S. López-Cornejo

THEORETICAL STUDY OF TRIPHENYLAMINE AND TRIPHENYLPHOSPHINE AS DONORS FOR DONOR-ACCEPTOR DYES IN SENSITIZED SOLAR CELLS

C.A. Peñuelas-Gámez, A. Báez-Castro, J.A. Baldenebro-López, D. Glossman-Mitnik

SYNTHESIS OF CARBON QUANTUM DOTS (CQDs) FROM LIGNOCELLULOSIC WASTE FOR APPLICATION IN DYE-SENSITIZED SOLAR CELLS (DSSCs)

G.Y. Romero-Zúñiga, F. Soriano-Corral, L. Da-Silva, Y. Mendoza-Tolentino

CIRCULAR ECONOMY AND RENEWABLE ENERGY: TRANSFORMING WASTE INTO RESOURCES

A. Ramírez-Jiménez, Q.C. Hernández-Escobedo

MODIFICATION OF THE OPTOELECTRONIC PROPERTIES OF TRIPHENYLAMINE-DERIVED DYES BY INCORPORATION OF PYRIDYL GROUPS: A DFT STUDY

D.A. Delgado-Montiel, N.R. Flores-Holguín, M.D. Gossman-Mitnik, J.A. Baldenebro-López

OVERVIEW OF BIOFUELS IN RENEWABLE ENERGY: TRENDS

G.M. Aponte-Figueroa, J.E. Delgado-Urdaneta, B.E. Soledad-Rodríguez

SUSTAINABLE CATALYSTS: USE OF PLANT RESIDUES AND THEIR FUNCTIONALIZATION WITH CALCIUM FOR BIODIESEL PRODUCTION

L.L. Díaz-Muñoz, H.E. Reynel-Ávila, D.I. Mendoza-Castillo, A. Bonilla-Petriciolet

DEVELOPMENT AND EVALUATION OF ORGANIC SOLAR CELLS WITH NATURAL DYES FROM VACCINIUM CORYMBOSUM AND MUCILAGE OF OPUNTIA FICUS-INDICA

J. Sabás-Segura, J.A. Marín-Alonso, M. Rico-Martínez

SUSTAINABLE INNOVATION: THE NICABARDA AS AN ENERGY AND ENVIRONMENTAL PROJECT IN THE MATAGALPA SUB-BASIN, NICARAGUA

I.E. Martínez-Pon, R.F. Jarquín-Matamoro

ANALYSIS OF THE STABILITY AND PERFORMANCE OF MAGNETIC CATALYSTS DERIVED FROM CIGARETTE FILTER WASTE FOR BIODIESEL PRODUCTION

B.P. Escalera-Velasco, H.E. Reynel-Ávila

OPTIMAL EVALUATION OF BRINE DESALINATION TECHNOLOGIES FOR A SUSTAINABLE LITHIUM SUPPLY CHAIN: THE CASE STUDY OF MEXICO

V.O. Vega-Muratalla, C. Ramírez-Márquez, L.F. Lira-Barragán, J.M. Ponce-Ortega

DEVELOPMENT OF A STRATEGY FOR THE FUNCTIONALIZATION OF ACTIVATED CARBONS FROM CORK USING OXALIC ACID AND LITHIUM, AND THEIR APPLICATION IN HYDROGEN STORAGE

L.J. Bastidas-Solarte, A. Bonilla-Petriciolet, E. García-Hernández

MATHEMATICAL MODELS FOR THE OPTIMIZATION OF SOLAR ENERGY USE IN OCOTAL, NUEVA SEGOVIA, NICARAGUA

C.J. Herrera-Castrillo

LAYERED DOUBLE HYDROXIDES: NEXT GENERATION OF CATALYSTS TO PRODUCE RENEWABLE FUELS AND LUBRICANTS

M.L. Malagón-Quinto, H. E. Reynel-Ávila

OPTIMIZATION OF A SOLAR DEHYDRATOR FOR THE FOOD INDUSTRY IN THE MEZQUITAL VALLEY

R. Bravo-Cadena, H.A. Pérez-Arreola, F.A. Mariscal-Navarro, L. Marañón-Priego, A.T. Calderón-Salazar, Y. Mendoza-Tolentino

DESIGN OF A CHEMICAL REACTOR FOR BIODIESEL PRODUCTION FROM USED COOKING OIL

A.T. Calderón-Salazar, H.A. Pérez-Arreola, A. García-Lugo, L. Marañón-Priego, C. Medina-Mendoza, R. Bravo-Cadena, Y. Mendoza-Tolentino

ADAPTATION OF ANAEROBIC BIOMASS FOR BIOGAS PRODUCTION FROM WASTEWATER CONTAINING FATS

L.A. Cruz-Acevedo, M. Canul-Chan, A. Alvarado-Vallejo, A. Alvarado-Lassman

BIOHYDROGEN PRODUCTION USING BOVINE RUMEN MICROORGANISMS

V.M. Gándara-Arteaga, A.J. Martínez-Gómez, R.I. Corona-González, M.A. Camacho-Ruíz

FUNCTIONALIZING CARBON NANOTUBES WITH THE CU-BTA COMPLEX AS PT SUPPORT TO PROMOTE THE NITROGEN REDUCTION REACTION

R. López-Leal, M.E. Sánchez-Castro, F.J. Rodríguez-Varela

SOLAR DESALINATION USING LASER-TEXTURED SURFACES

L.J. Velasco-Pardo, F.J. Carranza-Chávez, P. Segovia-Olvera, R.L. Pérez-Arce

PHOTOVOLTAIC PANELS FOR THE CONVERSION OF SOLAR ENERGY TO ELECTRICITY IN COMMUNITIES OF ESTELÍ, NICARAGUA

G.J. Espinal-Maradiaga, D.J. Rivera, A.Y. Ferrera-Jarquín

HOMEMADE OVEN AS AN ALTERNATIVE FOR THE COMMUNITY OF ISIQUÍ, NICARAGUA

L.A. Rivas-Cruz, E.J. Suárez-García, J.E. Solís-Ramírez

SUSTAINABLE RESIDENTIAL LIGHTING AT THE OSCAR ARNULFO ROMERO SCHOOL IN ESTELÍ, NICARAGUA

A.S. Cordero-Moreno, A.J. Alarcón-Martínez, G.P. Morales-Pérez

SYNTHESIS OF ELECTROCERAMIC NANOMATERIALS OF GADOLIDIUM-DOPED CERIA BY THE MOLTEN SALT TECHNIQUE

C. Bocardo-Roldán, J.A. Díaz-Guillén, K.P. Padmasree, M.R. Díaz-Guillén, O.J. Durá

MECHANOCHEMICAL SYNTHESIS AND CHARACTERIZATION OF DOPED CERIA FOR IT-SOFC ELECTROLYTES

Y.A. Yeverino-Martínez, J.A. Díaz-Guillén, K.P. Padmasree, M.R. Díaz-Guillén, O.J. Durá

MULTIDOPED OXIDES FOR USE IN FUEL CELLS

S.R. Arreazola-López, J.A. Díaz-Guillén, A.F. Fuentes, M.R. Díaz-Guillén, O.J. Durá

SYNTHESIS OF HETEROGENEOUS CATALYSTS FROM MUNICIPAL LEACHATE RESIDUAL BIOMASS FOR BIODIESEL PRODUCTION

M. López-Guerrero, M.R. Moreno-Virgen, F.J. Villalobos Delgado, H.E. Reynel-Ávila, A. Bonilla-Petriciolet

RECOVERY OF BUTANOL AND METHYL ETHYL KETONE AS BIOFUELS USING ADSORBENTS DERIVED FROM RESIDUAL BIOMASS

W.G. Laguna-López, H.E. Reynel-Ávila

STRATEGIC INTEGRATION OF SUSTAINABILITY METRICS FOR OPTIMAL POWER SYSTEM PLANNING HORIZONS

E.G. Mora-Jacobo, J. Tovar-Facio, J.M. Ponce-Ortega

AN ANNUAL STUDY ON LIPID EXTRACTION FROM PRIMARY WASTE SLUDGE AND ITS CONVERSION TO BIODIESEL

F.J. Villalobos-Delgado, H.E. Reynel Ávila

LITHIUM-RICH OXIDES ($\text{Li}_{1.2}\text{Ni}_{0.2}\text{Mn}_{0.6}\text{O}_2$) AS CATHODE MATERIALS: OPTIMIZATION FOR A LI-ION BATTERY PROTOTYPE

A.M. Rodríguez-Carrillo, A. Visintin

RISKS IN THE ENERGY TRANSITION: WHO'S RESEARCHING, WHAT WE KNOW, AND WHERE WE'RE GOING

R. Ramos-Hernández

IMPACT OF FOULING ON THE ECONOMIC PERFORMANCE OF SOLAR COLLECTOR SYSTEMS IN BATCH OPERATION

H.G. Lugo-Granados, L. Canizalez-Dávalos, M. Picón-Núñez

DESIGN AND THERMAL EVALUATION OF A COMPOSITE MATERIAL FOR PASSIVE COOLING USING RECYCLED POLYMERS

E.A. Barrero-Jiménez, I. Zavala-Guillén

EXPLORING THE POTENTIAL OF POTASSIUM HEXACHLOROSTANNATE PEROVSKITE FOR ENERGY STORAGE DEVICES

A. Romero-Contreras, E.M. Sánchez-Cervantes

TAILORING CHARGE TRANSPORT IN HETEROCYCLIC-BASED HTMS FOR PEROVSKITE SOLAR CELLS: INSIGHTS FROM COMPUTATIONAL CHEMISTRY AND GLOBAL OPTIMIZATION

R.R. Flores-Mena, M.I. Campos-Almazán

REMOVE OF LIGNOCELLULOSIC INHIBITORS FOR BIOETHANOL PRODUCTION USING ADSORPTION PROCESS WITH SPENT COFFEE GROUND

N. Bernal-Triviño, J.G. Sánchez-López, E. Soto-Regalado, J.J. Salazar-Rábago, N.E. Dávila-Guzmán

SYNTHESIS AND EVALUATION OF CATALYSTS FROM DIFFERENT RESIDUES FOR THE BIODIESEL PRODUCTION

A.P. Melchor-Durán, M.R. Moreno-Virgen, F.J. Villalobos-Delgado, H.E. Reynel-Ávila, A. Bonilla-Petriciolet

EVALUATION OF STRATEGIES FOR RECOVERING BIOGAS AND BIOFERTILIZER PRODUCTIVITY IN ANAEROBIC DIGESTION PROCESSES

D.E. Díaz-Castro, P. Rivas-García

STUDY OF RECOVERED MATERIALS FOR THEIR POTENTIAL APPLICATION IN SUPERCAPACITORS

D.E. Rebollar-García

FUTURE OF THERMAL COMFORT: THE RELEVANCE OF UNDERSTANDING THE IMPACT OF CLIMATE CHANGE ON LOW-INCOME HOUSING

L.R. Hernández-Nájera

ZIRCONIA COATINGS ON METALLIC SUBSTRATES: A COMPARISON BETWEEN STAINLESS STEEL AND TITANIUM FOR ELECTROLYSIS

M. López-Sánchez, M.M. Machado-López, J.C. Villalobos, H.J. Vergara-Hernández

FUTURE INSIGHTS ABOUT LITHIUM IN MEXICO

J.A. Martínez-Cruz

ADDRESSING ELECTRICITY DEMAND GROWTH FROM NEARSHORING: OPTIMAL STRATEGIES FOR ENERGY SYSTEMS PLANNING

M. García-Hernández, X. Castro-Reyes, J. Tovar-Facio

EFFECT OF CULTURE MEDIUM NUTRIENTS ON THE BIOMASS PRODUCTION AND FUTURE BIOENERGY POTENTIAL OF ARTHROSPIRA PLATENSIS

J.A. Lara-Reyes, C. García-Gómez

BIOHYDROGEN PRODUCTION DURING THE IMMOBILIZATION OF ANAEROBIC SLUDGE IN A CACTUS FROM NORTHEASTERN MEXICO

M.E. Ocaña-López, J.A. Rodríguez-De la Garza, M.A. Pérez-Rodríguez

Technical course: Assembly and industrial application of an alkaline electrolyzer: integration with solar energy and use in metal heat treatment furnaces.**Héctor Javier Vergara-Hernández**

Senior Researcher at Tecnológico Nacional de México - Instituto Tecnológico de Morelia (Mexico). He is member of Mexican National System of Researchers. He is specialist in renewable energy technologies and electrochemical processes. His expertise includes applied research and technology transfer in the design, optimization, and characterization of alkaline electrolyzers and proton exchange membranes.

Main conclusions: Dr. Héctor Javier Vergara-Hernández led a course focused on the design and industrial application of alkaline electrolyzers, their integration with solar energy, and their use in furnaces for thermal treatment of metals. The presentation highlighted the importance of hydrogen as an energy carrier, its potential to replace fossil fuels, and the importance of developing critical thinking around electrolysis processes and the production of hydrogen and oxygen. During this course, Dr. Vergara-Hernández and his team presented technological innovations aimed at optimizing wet and dry electrolyzers, addressing issues such as corrosion, energy efficiency, and temperature control. Advances in highly durable materials, patented designs to improve production efficiency, and strategies for integrating these systems with renewable energy were also discussed. The course concluded by emphasizing the need for applied research, technological innovation, and capacity building to consolidate the industrial use of green hydrogen as a sustainable alternative energy source.

Technical course: Best practices for the development of active nanomaterials and their evaluation with application in fuel cells, electrolyzers, and advanced batteries.



Ivonne Liliana Alonso-Lemus

Senior Researcher at Cinvestav (México). She is member of Mexican National System of Researchers. Her research focuses on the development of advanced electrochemical materials produced from biomass waste. She is also a mentor in STEM programs, guest editor, and reviewer for international journals.



Francisco Javier Rodríguez-Varela

Senior Researcher at Cinvestav (México). He is member of Mexican National System of Researchers. His research focuses on the development of nanocatalysts and electrochemical devices for energy conversion and storage, including fuel cells and electrolyzers. He is the founder of postgraduate programs in sustainability and nanotechnology, and has served as a guest editor in high-impact journals.

Main conclusions: The course addressed the development of advanced nanomaterials with applications in fuel cells, electrolyzers, and next-generation batteries. Dr. Javier Rodríguez-Varela discussed fuel cells and electrolyzers, and explained the operating principles, components, and technological challenges associated with these technologies, such as the high cost of noble metal catalysts (platinum, iridium, and ruthenium). He highlighted the importance of optimizing nanocatalysts, reducing costs through alternative alloys or supports, and improving energy conversion efficiency to promote green hydrogen production and use. Dr. Ivonne Liliana Alonso-Lemus continued with the second part of the course, focusing on advanced batteries, including supercapacitors and emerging technologies for energy storage. She analyzed the importance of electrochemical mechanisms, morphological control of nanomaterials and their impact on energy density, and the need for interdisciplinary research to develop more stable, economical, and sustainable materials. The course concluded by highlighting the key role of innovation in nanostructured materials in achieving a more efficient and cleaner energy transition.

Plenary lecture: Challenges for the industrial development of H₂V and renewable derivatives in Chile.



Humberto Ricardo Vidal-Gutiérrez

Associate Professor at Universidad de Magallanes (Chile). His research focuses on energy efficiency, biomass gasification, renewable energy, and green hydrogen. He has led projects aimed at biofuel development, regional energy strategies, and the establishment of technological and regulatory standards in Patagonia. He is a regional leader in innovation and technology transfer, leading sustainable energy initiatives for isolated communities, rural areas, and aquaculture in the Magallanes region.

Main conclusions: Dr. Humberto Vidal presented an overview of the development of green hydrogen in Chile, highlighting the geographic, political, and technical advantages that position the country as a strategic player in the global energy transition. Chile has exceptional renewable resources, such as solar energy in the north and world-class wind power in the south, which allow for low-cost electricity generation that is essential for competitive hydrogen production. Since 2020, the country has implemented a National Green Hydrogen Strategy and an action plan that promotes investment, regulation, infrastructure, and citizen participation. Currently, there are more than 75 projects in different stages, some of which are already operating at the pilot level in sectors such as mobility and mining, with a special emphasis on the production of green ammonia as an export vehicle. He addressed the challenges of scaling, permitting, territorial management, and technical capacity building. He underscored the need to coordinate efforts between universities, industry, and government, and showed how the academic sector has already begun to benefit from infrastructure, international cooperation, and talent development. He concluded his talk by inviting students and researchers to join this emerging field, which is full of opportunities and of global relevance.

Plenary lecture: Why do we need research infrastructure in photovoltaic (and energy) research?



Aitor Marzo

Senior researcher at Universidad de Granada (Spain). His research focuses on territorial characterization and radiometry applied to solar technologies, encompassing solar radiation, panel soiling, and solar resource modeling for photovoltaic and concentrating solar systems. He has participated as a principal investigator and project leader at Universidad de Antofagasta.

Main conclusions: Dr. Aitor Marzo opened his presentation by highlighting the importance of having a solid research infrastructure in the field of photovoltaics and energy as a pillar for advancing toward a real energy transition. He pointed out that technological evolution alone is insufficient if it is not accompanied by physical spaces and collaborative networks that allow for the validation, sharing, and scaling of clean energy solutions. He emphasized how collaboration between Europe and Latin America, through the European CACTUS project, has fostered the creation of scientific, technical, and training capacities, enabling data exchange, measurement standardization, and the development of new materials and devices. He also explained that infrastructure serves not only as a platform for cutting-edge research but also as a platform for training young people, transferring technology to industry, and generating evidence-based public policies. He emphasized that future energy planning must consider technical, social, environmental, and territorial aspects. In this sense, research infrastructure bridges science, industry, society, and government. He concluded that strengthening these platforms in Latin America is crucial for closing innovation gaps, democratizing access to knowledge, and achieving a fair and effective energy transition.

Plenary lecture: Nanoparticles and Nanofluids for Concentrated Solar Power Processes.



Yendry Regina Corrales Ureña

Senior researcher at Centro Nacional de Alta Tecnología (Costa Rica). She is specialist in nanomaterials and nanofluids and her research focuses on materials characterization, the application of nanofluids to enhance solar absorption, and the encapsulation of functional nanoparticles. She has collaborated with international institutions and participated in Martian simulations studying nanostructures under extreme conditions.

Main conclusions: Dr. Yendry Corrales Ureña presented a study on the synthesis of nanostructures using concentrated solar energy, highlighting the use of agricultural waste, such as pineapple, to obtain biogenic silica. She reached temperatures above 1600 °C using solar concentration techniques to induce thermal transformations and reduction reactions, generating materials such as pure silicon, fluorescent nanoparticles, and magnesium silicate nanotubes, which have not been reported. Her lecture explored solar reactor configurations, the use of historical parabolic dishes, and experimental challenges, such as temperature variation caused by clouds. Characterization techniques such as SEM, EDX, and Raman spectroscopy were also used to analyze the morphology and composition of products. This approach promotes a sustainable alternative for obtaining advanced materials that are useful in semiconductors, batteries, catalysis, and biomaterials.

Plenary lecture: Harnessing Coahuila's Natural Resources and Biomass Waste for Use in Hydrogen and Advanced Battery Technologies.



Ivonne Lilia Alonso-Lemus

Senior Researcher at Cinvestav (México). She is member of Mexican National System of Researchers. Her research focuses on the development of advanced electrochemical materials produced from biomass waste. She is also a mentor in STEM programs, guest editor, and reviewer for international journals.

Main conclusions: Dr. Ivonne L. Alonso discussed the use of regional coal and agro-industrial waste to develop functional materials in sodium-ion batteries, supercapacitors, electrodes, and electrocatalysts. Innovative compounds have been obtained from waste products such as chicken manure, bio-sludge, and grape pomace through doping and processes such as pyrolysis and solvothermal synthesis. These materials have demonstrated high performance in electrochemical applications, generating value from waste and promoting a sustainable energy transition with regional identity.



Round table: Challenges and Advances for the Energy Transition.



Sarah Essam Taha Mohamed

Project Manager at EU-SOLARIS ERIC (Spain). Her work focuses on the coordination of international projects that promote the development and integration of solar technologies in Southern European and Latin American countries. She has worked on various initiatives, promoting transnational access to experimental platforms, standardization of methodologies, and scientific collaboration.



Hilda Elizabeth Reynel-Ávila

Senior researcher at Tecnológico Nacional de México - Instituto Tecnológico de Aguascalientes (Mexico). She is member of Mexican National System of Researchers. Her research focuses on separation processes, biofuel production, and environmental remediation. She participates in international research networks and projects in the fields of environment and energy, including the Energytran project.



José Ysmael Verde-Gómez

Senior researcher at Tecnológico Nacional de México - Instituto Tecnológico de Cancún (Mexico). He is member of Mexican National System of Researchers, and President of the Mexican Society of Hydrogen. His research interests include the synthesis and characterization of nanomaterials, hydrogen technologies, fuel cells, and environmental remediation.



Pedro Ignacio Hancevic

Associate Professor at Centro de Investigación y Docencia Económicas (México). His fields of specialization are energy and environmental economics, empirical industrial organization, and applied microeconomics. His research focuses on the analysis of consumer and firm behavior in oligopoly markets, with the main objective of improving the design of regulations, competition and environmental policies.

Main conclusions: The panel discussion focused on the progress, challenges, and projections of the energy transition in EULAC. It was concluded that both regions have made significant progress in adopting renewable energy. However, it was highlighted that each region faces specific challenges derived from its social, political, economic, and technological conditions, which require differentiated and collaborative approaches to promote an effective and just transition. Sarah Essam presented the European experience in solar energy, highlighting the importance of regulation, financing, and citizen participation. Pedro Hancevic analyzed the economic and regulatory factors that can limit the progress of the energy transition, such as the lack of continuity in public policies or technological dependence. José Ysmael Verde presented the progress made in green hydrogen in Mexico and Latin America, emphasizing the need to define a national roadmap and consolidate regulatory frameworks. They agreed that technologies such as green

hydrogen and biofuels are essential for sectors that are difficult to electrify, but their large-scale integration requires investments in infrastructure, innovation in raw materials, and improvements in storage and electricity grids. The session concluded with a call to strengthen cooperation between the public and private sectors and consolidate solid regulatory frameworks that guarantee a sustainable, fair, and resilient energy transition.

Round table: Gender, inclusion, and energy transition.



Paula Sánchez Carretero

Project coordinator at Organización de los Estados Iberoamericanos (Spain). She has led educational and scientific cooperation initiatives between Europe and Latin America. She manages key programs that promote science, research, and academic mobility, strengthening multilateralism in the region.



Dulce M. Guevara

Specialist in gender, energy, and climate change at the National Association of Solar Energy (Mexico). She has experience working with organizations such as the Global Green Growth Institute and promotes gender equity in the energy sector in Mexico.



Aideé Zamora Espínola

Renewable Energy Engineer, founder and Deputy General Coordinator of the Women in Renewable Energy and Energy Efficiency Network (Mexico). She is an energy consultant, has expertise in energy efficiency, and leads initiatives that promote female leadership in the sector, promoting agreements and different strategies.

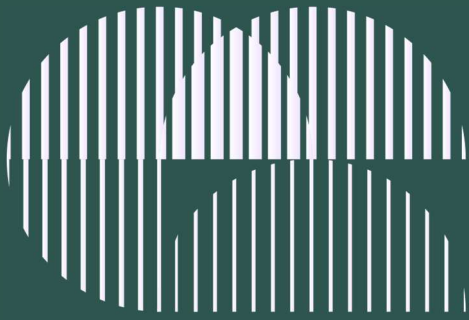
Main conclusions: This roundtable discussion addressed the transformation of the energy sector as an opportunity to build a more just and inclusive society, highlighting that the transition to clean energy is not only a technical and economic challenge, but also a social one. The participants, who were experts in inclusion, gender, and energy, highlighted the persistent underrepresentation of women and vulnerable groups in this sector. The difference between equality (as a human right) and equity (as a means to achieve it) was discussed, as well as the importance of an integrated approach to understanding how factors such as gender, class, and ethnicity intersect. The speakers shared their experiences and evidence of obstacles such as the glass ceiling, gender stereotypes, the overload of unpaid care work, and lack of work-life balance policies. They also mentioned the existence of harassment and workplace violence as real barriers to female participation. Statistics revealed a significant gap in leadership positions and representation in energy research. It was concluded that it is necessary to adopt a gender lens, promote



affirmative action, build support networks, and design policies with a human rights approach to close gaps and promote full participation in the energy transition.

The videos of all technical courses, plenary lectures and round tables are available in the next link:

<https://www.youtube.com/@Maestría.CienciasIngQuímica>



Energytran

www.energytran.oei.int

energytran@oei.int



**Funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

