



# Alliance of Universities in Europe

European Universities Linking Society and Technology

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## Sustainable campuses

- Universities are acting as educational and research hubs that form the environmental consciousness of the next generation and should lead in a broader social behavioural transformation and ecological consensus.
- Green University Campuses implement sustainable practices through:
  - The educational and research curricula
  - The operation
  - The response to sustainability matters that relate to environmental and social challenges

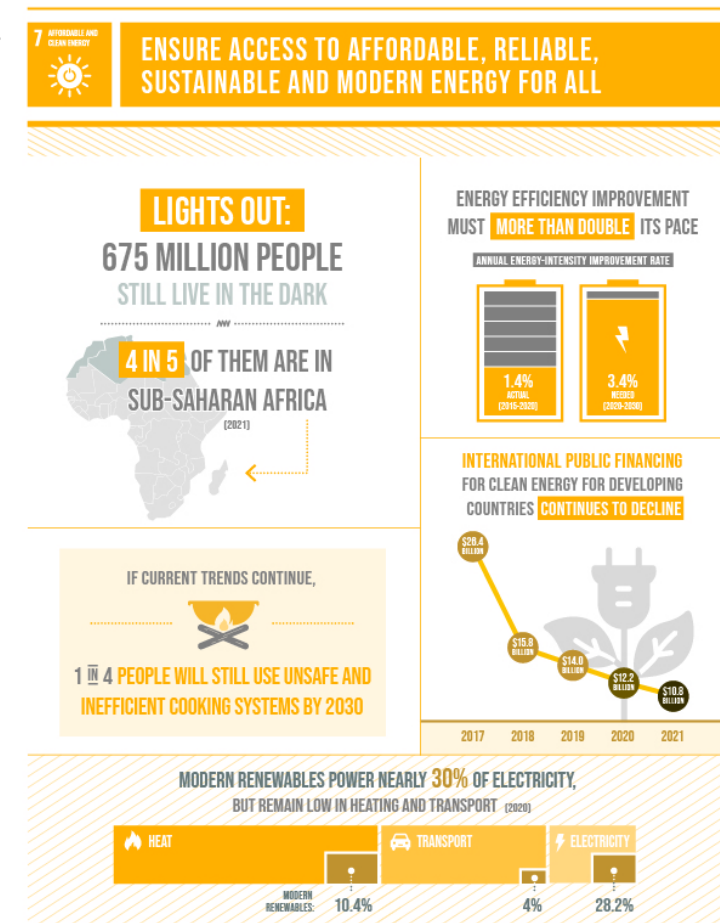




## Monitoring Clean Energy in the EULiST Campuses

Assessment and Monitoring the contribution of renewable resources to the overall energy mix used in EULIST campuses that aim in addressing sustainable practices. The thematic areas focused on the promotion of research in the clean energy technology adopting the initiatives of UN’s Sustainable Development Goals and the Green Deal:

- Ensure access to affordable, reliable & sustainable energy for all
- Address the European Area’s Focus Topic “Green Education”





## Monitoring Clean Energy in the EULiST Campuses

AIM: → provide participants with best practices for assessing and monitoring renewable energy resources and sustainability on European University campuses

STRUCTURE: → **Online Lectures (3)**

Introduction to the BIP's theme and content

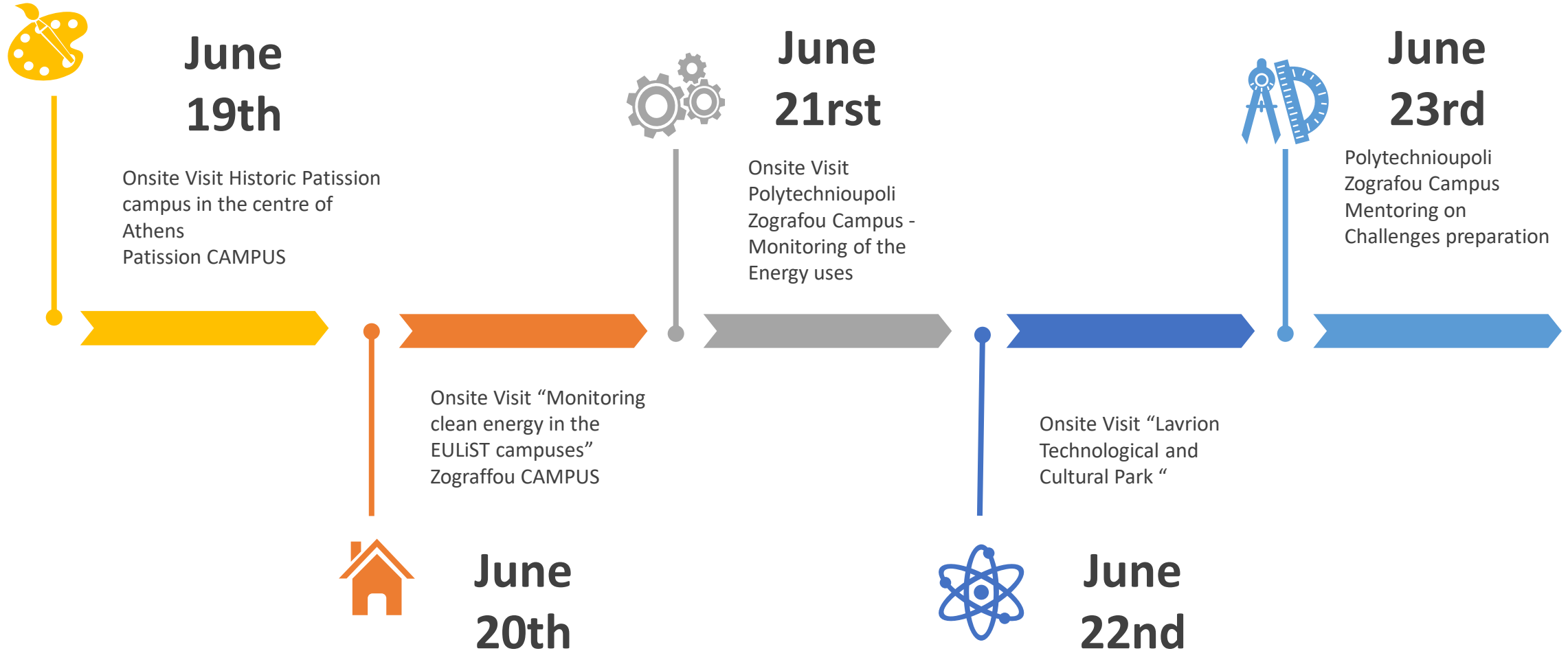
Theoretical insights and review of the latest research, best practices and case studies from Germany, Slovakia, Finland, Greece and France

**On site workshops (6 days)**





# Physical Component On-site Workshops





## On site Workshops – Day 1: The Historic Patision Campus

The Historic Patision Campus demonstrates many challenges in order to qualitatively and quantitatively assess the sustainability attributes and SDGs of the complex, due to its inherent and underlying complexities:

- Located in the center of Athens in a multifaceted neighbourhood – Social aspects
- The complex comprises of old and historic (designated) buildings – Preservation conflicts

The School of Architecture addresses sustainability issues mainly through teaching and research

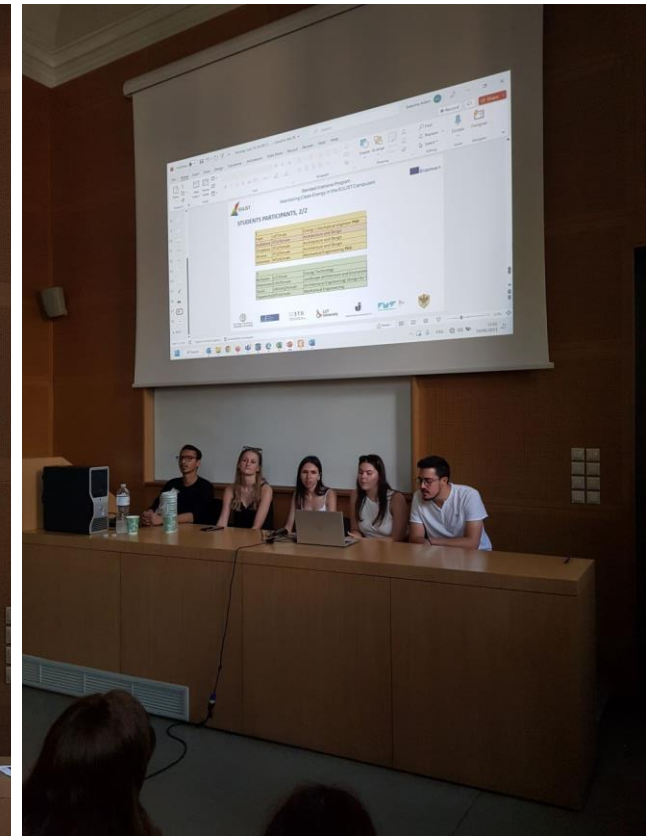






# COURSE PRESENTATION

Visit on Patision Campus and presentation of the workshop and NTUA course





## On site Workshops – Day 1: The Historic Patision Campus

Students of NTUA School of Architecture, presented their work delivered on a 3<sup>rd</sup> year elective course on Bioclimatic/Environmental design where the given project was the Patision Campus. The course focused on the qualitative and quantitative assessment of the campus' sustainable attributes and bioclimatic performance of the buildings. The study included on site measurements of air temperatures and daylighting performance and investigated the best bioclimatic strategies for the passive and energy efficient performance of the buildings. The participating students were guided and explored the campus and then they were presented with the measuring equipment and performed daylighting measurements.

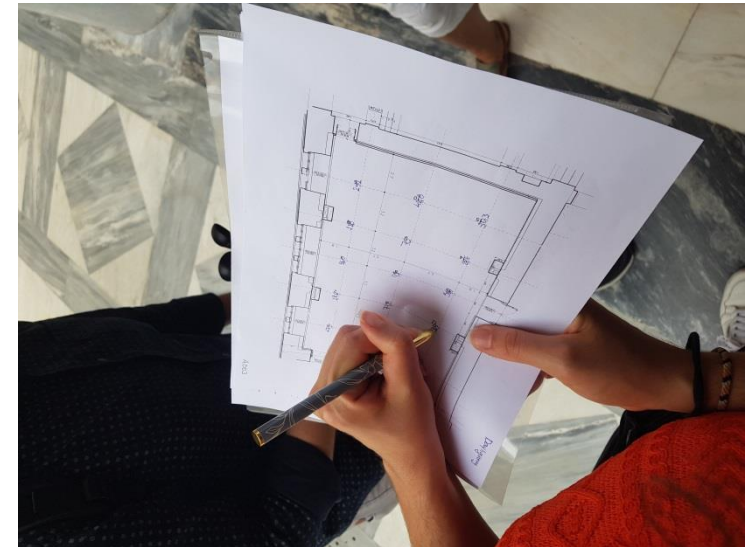






# QUANTITATIVE ASSESSMENT OF EXISTING CONDITIONS

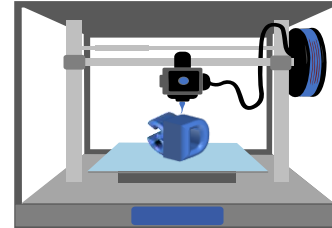
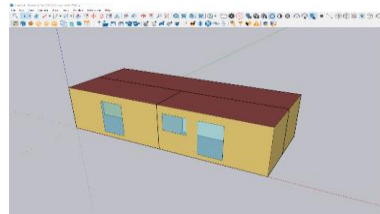
**DAYLIGHTING EXERCISE: Students measure daylighting levels in the atrium and classrooms**





# On site Workshops – Day 2: Zografou Campus

## Monitoring clean energy in the EULiST campuses



### 3D in the Built Environment

3D printing technology designed to revolutionize the construction industry



3D Energy Hub



### Eco-Friendly Sustainable Campus

Sustainability Roadmap of NTUA campus

Building a Sustainable Campus:  
A Pathway to a Greener Future

### ”DeCarboniseMyCampus” Course Project Eco-Friendly Sustainable Campus

PROJECT 'S STEPS

Project description and actions

- STEP 1: Software Setup
- STEP 2: Prototyping Building Setup - Simulation run
- STEP 3: Energy Optimization
- STEP 4: Forecasting Energy Consumption in 2050
- STEP 5: Documentation and Analysis:



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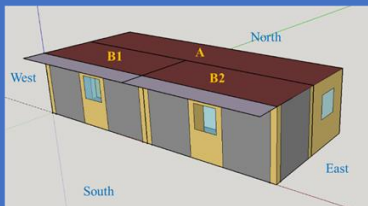


# On site Workshops – Day 3: Zografou Campus

## Monitoring of the Energy uses

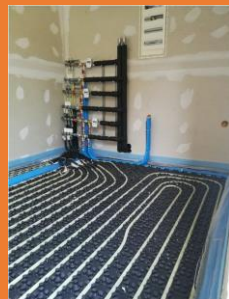
01

Technical specifications  
of pilot building  
Building envelope  
materials



02

Technical specifications  
of pilot building  
Active Systems



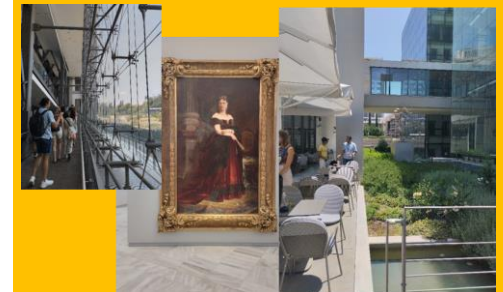
03

Visit to National  
Gallery – Alexandros  
Soutsos Museum  
Gold LEED Building

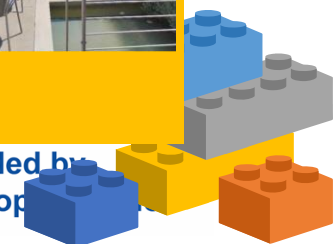


04

Visit to National  
Gallery – Alexandros  
Soutsos Museum  
Gold LEED Building



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# Project's General Steps



## Structured into groups

Structured in 4 groups according to 4 building uses (residential building, office, library, conference room).



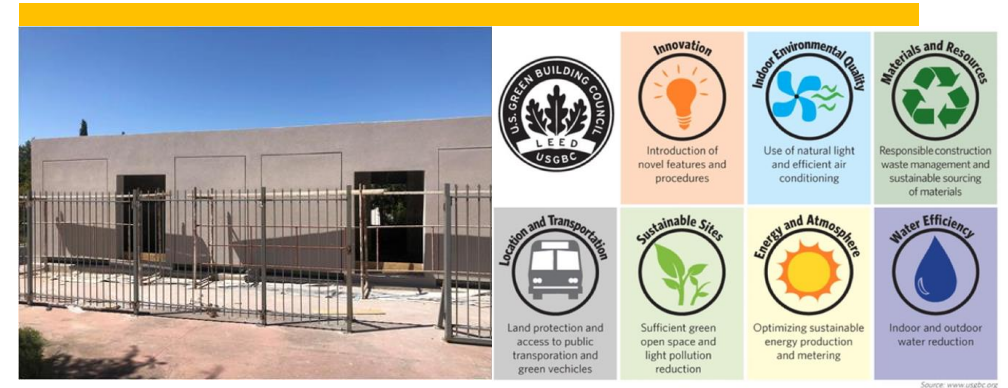
## Two different climatic zones

Greece-Athens (3A) and Sweden-Stockholm (6A)



## Impact of Climate Change in 2050

Beyond immediate objectives, the project set its sights on assessing the impact of climate change in 2050 on sustainable building energy consumption.



### Learning outcomes

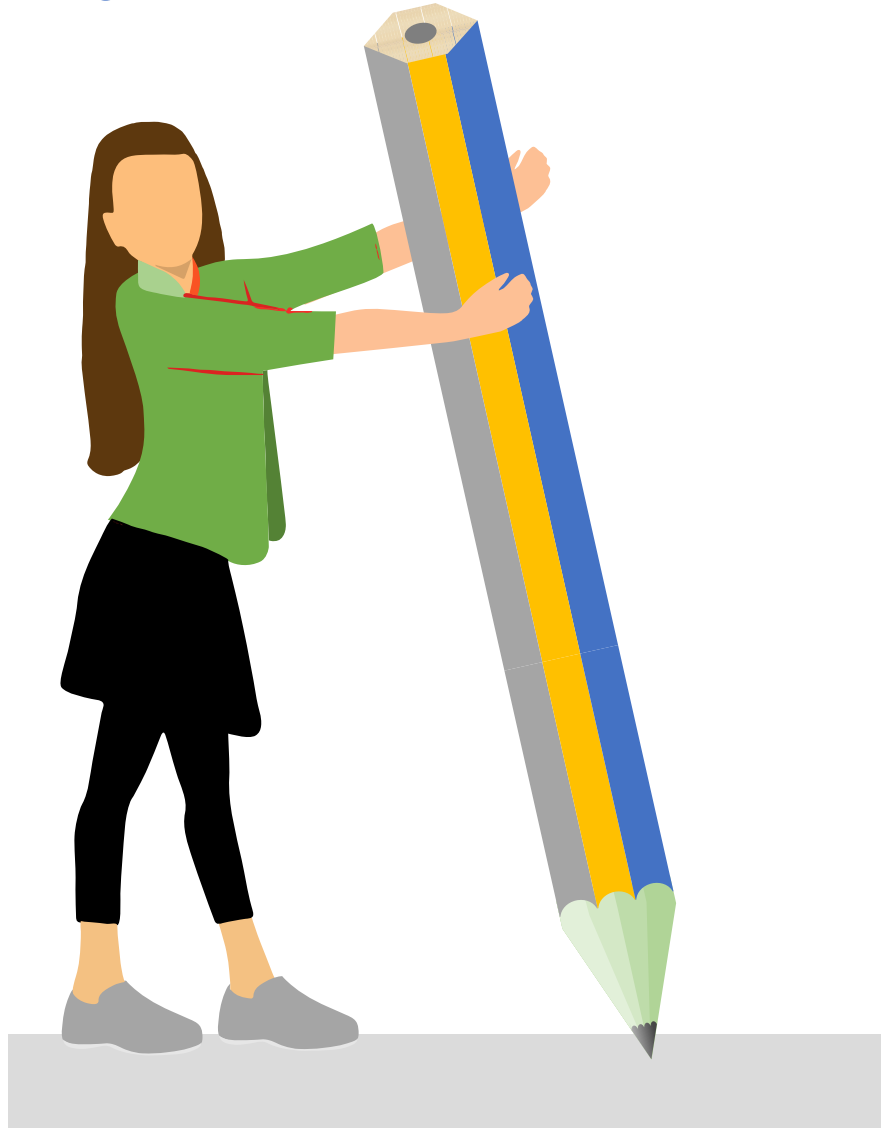
- a combination of theoretical knowledge with the combination of practical and simulations
- Interdisciplinary approach, from technique to society approach
- Towards positive energy buildings by means of cost effective measures in a) building envelope, b) Utilization of Renewable Energy sources c) HVAC and Automation systems
- Impact of Climate Change







# Project's Parameters-Outcomes



## Building's parameters

energy consumption needs aligned with user comfort expectations, envelope materials, climatic conditions, lighting, orientation, universal versus special design, the number and type of users



## Outcomes

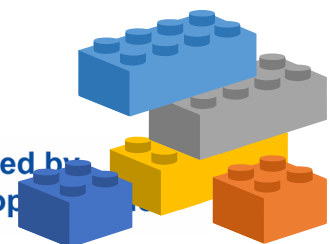
Students focused on annual needs encompassing heating, cooling, electrical consumption, and water consumption, contribution of climate data from the two countries in 2050 to the behaviour of the buildings, demonstrating a forward-looking approach to sustainable building practices.

## Learning outcomes

- Multidisciplinary collaboration
- Use a BEM software like EnergyPlus to analyze and optimize the energy design of a prototype building.
- Assess the energy performance of buildings and make informed decisions to improve their energy efficiency.
- Forward-looking approach to sustainable building practices according to climatic data of 2050



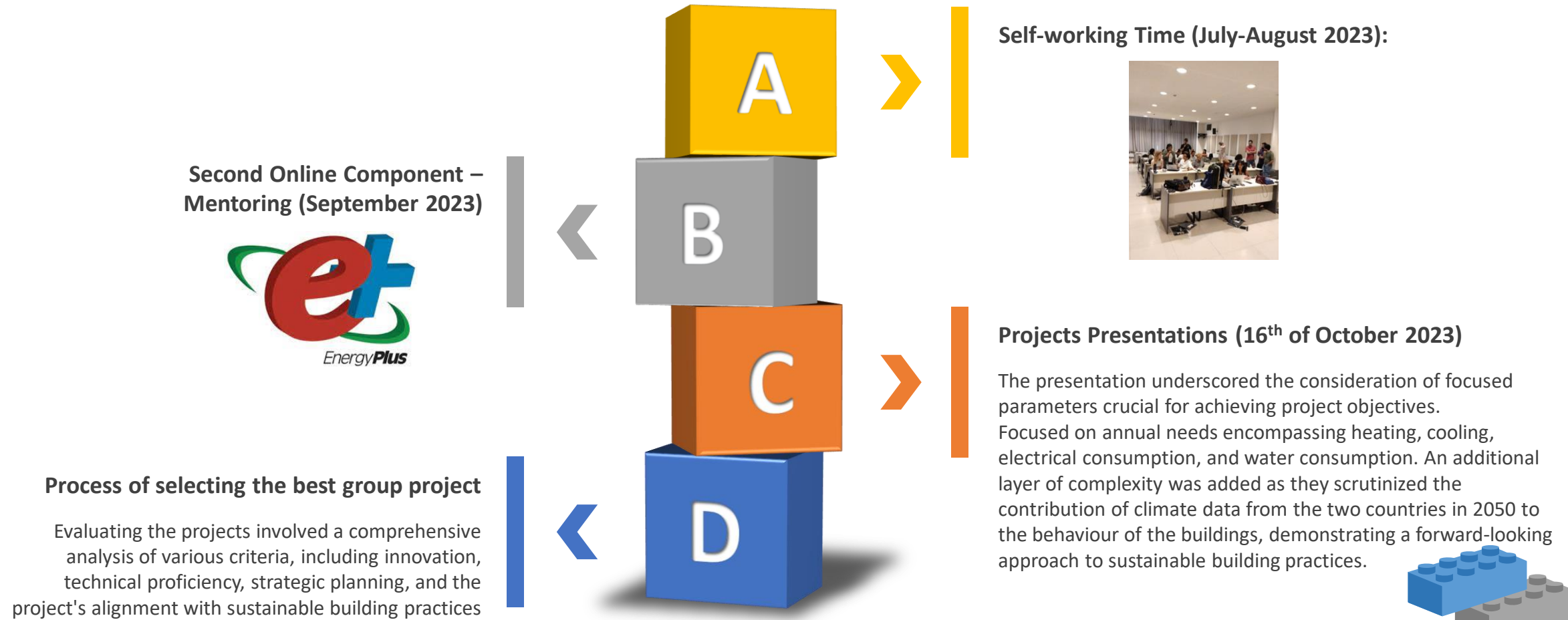
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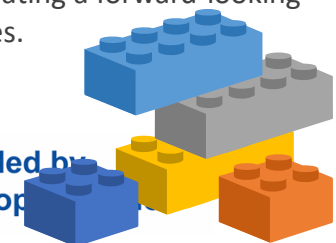




# Project's Working Steps



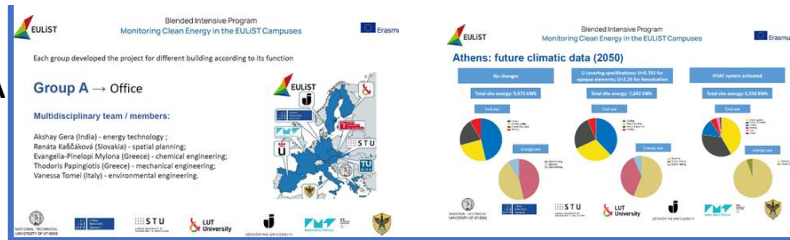
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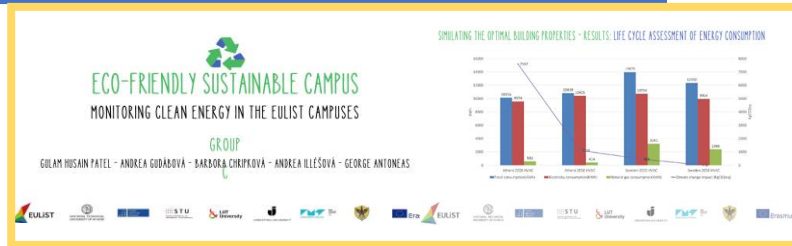


# Projects Presentations by Student Groups

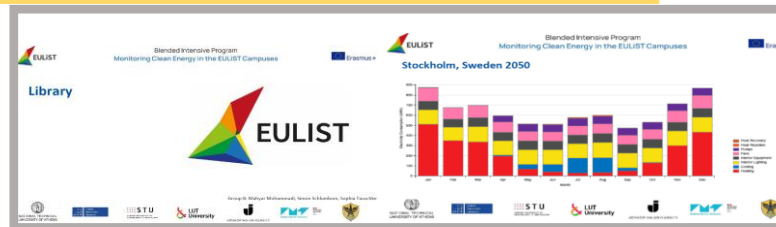
Group A



Group C



Group B



Group D

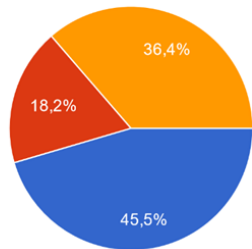




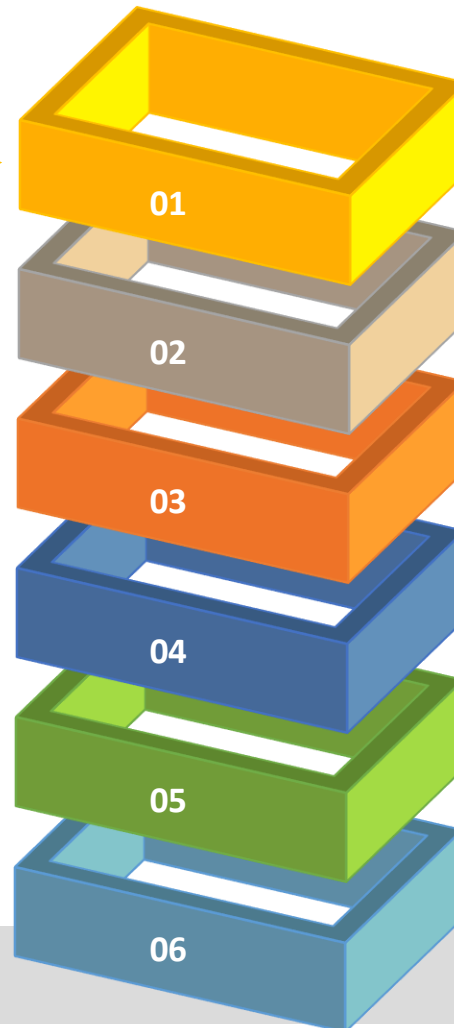
# Blended Intensive Program (BIP): "Monitoring Clean Energy in the EULiST Campuses"

## Evaluation Results

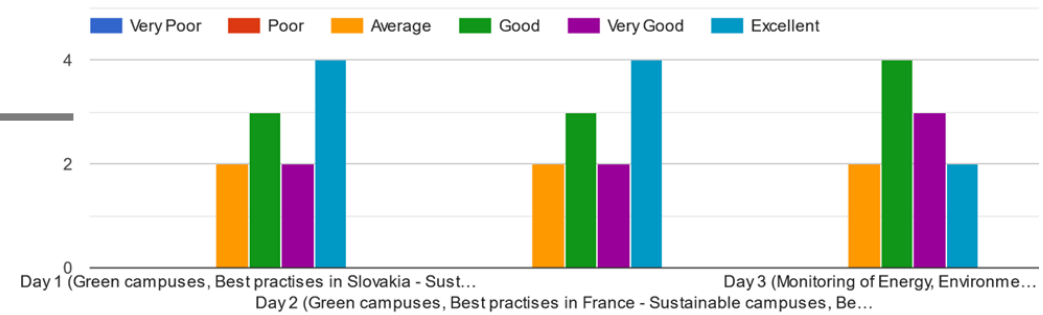
Which academic level are you currently pursuing?



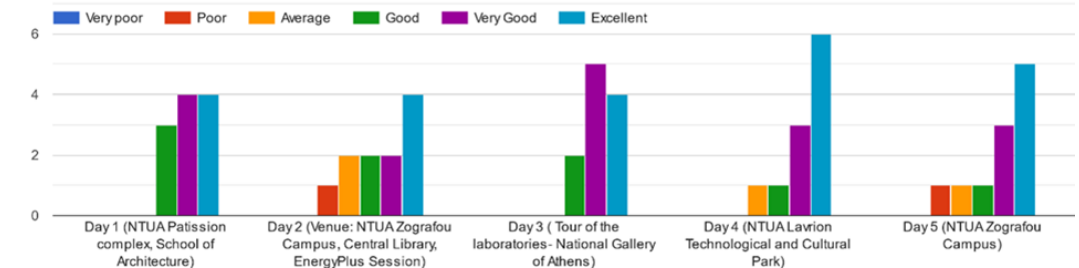
- Undergraduate (Bachelor's)
- Graduate (Master's)
- Postgraduate (Doctoral)



Your opinion on the online lectures.



Your opinion on the onsite workshops of the BIP.



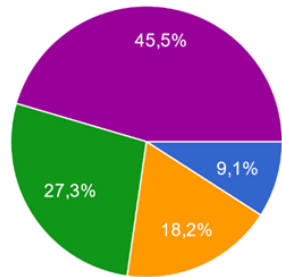
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# Blended Intensive Program (BIP): "Monitoring Clean Energy in the EULiST Campuses"

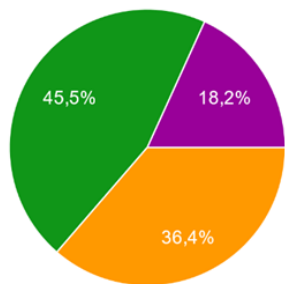
## Evaluation Results

Rate the quality of the teamwork in your team in terms of your learning.

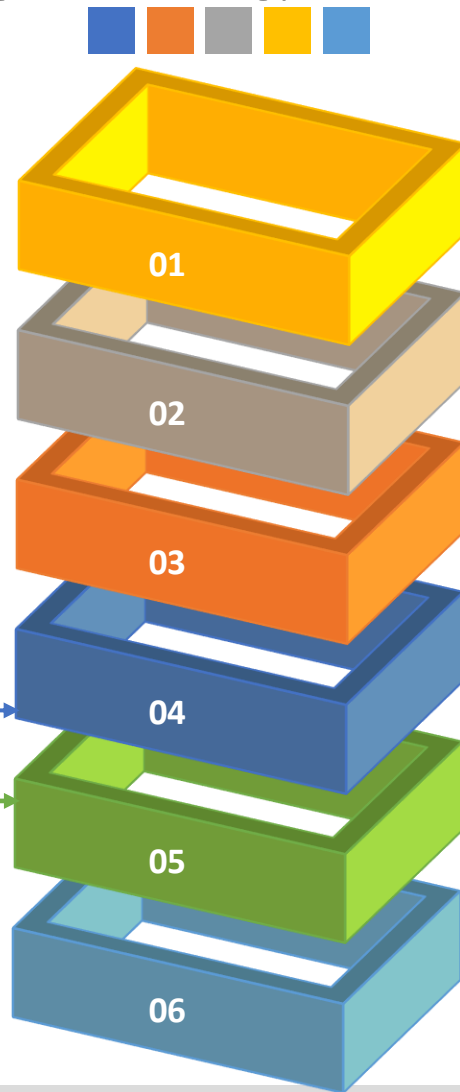


- Very low learning
- Rather low
- Suitable
- Rather high
- Very high

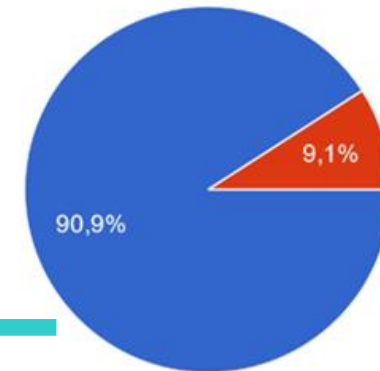
The level of difficulty of the course was in my opinion



- Not demanding at all
- Not demanding
- Sufficient
- Rather demanding
- Very demanding



I will recommend this course to my peers



- Yes
- No





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# THANK YOU

FOR THIS WONDERFUL EXPERIENCE

