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LitusGo Manual

Module 20

Green Buildings

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Preface to the LitusGo Education Manual

The LitusGo Manual is part of the LitusGo educational package which is included in the LitusGo portal: www.litusgo.eu. LitusGo aims at the training and capacity building of Local Authorities and local stakeholders in Integrated Coastal Zone Management issues and the reaction to the impacts of climate change.

This Manual consists of 20 autonomous, self-contained and inter-related modules. The modules are available in four languages, Greek, English, Maltese and Turkish and in three different forms: the dedicated wiki application in the LitusGo portal, the dvd and the hard copy version. This hard copy version of the LitusGo Manual consists of 20 self-contained booklets, one for each module, kept in a hard collective case.

List of modules of the LitusGo Educational Manual

Module 1:	European legal framework
Module 2:	Stakeholder involvement/Public participation
Module 3:	Sustainable tourism-carrying capacity
Module 4:	Water resources management
Module 5:	Fisheries/fish farming
Module 6:	Coastal water quality
Module 7:	Ecosystems management (land and coastal ecosystems)
Module 8:	Waste management/recycling/compost
Module 9:	Air pollution
Module 10:	Land uses/urban planning/coastal over-development
Module 11:	Landscape and marine-scape management
Module 12:	Coastal erosion control
Module 13:	Community annoyance issues 1: noise pollution
Module 14:	Community annoyance issues 2: light and thermal pollution, odours
Module 15:	Archeological areas/historic sites/cultural heritage
Module 16:	Extreme conditions management: flood risks, coastal flooding and storm surge
Module 17:	Droughts
Module 18:	Desertification
Module 19:	Energy use, consumption and management
Module 20:	Green buildings

Credits

The LitusGo Education Manual has been developed by the LitusGo Educational Manual Working group:
Modules 1, 2, 6, 7, 8, 9, 12, 13, 14, 16, 17, 18, 19 have been prepared by the scientific team of the beneficiary/coordinators ISOTECH Ltd. Major authors: Michael I. Loizides, Chemical/Environmental Engineer and Xenia I. Loizidou, Civil/Coastal Engineer. Constantinos Georgiades (MSc in ICZM) is responsible for the overall editing. The hard copy of the educational Manual is designed by Anastasia Georgiou.

Modules 3, 4, 5, 10, 11, 15, 20 have been prepared by the scientific team of the Sustainable Aegean Programme of ELLINIKI ETAIRIA - Society for the Environment and Cultural Heritage. Major authors: Georgia Kikou, Geographer, MSc Environment (Manager of the Sustainable Aegean Programme), Alexandros Moutaftsis, Economist, MSc Environment, Leonidas Economakis, Political Sciences, MA International Development.

Dr Alan Pickaver on behalf of partner The Coastal & Marine Union (EUCC) was responsible for the quality control of the educational material.

LitusGo partnership:

Coordinator/Beneficiary**:**

ISOTECH Ltd Environmental Research and Consultancy www.isotech.com.cy

Cyprus:

Municipality of Pafos www.pafos.org.cy

AKTI Project and Research Centre, www.akti.org.cy

Greece:

ELLINIKI ETAIRIA - Society for the Environment and Cultural Heritage www.ellet.gr **/ Sustainable Aegean Programme**, www.egaio.gr

ONISIS web development www.onisis.gr

Malta:

Municipality of Kirkop www.kirkop.gov.mt

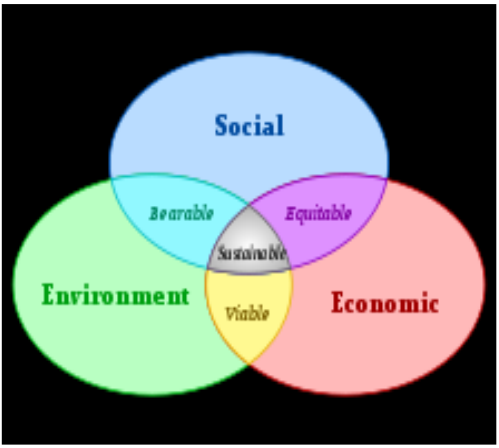
The Netherlands:

EUCC – The Coastal & Marine Union www.eucc.net

1| Theoretical background

Sustainability: the property of being sustainable, the condition where human activity may be continued indefinitely without damaging the environment and where the needs of all peoples are met equally [1].

Sustainable development embraces the main interdependent and indivisible areas of environmental protection, economic development and social development [2].



Picture 1. Definitions on sustainability often refer to the 'three pillars'' of social, environmental and economic sustainability [2].

Green building (also known as green construction or sustainable building) is the practice of creating structures and using processes

that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort [3].

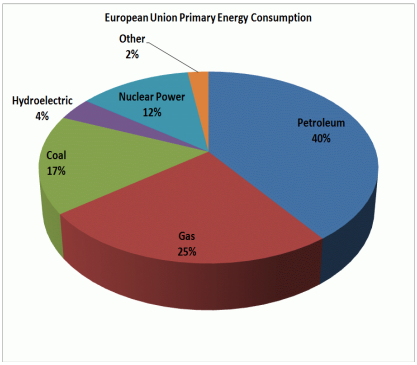
Advantages of Green Buildings [4]:

- Efficient technologies.
- Easier maintenance.
- Improved indoor air quality.
- Return on investment.
- Energy efficiency.
- Tax incentives.

Benefits of Green Buildings:

- Maximize energy conservation and efficiency by optimizing building orientation and integrating natural daylight and ventilation.
- Use of natural insulation such as roof gardens.
- Use of "green" technology such as solar panels, fuel cells, and photovoltaics.
- Conserve water and reduce runoff using solar water heating, contour landscaping, and water-conserving or water-recycling appliances.
- Energy saving. Energy is at the core of economic and social activity in industrialized countries. Energy costs affect not only industries with large energy consumption but also industry as a

whole and even the cost of living of citizens, notably because of the impact of energy prices on transport cost and heating [5].

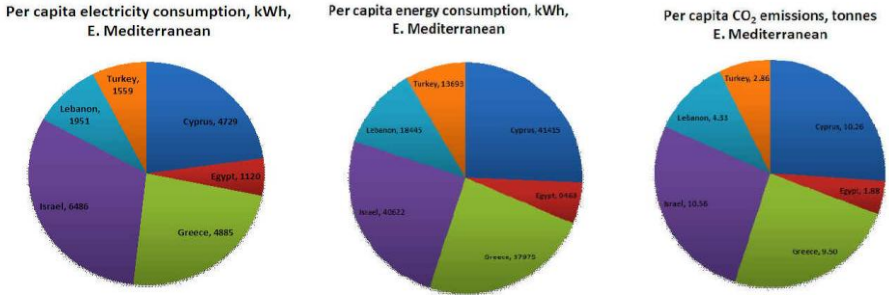


Graph 1. European Energy Consumption [6].

Below is the total energy consumption for each of the countries that participate in LitusGo, for the year 2003 [7].

Country	Total energy consumption in W per capita
Cyprus	4369,9
Greece	3594.0
Malta	2985,8
Netherlands	6675,2

The following three charts present a comparison among the eastern Mediterranean countries and how they are doing with annual energy consumption and CO_2 emissions [8]:



Picture 2. Per capita electricity, energy consumption and CO_2 emissions in Mediterranean [8].

The three charts show that Greece, Israel and Cyprus consume much more energy, electricity and have more CO_2 emissions than the other countries. What is surprising is that these three countries are not highly industrialised to justify that quantity of consumption. Facts like these show the need to develop more environmentally friendly consumption patterns, implement methods and solutions in our everyday life, and certainly to decrease energy consumption and CO_2 emissions. Green Buildings can greatly contribute in this direction.

In accordance with Directive 2002/91/EC on the energy performance of buildings, Member States shall take the necessary measures to ensure that new buildings meet the minimum energy performance requirements referred to in Article 4.
For new buildings with a total useful floor area over 1000 m^2, Member States shall ensure that the technical, environmental and economic feasibility of alternative systems is considered and is taken into account before construction starts. Alternative systems may refer to:

- Decentralised energy supply systems based on renewable energy,
- Combined heat and power (CHP),
- District or block heating or cooling, if available,
- Heat pumps, under certain conditions.

The Directive also contains provisions for existing buildings. Furthermore, energy efficiency Certificates are also available. [9].

2| Objective

Human overpopulation, expanding industrialisation and the increasing demands on resources, and other issues have brought degradation to the natural environment. Today, we are painfully beginning to learn that environmental resources are limited and sensitive to everything that we do. The LitusGo project, through this module on Green Buildings, is making an effort to support local authorities, local decision makers and local communities to acquire knowledge and capacities in order to take action and promote sustainability issues in their local development agenda, starting from their own houses and public buildings.

3| Problem

- Conventional buildings consume:
  - 2/5 of the world's energy production.
  - 1/6 of all water pumped out of natural flows.
  - 1/4 of all virgin wood harvested (not including furniture).

- Buildings account for some 40% of European energy consumption.
- 2/3 of energy used in European buildings is accounted for by households, their consumption is growing every year as rising living standards are reflected in greater use of air conditioning and heating systems.
- 10 million boilers in European homes are more than 20 years old, their replacement would save 5% of energy used for

heating.

- 30-50% of lighting energy could be saved in offices, commercial buildings and leisure facilities by using the most efficient systems and technologies.
- Half of the projected increase in energy needed for air conditioning – expected to double by 2020 – could be saved through higher standards for equipment [9].

"Green buildings" is a significant step towards sustainability in consumption patterns.

4| How to deal with the problem

Local Authorities can take action to promote sustainability in their areas. They can start from small interventions and proceed to bigger ones. Detailed descriptions of how to implement several of the following suggestions can be found in other LitusGo modules of this Manual.

- **Capacity building and education/trainings can** be organised by local authorities on different aspects of a green lifestyle, focusing in making local buildings and houses more "green". The spectrum is wide, the challenges are huge. Capacity building and information form the basis for local authorities' move towards sustainability.
- **Introduce sustainability policies in local decision making**. Set a list of "sustainability priorities". Adopt the "gap analysis method" of LitusGo: make the stakeholders actively involved by asking them to prioritise the local assets and local policies that

can shift from conventional to sustainable.

- **Stakeholder involvement:** Organise working groups and promote the implementation of the suggestions that will be adopted by the local decision makers and local stakeholders.
- **The Local Authority can promote "sustainability tips" for the everyday life of the citizens in order to make their houses more "green"**:

➢ **Saving energy tips:**

- ✓ Install low-flow showerheads, faucet aerators, and high efficiency toilets.
- ✓ Lower thermostats a few degrees in the winter.
- ✓ For winter: keep curtains or window shades closed during the night to keep in heat and open them during the day to let the sun warm your room and reduce heating needs. The opposite for summer: by opening curtains and shades during the night and closing them during the day the house stays cool and the need for air-conditioning is minimized.
- ✓ Wash clothes in cool (30°C) water**.** 90% of the energy used by washing machines goes to heating water.
- ✓ Use dishwasher and clothes washer only when they are fully loaded.
- ✓ Properly insulate the houses.
- ✓ Use Light Timers.
- ✓ Plant trees for passive solar protection.
- ✓ Install low-flow showerheads. With less water to heat you save water and energy.

➢ **Waste management:**

- ✓ Promote compost. Local Authorities can launch and subsidise pilot composting schemes. Compost home organic waste. In Mediterranean countries, organic waste is more than 50% of home waste. Households can have less waste and create their own soil for gardening.
- ✓ Local Authorities can implement tax-less schemes to encourage people to compost and reuse.
- ✓ Recycle, re-use paper etc.
- ✓ Use non-toxic cleaners, etc.

➢ **Local Authorities can support citizens (if possible by subsidies) that are about to construct a new house to implement "green building" provisions such as:**

- ✓ Use materials that are selected based on their life-cycle environmental impacts
- ✓ Make use of renewable energy resources. Install a solar water heater and even photovoltaic systems
- ✓ Minimize the use of mined rare metals and persistent synthetic compounds
- ✓ Apply reduce, reuse, and recycle to materials in all phases of construction and demolition
- ✓ Install grey water re-use systems
- ✓ Reduce harmful waste products produced during construction

As we become aware, we need to practice what we learn as that is the only way we can allow nature to catch up with the rate at which our requirements grow. This does not mean having to stifle human development. On the contrary, it means sustaining the supply of resources in order to sustain human development.

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