

EnerTech Summer Academy: Mastering Advanced Technologies in Energy

Monday, July 1 (Day 1), 10:00-14:00

“Electric Power Grid Contribution to a Sustainable Environment, Energy Supply, and Economic Welfare Future: Potential and Implementation Challenges and Proposed Policy”

Prof. Michael Caramanis, Boston University, former Chairman of the Hellenic Regulatory Authority for Energy

1. Power Grid Characteristics
 - a. An immense Cyber/Physical Network Coupling Millions of Participants
 - a. Instantaneous Supply=Demand Requirement Poses Great Challenges for Reliable Energy Supply Integrating Massive Renewable Generation (Duck Curve, Stability, Uncertainty, Centrally Scheduled Reserves)
2. What is New in Today’s and the Future Power Grid?
 - a. Rapidly expanding clean, albeit uncontrollable/uncertain, Renewable Energy Supply,
 - b. But also, New Types of Demand and Distributed Energy Resources (DERs)
3. Paradigm Shift: Old *Supply Follows Demand* Practice must be replaced by New *Demand Follows Supply* Paradigm. But How?
 - a. Action must Expand *Centralized Control* of High Voltage Transmission System Interconnecting **hundreds** of Large Conventional Power Plants, to *Adaptive Distributed Control* of Low Voltage Subsystems Interconnecting **millions** of consumers, microgenerators, and flexible/storage-like loads.
 - b. Relative Importance of *Cyber part* of the *Cyber/Physical T&D Grid* must increase to enable *adaptive decentralized control* of microgrids/virtual Power Plants/Energy Service Company Aggregators/Microgrids/Service-Transformer-Connected Distributed Energy Resources (DERs)
 - c. PV Panel Smart Inverters, Microgenerators, Smart Chargers, HVAC Smart Thermostats, and similar DER Cyber Capability, (communication, computing, actuation) must be able to communicate through an appropriately designed digital platform for the purpose of achieving mutually beneficial Equilibrium.

- d. Advanced Spatiotemporal Markets with dynamically bidding Supply and Demand Participants must be Designed and Operated under Regulatory Supervision to assure Fairness while Optimizing Social Welfare.
4. The Case of Greece: What is Special for Success in the Pursuit of 1,2,3?
 - a. Renewable Potential and Green Transformation of Greek Islands Requires *Strong Electrical Interconnection to Mainland* – Greece and Neighbors (started but still incomplete and late, relative to original plan anticipating the Cycladic connection in ~ 2000, while it has only recently started) and *Fair allocation of Renewable (wind) Infrastructure*.
 - b. Electrification of Transportation and Space Conditioning
 - c. Storage: Short Term (Batteries/EV, HVAC, Storage-Like Consumption), Medium Term (Pumped Hydro), Longer term (Small Nuclear???)
 - d. Advanced T&D Market Design and Digital Platform Enabled Distributed Control.
 - e. Development and Adoption of Advanced Information and Communication Distributed “Grid-Forming” Capability.

Tuesday, July 2 (Day 2), 10:00-14:00

“New Horizons in Energy Entrepreneurship”

Dr. Stelios Bikos, General Manager, Hellenic Energy Competence Center (HECC)

1. Market Trends and Opportunities: Analyzing the current landscape and identifying emerging trends in the energy sector.
2. Evaluating Energy Startups: Techniques for assessing the growth potential of new energy startups.
3. Sustainable Business Models: Crafting business models that not only drive growth but also align with sustainability goals.
4. Investment Strategies: Understanding the financial landscape and attracting investment for energy ventures.
5. Case Studies: Real-world examples of successful energy entrepreneurship and lessons learned.

Wednesday, July 3 (Day 3) 10:00-14:00

“The Digital Pulse of Energy Transformation”

Prof. Nikos Chatziargiriou, National Technical University of Athens

Prof. Aris Dimeas, National Technical University of Athens

1. Smart Meter Technologies: Exploring the role of smart meters in enhancing energy efficiency and consumer engagement.
2. Smart Cities Integration: Understanding how innovation contributes to building sustainable and smart cities.
3. Grid Modernization: Understanding the digital transformation of energy grids and its impact on reliability and resilience.
4. IoT Devices in Energy: Examining the integration of Internet of Things (IoT) devices for optimized energy management.
5. Data Analytics: Leveraging data for informed decision-making in energy operations.
6. Cybersecurity in Energy Systems: Addressing the challenges and solutions for ensuring the security of digital energy infrastructure. Training of companies' staff.

Thursday, July 4 (Day 4), 10:00-14:00

“Innovation Driving the Low-Carbon Energy Transition”

Prof. Dimitra Vagiona, Aristotle University of Thessaloniki

Prof. Theodore Panagos, International Hellenic University

1. Renewable Energy Sources: Spatial Planning and Sustainable Siting of Renewable Energy Projects.
2. Legal aspects of RES penetration.
3. Panel Discussions: Engaging discussions with industry experts on the role of innovation in a sustainable energy future.

Friday, July 5 (Day 5)

1st Part: “Nuclear Energy and Technology”

Prof. Nick Petropoulos, National Technical University of Athens

The role of nuclear power-From pessimism to optimism.

2nd Part: “Green H2 Routes: Crafting the Regulation and Transportation Infrastructure for Europe's Hydrogen Transition”

DESFA H2 Committee

1. The development of a pan-EU hydrogen market: How hydrogen transportation infrastructure will support this, challenges and opportunities. The role of Greece

P. Panousos, Energy Transition Senior Manager

2. An Overview of Environmental and Social Red Flags, Permits and Legal Framework – “Status of today, Strategy and Proposals for tomorrow”

M. Karavassili, Environmental Permits Manager

3. Dedicated H2 Pipelines and Stations. Technical Specifications and Challenges.

K. Diamantopoulos, Engineering & Maturing Senior Manager

4. H2 Readiness of existing infrastructures – Evaluating the compatibility of the as-is situation to accommodate Hydrogen.

P. Frantzeskakis, Technical Senior Manager

Networking Sessions: Building connections with professionals and experts in the hydrogen sector.

Field Trip to Revithousa- LNG Terminal

**Saturday, July 6 (Day 6): Field Trip Day/Acropolis Museum
Farewell lunch**