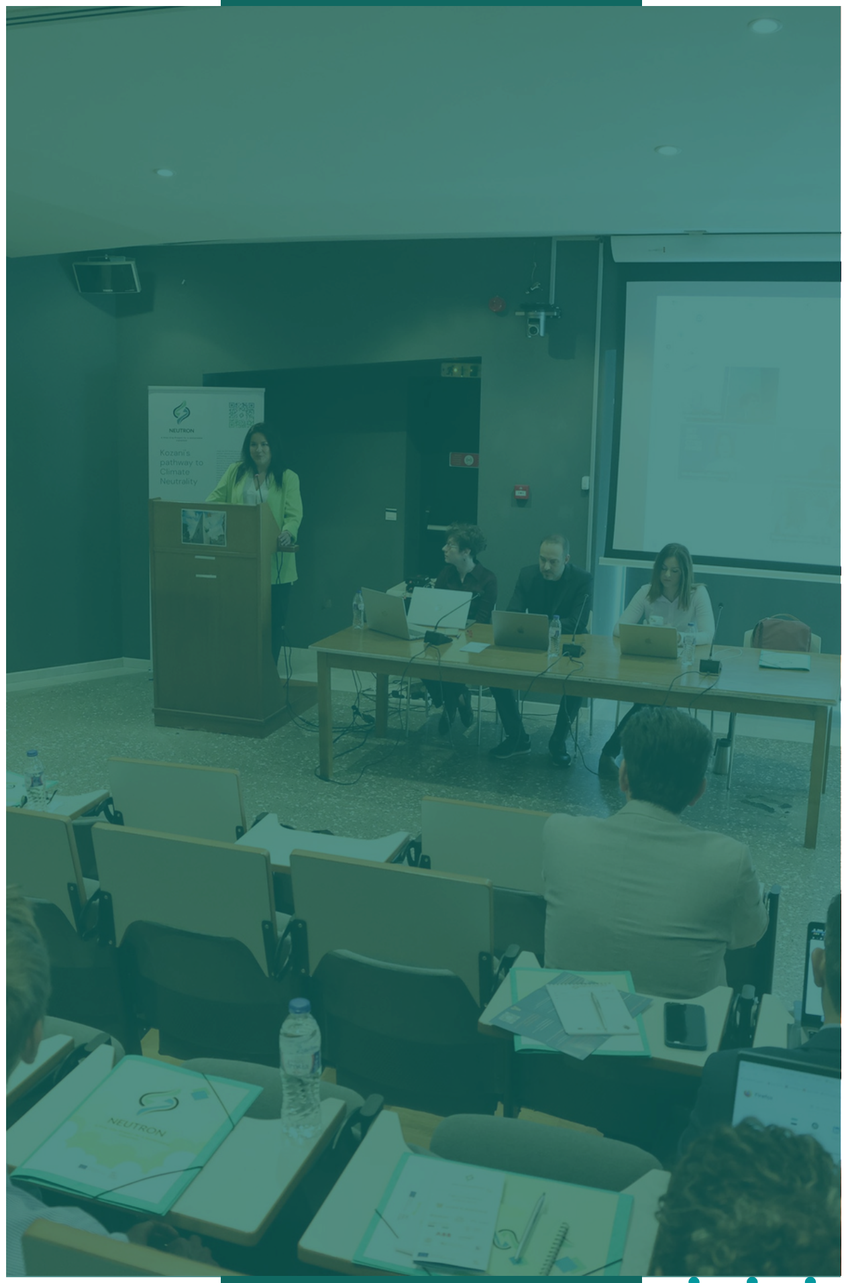
NEUTRON

ΔΗΜΟΣ ΚΟΖΑΝΗΣ

NEUTRON 3rd Workshop

Kozani’s blueprint for a Sustainable District Heating System



The project has received funding through NetZeroCities from the European Union’s Horizon 2020 research and innovation programme under the grant agreement No 101036519

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01 Opening of the final Workshop

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Dr. Kyriaki Sakkelariou and Dr. John Tziouras presented the special guests as moderators of the 3rd and final Workshop. Dr. Tziouras made a short historical follow-up of the pilot project, since its inception, proposal submission and mentioned that was one of the first Pilot Cities Programme projects selected by the NetZeroCities during the 1st Cohort.

Dr. Kyriaki Sakellariou, DIADYMA
Dr. John Tziouras, Ergoncell

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Ms Kyriaki Chatzimanoli, Deputy Mayor for the Tourism, Urban Planning & Citizens Service Center of the City of Kozani, was the keynote speaker on behalf of the Municipality of Kozani. Ms Chatzimanoli reaffirmed Kozani's goal for climate neutrality and highlighted the importance of the NEUTRON to that end. Ms Chatzimanoli also acknowledged the need for closer cooperation within the project partners and she reaffirmed Municipality's will to the timely completion of the NEUTRON.

Kyriaki Chatzimanoli,
Deputy Mayor of KOZANI – Tourism, Urban Planning & Citizen Service Center

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02 Keynote speeches

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Mr. Thomas Osdoba opened the workshop with a keynote addressing the challenges and aspirations of the Pilot Cities Programme, under which Kozani's NEUTRON project was selected during the inaugural cohort. He highlighted the Programme's mission to support cities in pioneering innovative solutions for achieving climate neutrality, emphasizing the importance of bold experimentation and scalable models.

Mr. Thomas Osdoba,
Programme Director - NetZeroCities

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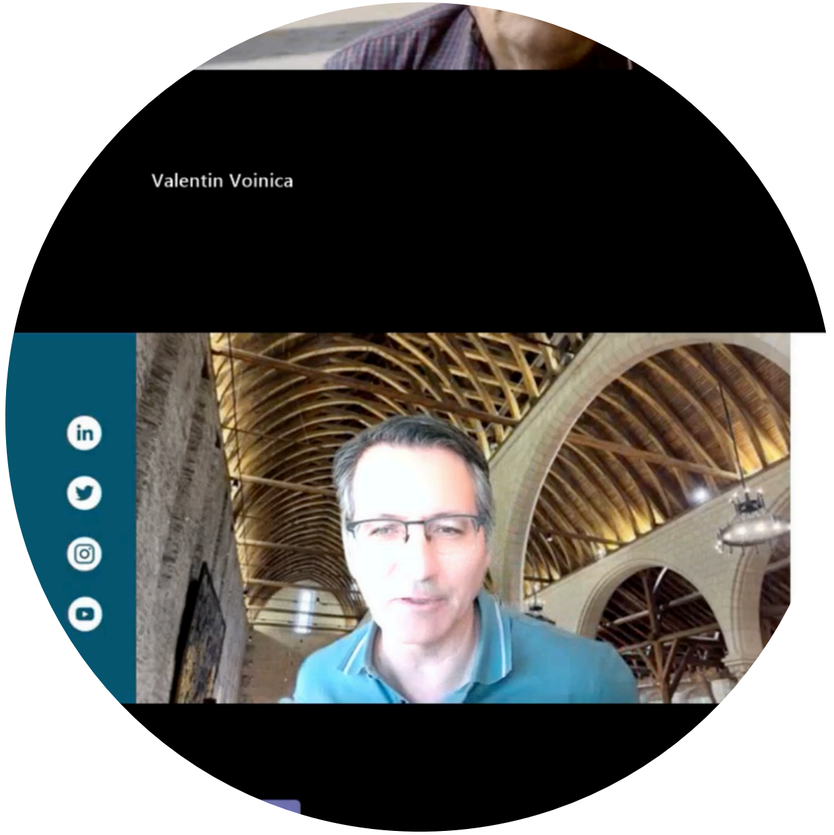
Mr. Osdoba acknowledged the significant challenges faced by Pilot Cities, including balancing technological innovation with community engagement, securing financial resources, and navigating regulatory complexities. He commended Kozani for its visionary approach with the NEUTRON project, particularly its integration of renewable energy sources and circular economy principles into the District Heating System.



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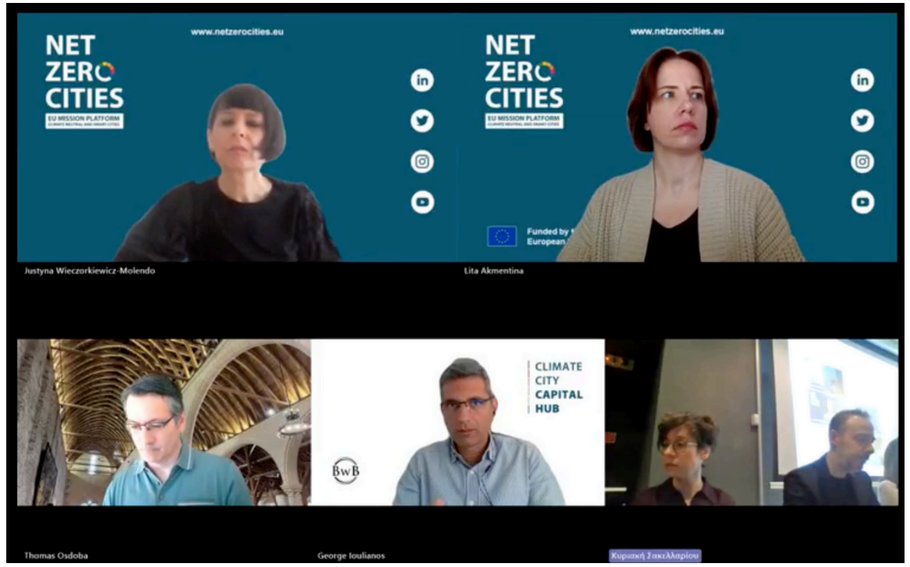

Mr. Osdoba concluded by stressing that the lessons learned from the NEUTRON project and other cohort participants would be instrumental in shaping the future of urban sustainability across Europe. Osdoba emphasized that collaboration, adaptability, and a commitment to systemic change are key to overcoming the challenges and achieving the ambitious goals of the Pilot Cities Programme.

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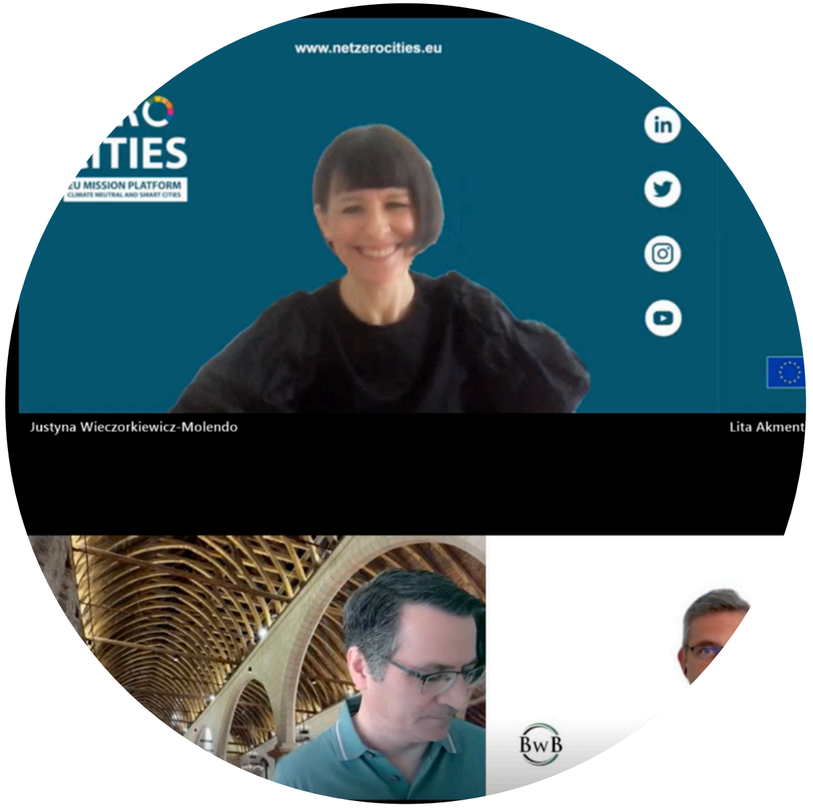
Kozanis’ City Advisor on behalf of the NetZeroCities, **Ms Justyna Wieczorkiewicz - Molendo**, welcomed the works of the 2nd NEUTRON Workshop and she set the general framework of the Pilot Cities Programme. Ms Molendo acknowledged the work done by NEUTRON partners as well as from the City of Kozani until now and she encouraged the partners to keep collaborating for the completion of the NEUTRON project. Ms Molendo reaffirmed NZC’s availability to support Pilot Cities and presented new features of the NZC Platform.



Justyna Wieczorkiewicz -Molendo,
NetZeroCities -
City Advisor for KOZANI

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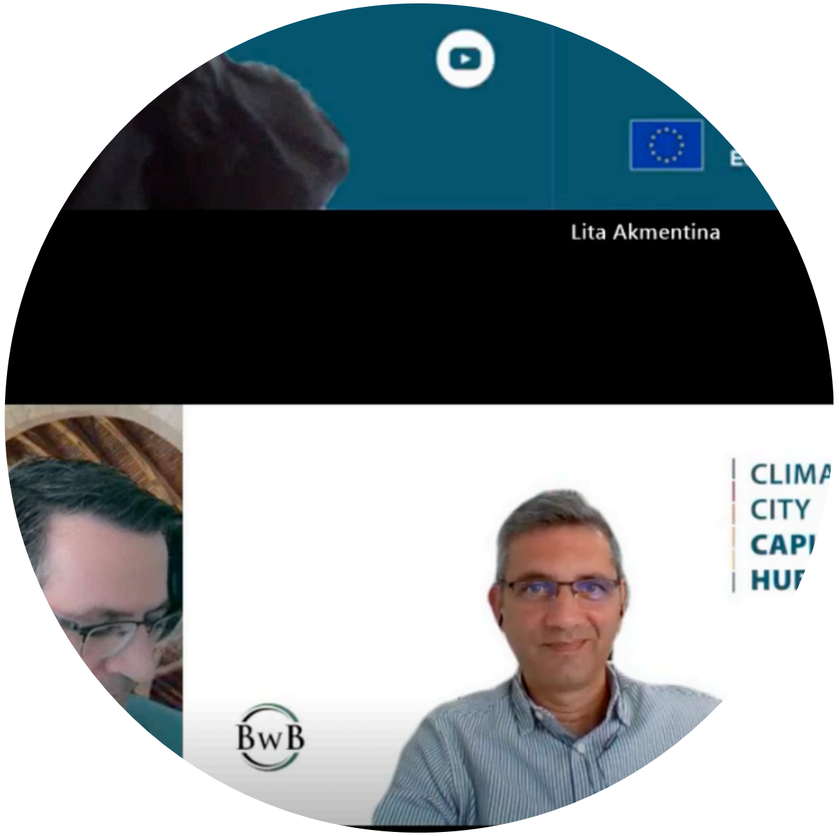
Mr. George Ioulianos, a Financial Advisor representing NetZeroCities, delivered a comprehensive overview of the financial pathways available to support the NEUTRON project through the Climate City Capital Hub. He emphasized the Hub's role in bridging the gap between innovative climate projects and sustainable financing solutions, providing tailored support to Pilot Cities like Kozani.

In his speech, Mr. Ioulianos outlined specific mechanisms and tools available within the Hub, including blended financing models, public-private partnerships, and access to European funds aimed at accelerating decarbonization efforts. He stressed the importance of aligning NEUTRON's objectives with broader climate finance criteria to maximize funding opportunities.



George Ioulianos, NetZeroCities -
Financial Advisor for Climate City Capital Hub

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Mr. Ioulianos also highlighted the need for robust feasibility studies and stakeholder engagement to secure investment, positioning NEUTRON as a high-impact initiative that aligns with the EU's climate neutrality targets. He concluded by encouraging Kozani's stakeholders to leverage the Climate City Capital Hub's resources to ensure the project's successful implementation and scalability.

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In his speech, **Mr. Vasileios Balachtsis**, representing CluBE, outlined the pivotal role of Kozani's Climate City Contract (CCC) in driving the decarbonization of the District Heating System. He described the CCC as a strategic framework that integrates ambitious climate goals with actionable plans, ensuring a cohesive approach to achieving climate neutrality.

Vasileios Balachtsis, CluBE

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Mr. Balachtsis highlighted how the CCC could lay the groundwork for the NEUTRON project, providing a structured roadmap and mobilizing stakeholders across sectors. The CCC already proposed concrete measures for reducing greenhouse gas emissions, including the transition to renewable energy sources and the incorporation of green technologies within the District Heating System.

He emphasized the significance of the CCC's participatory approach, which engaged local communities, industry partners, and policymakers to align efforts and resources

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03 NEUTRON's partners presentation

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Our Team

Dr. Kyriaki Sakellariou, Solid Waste Management Body for Western Macedonia - DIADYMA SA

Prof. George Panaras, Municipal Water & Sewerage Company of Kozani – DEYAK

Catherina Christodoulou, Thessaloniki Water Supply & Sewerage Company – EYATH SA

Dimitrios Makris (PhD), Aristotle University of Thessaloniki – School of Mechanical Engineering

Prof. Dr. – Ing. Spiros Alexopoulos, Solar - Institute Jülich

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Our Team

Dr. Nikolaos Margaritis, Centre for Research & Technology Hellas – CPERI

Daniel Högemann, KRAFTANLAGEN Energies & Services

George Makris, ZEUS Helios Electricity Company

Angelos Chasiotis, ABB Hellas

Dr. Feni Tzioura, ERGONCELL

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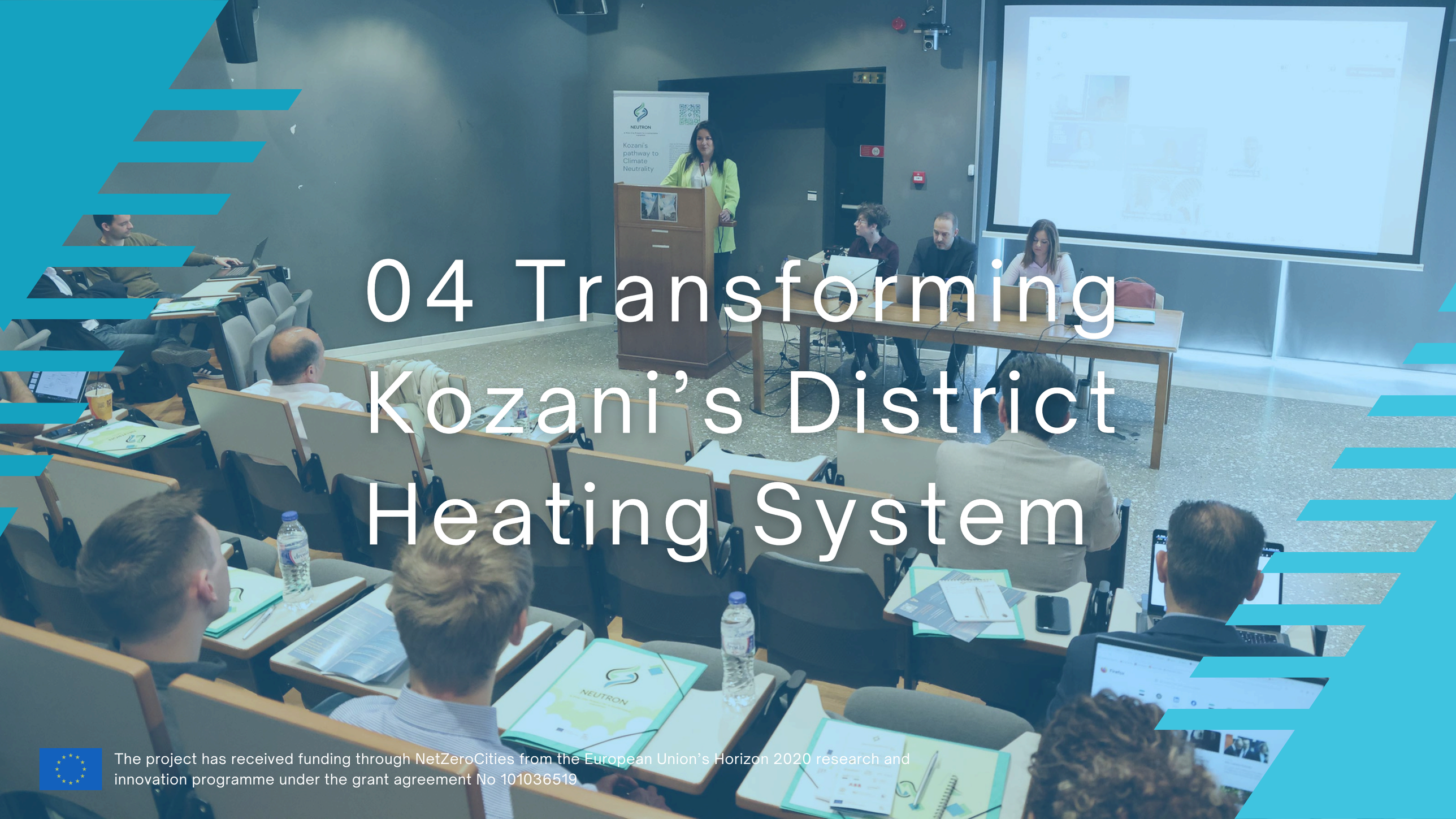

04 Transforming Kozani's District Heating System

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During the lecture, **Prof. Dr. – Ing. Spiros Alexopoulos** outlined the comprehensive pathway for decarbonizing Kozani's District Heating System, emphasizing the feasibility and transformative potential of the NEUTRON pilot project. Key aspects included the substitution of fossil fuel-based thermal energy with renewable energy sources, as well as the innovative technology developed specifically for this project.

Prof. Dr.- Ing. Spiros Alexopoulos,
Solar - Institute
Jülich

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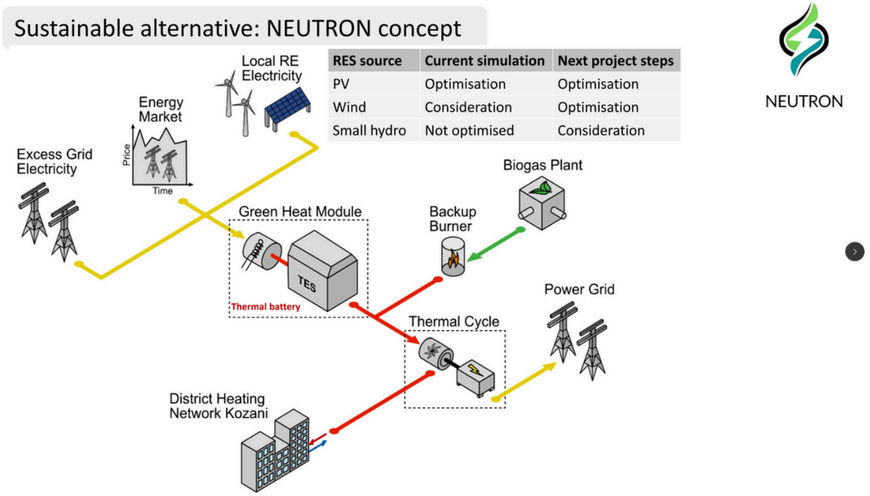
Prof. Alexopoulos presented findings demonstrating that the transition is both technologically and environmentally achievable, with significant economic advantages. These include reduced energy costs for residents and industries and a marked decrease in greenhouse gas emissions. The lecture also highlighted the scalability of the project, suggesting its applicability to other European regions with similar heating systems.



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Prof. Alexopulos concluded by stressing the importance of leveraging financial tools and collaborative efforts, particularly with local stakeholders like the Municipality of Kozani, to accelerate the city's journey toward climate neutrality by 2030.

Prof. Dr.- Ing. Spiros Alexopoulos,
Solar - Institute
Jülich

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In his lecture, **Mr Daniel Hogeman from Kraftanlagen**, the primary industry partner, presented the final calculations about the Green Heat Module, the cornerstone technology of the NEUTRON pilot project. The presentation emphasized the module's capability, which facilitates the seamless integration of renewable energy sources into Kozani's District Heating System.

Daniel Högemann,
KRAFTANLAGEN Energies & Services

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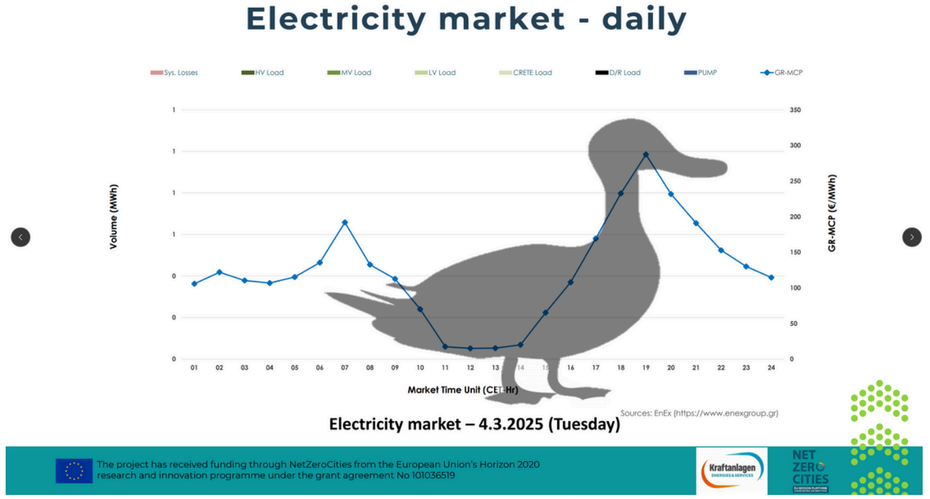
Mr Hogemann detailed the module's ability to enable cross-sector collaboration by linking renewable energy production with district heating infrastructure, thereby creating intrinsic value for the community. Key benefits outlined included significant reductions in greenhouse gas emissions, improved energy efficiency, and lower operational costs for both residents and industries.



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The Green Heat Module was showcased as a scalable solution with the potential for application across Europe, particularly in regions seeking to decarbonize their heating or cooling systems. The lecture concluded by underscoring the importance of such technologies in achieving climate neutrality and fostering sustainable development.

Daniel Högemann,
KRAFTANLAGEN Energies & Services

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05 Generating and distributing clean energy in Kozani’s heat network

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Mr. Dimitrios Makris (PhD) from the Aristotle University of Thessaloniki delivered a lecture on the “Circular Energy from Waste: Heat & Power for Kozani’s Community & its District Heating System” where he explained how circular inputs render the GHM resilient, including the use of heating power as a medium to use the energy when needed later for other uses. This lecture highlighted the NEUTRON project’s innovative approach to integrating circular economy principles by harnessing energy from waste to power Kozani’s District Heating System. Mr. Makris detailed how this process complements renewable energy sources, creating a sustainable, closed-loop system that maximizes resource efficiency.

Dimitrios Makris PhD,
Department of Mechanical Engineering - AUTH

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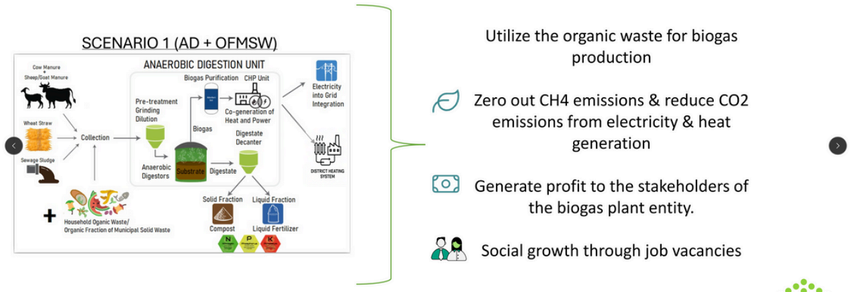
The use of waste-to-energy technology not only reduces reliance on fossil fuels but also addresses waste management challenges, converting local waste streams into valuable thermal and electrical energy. Mr Dimitrios Makris emphasized the environmental benefits, including reduced landfill use and greenhouse gas emissions, alongside economic advantages for Kozani's community through lower energy costs and enhanced energy security.

The NEUTRON study case for circular economy



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The presentation concluded with a discussion on the replicability of this model for other municipalities, underscoring its role in fostering sustainable urban development and advancing the transition to climate neutrality by utilizing local resources effectively.

Dimitrios Makris PhD,
Department of Mechanical Engineering - AUTH

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In his speech, Mr. George Makris presented an innovative energy market model tailored to Kozani's District Heating System, emphasizing the economic and social benefits of transitioning to a renewable energy-based system. He highlighted that the adoption of RES not only ensures affordability for consumers but also opens avenues for community participation and profit generation.

George Makris CEO,
ZEUS Helios Electricity Company

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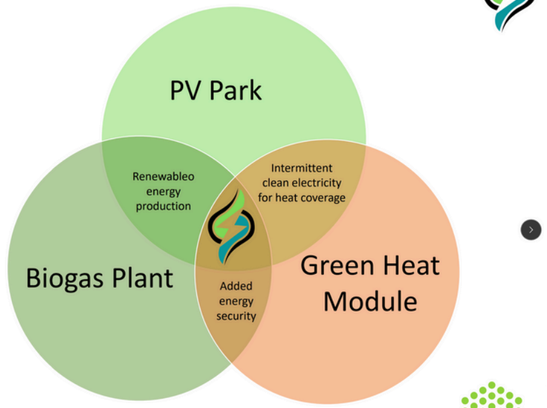
Mr. Makris introduced the concept of forming an Energy Community in Kozani, where residents could collectively invest in and supply electricity to the Green Heat Module. This approach would empower locals by turning them into energy producers, enabling them to share in the financial gains from renewable energy generation.

GHM INITIAL RESULTS

- The hard work of WP3 of Neutron paid dividends. Weekly meetings in a 2 year period under the SIJ leadership showcase that the future is renewable for Kozani's district heating.

- Renewables aren't just cleaner, they're far cheaper than natural gas. The price gap is undeniable.

- The financing scheme, the availability of grants, and the optimization of renewable energy integration will determine the extent of the cost decline compared to natural gas.



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The speech underscored the transformative potential of this model to enhance energy security, reduce costs, and foster community-driven sustainability, serving as a blueprint for democratizing energy markets and achieving climate neutrality.

George Makris CEO,
ZEUS Helios Electricity Company

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Dr. Volker Ludwig's speech explored the pivotal role of bioenergy in enhancing the sustainability of Kozani's District Heating System within a circular economy context. He highlighted the compatibility of bioenergy resources with the Green Heat Module, underscoring their potential to provide a consistent and renewable energy supply for district heating networks.

Dr. Ludwig emphasized that bioenergy alternatives could amplify also local engagement by utilizing organic waste and biomass residues to generate energy. This approach would not only contribute to the decarbonization of heating but also strengthen the circular economy by turning waste into a valuable resource.

Dr. Volker Ludwig,
Director for International Affairs of the German Association for Waste Management

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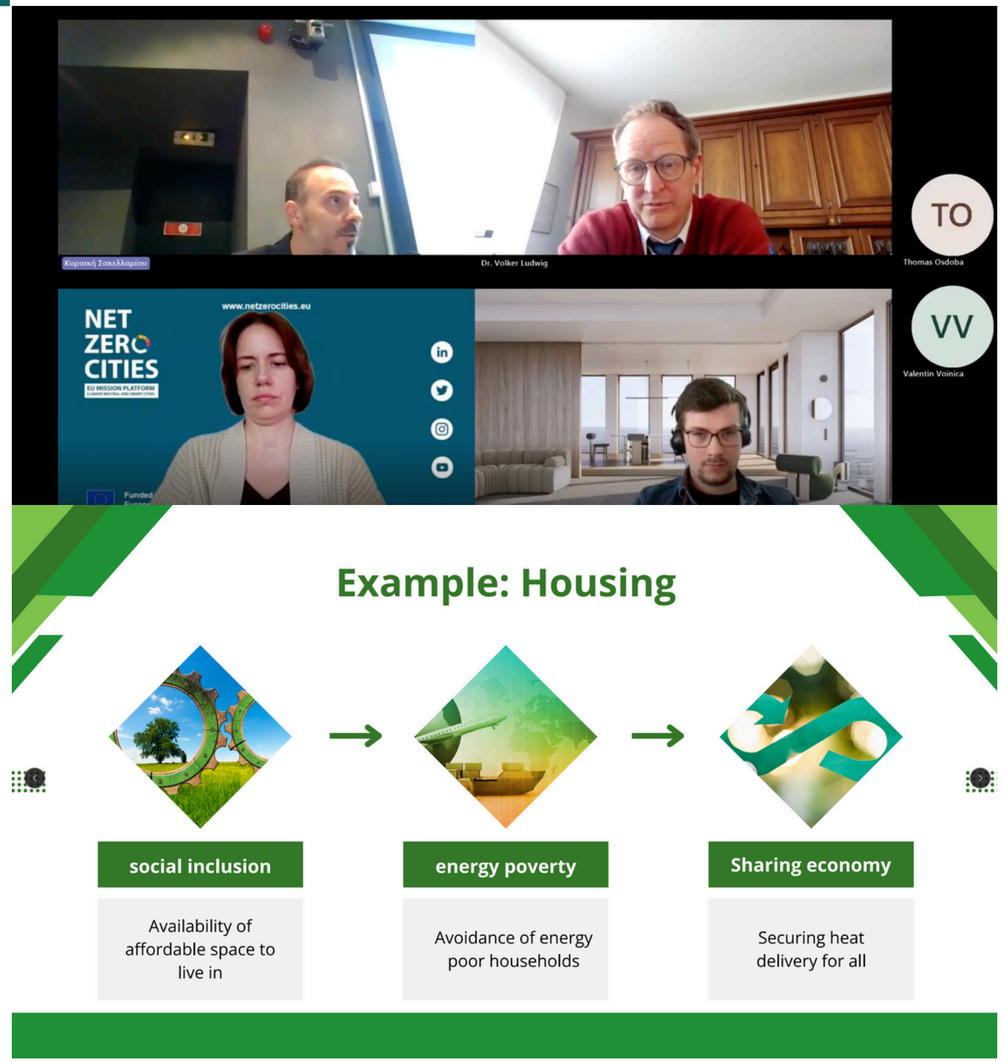
The lecture concluded by stressing bioenergy's role in diversifying energy sources, ensuring energy security, and fostering resilience in district heating systems, making it an integral component of Kozani's transition to climate neutrality, as recent experience show in other EU member states.



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06 Kozani’s District Heating System in crossroads

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Prof. George Panaras delivered an insightful lecture addressing the challenges faced by Kozani's District Heating Operator in the journey toward decarbonization. He outlined key obstacles, including the high initial investment costs, the complexity of integrating renewable energy sources (RES) into existing infrastructure, and the need for advanced energy management systems.

Prof. George Panaras
University of Western Macedonia - Municipal Water & Sewerage Company of Kozani – DEYAK

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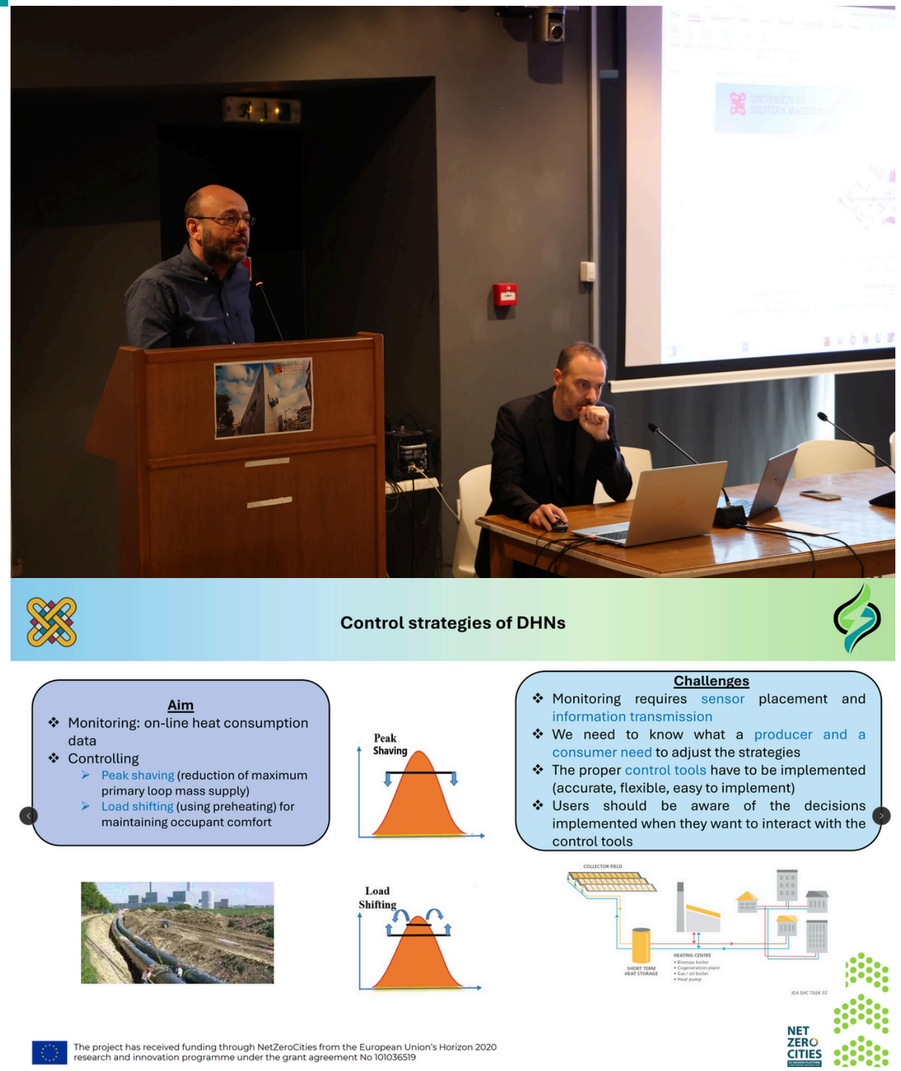
Prof. Panaras also explored a range of technological alternatives to overcome these challenges, such as the substitution of fossil fuels with RES like solar thermal, bioenergy, and waste-to-energy solutions. He emphasized the importance of innovative technologies, such as the Green Heat Module, in enabling a seamless transition while ensuring system reliability and efficiency.



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The lecture concluded with a roadmap for addressing these limitations, focusing on strategic planning, stakeholder collaboration, and leveraging financial tools to make the transition to RES economically viable and technically feasible. Prof. Panaras underscored that overcoming these challenges is crucial for achieving climate neutrality and fostering sustainable development in Kozani.

Prof. George Panaras
University of Western Macedonia - Municipal Water & Sewerage Company of Kozani – DEYAK

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07 Open Discussion: NEUTRON’s over. What’s next?

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Workshop’s conclusions

Dr. Kyriaki Sakellariou, in her concluding remarks at the 3rd Workshop, highlighted the transformative potential of the Green Heat Module for Kozani's District Heating System. She emphasized that the two-year NEUTRON project successfully demonstrated the feasibility and sustainability of integrating this innovative technology into the city's heating infrastructure.

Dr. Sakellariou commended the smooth implementation of the project, attributing its success to close collaboration among stakeholders, advanced simulation models, and rigorous research. She noted that the Green Heat Module, as a core component of the system, provides a practical pathway to replace fossil fuels with renewable energy sources, ensuring environmental and economic benefits.

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NEUTRON

Dr. Sakellariou concluded by reinforcing the Green Heat Module’s role in facilitating Kozani’s transition to climate neutrality by 2030, while also positioning the project as a replicable model for other European cities seeking to decarbonize their district heating systems.

Kozani’s blueprint for a Sustainable District Heating System

Dr. Kyriaki Sakellariou

Solid Waste Management Body for Western Macedonia - DIADYMA SA, Moderator

Dr. John Tziouras

Ergoncell, Moderator

Roundtable discussion

NEUTRON’s over. What’s next?

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Panel discussion

George and Dimitris Makris

Auditorium

Stakeholders

Auditorium

Stakeholders

Auditorium

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Panel discussion

Spyros Alexopoulos

Auditorium

Stakeholders

Auditorium

Stakeholders

Auditorium

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Workshop snapshots

Municipality of Kozani

NEUTRON partners

Stakeholders

Auditorium

Danieal Hogemann and Kyriaki Chatzimanoli

NEUTRON partners

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NEUTRON

A Pilot City Project for a sustainable transition

29 April 2025

Duration 09:00 - 15:00 (Local time)

Kozani, Greece