

# International Symposium and Workshops

## Sustainable Solutions at Times of Transition (SuST)

14-17 July 2022, Nisyros Island, Greece



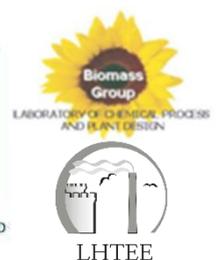
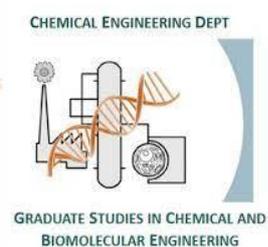
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## *Welcome Address*



As Chairperson of the International Symposium and Workshops '**Sustainable Solutions at Times of Transition (SuST)**' and on behalf of the Mayor of Nisyros (host of the Symposium), chairpersons and organizers, it is my great pleasure and honor to welcome you to Greece and especially to the island of Nisyros in the Aegean Sea.

In this time of growing ecological and humanitarian crises, when the COVID-19 pandemic exposed the ecological vulnerability of our global systems, and the unprovoked invasion of Ukraine is a re-telling of an old story of conquest and control that ends in murder, ruin, refugees, and resources catastrophe, there is an urgent need to integrate peace, well-being, ecological sustainability, resilience, and equity into all levels of society and education.

The Symposium and Workshops will be held on Nisyros, a small Greek volcanic island in the Aegean Sea, as a paradigm of areas where the access to and supply of resources are limited and under pressure, and where the cultural heritage and old knowledge are very valuable for societal resilience.

We will bring together experts, researchers, academics, engineers, practitioners, and designers for an increased socio-ecological awareness in the context of climate change, and for discussing sustainable solutions for the ecological challenges of "vulnerable communities" in which food, water, and energy resources are under serious threats.

We have the pleasure and honor of having with us as keynote speakers: Prof. **Jeffrey Sachs** from Columbia University, US and SDSN president; Prof. **Mat Santamouris** from the University of New South Wales, Sydney, Australia; and Prof. **Don Huisingh** from Tennessee University, the Emeritus Editor-in-Chief of the Journal of Cleaner Production.

The participants are kindly invited to constructively contribute to the technical and socioeconomic dimensions of sustainable solutions. We invite you to discuss and approach the interrelations of the environment, science, technology, design, with society, sustainability, resilience with an interdisciplinary approach.

The scientific program is structured as a Symposium and Workshops. The Symposium was designed to promote a scientific dialogue with keynote speakers and senior invited speakers, to support sustainability, based upon ethically and ecologically sound paradigms, practices, and policies at the local, Mediterranean, European, and global scales. The technical, socio-economic, ecological dimensions will be addressed in the context of "Sustainable Solutions at the Times of Transition." The Workshops will address topics of the utmost scientific and practical importance such as Circular Economy, Bioeconomy, and case studies, all of which will be concluded with plenary discussions.

I would like to acknowledge and express my deep thanks to our keynote speakers, moderators, chairpersons, and all presenters, the scientific committee, the organizing committee, and the Municipality and the people of Nisyros for the support and hospitality. I would like also to thank the Mayor of Nisyros, Prof. **Christofis Koroneos**, who dreams of transforming Nisyros into a place of socio-ecological sustainability, for hosting the event.

I am excited to meet all of you coming from different countries to this very special island in the Aegean Sea, and I am confident that the Symposium and Workshops, being held during the magical Greek summer, will be an unforgettable event for all, create vivid dialogues and strengthen collaborations and friendships!

Nisyros is a small island in the Aegean Sea. It is a peaceful, alternative destination for a simple, natural life and tourism. Its volcano adds an apocalyptic dimension, where one can be inspired and think of human futures on this planet. The picturesque villages with traditional architecture and great views bring us close to the Greek Cultural Heritage. The beaches are clean and have a relaxing atmosphere.

*I wish you a very pleasant stay in Nisyros for a unique, magical, and unforgettable experience in a highly stimulating, natural, blue-and-white environment!*

Professor Anastasia Zabaniotou, Aristotle University Thessaloniki  
**Chair of the Symposium**

President-elect of the Mediterranean Engineering Schools Network (RMEI-Réseau Méditerranéen des Ecoles d'Ingénieurs)

## *Salutation*



It is an axiom, our lives, our world is always at change. However, the rapid changes that have taken place in the past years, and the transition they bring, can be catastrophic unless concrete action is taken.

The entire world has been in a major transition adjusting to life with COVID-19-life is no longer the same.

The earth environment is rapidly changing and CO<sub>2</sub> emissions keep on increasing. The average annual global greenhouse gas emissions during the period 2010-2019 were at their highest levels in human history. It is extremely important for all humanity to realize that without deep emissions reduction now, our planet will keep on warming up surpassing the 1.5 °C increase level. Unless there is a change of the structure of the economy, unless there is a change in technology we use, unless there is a change in the way we think, life in our planet may cease to exist.

The International symposium we are organizing in Nisyros, “Sustainable Solutions at Times of Transition (SuST)” has a central objective to examine all these issues dealing with the transition period of climate change and to examine tools that will have an impact in reversing the environmental catastrophe that is ahead of us. The topics of the symposium will cover a wide spectrum of tools that can deal with climate change: Climate Change Impacts and Climate Change Mitigation Methods, Renewable Energy, Circular Economy, Bioeconomy, Sustainable Agricultural Systems, Systems Approaches (Life Cycle Assessment, Exergy Analysis, Carbon footprint, Environmental footprint, Water footprint, Nutrient footprint, Bio-diversity footprint, etc.). Beyond those tools there will be an examination of all aspects of sustainability and the interactions among the Human, Climatic, Eco-system, Technological, Economic, Policy and Ethical Dimensions.

It is our honor to have as a keynote speaker the world-renowned economics professor, bestselling author, innovative educator, academic, public policy analyst and global leader in sustainable development, Jeffrey Sachs. Professor Sachs is the Director of the Center for Sustainable Development at Columbia University and President of the UN Sustainable Development Solutions Network.

I want to welcome all the participants of the symposium to the mythical Island of Nisyros, a product of the battle between the Gods and the Titans. Gaia (Earth), the mother of all, turned the mortal Giants against the immortal Olympian Gods. Poseidon (God of the sea) had taken up the responsibility to neutralize Polyvotis (a Giant), who crossed the Aegean in an attempt to save himself. Poseidon caught up with him near Kos. With his trident he detached a part of Kos and hurled it at Polyvotis who was crushed under the rock's weight. **That rock, as the myth describes, is Nisyros.** This myth vividly represents the continuous battle between humans and nature, between change and stagnation.

Professor Christophis Koroneos  
Mayor of Nisyros  
Co-Chairman of SuST

## *Opening Message*



The title of this year's Symposium turns out to be well-thought-out. The unexpected Russian invasion in Ukraine resulted, among other, in an unprecedented energy price increase, above all regarding natural gas. These developments, taking place amid energy transition from fossil to renewable sources, are at the same time a threat and a challenge: A threat, because fears are raised that electricity and fossil fuel prices will remain at high levels; a challenge, because sustainable solutions that are within reach can help us put things right:

- The world needs a multiple of today's amount of climate-friendly electricity. It looks as if serious efforts are initiated to substantially increase the electric power generation share of new renewables (above all, solar and wind energy).
- The energy sector will more and more rely on climate-friendly hydrogen, produced preferably with climate-friendly electricity via electrolysis.
- Synthetic fuels produced from climate-friendly hydrogen and carbon dioxide, preferably captured directly from point sources (e.g. power plants or industrial plants), are generally seen as a pillar of any viable solution to the global energy and climate problem. They will contribute, for instance, to significant greenhouse gas emission reductions, possibly even to a complete climate neutralization of the existing fleet of more than one billion vehicles with internal combustion engines.
- More importantly, synthetic fuels represent the most promising and sustainable way for storing renewable energy surpluses. Hence, they can also help solving energy autonomy problems of isolated communities and, in particular, of smaller islands like Nisyros.

To some extent, the latter could be seen as a compensation for the hospitality that sustainability engineers and scientists experience in the recurring Symposia hosted in this beautiful island.

Professor Nicolas Moussiopoulos, Aristotle University Thessaloniki  
Member of the German National Academy of Sciences Leopoldina

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## COLLABORATING JOURNAL

The International Journal of Life Cycle Assessment



## ZOSIMOPOULIO CONFERENCE HALL

Thursday, July 14<sup>th</sup>, 2022

Symposium Opening

10:00-11:30	Registration
11:30-12:30	Welcome addresses
	Anastasia Zabaniotou, Conference Chair
	Christofis Koroneos, Mayor of Nisyros <i>The Nisyros Project - The Vision &amp; Implementation for Environmental Conservation with ZERO Status</i>
12:30-13:00	Petros Kokkalis, Member of EU Parliament
13:00-13:30	Short welcoming messages by supporting institutions
	13:30-18:00 Lunch and Midday Break
17:00-18:30	Registration
18:30-19:00	<i>Bus to Volcano - Volcano Theater</i>
	Moderators: Ch. Koroneos, A. Zabaniotou, N. Moussiopoulos
	Keynote speaker
19:30-20:30	<b>Jeffrey Sachs, Professor and SDSN President</b> <i>Sustainable Solutions at Times of Transition</i>
21:00-24:00	<i>Dinner at Níkiá village</i>

## ZOSIMOPOULIO CONFERENCE HALL

Friday, July 15<sup>th</sup>, 2022

Symposium

8:30-9:30	Registration
	Moderators: A. Zabaniotou, Ch. Koroneos
	Keynote speaker
9:00-9:40	<b>Mat Santamouris</b> Scientia Professor, Anita Lawrence Chair High, University New South Wales, Sydney Australia <i>Regional Climate Change and Mitigation Potential</i>
S1	<i>Invited speakers</i>
9:40-10:00	<b>Konstantinos Aravossis:</b> Addressing the effects of climate change
10:00-10:20	<b>Nicolas Moussiopoulos:</b> Industry and climate change, possible pathways in a globalized world
10:20-10:40	<b>George Tsatsaronis:</b> Challenges associated with the use of hydrogen for decarbonization
10:40-11:00	Discussion
	11:00-11:30 Coffee Break
S2	<i>Climate change</i> Moderators: G. Zarotiadis, D. Sarigiannis
11:30-11:50	<b>Nicolaos Theodossiou:</b> Climate change adaptation measures for sustainable urban water management
11:50-12:10	<b>Panagiotis Nastos:</b> Domestic rainwater harvesting systems as practices to create resilience to climate change and to enhance water security in small dry islands
12:10-12:30	<b>Dionysis Assimacopoulos:</b> Stakeholders' perception on climate change impacts and adaptation actions in Greece
12:30-12:50	<b>Andreas Matzarakis:</b> (Bio)Climate as decision factor in short- and long-term climate change adaptation in cities
12:50-13:10	<b>Spyros Voutetakis:</b> Sustainable thermochemical energy storage abundant materials.
13:10-13:30	<b>Johannes Orphal:</b> Sustainable urban transformation – A new paradigm for the 21 <sup>st</sup> century
13:30-14:00	Discussion
	14:00-16:00 Lunch and Midday Break

<b>S3</b>	<b>Sustainability</b>	<i>Moderators: P. Nastos, N. Theodossiou</i>
16:00-16:20	<b>Denis Sarigiannis:</b> Towards the development of safe and sustainable by design chemicals, materials and products	
16:20-16:40	<b>Charisios Achillas:</b> Digitizing culture as a means of promoting social sustainability and enhancing equity for vulnerable communities	
16:40-17:00	<b>Dimitrios Aidonis:</b> Sustainable tourism development through accessibility and equity: Novel tools for improving ease of access for all in tourism destinations	
17:00-17:20	<b>Paris Fokaides:</b> First evidence of sustainability assessment of educational building units with the use of Building Information Modelling tools	
17:20-17:30	<b>Discussion</b>	
<b>17:30-18:00 Coffee Break</b>		
<b>S4</b>	<b>Environment</b>	<i>Moderators: N. Moussiopoulos, F.Figueiredo</i>
18:00-18:20	<b>Eftichios Sartzetakis:</b> International environmental agreements with emission, abatement and adaptation choices	
18:20-18:40	<b>Constantinos Sioutas:</b> Mineral dust concentration and light absorption: real-time measurements in central Los Angeles	
18:40-19:00	<b>Grigoris Zarotiadis:</b> Dutch disease In Eastern Mediterranean	
19:00-19:20	<b>Athanasios Konstantopoulos:</b> Towards methods and protocols for nanoplastic aerosol generation, characterization and impact assessment	
19:20-19:40	<b>Piergiuseppe Morone:</b> Tracing waste to assess Circular Economy gaps from a global perspective	
19:40-20:00	<b>Discussion</b>	
20:30-21.30	<i>Drinks and Creative Reflections (Porfyris hotel)</i>	

<b>ZOSIMOPOULIO CONFERENCE HALL</b>		
<b>Saturday, July 16<sup>th</sup>, 2022</b>		
<b>Workshops</b>		
	<i>Moderators: A. Zabaniotou, Ch. Koroneos</i>	
	<b>Keynote speaker</b>	
	<b>Don Huisingh</b>	
9:00-9:40	The Institute for a Secure and Sustainable Environment, University of TN, US <i>In the Context of Climate Change what are the Roles of Divestment and Other Tools in Accelerating the Transition to Equitable, Livable Sustainable Post-Fossil Carbon Societies?</i>	
<b>W1</b>	<b>Energy Transitions</b>	
9:40-9:55	<b>Denis Sarigiannis:</b> The climate exposome	
9:55-10:10	<b>Yannis Sebos:</b> Assessment of the economic impact of actions targeting climate resilience in Greece	
10:10-10:25	<b>Nikolaos Katsoulakos:</b> Rethinking EU energy landscape at the basis of ethical and social concerns	
10:25-10:40	<b>Ann Wolter:</b> The Potential of Future Floating Wind Farms from a Socio-Economic and Financial Perspective in view of a Greek isolated and non-isolated tourist and industrial areas	
10:40-10:55	<b>Theocharis Tsoutsos:</b> Non-technological parameters of the sustainable development of offshore wind and wave power generation	
10:55-11:15	<b>Discussion</b>	
<b>11:15-11:30 Coffee Break</b>		
<b>W2</b>	<i>Nisyros and Islands</i>	<i>Moderators: E. Sartzetakis, P. Fokaides</i>
11:30-11:45	<b>John Kaldellis:</b> Clean-green solution for remote islands. The case study of Nisyros	
11:45-12:00	<b>Marina Nastou:</b> Cultural and natural heritage of Nisyros and climate change; effects and the need of protection and sustainability	
12:00-12:15	<b>Avraam Kartalidis:</b> Clean energy transition of Nisyros Island, through renewable energy production: Simulations and Energy Management concerns	
12:15-12:30	<b>Maria Papandreou:</b> New and flexible modes of electromobility in Southern Aegean	

12:30-12:45	<b>Ioannis Mamounakis:</b> A holistic energy planning platform supporting energy transition and smartification of geographical and energy islands	
12:45-13:00	<b>Stavroula Tournaki:</b> Simplified model on Sustainable Mobility planning in small insular tourism destinations. The case of Platanias, Crete	
13:00-13:15	<b>Discussion</b>	
13:15-14:00	<b>POSTER PRESENTATIONS</b>	
<b>14:00 -16:00 Lunch and Midday Break</b>		
<b>W3</b>	<i>Transport and Informatics</i>	<i>Moderators: A. Matzarakis, F. Ashour</i>
16:00-16:15	<b>Elliot Chevet:</b> Modelling of air pollution in Mediterranean coastal cities due to marine traffic	
16:15-16:30	<b>Dimitris Margaritis:</b> Monitoring the environmental impact of transport and promotion of electromobility in island areas	
16:30-16:45	<b>Horst Junker:</b> Problems of sustainability informatics development	
16:45-17:00	<b>Paris Fokaides:</b> Numerical investigation of the thermal performance of a solid biofuel boiler	
17:00-17:15	<b>Thomas Pietsch:</b> Sensor technology enables sustainable work	
17:15-17:30	<b>Carsten Domann:</b> Future of work – A mind game about use cases with AR, VR and XR	
17:30-17:45	<b>Naima El Haoud :</b> Future of work in Morocco in artificial intelligence age	
17:45-18:00	<b>Filipa Figueiredo:</b> Life-Cycle Assessment of forest ecosystem in Portugal for roundwood production: Eucalyptus globulus	
18:00-18:15	<b>Discussion</b>	
<b>18:15-18:30 Coffee Break</b>		
18:30-20:00	<b>Closing Session</b> <i>Moderators: Ch. Koroneos, A. Zabaniotou, N. Moussiopoulos</i>	
21:00-24:00	<i>Gala Dinner (Mandraki village)</i>	

**PARALLEL WORKSHOPS  
PORFYRIS HOTEL**

<b>Saturday, July 16<sup>th</sup>, 2022</b>		
<b>W4</b>	<i>Circular Economy</i>	<i>Moderators: J. Kaldellis, P. Fokaides</i>
10.30-10:45	<b>Nikolaos Efkolidis:</b> Circular utilization of post-consumer plastic waste via 3D printing– A preliminary study	
10:45-11:00	<b>Fatma Ashour:</b> The use of diapers scrap in the manufacture of clay bricks	
11:00-11:15	<b>Noura Fathy Adel Salam:</b> Optimization of Methyl Orange Removal from Textile Wastewater by Electro-Coagulation cell using RSM	
11:15-11:30	<b>Aggelos Lappas:</b> Recycling of end-of-life tyres via pyrolysis and catalytic vapour upgrading	
11:30-11:45	<b>Discussion</b>	
<b>11:45-12:00 Coffee Break</b>		
<b>W5</b>	<i>Bioeconomy</i>	<i>Moderator: D. Assimacopoulos, Ch. Achillas</i>
12:00-12:15	<b>Maria Proestou:</b> A critical global analysis of bioeconomy visions in bioeconomy policies	
12:15-12:30	<b>Nicolai Schulz:</b> Saliency of resilience challenges in bioeconomy policies: A comparative analysis	
12:30-12:45	<b>Magdalena Wojnarowska:</b> Sustainable innovations. Empirical evidence from the bioeconomy sector	
12:45-13:00	<b>Amalia Tzianopoulou:</b> Balancing technology and nature: Water management restoration techniques applied to agrivoltaics and their climatic impact compared with conventional photovoltaic systems	
13:00-13:15	<b>Filipa Figueiredo:</b> Towards zero food waste and losses: development of sustainable innovative solutions for artisanal meat sausages value chain in Portugal	
13:15-13:30	<b>Celine Gisèle Jung:</b> Health risk assessment due to some vegetable cultivated on a former MSW landfill	

13:30-13:45	Discussion
13:45-14:00	POSTER PRESENTATIONS (ZOSIMOPOULIO CONFERENCE HALL)
14:00 -16:00 Lunch and Midday Break	
W6	<i>Case-studies</i> <i>Moderators: G. Tsatsaronis, G. Jung</i>
16:00-16:15	<b>Tatiana Morosuk:</b> LCA of green hydrogen production and liquefaction
16:15-16:30	<b>Pantelis Manakas:</b> Sustainability assessment of incumbent and emerging technologies for waste valorization from the juice industry
16:30-16:45	<b>Despoina Fytli:</b> Agri waste to energy in energy in circular bioeconomy: Observational evidence of the Thessaly region in Greece
16:45-17:00	<b>Attilio Torre:</b> Mediterranean wetlands to mitigate the effects of climate change. The case of Aghios Mamas Natura 2000 site, Halkidiki, Greece
17:00-17:15	<b>Periklis Kafasis:</b> Towards a circular economy era - Integrated and innovative management of Used Cooking Oils through digital tools – The case of Western Macedonia
17:15-17:30	<b>Panagiota Saranti:</b> Sustainable urban development: the concept of home and community composting
17:30-17:45	<b>Kiriaki Sakellariou:</b> Mapping of agri-food and bio-based industries in the region of W.Macedonia for potential valorization of agri-food residual streams into high-added value products
17:45-18:00	Discussion
18:00-18:30	18:00-18:30 Coffee Break (ZOSIMOPOULIO CONFERENCE HALL)
18:30-20:00	Closing Session (ZOSIMOPOULIO CONFERENCE HALL)

## POSTERS

**E. Afthentopoulos:** Experimental study on the gasification of industrial wastes with steam or carbon dioxide for syngas production

**Anastasios Balaskas:** The energy profile of households in mountainous areas. The case of Metsovo

**Charisios Achilles:** Bridging the gap between the cultural pillar and other pillars of sustainability

**Christos Koidis, Ch.Achillas:** KYKLOS 4.0: Developing a Circular Manufacturing Framework

**Denis Sarigiannis:** Life cycle-based health risk assessment of plastic waste

**Dimitra Chondrogianni:** Powering electric vehicles' connection to building infrastructures: The future of energy and mobility

**Eleni Niarchou:** Environmental education and climate change: Actions in schools of the 3<sup>rd</sup> Primary Directorate of Athens

**Elisa Papadis:** Effects of flexible heat, fuel and electricity-producing facilities on future German electricity prices

**K. Zacheila:** Evaluation of urban and industrial wastes for energetic uses through gasification with carbon dioxide streams. A TG-MS study

**Konstantinos Papamonioudis:** Utilization of food waste towards a Circular Economy In the context of the sustainable development in Greece

**Maria Chanoumidou:** The basic need for clean water: How a school project can reach the concept of sustainability

**Mertin Sebastian Triebs:** Modeling exergetic emission allocation in linear optimization programs

**Naima El Haoud, Oumaima Hali Brahim Saber:** Adoption of AI in higher education using the structural equations model: The case of Morocco

**Paris A. Fokaides:** Numerical assessment of solar assisted plastics pyrolysis for sustainable utilization of plastic waste

**Vera Proskynitopoulou:** Anaerobic digestate exploitation from biogas plants originated in Western Macedonia