

# **8th International Conference on "Energy, Sustainability and Climate Crisis"**

**ESCC 2021**



**Conference Program**

ESCC

**Volos, Greece, August 30 – September 3, 2021**

### Conference Venue

The conference will take place at Center of Culture and Arts "Theatrini", Volos, Greece (location 39.36386544223833, 22.943448542329282). The Center of Culture and Arts "Theatrini" is 10 minutes walking distance from the Center of Volos (location 39.36049545054447, 22.949272204546027).

For more information please go to: <http://esc.uth.gr/venue/>

### Directors of the Conference:

Professor Panos Pardalos, Center for Applied Optimization, University of Florida (USA).

Associate Professor Georgios K.D. Saharidis, [www.GreenYourRoute.com](http://www.GreenYourRoute.com), University of Thessaly (Greece).

Professor and Chairman Mohsen A. Jafari, Industrial and Systems Engineering, School of Engineering, University of Rutgers (USA).

Professor and Chairman Soteris Kalogirou, Mechanical Engineering and Materials Science and Engineering, Cyprus University of Technology (Cyprus).  
Associate Professor Vítězslav Máša, Faculty of Mechanical Engineering, Brno University of Technology (Czech Republic).

Assistant Professor Ali Bouabid, Industrial and Systems Engineering at Khalifa University (UAE).

### Scientific Committee:

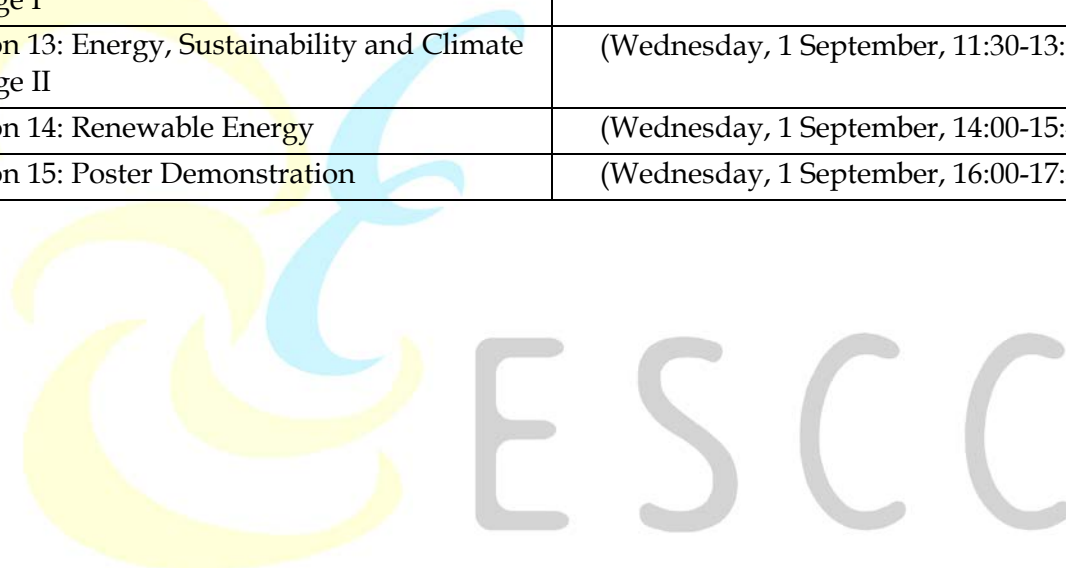
Professor Gülgün Kayakutlu, Faculty of Management, Istanbul Technical University (Turkey).

Associate Professor Mihalis M. Goliás, University of Memphis (USA).

Lecturer Dimitris Zissis, Operations Management, Norwich Business School (UK).

## Sessions

Session 1: Energy & Environment I	(Monday, 30 August, 9:45-11:00)
Session 2: Energy I	(Monday, 30 August, 12:00-13:15)
Session 3: Natural Resources & Emissions	(Monday, 30 August, 14:00-16:15)
Session 4: Energy II	Parallel Sessions (Monday, 30 August, 16:30-18:30)
Session 5: Operational Research I	
Session 6: Energy & Environment II	
Session 7: Operational Research II	(Tuesday, 31 August, 9:45-11:00)
Session 8: Bioenergy, Biosensors & Electrochemistry	(Tuesday, 31 August, 12:00-13:15)
Session 9: Society 5.0	(Tuesday, 31 August, 14:45-16:15)
Session 10: Decision Making	Parallel Sessions (Tuesday, 31 August, 16:30-18:00)
Session 11: Supply Chain & Maritime	
Session 12: Energy, Sustainability and Climate Change I	(Wednesday, 1 September, 9:45-11:15)
Session 13: Energy, Sustainability and Climate Change II	(Wednesday, 1 September, 11:30-13:15)
Session 14: Renewable Energy	(Wednesday, 1 September, 14:00-15:45)
Session 15: Poster Demonstration	(Wednesday, 1 September, 16:00-17:30)



## Program Summary

### Monday, 30 August 2021

- 08:00-9:00 Registration
- 09:00-09:45 Plenary Talk: Associate Professor Dr. Martin Pavlas  
**Network Flow Models and Local Environmental Impacts**
- 09:45-11:00 Session 1: Energy & Environment I
- 11:00-11:15 Coffee Break
- 11:15-12:00 Plenary Talk: Climate and Sustainability Advisor BANK OF GREECE  
Ms. Theodora Antonakaki  
**Climate crisis: A View from the Bank of Greece and the Case for Adaptation**
- 12:00 -13:15 Session 2: Energy I
- 13:15-14:00 Light Lunch (Take Away)
- 14:00-16:15 Session 3: Natural Resources & Emissions
- 16:15-16:30 Coffee Break
- Session 4: Energy II
- Parallel Sessions  
16:30-18:30 Session 5: Operational Research I  
Session 6: Energy & Environment II

### Tuesday, 31 August 2021

- 08:00-9:00 Registration
- 09:00-09:45 Plenary Talk: Assistant Professor Dr. Ali Bouabid  
**A Systems Approach for the Integration of Renewable Energy in Key Industrial Sectors in the UAE**
- 09:45-11:00 Session 7: Operational Research II
- 11:00-11:15 Coffee Break
- 11:15-12:00 Plenary Talk: Professor Dr. Panos Pardalos  
**Energy Systems**
- 12:00-13:15 Session 8: Bioenergy, Biosensors & Electrochemistry

13:15-14:00 Light Lunch (Take Away)

14:00 -14:45 Plenary Talk: Senior Adviser at the United Nations  
Mr. Jan-Gustav Strandenaes

**The Agenda that Changed the World - Agenda 2030 and the 17 Sustainable Development Goals**

14:45-16:15 Session 9: Society 5.0

16:15-16:30 Coffee Break

Parallel Sessions Session 10: Decision Making

16:30-18:00 Session 11: Supply Chain & Maritime

**20:00 ESCC Dinner – Veggera Restaurant, Volos**  
**Location: 39 Ferron ST. and Sarantaporou ST., Volos**  
**Log/Lat: 39.36335911466202, 22.936167370789416**

**Wednesday, 1 September 2021**

08:00-09:00 Registration

09:00-09:45 Plenary Talk: Professor Dr. Soteris Kalogirou

**Renewable Energy Systems: Current Status in the World and Prospects**

09:45-11:15 Session 12: Energy, Sustainability and Climate Change I

11:15-11:30 Coffee Break

11:30-13:15 Session 13: Energy, Sustainability and Climate Change II

13:15-14:00 Light Lunch (Take Away)

14:00-15:45 Session 14: Renewable Energy

15:45-16:00 Coffee Break

16:00-17:30 Session 15: Poster Demonstration

17:30-18:00 **"Panos Pardalos" Best Student Award**

**Thursday, 2 September 2021 (Only for Invited Researchers)**

09:30-10:45 Round table: Energy Systems (Chairman: V. Máša)

10:45-12:00 Round table: LIFE GreenYourRoute Project: Extended Presentation of the Platform (Chairman: G. Kalantzis)

- 12:00-13:00 Light Lunch (Take Away)
- 13:00-16:00 Seminar in Benders Decomposition Methods: Theory (Tutor: A. Fragkogios)
- 16:00-16:15 Coffee Break
- 16:15-18:30 Seminar in CPLEX: Theory (Tutor: E. Zygouri)

### Friday, 3 September 2021 (Only for Invited Researchers)

- 09:30-10:45 Special Issue Organization for ESCC 2021 (Chairman: Georgios K.D. Saharidis)
- 10:45-12:00 Organization of ESCC 2022 (Chairman: Georgios K.D. Saharidis)
- 12:00-13:00 Light Lunch (Take Away)
- 13:00-16:00 Seminar in CPLEX: C++ Library (Tutor: E. Zygouri)
- 16:00-16:15 Coffee Break
- 16:15-18:30 Seminar in Benders Decomposition Methods: Applications in Energy Networks (Tutor: A. Fragkogios)

### Sessions – Regular Presentations

#### Monday, 30 August 2021

##### Session 1: Energy & Environment I (9:45-11:00)

Chairman: G. Kalantzis

- (1) L. Aresti, P. Christodoulides, Ch. Makarounas, L. Lazaris & G. Florides "A Comparative Environmental Impact Study of Ground Source Heat Pump Systems".
- (2) T. Csoknyai, L. Czétány, V. Vámos, M. Horváth, Z. Szalay & Z. Deme-Bélafi "Analysis of Electric Consumption Patterns in the Hungarian Housing Sector Using Clustering Techniques".
- (3) M. Fronzel "Market Premia for Renewables in Germany: The Effect on Electricity Prices".
- (4) O. Němček, S. Honus & J. Chojnacki "Lowering CO<sub>2</sub> Emissions and Carbon Footprint Using Algae Cultures and their Application to Arable Land".

##### Session 2: Energy I (12:00-13:15)

Chairman: N. Alamanis

- (1) Ch. Vrettos "The Post-Growth Transformative Capacity of Energy Communities in Greece".
- (2) I. Zenginlis, J. Vardakas & Ch. Verikoukis "A Reinforcement Learning Approach for the Real-time Energy Management of a Smart Home".
- (3) Al. Saranti, K. Boson, St. Genoud, F.M. Cimmino & N. Imboden "Towards an Innovative Economical Mechanism for the Energy Renovation of Hotels. The CREnHOM Project".
- (4) P. Christodoulides, P. Pouloupatis, L. Aresti, V. Messaritis, S. Tassou & G. Florides "Efficiency and Design Aspects of Ground Heat Exchangers: A Parametric Analysis".

**Session 3: Natural Resources & Emissions**  
(14:00-16:15)

**Chairman: J. Pluskal**

- (1) K. Sukačová, D. Vícha, D. Tatarová, P. Lošák, V. Brummer & V. Máša "Microalgal Technology for Carbon Capture".
- (2) S. E. Sbai & F. Bentayeb "Climate Changes during and after the Lockdown (COVID-19) in the North-Western Cities of Morocco".
- (3) Ch. Matsouka, L. Boniati, A. Evdou, V. Zaspalis & L.Nalbandian "La<sub>0.7</sub>Sr<sub>0.3</sub>BO<sub>3</sub> (B=Fe, Mn, Co) Perovskites as Oxygen Carrier Materials for the Preparation of Dual Phase (combo-DP) Membranes for CO<sub>2</sub> Separation".
- (4) G. Kalantzis & G. Saharidis "LIFE GreenYourRoute Platform".
- (5) J. Fortea, L. García, J. Ruiz, M. Oliva & J. Arauzo "Adsorption of Propylene Glycol in Aqueous Solutions on Activated Carbon: Kinetics and Fixed Bed Experiments".
- (6) S.H. Moon, D. Lee & Y. Kim "Evaporation Heat Transfer Characteristics of R600a in Micro-Fin Tube".
- (7) V. Máša, M. Touš & V. Miklas "Industrial Wastewater Treatment - Trends and Perspectives".
- (8) M. Vondra, M. Touš, V. Miklas & M. Procházková "Processing of Digestate from Biogas Plants".

**Session 4: Energy II**  
(16:30-18:30) Parallel Session

**Chairman: N. Alamanis**

- (1) Th. Chrysanidis, Gr. Papageorgiou, N. Alamanis, D. Mousama & E. Tzatzos "Impact of Seismicity to the Construction Cost of the Load-Bearing Structure of a 5-Storey R/C Building and Resulting Emissions".
- (2) N. Alamanis, D. Zachos, Gr. Papageorgiou, Th. Chrysanidis, N. Xafoulis & Ev. Paschalis "Comparative Study Determining the Characteristic Elements of a Support Retaining System Anchored on the Top, in a Deep Trench for Buried Energy Pipelines, with a Vertical Excavation Front".
- (3) N. Xafoulis, Ev. Farsirotou, Sp. Kotsopoulos, A. Psilovikos & N. Alamanis "Flood Inundation Mapping using 1D/2D Numerical Model. A Case Study of Flood Event in Greece".
- (4) Ev. Paschalis, N. Alamanis, Gr. Papageorgiou, D. Tselios, A. Zahidou & I. Boufikos "Energy Production through Water Supply Network. The case of Larissa City, Greece".
- (5) Ph. Lokkas, N. Alamanis, N. Xafoulis, Gr. Papageorgiou, Ev. Paschalis & D. Zachos "A Consistent Approach on the Optimization of the Existing Forms of Energy".
- (6) Gr. Papageorgiou, Ev. Paschalis, N. Alamanis, D. Zachos & Th. Chrysanidis "Evaluation of Static Slope Stability Methods, Regarding to Areas with Buried Gas Pipelines, Sewerage and Cable Networks".
- (7) Th. Chrysanidis "Experimental and Analytical Investigation of the tensile Strain Impact on the Buckling of Highly-Reinforced Structural Walls and their Sustainable Design".

**Session 5: Operational Research I**  
(16:30-18:30) Parallel Session

**Chairman: M.C. Gouveia**

- (1) M.M. Denk & C. Oğuz "An Empirical Analysis of Renewable and Fossil Energy Investment Decisions Based on Policy Instruments: A Global Study with Mathematical Models".
- (2) A. MUYESSEROGLU & I. Duzdar "EV Charge Station Locating Problem-Case study: ITU Campus".
- (3) G. Dinc Yalcin, C.Y. Ozsoy & Y. Taskin "A Multi-Objective Mathematical Model for the Electric Vehicle Charging Station Placement Problem".
- (4) J. Marques, G. Oliveira, J. Silva, S. Teixeira & J. Teixeira "Implementation of a Forest Fire Propagation Model".
- (5) N. Tsolakis, E. Aivazidou & D. Bochtis "Human-Robot Synergy in Agriculture: A Real-World Automated System for Driving Operations Efficiency and Rural Welfare".

- (6) M.S. Mustafaoğlu, G. Kayakutlu & Ö. Kayalica "EFRI Model: Finding the Optimum Free Electricity Amount".
- (7) C.-H. Li, J.-B. Jhang & W.-M. Yan "Performance Comparison of Different Channel Types and Air Flow Rate for Vacuum Membrane Dehumidifiers".

### Session 6: Energy & Environment II

Chairman: L. Aresti

#### (16:30-18:30) Parallel Session

- (1) J. Nebie, T. Daho, S. Zongo, B. BAGRE & I. Konkobo "Experimental Study of a Box-Type Solar Cooker using Jatropha Oil as a Sensible Heat Storage Material".
- (2) T. Correia, J. Silva, J. Teixeira & S. Teixeira "Energy and Comfort in Buildings".
- (3) G. Yeni, M. Zafaranchi, G. Kayakutlu & Ö. Kayalica "A Load Scheduling Model for a Smart Public Building".
- (4) C. Molochas, A. Brouzgou & P. Tsiakaras "Carbon supported Ultra-Low Pt (Pd x Pt y) Electrocatalysts Preparation, Characterization and H<sub>2</sub>-PEMFC Performance".
- (5) W. Lee, W. Yang & Y. Kim "The Performance Improvement of PEMFC by applying Magnetic Field under Various Conditions".
- (6) L.S. Kyrgiakos, G. Vlontzos, G. Klefodimos & P. Pardalos "Assessing Input Use Deficiencies using Data Envelopment Analysis (DEA) in Durum Wheat Production".
- (7) C. Molochas & P. Tsiakaras "Current Progress on CO Tolerant Anode Electrocatalysts for H<sub>2</sub>-PEMFCs".

### Tuesday, 31 August 2021

#### Session 7: Operational Research II

Chairman: N. Tsolakis

#### (09:45-11:00)

- (1) C.O. Henriques, M.C. Gouveia & L. Dias "Assessing the Eco-Efficiency of the Electricity Sector through a Novel Productivity Index inspired by the Value-Based Data Envelopment Analysis".
- (2) M.C. Gouveia & C.O. Henriques "Sensitivity Analysis in Value-Based DEA Method applied to Eco-Efficiency of the Electricity Sector across EU".
- (3) Z. Moza & G. Saharidis "Vehicle Routing Problem: Modeling & Solution Approach".
- (4) A. Fragkogios, Z. Moza & G. Saharidis "Solving Travelling Salesman Problem with Multiple Benders-decomposed Subtour Elimination Constraints".
- (5) G. Saharidis "GreenYoruFreight: Innovative optimization matching algorithm for green last mile delivery of good in urban and sub urban regions".

#### Session 8: Bioenergy, Biosensors & Electrochemistry

Chairman: G. Yeni

#### (12:00-13:15)

- (1) G. Papapolymerou, A. Mpesios, M. Metsoviti, A. Papadopoulou, N. Gougoulas & D. Kasiteropoulou "Carbon Uptake Rate and Biomass and Lipid Productivities of Chlorella Protothecoides cultivated Heterotrophically with Crude Glycerol".
- (2) G. Balkourani, A. Brouzgou, K. Molochas & P. Tsiakaras "Me-N-C (Me= Fe, Co) Electrocatalysts with EDTA-derived N for Dopamine Electrochemical Detection".
- (3) H. An "The Closed-Open Truck and Loader Routing Problem for Biomass Transportation from Satellite Storage Locations to a Bioenergy Plant".
- (4) S. Thangavel & W.M. Yan "Bioenergy Production employing Microbial Fuel Cells (MFC) with Honey Comb Flow Straighteners".

#### Session 9: Society 5.0

Chairman: V. Máša

#### (14:45-16:15)



- (1) J. Morawska-Jancelewicz & E. G. Carayannis "Society 5.0 and Industry 5.0 ad driving Forces for Co-Creating Sustainability. Quintuple Helix Approach".
- (2) J. G. Strandenæs "The Agenda that Changed the World - Agenda 2030 and the 17 Sustainable Development Goals".
- (3) D.L. Eric "Science – Society Relations: A Global Framework and a Case in Practice".
- (4) G. Dima & V. Tanasiev "Embedding Service-Learning within HE Curricula to tackle Contemporary Challenges of University-Community Engagement and Partnerships".
- (5) A. Betts "Inclusive and Green Internationalization Initiatives".

**Session 10: Decision Making**  
**(16:30-18:00) Parallel Session**

**Chairman: J. Morawska-Jancelewicz**

- (1) M.P. Volpi & B. Moraes "The Use of Biogas as a Source of Bioenergy within 1G2G Ethanol Biorefineries Through Residues Co-Digestion".
- (2) J. Quevedo, I. Herrera, Y. Pérez, E. Benzant & A. Arias "Modeling Energy Systems to Contribute to the Sustainable Development of the Dominican Republic".
- (3) N. Yang, N. Korfiatis & D. Zisis "Mapping the Sustainability Discourse in Digital Entrepreneurship: An Analysis of Investment Allocation of Sustainability Focused Tech Start-Ups".

**Session 11: Supply Chain & Maritime**  
**(16:30-18:00) Parallel Session**

**Chairman: A. Fragkogios**

- (1) K. Spanaki, M. Fakhimi & S. Despoudi "Sustainable and Digital Agricultural Supply Chains: A State-of-the-Art Review on AI- driven AgriTech Research".
- (2) M. Benioudakis, D. Zisis, A. Burnetas & G. Ioannou "Coordinating Decisions of Delay-Sensitive Customers via Service Provision Aggregators".
- (3) D.V. Lyridis, Ch. Ntakolia, M. Douloumpakis, Ch. Papaleonidas & V. Tsiampa "Stochastic Modelling for an LNG Refueling System Design".
- (4) N.A. Kyriakakis, Th. Stamadianos, M. Marinaki & Y. Marinakis "The Electric Vehicle Routing Problem with Drones".
- (5) E. Sdoukopoulos, V.M. Perra, M. Boile, L. Efthymiou, E. Dekoulou & Y. Orphanidou "Supporting Economic Sustainability of Cruise Destinations in Greece and Cyprus".

**Wednesday, 1 September 2021**

**Session 12: Energy, Sustainability and Climate Change I**  
**(9:45-11:15)**

**Chairman: El. Zygouri**

- (1) L. Kumar & A. Aggarwal "Climate Change: Awareness and Responses of Indian Corporates".
- (2) K. Tsatsakis & A. Tsitsanis "Towards the Optimum Combination of Decentralised Flexibility Assets in the Markets Creating Benefits to All The Actors in the Smart Grid Value Chain".
- (3) C. García-García, C.B. García & R. Salmerón "Is the Level of Education a Relevant Factor influencing the Air Pollution Attitudes of the Countries? A EU-28 Case of Study".
- (4) T.-F. Yang, Y.-C. Chen & W.-M. Yan "Study on Airflow and Temperature Distributions in a Data Center".

**Session 13: Energy, Sustainability and Climate Change II**  
**(11:30-13:15)**

**Chairman: C. Molochas**

- (1) P. Georgilakis, V. Evangelopoulos & Th. Kontopoulos "Competition of Aggregators in Local Energy Markets".
- (2) J. Pluskal, R. Šomplák & J. Kúdela "Design of Transport Infrastructure with Respect to the Specific Features of Case Studies".

- (3) V. Nevrlý, R. Šomplák & V. Smejkalová "Modelling Opportunities of Waste Production Quantities and Future Generation Rates".
- (4) B.İ. Toprak, İ. Solmaz, Y.S. Şahin "Numerical Analysis of Heat Transfer and Flow Characteristics of Artificial Aluminum Foam Heat Sink with Impinging Jet".
- (5) B.K. Ameyaw & F.K. Agyei "Profits and Access along Ghana's Charcoal Commodity Chain".

**Session 14: Renewable Energy**  
(14:00-15:45)

**Chairman: Th. Chrysanidis**

- (1) B. Bagre, I. Muritala, M. Boukar, Y.W. Gounkaou, T. Daho, A. Rabani, J. Nebie & Sh. Babajide "Development of Sensible Heat Storage Material using Dune Sand, Clay and Ash Waste".
- (2) Ch. Pagkalos, St. Markolefas, M. Koukou, E. Douvi, J. Konstantaras, G. Dogkas, Y. Caouris, M. Vrachopoulos "Development of a Novel Compact Flat Plate Solar Collector Integrated with LHTEs Tank: Finite Element Analysis to Evaluate Optimum Tank Insulation and Structural Analysis of the Supporting Base".
- (3) G. Spiliotopoulos, L. Tsipouras & V. Katsardi "Assessment of Wave Energy Solutions to Complement into a Hybrid System of a Floating Offshore Wind Energy Farm in the Aegean Sea".
- (4) M.A. Fazal & S. Rubaiee "Effect of ZnO Doped Phase Change Materials on the Efficiency of Photovoltaic Solar System".
- (5) T. Görmüş, B. Aydoğan, B. Ayat & T. Çarpar "Wave Power Projections for the 21st Century in the Black Sea".
- (6) R. Inglesi-Lotz "Institutional Factors in the Heart of the Renewable Energy Adoption in South Africa: A System Dynamics Approach".

**Session 15: Poster Demonstration**  
(16:00-17:30)

**Chairman: V. Máša**

- (1) V. Miklas, M. Touš & V. Máša "Winery Wastewater Treatment: Synergy Between Model and Experiment for Air Stripping Unit".
- (2) V. Turek, Z. Jegla & B. Kilkovský "Designing Integrated Equipment for 'Waste-to-Energy' Processes".
- (3) M. Procházková & V. Máša "Recovery of Secondary Raw Materials from Industrial Waste Water".
- (4) K. Bryszewski, J. Rodziewicz, A. Mielcarek & W. Janczukowicz "Anaerobic Stabilization of Electrochemical Sewage Sludge".
- (5) R. Raso, A. Lete, L. García, J. Ruiz, M. Oliva & J. Arauzo "Valorization of Glycerol through the Aqueous Phase Hydrogenolysis Process to Obtain Value-Added Products".
- (6) D. Szwarc & K. Szwarc "Disintegration with a Pulsed Electric Field and its Effect on Methane Yield from Grass Silage".
- (7) A. Nowicka, D. Szwarc & K. Szwarc "Use of a Pulsed Electric Field in the Pre-Treatment of a Lignocellulosic Substrate Before Methane Fermentation".
- (8) S. Paz, C. Rubio, Á.J. Gutiérrez, D. González-Weller, V. Martín & A. Hardisson "Toxic Metals in Seaweeds from a North Atlantic Ocean Region (Tenerife, Canary Islands) - A Sustainable Production Area of Edible Seaweeds".

**Emergency Telephone Numbers**

Police	100
Medical Emergency Department	166
Dr. Georgios K.D. Saharidis	(+30)6977404429
Fire Department	199
WIFI Network Name	kentropolitismou or kentropolitismou_ext
WIFI Password	politismos2021