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"Basic Course in Corporate Social Responsibility"

CSR

Section 5

CAMERA DI COMMERCIO
TREVISO - BELLUNO | DOLOMITI

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"Basic course in Corporate Social Responsibility" in e-learning mode

Handout - Section 5

Stakeholders – Environment and territory

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1. Environment, territory and community

To give a definition of environment, (as a stakeholder) it is first necessary to think of the etymology of the specific term.
The word "Environment" is derived from the French word "Environ", which means "surrounding"; in this sense, it implicitly contains the idea of the centrality of man, which for a long time has characterized scientific and humanistic thought: man considered not as an integral part of the biosphere, but as an "external component", capable of shaping and managing the environment thanks to the superior intellectual abilities we are endowed with. However, it is not possible to speak of "environment" without considering human presence, since all of our choices and behaviours cause direct and indirect effects on the environment that surrounds us. Man and Environment constitute, therefore, an integrated whole where each action of the former determines a response from the latter, on the basis of which new choices and new behaviours will be determined. Given the global demographic increase and technological development, it is necessary to strive for an integrated management of the territory, where economic needs, well-being, progress and environmental protection are compatible.

1.1 Sustainable development

The term "sustainable development" was defined for the first time in 1987 in the Brundtland Report, which indicated the type of development that meets the needs of the present without compromising the possibilities of future generations. The consumption of resources must therefore be such as to ensure that successive generations receive at least the same amount of resources that we have received from the previous generation.
Eco-sustainability is expressed not only through productive activities, but also through saving activities and a weighted and "intelligent" energy consumption.

Sustainable development is characterised by three different dimensions: economic, environmental and social, and it is based on two very important principles:

- **intra-generational equity**, that is solidarity with developing countries;
- **intergenerational equity**, or respect for future generations.

Companies' commitment to achieving sustainable development in their business activities has increased thanks to public opinion and widespread awareness of this issue. However, such awareness in citizens and the media has been (and still is) conditioned mainly by the environmental disasters that have marked the 21st century, among which deserve to be mentioned: Minamata – Japan: release of Methylmercury in wastewater by Chisso Corporation chemical plant; Seveso – Italy: on July 10, 1976, in the ICMESA company plant, in Meda, bordering with Seveso, a chemical reactor which was destined to the production of trichlorophenol, lost control of temperature and overheated beyond the safety limits; the high temperature caused a modification in the chemical reaction that resulted in a massive formation of dioxin, one of the most toxic chemical substances which cause a bioaccumulation; Chernobyl – Ukraine: on April 26, 1986 in the nuclear plant reactor no.4 exploded; on November 19. 2002 the Prestige ship, sailing under the Bahamas flag, with a cargo of 70 thousand tons of oil, after a damage off the coast of Spain, broke in two and sank).

The commitment of the international community, developed starting from 1987 and culminated with the 1992 Rio de Janeiro Convention and then taken forward with the renowned Kyoto Protocol, can be summarized through 4 documents:

- the Rio Declaration (it defines in 27 points the rights and responsibilities of the Nations concerning sustainable development and key sectors of civil society matters);
- Agenda 21 (operational instrument for the implementation of the sustainable development principles);
- the Convention on Biodiversity (whose aim is to safeguard animal and plant species in their habitat and the rehabilitation of those in danger of extinction);
- the Convention on Climate (which sets general limitations for the containment of gas production and for the reduction of the "greenhouse" effect);
- the Forest Principles (which states the right to use forests according to each countries' needs, without however harming their conservation and development).

Another concept is associated to Sustainable development, which is **Sustainable Consumption**. It is a mindful and more efficient consumption, conscious about production, distribution, usage and disposal of products and services during their whole life cycle. Everyone can participate in the safeguarding of the Earth, as "sustainable consumers", also by implementing simple conducts or changing lifestyles to some extent. Following is a list of possible life choices that promote environmental sustainability:

- **Food choices:** prefer fresh and bio food containing less preservatives; seasonal and locally produced food (the preference for 100% local food is increasingly spreading: it means choosing to buy locally produced food, which ensure the minimum impact as far as energy consumption and emissions linked to product transportation, and other factors are concerned);
- **Reduce the use of products containing hazardous / toxic chemicals:** purchase cleaning products for the household and for personal care by checking labels and preferring those that obtained the ecological labels (for example Ecolabel), use the washing machine only when fully loaded, etc…);
- **Reduce air pollution:** when possible use public transport, bicycles/electric bicycles, go on foot (see paragraph on sustainable mobility; buy "green" motorized vehicles (GPL, methane gas, hybrid cars – GPL/electric/hydrogen fuelled[1]**;**
- **Sustainable tourism:** choose certified camping/hotels, respect the hosting country's laws and culture, etc…;
- **Reduce waste production:** the European Union Directive2005/32/CE[2], (commonly known as the EuP – Energy using Products – Directive) on the development of specifics for the eco-compatible planning of energy using products; it acknowledges eco-design concepts in order to produce eco-compatible products. This regulation involves all aspects of a product life cycle, in compliance with

[1] In Bozen, on September 21, 2017, the Carabinieri used for the first time a hydrogen patrol car.

2 The Framework Directive, containing the amendment to the European Council Directive no. 92/42/CE and of the European and Parliament Directives no. 96/57/CE and 2000/55/CE, was recognized by the Italian legislation with the Legislative Decree no. 201 of November 6, 2007, and it regards only some specific product categories; in order to use the CE mark on those products falling in the scope, it is mandatory to comply with EuP, which therefore becomes a binding rule. The Directive concentrates mainly on large diffusion products such as, for example: gas and oil fuelled or electric heater sand boilers, electric engines, lighting devices, household appliances, office machines, consumer electronics, HVAC (Heating, Ventilation and Air Conditioning) devices for air heating, ventilation and conditioning. Moreover, it focuses on on stand-by devices, and proposes consumer electronics for many electronic devices, such as televisions, recorders, etc. two shutting off options: hard-off or off mode, which guarantee a low energy consumption, null if the device is completely unplugged, and soft-off or stand-by mode, which is formally turned off but still consuming a certain quantity of energy, usually low but not null.

the Life Cycle Assessment principles (presented in the next paragraph); in this particular case, the choice of materials shall be made in view of their recyclability, considering the possibility to avoid the use of hazardous substances; the planning of the product and of all its parts (possible choices that reduce the product and its production energy consumption, possible solutions that lengthen the product life and the use of modular structures that simplify production, maintenance and disposal); product production; wrapping, packaging and distribution; user manuals that consider aspects to be signalled to the client; the product end-of-life (assessment of the difficulty to unpack the product for the disposal of waste and/or possible recycling of the product or part of it). Section 6 of this course will be dedicated to operational instruments to implement a corporate policy that pursues environmental sustainability. Other responsible behaviours are dealt with in the paragraph on waste management in this section, etc…;

- **Reduce water consumption:** prefer the shower to the bath, select low water consumption toilet flushes, dishwashers and washing machines (always use when fully loaded), carefully close the taps and insert a valve to reduce the water flow, etc…

1.2 Environmental sustainability indicators

Sustainability indicators allow to define and evaluate, in a simple and concise form, the degree of progress towards (or away from) a general sustainable development objective, by measuring some parameters considered significant; a good indicator is the one that allows to detect and remedy a problem before it is too late. The indicators are essential for carrying out a sustainability performance assessment.
The more an objective is difficult to define, the more the indicators play a fundamental role in achieving it effectively.

1.3 Indicators selection criteria

In order to be considered good and valid, a sustainability indicator must be able to highlight in a simple and concise manner a trend with respect to a definite objective, easily interpretable compared to a reference benchmark, easy to measure, plausible and reliable, that is, it must be recognized by the relevant national and international institutions.
All phenomena connected to sustainability are measurable: some are physical phenomena that can be directly measured, others instead are phenomena for which there is no possibility of a direct measurement, but which can be quantitatively expressed with reference to an appropriate and weighted intensity scale.

It is possible to identify two types of indicators:

- **absolute indicators**, which express the levels of those variables identified as meaningful;
- **relative indicators**, constituted by ratios between same-kind or different-kind absolute indicators.

Moreover, indicators can be classified, according to their function, in 4 large categories:

1. *descriptive indicators* (or systematic), which detect "what is happening" with regards to the various environmental components, and represent the basic indicators for the identification of the environmental situation;
2. *performance indicators*, which measure distance (distance-to-target) from the current situation compared to the reference values, political objectives, sustainability levels;
3. *aggregate indicators*;
4. *composite indicators.*

Criteria for selecting and validating indicators have been developed by various bodies; among these, the Organization for Economic Cooperation and Development has identified three essential requisites for the selection of an indicator, which are currently accepted and applied at an international level:

- **relevance;**
- **analytical consistency;**
- **measurability.**

The set of common indicators, identified at a European level, is divided into 5 main mandatory indicators:

1. Citizens' satisfaction with regards to the local community;
2. Local contribution to global climate change;
3. Local mobility and transport of passengers;
4. Availability of green areas and local services for citizens;
5. External air quality at a local level.

There are also 5 additional indicators which are discretionary:

1. Students' transportation to and from school;
2. Sustainable management of local authorities and local enterprises;
3. Noise pollution;
4. Sustainable use of the territory;
5. Products that promote sustainability.

Moreover, every time a system of indicators is aimed at being used in a strategic planning process (even more in case of Local Agenda 21 processes), the selection of indicators must be shared, and the final system construction must be carried out through a joint process.

An indicator system must be multidimensional and therefore able to represent at its best the three environmental, social and economic sustainability dimensions.

2. Life Cycle Assessment

The Life Cycle Assessment (LCA or Evaluation of the Life Cycle) is one of the fundamental tools for the implementation of an Integrated Product Policy (IPP), as well as the main operative instrument of the "Life Cycle Thinking". It is an objective method for assessing and quantifying the energy and environmental consumption and potential impacts associated with a product / process / activity throughout its entire life cycle, from the acquisition of raw materials to the end of life ("from cradle to grave").

This technique has assumed, both nationally and internationally, an important role among the tools created for the analysis of industrial systems, thanks to its **innovative approach** which consists in **considering all the phases of a production process as correlated and dependent.**

At an international level	At a European level
it is regulated by the ISO standards of the 14040 series, on the basis of which a life cycle assessment study provides for: • the definition of the objective, of the field of application of the analysis and the compiling of an inventory of the inputs and outputs of a specific system (ISO 14041), • the assessment of the potential environmental impact related to said inputs and outputs (ISO 14042), • interpretation of the results (ISO 14043).	The strategic importance of the adoption of the LCA as an essential scientific instrument that is significantly suitable to identify relevant environmental aspects, is clearly stated: • in the Green Paper (COM 2001/68/CE), • by COM 2003/302/CE on Integrated Product Policy and it is also recommended, at least indirectly, in the EMAS and Ecolabel Regulations.

The LCA aims to define, first, a complete account of the interactions of a product or service with the environment. This contributes to an understanding of the direct or indirect environmental impacts caused and gives those with decisional power the necessary information to determine the conduct and environmental effects of an activity, in order to identify opportunities for improvement, and the best solutions for intervening on environmental conditions.

2.1 Applications of the LCA methodology

The multiple applications of the LCA methodology provide fundamental support to the **development of Environmental Labelling schemes**:

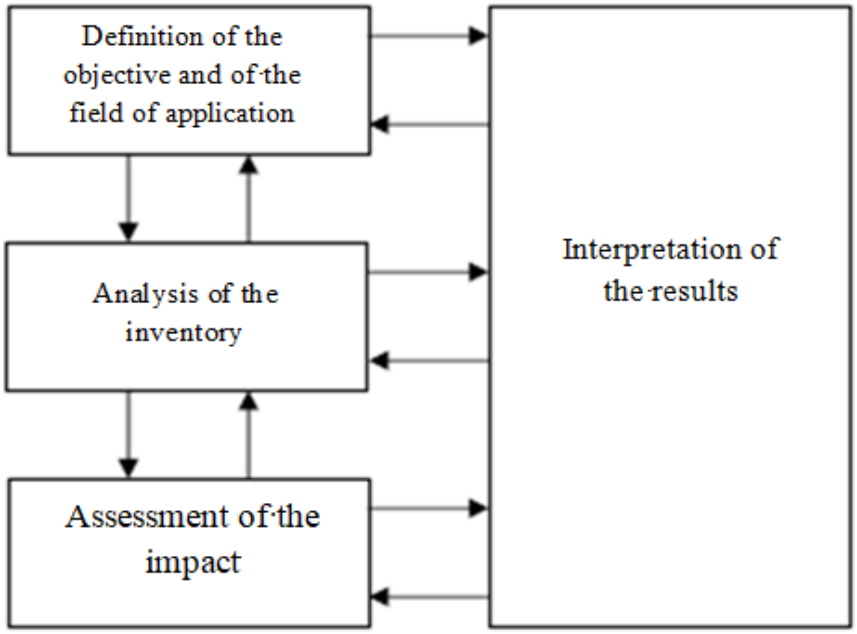
- in the definition of the environmental reference criteria for a given group of products (type I ecological label: Ecolabel),
- as the main tool for obtaining an Environmental Product Declaration: EPD (type III ecological label);
- in the development and improvement of products and processes,
- in Environmental marketing,
- in strategic planning,

- in the implementation of Public Policies.

2.2 LCA Phases

In accordance with ISO 14040 and 14044 standards, the Life Cycle Assessment is characterized by four distinct phases of analysis:

1. **definition of the objective and of the field of application** (goal definition): in this phase the aims of the LCA are specified (what is the object of the study?), the expected level of detail, and the reliability of the information required in the study;
2. **inventory** (Life Cycles Inventory Analysis), consisting of 5 parts: System boundaries; Process Flowchart; Collection of Data; Impact allocation rules/problems (Allocation Procedures) Processing data;
3. **impact assessment**: a technical-quantitative and / or qualitative process to assess the effects of the environmental impacts of the substances identified in the inventory;
4. **evaluation of improvements** (Improvement Assessment): options are evaluated and selected to reduce the environmental impact and consumption of the functional unit examined. This phase consists of 3 parts: a) translation and interpretation of results; b) verification of the achievement of the objectives of the study (iteration), the quality of the data and the limits of the system (sensitivity analysis); c) compare the possible options.



Phases of the LCA Cycle (ISO 14040)

3. Energy saving and renewable energy

In any building used for civil or tertiary purposes, in order to meet the needs of those who live and/or work there, energy is used (heating the rooms, water for sanitary use, air conditioning and ventilation, lighting, appliances operation, etc…). A rational use of energy, also called energy saving, is an efficient way to maintain an acquired quality of life, obtaining the desired result with the most suitable form of energy and with the lowest possible consumption. This involves the dual choice of energy source (minimizing the use of fossil fuels) and type of plant, which shall consistently maintain a "virtuous conduct" in its use.

The issue on energy saving in the construction sector should constitute a whole chapter in itself and this goes beyond the scope of this course. It was therefore decided not to provide an in-depth analysis of the regulatory aspects of this issue (at the end of the paragraph - and only for possible insights -) some of the main national and community regulations are mentioned), but to indicate some behaviours that, if implemented, may lead citizens and entrepreneurs to lower the high energy consumption and the relevant costs.

Examples of energy saving behaviours:

- **replacement of incandescent bulbs with compact fluorescent lamps:** these achieve lower energy consumption and longer life. Their higher price, compared to incandescent bulbs, is amortized by longer life. In transition areas (for example corridors) it is advisable to use the first kind of bulbs, as the frequent turning on and off reduce the life of fluorescent lamps;
- **natural light or "daylighting**": a careful lighting study (in particular in the construction phase) helps, thanks to the use of software that simulate the sun's movements, to calculate the estimate brightness values that can be obtained within the premises. Modern construction technologies used for glazed surfaces allow to provide for up to 75% of the necessary lighting during the day;
- **replacement of traditional boilers with condensing boilers.** traditional boilers use only part of the energy fuel while condensing boilers instead give back this amount of unused energy. The condensation process allows to recover the heat that would otherwise be dispersed with the fumes;
- **installation of radiant panels as heating systems:** heating systems installed on floors, walls and ceilings are more efficient both in terms of comfort and energy saving. Air is less dry, there are no warm currents, they improve acoustic insulation absorbing the noise within the various stores of the building, they work at low temperatures and can be integrated with a solar thermal system. It costs about 30% more than traditional heating systems; the use of thermostatic valves, chronothermostats, substitution of obsolete fixtures;
- **purchase of household appliances with class A energy consumption** and, if possible, request the dual hourly rates which allow for more favourable supply conditions for night hours and weekends;
- **home automation:** applied technology which studies home automation: It allows the intelligent management of all technical systems installed in a building (electrical, heating / conditioning, anti-intrusion systems, etc...);

- **implementation of automatisms in the operation of electrical systems:** use of timers to automatically switch off lights and/or other electrical devices, use of sensors that allow for lighting only if necessary (for example motion detectors), crepuscular sensors, etc… Possibility to completely interrupt tension for controlled plugs, excluding the stand-by functioning of electronic devices (it is possible to reduce yearly energy consumption without having to operate on the electrical system by avoiding using the stand-by function when not necessary: for example turn the PC monitor off when not in use, etc…)

Non–renewable energy sources (as natural gas, carbon, oil and nuclear energy) are those sources generated by long natural processes of transformation, which tend to run out within human life spans, becoming too expensive or too polluting for the environment. At the moment, non-renewable resources are the most exploited as they produce the largest amount of energy thanks to technologically tested plants. In most cases, non-renewable energy sources are those that pollute the environment the most.

Renewable and alternative energy sources are sources that, unlike traditional or fossil fuels, can regenerate in relatively short periods of time. The use of alternative energy sources allows to use what is available on the territory, enhancing resources and improving the quality of the environment. *"Renewable energy resources can provide for a relevant contribution to the development of a more sustainable energy system, increase the level of awareness and participation of citizens, contribute to territorial and environmental safeguard and offer opportunities for economic growth" (Italian White Paper).*

Common characteristics of renewable energy resources are:

- null or low cost of the used source: sun, wind, and water are indeed free of charge; biomass instead has a cost related to the necessary operations carried out in order to use it;
- higher investment costs for the building plants compared to traditional energy sources;
- plants systems require a medium-long period for cost amortisation, however they have a very long service life;
- null or low levels of emissions when in function;
- even small plants for decentralised production allow to make buildings self-sufficient from the energy point of view;
- State incentives: forgivable loans, contributions on produced energy (for example "Conto Energia" to produce electricity from photovoltaic panels, and green certifications).

The following are some alternative energy sources:

- hydroelectric energy;
- geothermal energy;
- energy derived from biomass and biogas (also biodiesel and rapeseed oil);
- wind energy;
- solar energy (both through thermal-solar and photovoltaic power plants);
- tidal and wave energy.

<u>Energy saving in the building sector: a few references to national and community regulations</u>

Energy efficiency in the building sector represents an issue of the utmost importance in the economic and social life of all citizens.

Starting from 2002, Europe carried out a series of initiatives aimed at reducing CO_2 emissions and at the same time the dependence from extra-UE non-renewable primary resources, promoting in particular a regulation framework aimed at improving energy performance of buildings, which represent about 40% of the total energy consumption and 36% of CO_2 emissions, but with wide margin for improvement and advancement.
The regulation process started in 2001 with Directive no. 91/2002/CE on energy efficiency with which the European Community provides guidelines for providing improved energy efficiency in buildings by indicating:

- Minimum requirements for new buildings, for those that are undergoing restoration and for those undergoing energy redevelopment procedures;
- Mandatory Energy Certifications;
- Regulate the inspection of air-conditioning systems;
- The reference regulation framework for the calculation of the buildings' energy performances.

However, the Directive cannot respond to those technological changes which, in the following years, have transformed buildings from passive into active bodies, able to produce on-site – even considerable - amounts of their energy demand thanks to the advent of Renewable Energy Source (RES) systems.
With the following Directive no.2010/31/UE (EPBD recast), besides recalling the key concepts defined in the previous directive, a new series of definitions and provisions was introduced in order to face technological changes such as nZEB (near Zero Energy Buildings): all new construction or significantly renovated buildings will have to, from 2021, be near zero energy buildings, that is to say, with a very low consumption of energy deriving from primary non-renewable sources. Basically, new buildings should: emphasise the use of renewable energy sources, have high-level performances, both in terms of external structures and internal systems.
In Italy, Directive no. 2101/31/UE was approved with the issuing of Law no.90/2013 and implemented through interministerial Decrees 26/06/2015. Starting from October 1, 2015, with the exclusion of some regional cases, it changed the way energy efficiency activities are carried out. The main news introduced in the Italian regulation systems examine:

- The introduction of new requirements to comply with, as the H'T global transmission coefficient;
- The APE reference model (Attestato prestazione energetica – Energy Performance Certification), identical at a National level;
- Introduction of the SIAPE (Sistema Informativo sugli Attestati di Prestazione Energetica - Information System on Energy Performance Certifications), which is a national energy land register that will soon be available at ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile - Italian National Agency for New Technologies, Energy and Sustainable Economic Development).

The new regulation strongly promotes the construction or renovation of high performance buildings, with increasingly isolated external materials due to the obligation to refer to transmittance values for opaque and transparent surfaces, which are stricter compared to the previous values, as well as having increasingly efficient systems, also thanks to the use of renewable sources generators.

Besides the regulatory aspects related to energy certification, there is Directive no.2990/28/CE on the "Promotion of the use of renewable energy sources" (RES), acknowledged in Italy with Leg. Decree no. 28/2011 and which imposes the use of RES in order to reach the minimum levels of renewable energy sources use set by the European Community for 2020. The directive is fully incorporated in the high-performance building sector as it imposes, with increasingly higher percentage points, the use of renewable energy in newly constructed buildings or buildings undergoing significant renovation. In particular, with relation to the previously described interventions, it is mandatory to install systems that can simultaneously guarantee for:

- 50% coverage of Hot Sanitary Water consumption from renewable sources;
- yearly global coverage using renewable sources for heating, hot sanitary water and cooling respecting the following percentage points:
  - 20% when the request of the relevant building permit is submitted from May 1, 2012 to December 31, 2013;
  - 35% when the request of the relevant building permit is submitted from January 1, 2014 to December 31, 2016;
  - 50% when the request of the relevant building permit is submitted from January 1, 2017;

For new buildings and for buildings undergoing significant renovations, it is furthermore mandatory to install RES powered systems with power P equal to P = (1/K) *S that produce electricity, where S is the surface plan of the building at ground level, while K is a coefficient assuming the following values:

- K=80 when the application of the relevant building permit is submitted from May 1, 2012 to December 31, 2013;
- K=65 when the application of the relevant building permit is submitted from January 1, 2014 to December 31, 2016;
- K=50 when the application of the relevant building permit is submitted from January 1, 2017;

The "Energy Efficency" Directive no.2012/27/UE, acknowledged in Italy with Leg. Decree no.102 of July 4, 2014, defines also a series of measures to achieve a 20% improvement in energy efficiency within 2020 in all the UE. Among these are:

- the energy diagnosis defined as "a systematic procedure aimed at obtaining an adequate knowledge of the energy consumption profile of a building or group of buildings, of activity or industrial, commercial or public/private services systems, at identifying and quantifying energy saving opportunities under the cost/benefit profile and at reporting the relevant results". In particular the decree provides for the performance of a diagnosis by large energy-consuming companies within December 5, 2015 and then every 4 years. The results of such diagnoses are then communicated to ENEA and the ISPRA (Istituto superiore per la protezione e la ricerca ambientale - Institute for Environmental Protection and Research), in charge of the filing;
- the obligation to perform energy efficient interventions on buildings of the public administration which cover at least 3% per year of the air-conditioned working surface;
- the obligation to implement, within December 3, 2016, in all buildings having centralised systems, heat metering and energy consumption billing systems, beside the implementation of thermo-regulating systems, which represent a very useful instrument to limit consumption and simultaneously improve energy usage. A notification system without regulations is indeed useless as it does not allow final users to have control over their consumption, but, similarly, a regulation

with no notification is also useless as the final user feels less encouraged to use it as there is no possibility to measure real consumption.

For any further in-depth analysis on this issue please check the following document http://documenti.camera.it/Leg17/Dossier/Pdf/AP0120A.Pdf (Chamber of Deputies 16th Legislature "Renewable sources and encouraging mechanisms for the sector: perspectives and objectives no.284/1)

4. Waste Management

Urban and special waste management is a fundamental aspect in the human journey towards a more sustainable development and the improvement of the current environmental safeguard level; it is based on the "4 R principle" (reduce, re-use, recycle and recovery), is aimed at preventing waste production, reducing the quantities generated and the level of danger to health and the environment, re-use of certain goods (such as packaging), promoting recycling and other forms of material recovery (such as composting), developing energy recovery systems, guaranteeing safe disposal of non-recoverable waste, and disposal in suitable facilities possibly close to the place where the waste is produced.

A company that is socially responsible towards the environment must at least comply with the binding national and community regulations that coordinate waste management. Below there is a list concerning the main laws that regulate this issue. Some interventions/behaviours that companies and citizens can adopt to go beyond law obligations will later be indicated.

4.1 National and community regulations on waste management

The European Commission started in 2005 a reformation process of waste regulations, which led to issuing Directive no. 2008/98/CE and of Regulation no. 2014/955/UE in 2014. The European Union therefore proposed a legal framework aimed at controlling the whole waste cycle, from production to disposal, focusing on re-use and recycle, setting objective goals that must be met by 2020 and identifying strategies useful for pursuing these goals.

- prevention principle;
- hierarchical waste principle;
- prevention, preparation for re-use, recycling, recovery, disposal in landfills;
- "polluter pays" principle;
- green economy.

Based on the abovementioned principle of waste hierarchy, the European Commission established that the correct management of waste must respect a hierarchy of actions that follows an order set considering the environmental sustainability priority level.

a) prevention
b) preparation for re-use
c) recycle
d) recovery of other kind, for example energy recovery
e) disposal.

According to this principle, prevention must be carried out favouring the reduction of production and dangerousness of waste, and enabling easy re-usage, recycling and other recovery operations. At the lowest level of the waste hierarchy principle there is disposal in landfills, conceived as a residual option to be eliminated over time.

Italian regulation has implemented the European Law Decree no. 152/2006, subsequently modified with Law Decree no. 205/2010. In 2013 the Ministry of Environment approved the First National Action Program

that sets the essential prevention objectives to be achieved by 2020 in lines with the European Union Objectives.

Through the Stability Law 2014, the Chamber approved the *Collegato Ambiente*, a document that sets measures for public tenders, safety and environmental impact assessments, hydrogeological instability, energy saving, environmental taxation and Green Economy.

Waste legislation is particularly complex and detailed, and an in-depth analysis cannot be dealt with in this course. Please refer to the Italian Ministry for the Environment, Land and Sea Safeguard where you can check all the main topics organized by years (Water, Air, Energy, Nature, Land).

4.2 Commitment of the Public Administration

Public Administration authorities shall promote all the activities aimed at:

- preventing waste production, favouring waste recovery and reducing its hazardousness;
- favour development and implement clean technologies, especially those able to reduce the consumption of natural resources;
- adopting functional economic instruments to achieve the objective;
- promoting the adoption of corporate management instruments such as, for instance, eco-statements, sustainability reports, environmental management systems (section 6 of this course), life cycle assessments (LCA), ecolabelling;
- informing consumers and raising awareness;
- fostering the design and sale of specially conceived products that can reduce waste production and the environmental impacts related to waste production, use and disposal.
- identifying tender conditions that give value to those solutions able to avoid waste production, define tender conditions that favour products made with resource recovery.

4.3 Waste prevention

Waste preventionconsists in a set of instruments addressed to discourage, financially penalise or even ban the production of materials and products featuring a very short Life cycle, becoming waste without any possibility of reuse. For all these activities, both enterprises and citizens can be an active party, being encouraged to reduce from start waste production or to properly dispose waste.

4.4 Advice for enterprises and citizens

For enterprises and citizens, we can give the following advice about waste management:

- properly dispose waste, segregating it based on its type (wet waste, Glass/Plastic/Tin, paper and cardboard, non-recyclable dry, batteries, expired medicines; use of further disposal containers at Waste Management Facilities, such as those for mineral/vegetable oils and Electrical and electronic equipment);
- provide an adequate number of containers within offices to allow employees to properly dispose waste;
- train the personnel on the importance of a proper disposal of produced waste;

- reduce paper consumption: avoid printing documents, mail or any other material unless strictly necessary; prefer the transmission of information and documents, among different departments and the management, through the net (server, email); use of recycled paper (printed on both sides); use of recycled paper for official documents;
- reduce toner consumption: when printing cannot be avoided, print by selecting draft copy or low resolution, not high resolution. It is moreover possible to recover empty toners and have them regenerated (in such a way there is no waste is produced and the empty container is recovered);
- favour the use of fully recyclable packaging: glass, aluminium and paper/cardboard are raw materials that better meet the recycling process requests;
- if possible, purchase bottles that can be returned;
- avoid buying and using products with too much packaging: a careful study of the packaging can save on raw materials, production and disposal costs for companies and reduce waste to be segregated by citizens;
- do not throw away something that is not broken just because it is old: many objects (house appliances, books, clothes, etc.) that we may consider worn out, ugly or no longer useful can be given to other people. A best practices case at a municipal level is the one involving a company that instead of disposing monitors and pcs that are no longer functional for its company, it gives them away to schools or bodies that can reuse them;
- repair broken objects when this is possible and more convenient.

5. Sustainable mobility

Sustainable mobility is a system of urban mobility inspired by the principle of efficient use of the land and natural resources and aimed at ensuring respect and integrity of the environment. It is able to reconcile the right to mobility with the need to reduce pollution (both noise and air pollution) and negative externalities (urban traffic, difficulties for pedestrians and bikers, risks of accidents, non-renewable resources consumption, less land available), which impose a social cost on the community, and can only be removed by adequate regulation and through public intervention. In 2011 two different European Commission Communications (COM/2011/112 Roadmap for moving to a competitive low-carbon economy in 2050 – March and COM/2011/885 Energy Roadmap 2050 – December) posed the question of setting a path to cut by 2050 greenhouse gas emissions to 80% below 1990 levels.
The 2030 climate and energy framework adopted by EU leaders in October 2014 is based on the 2020 climate and energy package, setting three main objectives to be achieved by 2030:

- reduce greenhouse gas emissions by at least 40% (compared to 1990 levels);
- a renewable energy target of at least 27%;
- an energy efficiency improvement of at least 27%.

The White Paper issued by the European Commission in March 2011 provides for conventionally fuelled' cars to be halved in urban transport by 2030 and completely phased out by 2050. (EC, 2009 and 2011); urban mobility therefore shall give its contribution to reach these community goals.

Moreover the European Directive “Alternative Fuel” (2014/94/EU directive) indicates the path to follow to reduce to the minimum dependence from oil and environmental impact in the transport sector, by setting the minimum requirement for the construction of infrastructure for alternative fuels (electricity, Liquefied natural gas (LNG), Compressed natural gas (CNG) and hydrogen) to be implemented through national strategic frameworks of member states, as well as common technical specifications for charging points and requirements regarding information to users.

Pursuant to this Directive, electricity can increase the energy efficiency of road vehicles and contribute to reducing CO2 emissions in transport, with advantages in terms of air quality improvement and noise pollution reduction in urban and suburban areas. EC indications refer to the fact that Member States shall provide charging points accessible to the public in such a way as you guarantee adequate supply so that electric vehicles can circulate in urban and suburban areas and other highly populated areas. The number of these charging points shall be set by considering the estimated number of registered electric vehicles by end of 2020 in each Member State. Just to give an idea, the adequate average number of charging points shall be equivalent to at least one charging point per 10 vehicles, considering the type of vehicle, its charging technology and the private charging points available.

The 2014/94/UE Directive implements the TEN-T orientations providing that also inland ports and sea ports, airports and core road network, defined in the EU regulation n. 1315/2013 of the European Parliament and the Council (“TEN-T network”), provide the availability of alternative fuels.

In particular, the electricity charging points located along the coasts can guarantee a supply of clean energy for maritime transport and navigable inland waterways, especially in sea ports and inland navigation ports with low air quality or high noise pollution. The electric network located along the coasts can contribute to reducing the environmental impacts of ships equipped for navigation at sea and inland navigation.

Also, the supply of electric energy devoted to airplanes parked at airports can reduce the consumption of fuels and noise pollution, improve air quality and have a lesser impact on climate change. Member States can therefore take into consideration, in their respective strategic national frameworks, the need to supply airports with electric network.

Law n. 221 dated 28 December 2015 (the so-called document *Collegato ambientale*) published on the Official Gazette on 18th January 2016, stating the "Provisions regarding the environment to promote green economy measures and limit the excessive use of natural resources" represent a small though important step in the path that our country is taking towards European standards: it is envisaged to allocate, within the 35 million Euro limit, the amount of resources that fall within the competence of the Ministry of Environment, for the achievement of a national experimental program of sustainable mobility home-school and home-work, within the scope of projects that can be allocated 50% of the profits coming from the auctions of the European system for the exchange of quota of greenhouse emissions (pursuant to Art. 19, comma 6, of Law Decree 13 March 2013, n. 30), aimed at limiting the effect of traffic and air pollution, such as the walking school bus, car-pooling, car and bike sharing. Due to the smog emergency, more and more public administrations in some large cities had to take measures to limit traffic (road blocks**,** alternate days circulation, reducing speed, etc.), therefore the Government has planned further interventions, more structured, among which financing actions in favour of electric mobility with 50 million Euro addressed to large cities.

Law n. 257/2016 published on the Official Gazette on 13 January 2017, implementing the 2014/94/EU Directive, sets the minimum requirements for the construction of infrastructure for alternative fuels including the charging points for electric vehicles and the refuelling points for Liquefied natural gas (LNG), Liquefied petroleum gas and hydrogen. Pursuant to these regulations, by 31 December 2017, Municipalities shall update their building regulation providing that achieving the building certification for new buildings [3]is bound to supplying electric infrastructure for charging vehicles.

The provision defines to supply on the territory an adequate number of charging points accessible to the public by 31 December 2020.
By 31 December 2015, an adequate number of charging points for hydrogen shall be made available to the public, to be developed gradually, by taking into account the current demand and its evolution in the short term, to allow the circulation of hydrogen internal combustion engine vehicle, including hydrogen fuel cell vehicles. In order to guarantee uniform minimum levels of accessibility to the charging services and uniform development over the whole Italian territory, the Government adopted the National Plan for charging infrastructure aimed at creating an infrastructure network and carrying out recovery actions on the building heritage to develop networks, by introducing charging service management procedures based on electronic

[3] This obligation concerns new buildings for non-residential use with a useful surface of over 500 sq.mt., which underwent deep renovation, and new residential buildings with at least 10 housing units which also underwent deep renovation. The electric infrastructure installed shall allow for recharging a vehicle from each single lot in the covered or uncovered parking space or from each car shelter, regardless of them being in property or not, in compliance with the building provisions set out in the Regulations and - only for new residential buildings with at least 10 housing units - for a number of parking spaces and car shelters not inferior to the 20% of the total.

counters; to implement the National Plan, the Government promotes the finalization of programme agreements with the participation of all public and private stakeholders, including the providers of electric energy.
The Regions, in the case of authorisations for the creation of new fuel stations and complete renovation of the existing fuel stations, must comply with the obligation of having electric charging points. Moreover, Regions must adopt law provisions of their own competence based on an agreement with the Government to better assure the achievement of single units and uniforming them over the territory. The Regional legislation can provide, among others, a minimum standard of public charging points, consistent with the National Plan provided for by the Government.

Introducing sustainable mobility models implies, besides saving energy and costs and a more efficient organization of mobility, having positive impacts on the citizens' life quality. Therefore, sustainable mobility is a very important social qualification factor.

5.1. Sustainable mobility interventions: a few examples

Among sustainable mobility interventions there are:

- **Strengthening local public transport:** thanks to dedicated lanes or ways, fare integration systems, info-mobility instruments and the adoption of suitable planning instruments such as, for example, the Urban Mobility Plan. Public transport is the first historical expression of sustainable mobility. Vehicles assigned to mass transport allow for the reduction of private means of transport.
- **Fares and park pricing:** Congestion pricing that regulates the entrance with fee to streets or particular urban areas. Park pricing (implementation of hourly tickets on parking increases the cost of private cars usage and facilitates the access to the parking for short periods of time); Park and Ride (facilitation of the interchange between car and public transport in cities), mobility credits. It is most effectively applied in Road Pricing, which extends the payment of the ticket to all cars entering the city (for example in London);
- **Traffic calming:** the temporary imposition of a ban on urban traffic is an emergency measure to reduce road traffic and polluting emissions, however not solving the problem. This intervention aims at banning the use of cars to favour more sustainable alternative mobility alternatives. The most efficient methods for traffic calming are Green Islands (established in 1995 and recognised in Europe as Zone30) and restricted traffic areas. In the first case they are areas with reduced movement of vehicles, where there is no transit traffic, and they are aimed at recovering the liveability of urban areas. In the second case these are urban areas marked by specific physical and prescriptive signals for entrance/exit, and in which the objective is to integrate the different traffic components and to requalify the functional, architectural, historical and cultural peculiarities of the area;
- **Car sharing and Car-pooling:** services based on the principle of using a private vehicle for collective use. In Car Sharing the vehicle can be rented, also for a few hours, at specialised companies and returned at the end of its use. It is very advantageous for those who occasionally use the car, as they can have a car available when needed without bearing additional costs. In Car Polling, instead, the car is owned by a private individual that makes it available for the home-work journey together with other passengers, often acquaintances or colleagues, who share the same timetable and route, thus contributing to diminishing traffic congestion. Companies can contribute to the promotion of car-pooling, given employees work at the same place and live in the premises

proximity. Car-pooling can be organized through an Operations Centre managed by a specific software that is in charge of the database, the passengers, also through newsgroups.

- **Mobility Manager:** a role introduced in 1998 with the function of analysing the mobility needs of employees of public and private companies with over 300 staff, working at the same production unit, or with over 800 staff, working at more local premises in the same municipality with at least 150,000 inhabitants (appointing a mobility manager in private companies is optional).
- **ITS information technology systems** to manage the flow of vehicles (for instance, channelling into city parking, traffic news, satellite navigation, etc.);
- implementation of **teleworking systems**;
- **Creation of safe home-school routes** (with specific pilot projects pedestrian mobility can be promoted (in some cities of the Veneto region, such as Treviso, the walking school bus[4], and cycling paths have been created for the home-school route, with a noticeable improvement of accessibility, liveability and safety in the territory for children and young people);

5.2 Best practice in environmental management

The following is a case study of a leading company in Treviso in the mortar, plaster and premixed materials sector. All pieces of information were retrieved from the company website.

The company, which has always considered efficiency, energy saving and environmental safeguard important issues, took part in the “Ministerial project for the assessment of environmental impact” applied to 4 products already present on the market, and published the relevant report in its Carbon Footprint, validated by a third-party authority.
The Carbon Footprint represents a subset of data retrieved from an LCA study. The analysis that was carried out enabled to compare and measure the environmental impact generated by the different production processes, measuring them in equivalent CO_2 kilograms, in order to identify those with the greatest impact, proving their environmental performance with the most objective data possible, compensating the produced CO_2quantity and trying to reduce its emissions at the source. This analysis represented an important opportunity for the company to examine and optimise its production system, with the aim to further improve it in terms of reduction of the impact on the environment.
The company has activated many partnerships, among which the one with Legambiente deserves a mention, as it has selected the company to promote the “Rapporto Cave 2017", and to launch a series of activities aimed at disseminating best practices in terms of circular economy and redevelopment of the residential and school building heritage. The company also cooperates with another important national leading company to promote, safeguard, and enlarge companies specialised in underground works. Many are the certifications and recognitions that attest to the security and eco-compatibility of the marketed products (European Technical Approvals that assess the technical suitability for use for in thermal insulation interventions; the British Board of Agrément, a certification deemed necessary to extend the offer of the “Cavity wall Systems", in particular for the British market; National Association of Bio-ecological Architecture: important recognition for organic-ecological products attesting to the maximum care for environment and full compliance with strictest bio-architecture criteria; the voluntary label concerning the

[4] Short home-school journeys to accompany children on foot, under the surveillance of some people in charge (firemen, teachers, parents); this avoids traffic congestion near schools and make children aware of environment.

emission of volatile and semi-volatile organic compounds (VOC and SVOC) is issued by the Voluntary Ecological Guards Association(VEG) for floor laying materials, glues and emission-controlled construction products. Applied to the Floors and Coverings Laying System, after undergoing strict tests, the products resulted as Emicode EC1 Plus (i.e. very low emissions levels); Green Building Council Italy, a non-profit association that favours the diffusion of a more sustainable construction culture, promotes LEED® credits, a measurable certifying system to check building sustainability. In 2017, 80 products by this company were mapped according to the requested requirements: a real help for those professionals who want to build according to this sustainability protocol; the NF certification label, fundamental for the French market; French Label Etiquetage sanitaire, a classification and labelling system concerning the volatile organic compounds emissions (VOC) of building, decoration and internal house finishing products, etc.).

The effort puts in the research for the best raw materials quality is then visible in the high standard level of the products. Pursuing solutions for territorial safeguard, as for example water usage and transport optimisation, leads to the development of highly technological products that respect the environment and the final user's safeguard.

The company directly cultivates and manages limestone and gypsum quarries, raw materials that are essential for the creation of products, with avant-garde extraction technologies and with techniques developed to respect the territory, workers' health, environmental recovery and the re-use of the quarry area at the end of the extraction. Extraction activities are developed to respect the geo-morphological, hydro-geological and landscape balances, thus minimising the impact on the territory. Dust and noises deriving from the working processes are constantly measured to check the quality of the working and external environment. Quarry cultivation is carried out both in surface, through horizontal descending plains, favouring the immediate reinstatement of the slope where the extraction took place, and with an underground crushing chamber, allowing for the reduction of road transport.