



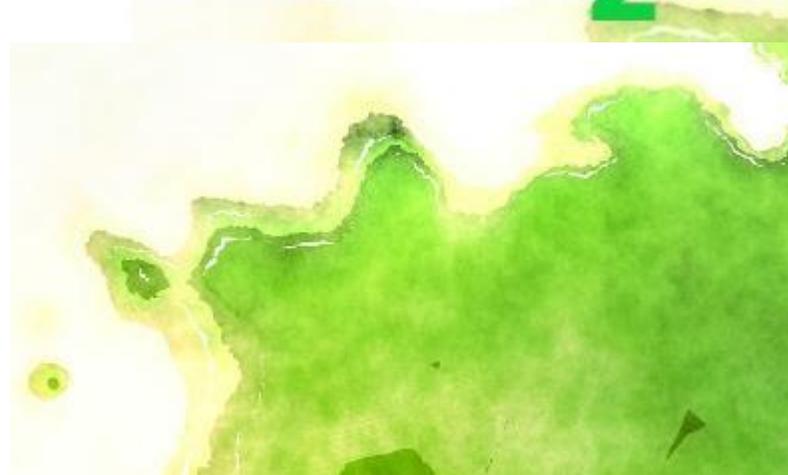
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HIGH-LEVEL CONFERENCE ON **CIRCULAR ECONOMY 2**



AI-NURECC PLUS ONLINE EVENT
11 | APR | 2022

Harnessing the circular potential in Western Macedonia, Greece

Dr. Yannis FALLAS

Director
Cluster of Bioeconomy and Environment of
Western Macedonia



@AI_NURECC_PLUS



The Region of Western Macedonia - Greece

- Pop. ~284.000 inh.
- 13 Municipalities
- Regional GDP PPS EU-28 avg: from 83% (2006) to 59% (2017)
- Unemployment 27,1% (2019), > 50% among youth
- Continental climate
- Mountainous, the only Greek Region without sea coast...



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Pindos National Park "Valia Kalda"



Bridge over Aaos River



Kozani Central Square



Vasilitsa Ski Resort



The action AI-NURECC PLUS has received funding from the European Union



Strong Energy Sector & District Heating

- 4 lignite mines 40 Mtns / yr
- \approx 50% total GR MWeI until 2012
- \approx 12,5% from lignite (March 2020)
- \approx 20.000 jobs
- > 200 cooperating SME's

Challenge
Lignite plants
decommissioning by 2023
Except 1 Unit in 2028

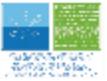
3 / 5 DH in the country

3 / 4 municipal DH





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Biomass Residues



Animal waste: >500.000tns/yr



Forest wild fires



Agricultural residues: >200.000tns/yr

Fields on fire



Forest residues: \approx 10.000tns/yr

Forest exploitation: > 50.000tns/yr

Artificial forests: >40.000 acres \approx
80.000tns/yr (thinning)



Depleted coal mines: \approx 150.000 acres



Western Macedonia, Greece

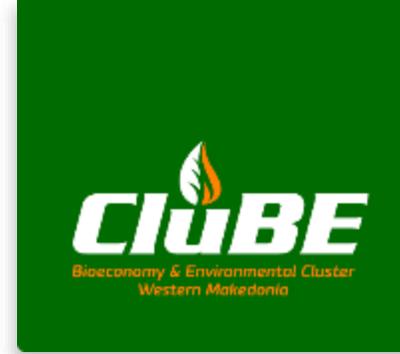
Bioeconomy and Environment Cluster – CluBE

- Formally established (2014)
- Not for profit company
- Bottom-up approach

<https://clube.gr>

**Development of common business and R&D in the fields of
Bioeconomy and Environment
Mobilize resources to bridge the gap**

Areas of Activity



Bioenergy and other **RES** for District Heating and industrial, commercial and domestic use

Development of **Circular Economy** in order to add value to the residual streams

Promotion of **Bioeconomy** as a major decarbonization pillar for the regional economy

Organizing local **biomass supply chains**

Increasing the share of **biofuels in the energy mix** of transportation fuels

Optimization of heating systems

Biomass development (energy **plantations**, forest management, certif. schemes, etc.)

Energy **efficiency** in industry, services, households / collective models

Cooperation models (ESCO's, energy cooperatives, ...)

Promote the concepts of **smart cities and villages**

Development of the **green hydrogen economy** for industry, energy and transport

Industrial Symbiosis

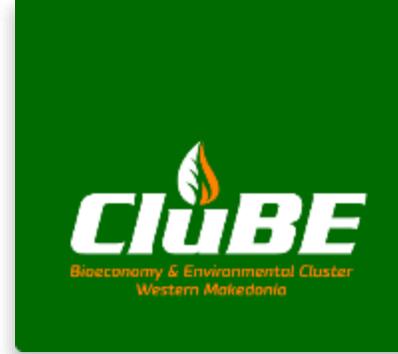


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CluBE : a rich ecosystem



- Public sector
- R&D
- SMEs
- Environment
- Social

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European Competitive Projects

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Project Portfolio

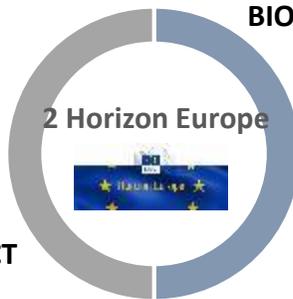
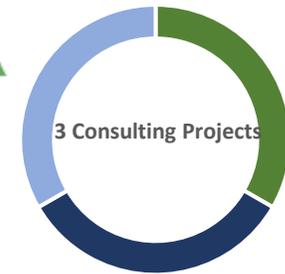


SEED

GreenSkills4H2



Training and counseling program "Agrocircularity"



BIOMODEL4REGION



CEE2ACT



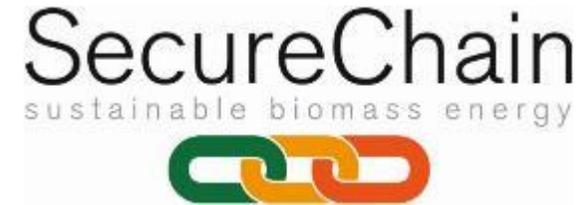
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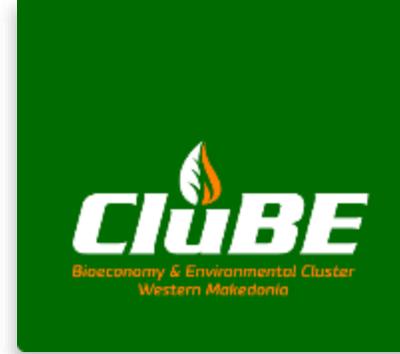
SecureChain



- **Horizon2020**
- **topic: LCE-14-2014,**
- **type of action: CSA**
Total budget: 1,809,586.25 €
- 11 partners from 8 EU countries
- Promoted a Sustainable Supply Chain Management (SSCM) that met highest environmental quality standards and targeted local biomass suppliers, energy producers and financial sector players.



aGROWchain



Establishment of a supply chain for green wastes, combined with the relevant business model, which will secure its sustainability

Partners:

- Municipal District Heating of Amintaio
- CRES
- Cluster of Bioeconomy and Environment of Western Macedonia
- Municipality of Novaci
- National Extension Agency



Project Start: 29/05/2018

Project End: 28/05/2021





Development of procedures and technology validation for the creation of locally available biomass value chains in Western Macedonia

Partners:

Municipal District Heating of Amyntaio - DETEPA

Municipal District Heating of Ptolemaida - DETIP

Center for Research and Technology HELLAS

Aristotle University of Thessaloniki

ALTEREN Energy & Environment S.A.

Cluster of Bioeconomy and Environment of Western Macedonia

Project start: 04/06/2018

Project End: 30/09/2022



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Market Uptake Support for Intermediate Bioenergy Carriers

MUSIC aims to facilitate further market uptake of three types of IBC (pyrolysis oil, torrefied biomass and microbial oil) by developing feedstock mobilisation strategies, improving logistics and development of IBC trade centres.

CluBE's contribution will mainly consist of identifying the local supply chain, as well as mobilising and coordinating the local case study for Greece; CluBE will bring all actors involved in the production of the IBC together, in order to successfully implement the local bioenergy setting.

Project Start: 01/09/2019
Project End: 31/08/2022





EU network of Regions On Sustainable WOOD mobilisation ready for digitalization

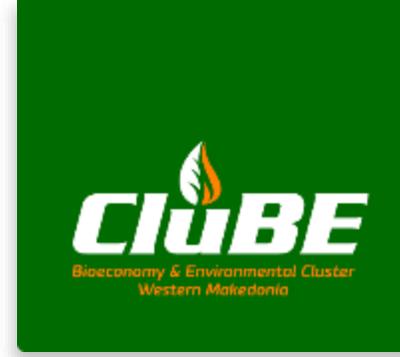
ROSEWOOD4.0 project builds on the well-established ROSEWOOD network of Regional Hubs connecting multiple actors along the forest value chain to reinforce the sustainability of wood mobilisation in Europe.

CluBE is participating in the South-East Regional Hub, supporting the efficient knowledge transfer and exchange between key local, regional and National stakeholders while boosting the dissemination between the South-East Hub's regions, in order to align multi-level actors from the entire value chain around common goals such as the reinforcement of the forestry industry and the creation of new business opportunities.

Project Start: 01/01/2020

Project End: 31/12/2021





RUBIZMO – business models for modern rural economies

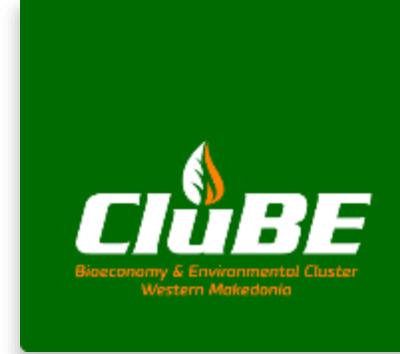
RUBIZMO aims to generate jobs and growth in highly diverse rural areas in the food sector, bio-based value chains and eco-system services.

RUBIZMO will prepare Europe-wide upscaling and replication of models in rural areas using 50 successful business cases and 20 new business models.

Project start: 01/05/2018

Project end: 30/04/2021



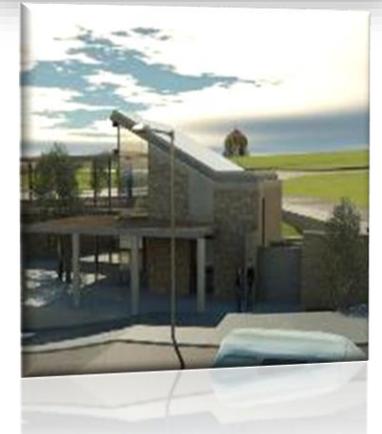


STARDUST – Holistic and Integrated Urban Models for Smart Cities

STARDUST project is the first approved project in the Smart Cities field (Smart Cities and Communities) of the Horizon2020 program that a Greek city is member of the consortium.

CluBE will act as catalyst for the implementation of studies and projects that will make the Follower Cities smart and environmentally sustainable. Specifically, for the municipality of Kozani, CluBE will help the city of Kozani maintain its energy character and become a smart green energy municipality model during its transition to the post-coal era.

Project start: 01/10/2017
Project end: 31/03/2024



BENEFIT



«Improving energy efficiency in Public Buildings»

Energy efficiency upgrade of DIOIKITIRION in Thessaloniki and a Sports hall in Bitola

Partners:

- Ministry of Interior (Macedonia and Thrace Sector)
- Cluster of Bioeconomy and Environment of Western Macedonia
- Centre for Renewable Energy Sources and Savings (CRES)
- Municipality of Bitola
- Public Enterprise of Urban and Architectural design in Bitola

Project Start: 28/10/2018

Project End: 31/07/2022





Novel Organic recovery using Mobile ADvanced technology

NOMAD aims to replace non-renewable mineral fertilizers with low-carbon, organic equivalents, creating new, disruptive business models for rural decentralized AD to support the circular bio economy.

The project includes partners from China, Greece, the UK, Italy, Romania, Malta and the Netherlands to develop an innovative, mobile, small-scale technology solution designed to recover fibre and specific nutrients from digestate to produce high performance bio-fertilizer products.

Project Start: 01/10/2019

Project End: 30/09/2022



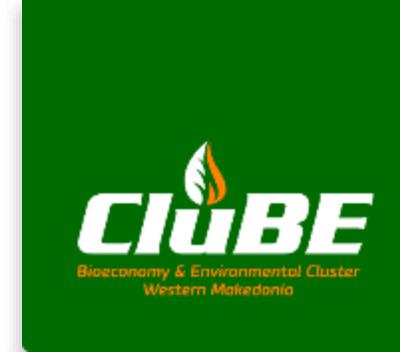
NOMAD

Mobile Bio-Fertiliser Solutions



The action AI-NURECC PLUS has received funding from the European Union





In2UCO - Integrated and innovative pilot-scale management of cooking oils with the participation of citizens and students

In2UCO project scope is the integrated and innovative separate collection and management of used frying oils - household waste, the so-called Used Cooking Oils (UCOs), in order to be further utilized. The disposal of large quantities of used frying oils and fats creates significant problems in the municipal waste-water treatment plants and landfills, mainly due to their physicochemical characteristics. .

Partners:

Cluster of Bioeconomy and Environment of Western Macedonia

DIADYMA S.A.

Municipality of Kozani



Project start: 18/05/2020

Project End: 17/11/2021





Scalable technologies for Bio-Urban waste recovery

SCALIBUR creates a holistic consortium to reduce urban biowaste and replace it with a new production chain of biomaterials, forming a partnership of end users to recover and transform biowaste from three municipalities, namely Madrid (ES), Albano (IT) and Kozani (EL), into value added products.

In this framework, CluBE performs these tasks for the pilot city of Kozani by means of mapping the local stakeholders involved in household and HORECA biowastes and organizing them into a local Biowaste club.



Project Start: 01/11/2018
Project End: 31/10/2022



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Hub of circular citiew boosting platform to foster investments for the valorisation of urban biowaste and wastewater

The HOOP Project will help to unlock bio-based investments and deploy local bio economies in Europe through a systemic and cross-cutting approach. It will offer **Project Development Assistance (PDA)** to a group of 8 lighthouse cities and city clusters - to build the technical, economic, financial and legal expertise needed to develop concrete investments to valorise OFMSW (Organic Fraction of Municipal Solid Waste) or UWWs (Urban Wastewater Sludge) with the aim of obtaining safe and sustainable bio-based products.

CluBE will participate in the Project by a) the identification and analysis of novel Circular Business Models behind successful solutions in the value chain of bio-waste valorisation. CluBE will also undertake a stakeholder engagement, awareness raising and acceptance of biobased products for the Region of Western Macedonia.



Project start: 01/10/2020

Project End: 30/09/2024





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Modeling tool for giving value to Agri-food residual streams in Bio-based industries

The main objective of MODEL2BIO is the integration of a deeper knowledge on composition, logistics and volume of various organic streams which is in the position of supporting the decision-making process to maximise profit from a specific feedstock and to select the most appropriate technologies for its optimal valorisation.

CluBE will lead the Work Package on the tool validation in 3 pilot cases covering 3 EU main geographic distribution and entities, through a multi-stakeholder verification process. CluBE will also be the coordinator for all the activities and residual stream characterisations in the Western Macedonia region

Project start:

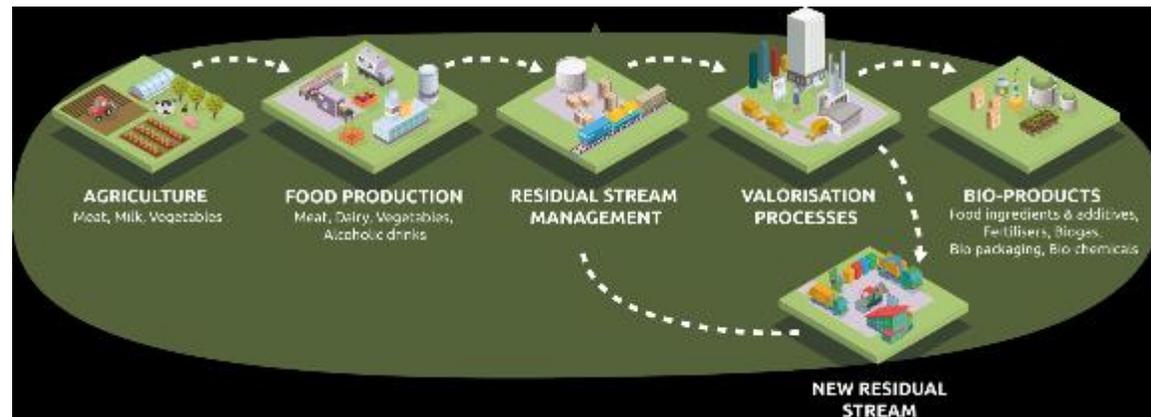
01/05/2020

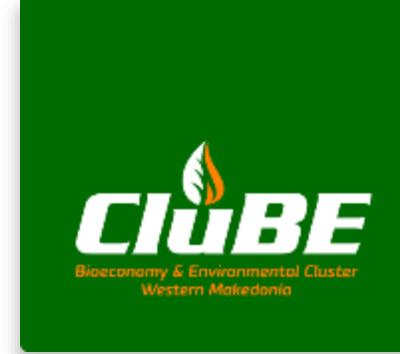
Project End:

30/04/2023



model2bio





Bio-Based Digital Twins

BBTWINS aims to develop a digital platform for the optimisation of agri-food value chain processes and the supply of quality biomass for bioprocessing.

The platform will be based on 'digital twins' technology – creating a real-time digital replica of physical processes in the agri-food industry.

CluBE is coordinating the regional demonstration while also leading the Work Package 6 which will validate the model in real life environments.



Project start:

01/06/2021

Project End:

31/05//2025





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BIOMODEL4REGIONS

BIOMODEL4REGIONS project aims to support the establishment of the innovative governance models at local/regional level to achieve better-informed decision-making processes, social engagement and innovation to support and strengthen EU and international science-policy interfaces to achieve the Sustainable Development Goals.

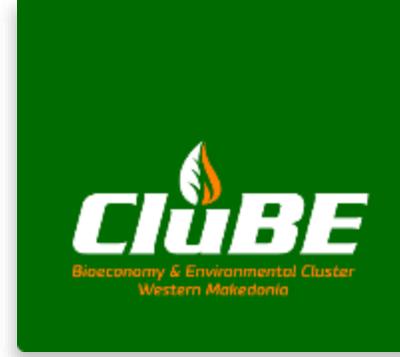
The methodology is based on the set-up of a governance structure among **bioeconomy clusters** that will leverage on previous successful projects, initiatives and best practices to capitalise on work performed through several years of research and studies in the field of bioeconomy.

These results will be demonstrated within the project to support 6 pilot regions chosen in clusters' network.

Project start: 01/06/2022

Project End: 31/05/2025





CEE2ACT will empower countries in Central Eastern Europe and beyond to develop **circular bioeconomy strategies and action plans** through knowledge transfer and innovative governance models enabling sustainability and resilience to achieve better informed decision-making processes, societal engagement and innovation, building on the practice of experienced countries serving as role models in this context. Knowledge transfer and inspiration in creative formats that address the motivations, needs and knowledge gaps of each CEE2ACT target country will be realized through the CEE2ACT National Bioeconomy Hubs.

The findings will be synthesized, in an analytical framework, which will result in National-level Roadmaps for the Bioeconomy Strategies in Targeted CEE2ACT countries, boosting societal engagement in the countries' transition towards circular bioeconomy.

In this context, CluBE will take part in the effort by running case studies, establishing networks, providing training and capacity building, and performing stakeholder engagement in the region of Western Macedonia

Project start: 01/06/2022

Project End: 31/05/2025





The main objective of BeCircular is to provide **employment opportunities** for young educated unemployed people and set the base for trade growth within the cross-border area of Greece-Republic of North Macedonia. It also promotes the cross-border mobility of people and ideas through the optimized exploitation and elaboration of the project's results.

CluBE is leading the Work Packages related to the Communication and Dissemination of the project as well as the community engagement. In WP3 CluBE will collect data and assess needs related to the sector of circular economy and elaborate on action plans related to new feedstocks.

In WP4 CluBE will upgrade the existing e-platforms for material workflows in R&R center and develop an e-learning platform and a smartphone application. In WP5 CluBE will be responsible for the creation of "Living Labs" ecosystems related to creative industries, bioeconomy and bio-waste exploitation and general entrepreneurship.



Project start: 04/03/2022

Project End: 03/09/2023





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CluBE Projects

Agriculture and PV's



A cooperation with Enel & Wise Greece

Exploitation of the PV space for the cultivation of local products



Educational Programs

- Participants:** people from the community of Polymylos and the Municipality of Kozani
- Characteristics of participants:** unemployed, vulnerable groups, women, existing producers who want to evolve further
- Object of educational programs:**
- Cultivation of land and production of bioproducts
 - Packaging and successful product promotion
 - Practical help and guidance to get a product from the "field on the shelf"
 - Promotion of products through the sales network of "Wise Greece" as the first products produced with the power of PV





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CluBE Projects

GreenSkills4H2



The project **GreenSkills4H2** (The European Hydrogen Skills Alliance) is referred to Vocational Training Programmes to address urgent skills needs of people for a 4 - year period. The blueprint will also address the skills need of workers in Declining Sectors and **Transition Regions** to provide them with upskilling and reskilling opportunities that will enable them to access new employment opportunities within the Hydrogen sector.

Through this GreenSkills4H2 blueprint and the wide sectoral partnership of European stakeholders it will establish, it will be possible to develop and rollout a Hydrogen Skills Strategy across the whole of Europe, maximising the project impact and delivering the skilled workforce needed by the rapidly growing Hydrogen Industry.

Within the project, CluBE will design reactive and urgent upskilling and reskilling programs for the Western Macedonia Region, which will be specific to hydrogen technologies for the whole hydrogen value chain.

Project start: 01/06/2022

Project End: 31/05/2026

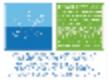


Erasmus+



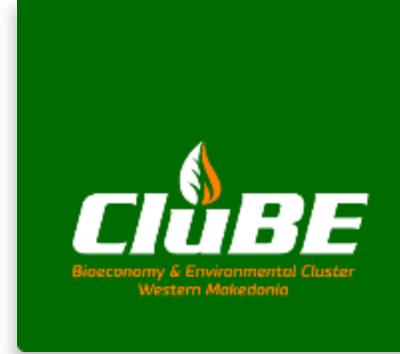


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CluBE Projects

SEED



SEED – Sustainable Energy Education realizes impact to global **climate change prevention** with excellent and innovative vocational education on solutions to become a fossil free energy continent. Challenges on transition develop rapidly, with a high demand for digital and green. Solutions are not yet clear, and technologies are constantly evolving. Well-equipped students, professionals and suitable labor capacity are needed for the tasks and challenges. Vocational education, as a driver for innovation and growth and agile in adapting to the labor market, has a heavy responsibility. In addition, the shortage in labor capacity forces us to develop new ways of working and educating.

CLUBE is leading the Work Packages related to the Communication and Exploitation of the project and acts as a regional mobilization hub for decision makers, research, education, and enterprises, and brings all stakeholders together to develop synergies and projects in the fields of Bioeconomy and Environment. CluBE is leading the Work Packages related to the Communication and Dissemination of the project as well as the community engagement.

Project start: 01/06/2022

Project End: 31/05/2026



Erasmus+



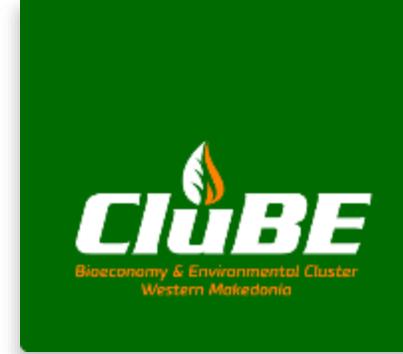
WHITE DRAGON



The “White Dragon” project will use GW-scale renewable electricity for the **production of green hydrogen** by electrolysis in Western Macedonia. Hydrogen will then be stored directly (short-term hydrogen storage) and indirectly (injection to DESFA’s natural gas pipeline) and, subsequently, through high temperature fuel cells will provide the country’s power grid with electricity as a fixed base load co-generation unit of green energy and heat.

A main goal of the “White Dragon” project is the development, by the cooperating companies, of an integrated Hydrogen Industrial Research Center within the high-tech R&D&I Hydrogen Hub that will be created in Western Macedonia.

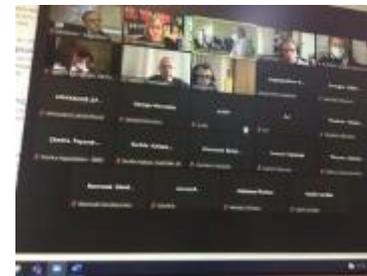




100 Climate Neutral Smart Cities proposal

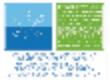
CluBE coordinated the proposal of the Municipality of Kozani which was submitted to the relevant Call of EoI of the European Mission “**100 Climate Neutral Smart Cities by 2030**”

The project will include a huge effort of the Municipality to be climate neutral by 2030, by significantly reducing its emissions from all sectors, including buildings, transport, energy production, industry, **waste recycling**, etc, while off-setting the remaining GHG emissions with relevant initiatives, such as afforestation, etc





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Other Strategic Projects 1



Hydrogen

- Just Transition Fund (Prasino Tameio) – Use of sewage sludge for Hydrogen production

Circular Economy

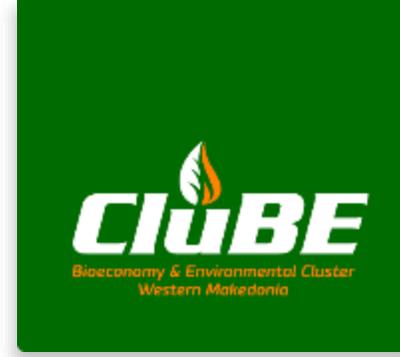
- Circular Economy Park for Western Macedonia

Bioeconomy

- Biorefinery
- Mobile extraction unit for aromatic residues



Other Strategic Projects 2



National Centre for Knowledge in the Energy sector

- Member of the consortium selected

Energy Efficiency

- Financial Innovative Processes for Energy Efficiency (PDA)

Main roles in projects



Establishment of ideas and basic scenarios

Local / regional case coordinator

Stakeholder identification and engagement

Mobilization of local ecosystem

Communication and dissemination at local, national and Eu level

Replication at regional, national and international level, with a special focus on the Balkan area



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Expanding network

Go global to act local

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EU added value



- Greenovate! Europe – Full member 
- European Bioeconomy Stakeholders Panel – DG RTD European Commission – Member 
- Biobased Industries Consortium (BIC) – Associate Member 
- European Clean Hydrogen Alliance – Member 
- Innovawood – Full member 
- Hellabiom (Hellenic Biomass Association) – Full member 
- Fuel Cells and Hydrogen Joint Undertaking (FCH JU) – Hydrogen Valleys Partnership – Member 
- European Circular Economy Stakeholder Platform – Leadership Group Member 
- ENRD Mainstreaming the Bioeconomy Thematic Group – Member 
- S3 Bioenergy Partnership – Member 
- Greek Bioeconomy Forum – Founding member 
- Local Governments for Sustainability – Member 
- Hellenic-German Chamber of Commerce and Industry  Ελληνογερμανικό Επιμελητήριο και Βιοποικιστικό Επιμελητήριο / Deutsch-Griechische Industrie- und Handelskammer
- American-Hellenic Chamber of Commerce 



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Human Resources

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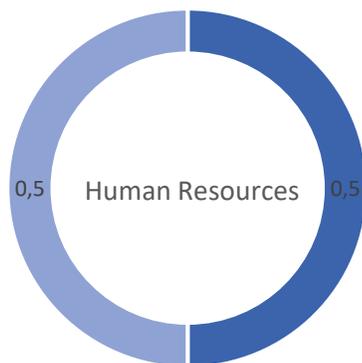


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Gender Balance



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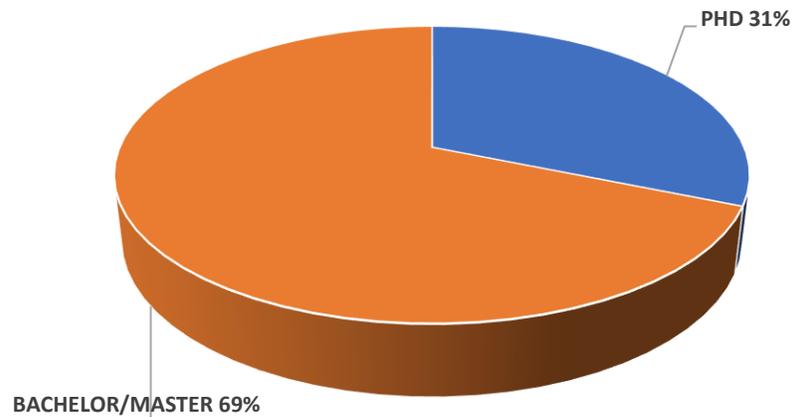


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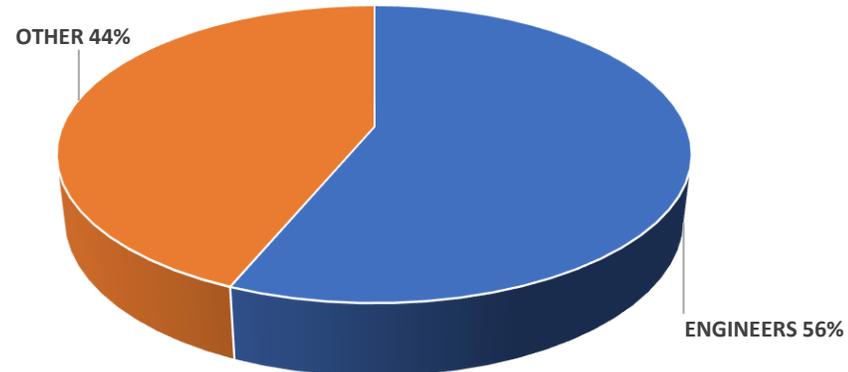


PHD HOLDERS



Emphasis on knowledge

ENGINEERS



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There is life after Coal

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And in your case?

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- SWOT
- Focus
- Momentum
- Commitment
- Champions



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Thank you for your
attention !!!!

Ioannis Fallas, PhD

Director

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