TOWARDS A SUSTAINABLE UNIVERSITY

THE CASE OF UNIVERSITY OF PATRAS

Committee of Environmental Management

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Sustainability is an obligation!

Why?
- Modern society is depending on fossil fuels
- Human population is growing
- Climate change
- Limits of Earth’s natural resources
- Fresh water limitation
- Food origins

When?
- Now

How?
- Increase awareness, Involve people
- Sustainable actions
University of Patras

When we started a couple of years ago...

• Does university define sustainability and how?
• Are we aware of the sustainability actions going on at our university?
• Do we have a sustainability strategy and goals?
• Who is responsible?
• Is there a sustainability team?

ANSWER

NO
**Areas of sustainability**

Curriculum, Education, Research, Energy Consumption, Awareness, Infrastructures, Recycling, Wastes, Transportation

**Indicators (Environmental footprint)**

1. Factors affecting campus CO\textsubscript{2} emissions (energy consumption, transportation, waste produced etc)
2. Collecting the data (technical and administrative directorates, carry out poll)
3. Calculate the carbon footprint and forecast the impact of specific action(s)

**Reports**

*Early reporting only the consumptions and simple actions*

*Middle plan and commitment*

*Mature full report with environmental, social and economic indicators*
UNIVERSITY OF PATRAS
FIRST STEPS TOWARDS SUSTAINABILITY
University of Patras

Demographics

Established in 1964

Personnel
- 685 Faculty Members,
- 420 Administrative Personnel
- 26,000 Undergraduate students
- 2,500 Postgraduate students

Campus
- 265.6 acres area
- 40 (257,000 m²) major buildings
Committee of “Environmental Management”

(UPatras 02.12.2010)

**Key Focus Areas**

- Environmental education and awareness
- Energy conservation
- Recycling and Waste Management-Waste Disposal
- Water and wastewater management
- Greenspace, volunteering

**Infrastructures**

- The Intra-University Networks (10 relevant to the topic) ([http://research.upatras.gr/index/page/3/2](http://research.upatras.gr/index/page/3/2))
- The postgraduate Programs relevant to Environment and Energy
- The General Directorate of Technical Services, Planning and Networks of UPatras
Office of Campus Sustainability

The front line for accomplishing the targets ...

**SCOPE**

- Work with the Committee of “Environmental Management” to set goals and identify opportunities to sustainable operations
- Organize the recycling actions
- Produce brochures with instructions for the actions
- Provide information exchange and communicating with the staff, students and local community
- Set an environmental management system (EMAS, ISO14000)
- Organize the webpage
- Inspire the people to energy saving and sustainable actions
The University of Alberta is committed to a continuous effort to instill sustainability into the many aspects of university life, on our campuses, in our institutions, and in the larger community of which we are part. In alignment with its values, vision and mission, the University takes an integrated approach to sustainability that incorporates teaching and learning, research, outreach, and the operations that support them, as it builds one of the great universities for the public good. The University strives to manage all resources in harmony, recognizing the interconnectedness of ecological, social and economic systems. To this end, the University of Alberta is committed to constant improvement guided by the following principles:

**Integration**
- Encourage the development of collaborative solutions involving all stakeholders.
- Promote a culture of integrated sustainability through excellence in teaching, learning, innovative research, and community engagement.

**Education and Outreach**
- Aid students and all other members of the University community in developing the knowledge and tools necessary to become informed future leaders, and global citizens during their experience at the University of Alberta.
- Promote a culture of sustainability at the University by providing opportunities for participation, discovery learning, and transformative experiences.
- Contribute to, and participate in the advancement of sustainability in the local and global communities by sharing knowledge, expertise, best practices, and lessons learned.
Research
- Support innovative research and inquiry that improve understanding of challenges to sustainability and lead to real-world solutions and problem-solving.
- Encourage a collaborative approach to research that includes faculty research undertaken in partnership with operations staff, students, community organizations, industry and any other potential stakeholders.

Improvements in operations and practices
- Develop strategies and objectives that conserve resources, decrease the production of waste, minimize ecological footprints, and decrease greenhouse gas emissions.
- Provide practices aimed at sustainable supply chain management.
- Develop processes that support long-term ecological, socially, and fiscally responsible decision-making in activities, operations & practices.

Stewardship
- Protect the natural environment by enhancing local and global ecosystems and biodiversity for both present and future generations.
- Contribute to the protection of the Earth’s environmental life-supporting systems by minimizing the pollution of air, water, and soil.
- Aim to enhance the global environment through balanced and positive social, economic, and ecological activities.
Environmental Education

- Postgraduate programs (more than 500 students and 100 PhD)
- Undergraduate courses
- Seminars and Lectures
- Schools seminars
- Cooperation with other Institutions and Organizations
Research

- Bio-products and biofuels
- By-products (waste) valorization
- Renewable Energy Sources
- Energy Conservation and Production
- Fuel cells
- Wastes to end-products (fertilizers, polyphenols, Polyhydroxyalkanoates, etc)
- Hydrogen and bio-hydrogen production
- Greenhouse gases
Exploitation of Research Results

Red mud dispersion in the Central Gulf of Korinthos
(700,000 t/year)

Installation of 4 filter press. Total investment: 12,000,000€

!!!!!! End of rejection 31-12-2011 !!!!!!
(project EPAN with University of Patras)
Applications

Solar car (ERMIS)

SEATRAC autonomous sea access for AMEA

Hermes II, 29 kg

Hermes I, UPatras 2004
Energy Consumption

Electricity cost
2 M€/Year

Running project
- Energy reduction

Future plans
- Co-production of electricity and heat
- Renewable Energy Sources (solar, wind energy, biofuels etc.)
Energy Savings

building management system (BMS)

- 6 BMS (new buildings)
- 38 electricity monitors and recorders

A 10% energy saving is anticipated
Renewable Energy

6 Panel Technologies

- p-Si
- a-Si
- a-Si/μc-Si
- CIGS
- HIT
- CdTe

Data logger

web monitoring and supervision on-line measurements of solar energy, air temperature, module temperature, wind speed

photovoltaic installation 10 kWb

Department of Chemical Engineering
Energy: Renovation Projects

Department of Mechanical Engineering and Aeronautics

Total budget: 850,000€
Recycling

e-wastes

- 7 recycling campaigns
- 14 containers
- 7,000 to 8,000 pieces
Recycling

- PAPER: 12.145 kg
- BATTERIES: 1.542 kg
- INK CARTRIDGES: 1.348 kg
- LIGHT BULBS
- HAZARDOUS WASTES
The quality of the effluent is satisfactory for irrigation of green areas.
Continuous Measurements

- sulfur dioxide, nitrogen oxides and carbon monoxide
- Particulate matter, PM10 and PM2.5, ozone.
Greenspace activities
Upatras Point for Environmental Awareness
National Park Vouraikos gorge, Helmos mountain
Collaboration with organizations

Mediterranean S.O.S.
Alternative Transportation

Volunteer social network of student and staff of the UPatras DIAPASON

- Biking
- TRENOSE
- infrastructure (round-about)
Walking Routes

Support natural ecosystems on campus
Awareness activities

- REDUCE
- REUSE
- RECYCLE

SUSTAINABILITY
Awareness activities

**RECYCLABLE ITEMS**
Recycling empty printer or fax cartridges (inkjet or laser)

At University of Patras there are bins in the Secretariat office of each Department, in the Library, in the Central Administration Building and in the Printing Center. The recycling is being held with the cooperation of FillTec Co.

**RECYCLABLE ITEMS**
Recycle paper of any color and type: old corrugated containers, old magazines, old newspapers, office paper, residential mixed paper, file folders, copy paper, junk mail, cardboard. You cannot recycle used paper towels, napkins and tissues.

At University of Patras there are bins in the Secretariat office of Chemical Engineering, Civil Engineering, Architectures and Physics Department, in the Library, in the Central Administration Building and in the Printing Center. The recycling is being held with the cooperation of ANYEL SA.
Awareness activities

RECYCLABLE ITEMS

All kinds of lighting fittings can be recycled because of the material that comes out of them like iron metals, copper, aluminum, glass, plastic which can be recycled and reused in a very big percentage.

The recycling items are:

- Lighting fittings
- Incandescent lamps

The lamps below have mercury and have to be put in a specific waste bin. The recycling procedure for these is different. It is very important to handle them very carefully so we can prevent them from being broken and releasing mercury in the environment.

- Fluorescent lamps
- Compact Fluorescent lamps
- High pressure Discharge lamps, which include sodium lamps, mercury lamps and metal halide lamps

Recycle lamps and help the environment. All used lamps can be sent in specific approved recycling companies. From there the following materials can come out:
- Glass
- Metals
- Fluorescent Powder
- Mercury

At University of Patras there are two bins in the Central Administration Building and the recycling is being held with the cooperation of FOTOKIKLOSIS SA

The recycle waste bin’s dimension for lamps is 600 X 400 X 800mm. All kinds of lamps can be recycled. In order to make the collection easier we have placed inside the bin, separates. There are two rectangle cartons where we place the elongated fluorescence lamps and two square cartons for the rest of the fluorescence lamps like the ones that have mercury-sodium-round and compact.
Awareness activities

At University of Patras there are bins in the Secretariat office of each Department, in the Library, in the Central Administration Building and in the Printing Center. The recycling is being held with the cooperation of AFHS SA.

Recycle all portable batteries. From recorders, radios, toys, cellular and cordless phones, laptop computers, watches, lenses, cameras...

Batteries weighing more than 1.5 kg – Two bins in the area of Library with the cooperation of SYDESYS

All batteries are extremely toxic and harmful to the soil, groundwater and human health.

Why should we recycle the batteries?
- Protect the environment
- Energy save
- Reduce waste

Electrical and electronic equipment waste
- In the Library in cooperation with Electrocycle
**Sustainability Questionnaires**

1. **Do you know what sustainability is?**
   - None
   - Little
   - Quite a bit
   - Great deal
   - Do not know

2. **Are you a volunteer in a University team?**
   - Yes
   - No

3. **Is there a Committee of Environmental Management in your University?**
   - Yes
   - No

4. **Is there an Office of Sustainable Management?**
   - Yes
   - No

5. **Are you recycling in the University?**
   - Paper
   - Cartridges
   - Batteries
   - E-waste
   - Lighting bulbs
   - Used oils
   - Plastic
   - Other, please specify

6. **What is the most important drawback in the sustainability management of the University (indicate only one)?**
   - Lack of interest
   - Organisational structure
   - Lack of information
   - Financial constraints
   - Other, please specify

7. **Indicate the extent to which the University offers courses which address topics related to sustainability.**
   - None
   - Little
   - Quite a bit
   - Great deal
   - Do not know

8. **Estimate the amount of research or scholarship being done in the various disciplines in the area of sustainability (for example renewable energy, sustainable energy design, etc.).**
   - None
   - Little
   - Quite a bit
   - Great deal
   - Do not know

9. **What percentage of faculty members teach or do research on sustainability issues?**
   - .......... %

10. **What percentage of faculty members do you estimate would be interested in teaching and research on sustainability issues?**
    - .......... %

11. **The chart below lists some of the operational practices emphasized by institutions moving toward sustainability. Please complete the chart and indicate the extent to which the University of [University Name] has implemented these practices using the following scale: 1 - none, 2 - a little, 3 - quite a bit, 4 - a great deal, 5 - don't know.**

<table>
<thead>
<tr>
<th>PRACTICES</th>
<th>RATE from 1-5</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 and air pollution reduction practices (including alternative fuel use, renewable energy sources, emission control devices, etc.)</td>
<td></td>
<td></td>
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<tr>
<td>Building construction based on ecological design</td>
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</tbody>
</table>
Sustainability questioners

1. Does your University have a sustainable policy?  
   YES  NO

2. Choose from the table the two most important roles that University of should have in the region:

   - High educational and research level
   - Environmental management
   - Energy conservation
   - Sustainability policy
   - Health issues
   - Equal opportunities – social justice

3. How important is the role of the university in sustainable development?
   - Not important
   - Little important
   - Very important
   - Extremely important

4. What area of the following would you choose as the most efficient for the sustainable initiatives of the university (tick one option only)

   - Environmental management
   - Research in environmental and sustainable issues
   - Help and advice how local region can handle environmental issues
   - Add in curriculum lectures involving the sustainability issues
   - Energy conservation
   - Recycling paper, batteries, plastic, cartridges etc.
   - Volunteer actions
   - Wastewater treatment plants
   - Water saving
   - Other

5. Do you believe that Universities have environmental effects?  
   YES  NO

6. Do you know how to save energy in the university buildings?

7. How important do you consider are the active members of the university community in environmental management programs of the University?
   - Not important
   - Little important
   - Very important
   - Extremely important

8. In your opinion who must initiate the sustainability practices within the University? (choose one option)
   - Students
   - Academic Staff
   - Staff
   - Administration

9. Which way is the most convenient for students to be informed about the actions of the University?
   - Announces in the official web page
   - e-mail
   - Facebook, Twitter etc
   - Brochure
FACTORS FOR SUCCESS

- Understand the culture of the campus - how to gain awareness, involvement, inspiration, and commitment
- Set feasible goals
- Long term goals that remain consistent overtime
- Maintain operational stability
- Get reliable Sustainability Partners
- Find day to day successes in times of tight or no budgets
- Marketing and communications play a huge role in helping this process succeed
- Maintain on-going involvement and support of the authorities

SUSTAINABILITY IS PLACE, TIME AND PEOPLE DEPENDING
THANK YOU!

Education is humanity’s best hope and most effective means in the quest to achieve sustainable development (UNESCO, 1997)