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Green economy and environmental awareness in school programs: The A.P.P. VER. project

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Index

Abstract

Green economy represents the focus of this project of thesis, as it is currently growing stronger and permeating different sectors of industry, production and services. However, it does not just refer to economic sectors: the green transition runs throughout society and environment as well and it constitutes a whole new progressive model heading to the concept of sustainable development.

This thesis was inspired by an internship done at "Città Metropolitana di Torino", which is promoting a new European project called "A.P.P. VER. – Apprendere per Produrre Verde". This context constituted the opportunity to enter the green world, as the A.P.P. VER. project is moving through different sectors, as industries and school education. The aim of the project is to modify educational schedules towards a green perspective, to ease students during their school-work alternation sessions and to raise environmental awareness not only inside schools, but also throughout all the territory in which they operate, in order to increase public participation and action in favor of the environment.

For these reasons, this thesis starts by defining the green sector. The first chapter tries to explain the basics of green economy, circular economy and sustainable development, how they were born and their development throughout history. As A.P.P. VER. cooperates with France, the French perspective is also included. The second section of the chapter provides the analysis of some green businesses certifications, such as environmental accounts and EGSS sector, moving after to the case of green jobs. This analysis is linked to the necessity, inside the project context, of identifying a number of green organizations, such as industries, public services or entities, in which students will enroll in a school-work alternation session. Thus, green indicators are needed to detect good examples of green practices.

As the project promoted by Città Metropolitana is being implemented in secondary schools, the second chapter addresses green educational policies, from a global, European, Italian and French point of view. It explains the major educational policies adopted in favor of the green transition: there are many policies inside each territorial context, but they all refer to the most important ones, such as the 2030 Agenda and the Europe 2020 programme. All the analyzed policies form the basis of the A.P.P. VER.

project, which marks the relationship between young students and their territory: environmental knowledge and awareness are fundamental to shape their minds and create responsible and informed new generations of people who respect nature and natural resources.

The third chapter of this paper analyzes the A.P.P. VER. project in a more detailed manner, starting from the context of Città Metropolitana, the related internship and moving after to the project itself. In particular, it focuses on one of the main instruments provided by the project, namely the Sussidiario, which allows for the detection of green organizations inside the designated territory. Some descriptive interpretations have been created "ad hoc" for this project, starting from the international green indicators described in chapter one. They have been modified by some working groups, in order to make them as suitable as possible to the territorial context and to the educational purposes of the project and they will serve for the identification of a number of green organizations that will be included in the project. An example of these new interpretations is given at the end of the chapter, in order to understand the specific territorial requirements inside the project context.

1. The Green Sector, How Is It Defined?

This first chapter addresses the basics of sustainable development and green economy, their history, development and changes at the international and national levels. The aim of the second section of the chapter is to analyze some types of green businesses classifications, moving to the more specific category of green jobs. As this whole study is directly linked to the A.P.P. VER. project, this first chapter gives information about the foundations of the project, concerning both the green economy literature and the international green indicators and classifications on which the project is based.

1.1 Green Economy, Circular Economy and Sustainable Development

1.1.1   History and International Foundations

The ideas of sustainable development and, mostly, of green economy are quite new. They started to appear at the end of the 20th century at the international level and they created the basis of the green sector we know today. The first important step was taken in 1972, during the United Nations Conference on the Human Environment, also known as Stockholm Conference: for the first time environmental protection became a major political issue, especially referring to environmental quality, the protection of natural resources and the promotion of international environmental cooperation. The main achievement was the creation of the United Nations Environment Program (UNEP).

The definition of sustainable development was firstly given by the United Nations World Commission on Environment and Development (WCED) in 1987 inside the Brundtland Report, also called "Our Common Future":

> "[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1987, chapter 2).

In 1992 the Rio Conference (Earth Summit) enforced the link between development and environmental protection and it created a convention on climate change and biodiversity, a Commission for Sustainable Development and an action plan called Agenda 21.

At the beginning of the new millennium, the United Nations created the Millennium Development Goals (MDG, 2000), which were composed by eight international targets to be met by 2015. They focused on extreme poverty, education, gender equality, child mortality, HIV and malaria, maternal health, environmental sustainability and international cooperation. The results were very often considered unsatisfactory because

of some implementation problems they had to face. Ten years after the Rio Conference, the Johannesburg Conference (2002) focused even more on the social dimension of development, and in 2008 the UNEP Green Economy Initiative (GEI) gave an important definition:

> "System of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities." (GEI, UNEP, 2008)

Green Economy has also been defined as a low carbon impact economy, a resource efficient and a socially inclusive one. "The Future We Want" is the document deriving from the Rio+20 Summit (2012) and it focused on the joint action of economic and social development.

Moving to more recent times, in 2015 the evolution of the MDGs has been proposed: the "Sustainable Development Goals - Transforming our world: The 2030 Agenda for Sustainable Development". They include 17 global targets promoted by the United Nations, about ending poverty and hunger, improving health and education, sustainable cities, fighting climate change and protecting oceans and forests. Also in this case, they have been often criticised for their contradictions and for the expensiveness of their implementation.

Regarding climate change, the first step in the fight against it was taken in 1997 with the creation of the Kyoto Protocol, which is an international treaty under the aegis of the UNFCCC (United Nations Framework Convention on Climate Change). Its Member States must reduce their greenhouse gases emissions; it came into force in 2005 with the ratification of Russia, but it has been strongly criticized because of its weakness in the fight against climate change. A more recent action was taken in 2015 during the Paris Conference on Climate Change (COP 21), which seeks to conclude a universal and binding agreement on climate to be accepted by all states. The goals of the Conference seemed to be mined by the recent intention of the United States to withdraw from the agreement, which will eventually happen only in 2020, but many US public and private actors showed their commitment in pursuing the fight.

At the European level, the environment became part of the political agenda in 1993 with the Maastricht Treaty, and the 1999 Amsterdam Treaty imposed the environmental

protection and sustainable development to be issued by European governments. In 2008 the Sustainable Consumption and Production Action Plan was presented by the European Commission, in order to improve environmental performances of products during their entire life cycle, to increase better productive technologies and to inform consumers. It also promotes Green Public Procurement and eco-innovation.

The Europe 2020 Strategy (born in 2010) consists of five quantitative goals to be met by the end of 2020, concerning employment, R&D, climate and energy, education, social integration and poverty reduction.

The 7th Environment Action Programme to 2020 was adopted by the EU in 2013 to protect natural resources, increase growth and low carbon emission innovation and to maintain the health and well-being of the population by respecting the natural limits of Earth. The main goal is a circular economy without waste.

1.1.2 Green Economy and Sustainable Development Today

The definition of Green Economy is given, at the international level, by the UNEP and it is not a simple economic definition: it comprises the whole natural capital and its different forms used by men. The key is represented by green investments, which are fundamental for the maintenance of natural capital and use of energy. The concept of green economy is strictly linked to the one of sustainable development: the last one includes the protection of natural resources (forests, water, agriculture, fisheries) and the push of their relative productive sectors (renewable sources, manufacturing, waste production and management, building, transport, tourism and cities). A sustainable management of the natural resources and of their sectors represents the correct application of the green economy concept, particularly linked to sustainable development: it is not just related to the environment, but also to the social dimension, through the creation of jobs, social inclusion and the reduction of income and gender inequalities.

The European knowledge on green economy is also based on the definition given by UNEP, although it is shaped according to European characteristics.

Figure 1: Circular Economy. Source: dreamstime.com

Sustainable development, meaning a healthy environment for humans and equitable access to natural resources, is threatened by the modern economic model. Green economy represents the solution, because it is based on transparency and on right governance, in order to eradicate poverty and boost sustainable and inclusive lifestyles.

The Italian Environment Department defines circular economy as a model in which "the value of products and materials lasts as long as possible, raw materials use and waste production are more than decreased and the components of products which reached the end of their life cycle can be reintroduced inside the production system. Thus changes are needed in design, market, firms and ways of consumption: in order to do so, innovation is fundamental, not only in the field of technology, but also regarding organization, society, financing methods and politics." (COM (2014) 398).

In France as well the UNEP's definition is adopted and, in particular, circular economy "is an economic model of production and exchange which, at every phase of the products' life cycle, aims at improving the efficiency of natural resources and decreasing the environmental impact, developing human well-being at the same time." (Ademe, 2017, France).
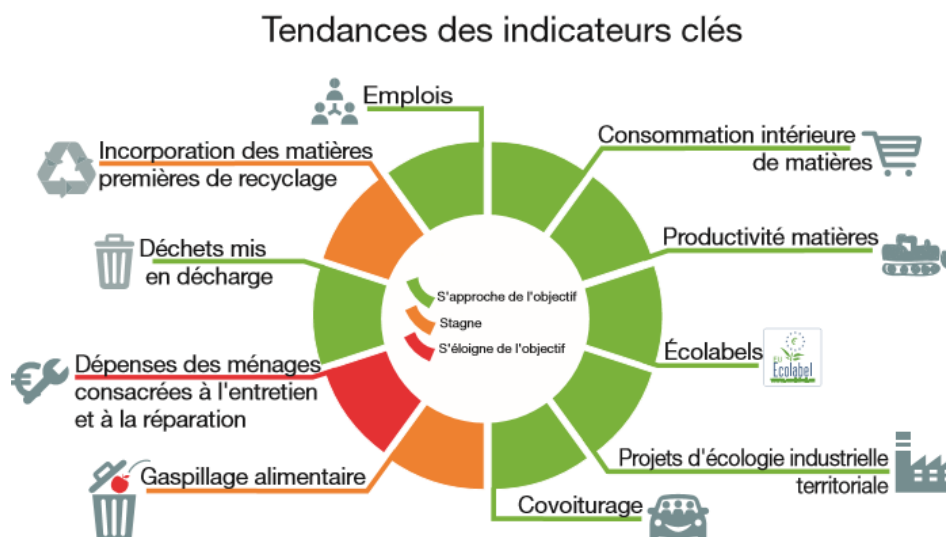

Figure 2 : Circular Economy in France. Source: 10 indicateurs clés pour le suivi de l'économie circulaire, Edition 2017

1.1.3 Environmental Cooperation and Education

Environmental cooperation is part of the international cooperation and it promotes environmental conservation as cultural, social and economic development for people involved in it. Social and economic development is sought through the protection of a threatened environment, by a sustainable use of its resources, in order to increase empowerment, improve life standards and sensitize people.

In particular, environmental cooperation has been discussed during the 2016 COP22 held in Marrakech, which is the prosecution of the Paris COP21. Environmental cooperation for sustainable development is fundamental to fight against climate change and to promote climate adaptation and mitigation. New models will be tested, as for the public-private collaboration, which demands strong commitment by every Member State. The institution of the Green Climate Fund by 2020 has also been

Figure 3: COP22 Marrakech

requested, in order to help developing countries in the struggle against climate change.

PAGE, Partnership for Action on Green Economy, was born in 2013 to support countries seeking for a green and more inclusive growth. It builds economic policies and sustainable practices for development, it creates new jobs, tries to reduce poverty and inequalities and to reinforce ecological foundations. Member countries are also assisted in the SDGs implementation, mainly regarding number 8: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all." (un-page.org)

Another important program is held by EU: Horizon 2020 focuses on research and innovation. Its funds are available from 2014 to 2020 and they also attract some private financings. Most of the development aids come from EU and European countries, which are the major global donors.

The Italian cooperation for development has been recently upgraded. The 2014 n.125 Law sets some goals as poverty eradication, inequalities reduction, human rights defense, conflict prevention and peace affirmation. The AICS (Agenzia Italiana per la Cooperazione allo Sviluppo) follows this general path and it also promotes the sustainable use of natural resources, the protection of water, air, soil and biodiversity, the fight against desertification and climate change. It also works in the energetic field (renewables) and in transports and infrastructures.

The French Strategy for Health and International Cooperation mainly promotes health, care and sanitation, but it also focuses on the environment, because a polluted or resource-less area could foster the increase of defeated or new illnesses. The French Department of the International Union for Conservation of Nature is engaged in environmental cooperation, mainly in Africa, for the promotion of biodiversity and local development, with numbers of projects starting from 2006.

As for environmental education, target 4.7 from the SDGs says that "every student must acquire knowledge and skills in order to promote sustainable development, through the education for sustainable development and sustainable lifestyles, human rights, gender equality, promoting a peaceful and non-violent culture, global citizenship and cultural diversity." (un.org)

Environmental education is a primary instrument to change people's minds and habits, in order to make them understand and correctly use the cultural values linked to nature and to be active participants in the fight for environmental protection.

1.2 Classification and Certification of Green Businesses

Inside the context of the A.P.P. VER. project, international green classifications and certifications constitute the basics on which special green indicators have been created. They have been shaped according to the project's purposes, both from a territorial and educational point of view. The following section analyzes the main international foundations on this matter.

1.2.1   Environmental Accounts

Environmental accounts are a statistical system focusing on the mutual relationship between economy and environment, as the modern economic system exerts a pressure on the environment and the environment contributes to the economy. Environmental data are collected using the same method of national accounts, but they are more exhaustive as they include two different levels. They focus on the amount of pollution emitted by industries and households and they compare these data with the output produced by these sectors or with inputs used to decrease pollution. They also include social aspects of sustainable development and employment shares of the green sector, as they are correlated to national data.

The account structure organizes data both in a physical and monetary term: every aspect investigated by national accounts is taken into consideration from an environmental point

of view. The measurement of physical flows is structured around the flows of natural inputs from the environment to the economy, flows of products within the economy and flows from the economy to the environment. The latest version, called "System of Environmental-Economic Accounting – Central Framework" dates to 2012 (SEEA 2012 CF).

The European environmental accounts collect data from the EU Member States and EFTA[1] countries, they are included in the "European Strategy for Environmental Accounts" (the latest version concerning the 2014-2018 period) and they are divided into modules.

- *Air emissions accounts* collect the presence of six greenhouse gases and seven air pollutants in the atmosphere. They include data on emitting industries and households and follow the residency principle of national accounts. They are used for carbon footprints and climate change modelling.

- *Economy-wide material flow accounts* concern the amount of physical inputs into the economy, material accumulation and outputs to other economies or to nature. They are used to measure resource extraction, material consumption, resource productivity and footprints.

- *Physical energy flow accounts* measure the flows of energy going from the environment into the economy, within the economy and back. They are suitable for energy productivity, analyses and modelling.

- *Environmental taxes* include energy, transport, pollution and resources taxes paid by industries and households. They are useful for economic comparisons and social studies.

- *Environmental goods and services sector (EGSS) accounts* show data on the production of goods and services that are strictly linked to environmental protection and resource management. They give information about environmental economy growth and green jobs. Their collection became mandatory in 2017.

- *Environmental protection expenditure accounts* report the environmental protection expenditures from a demand perspective. In particular, they quantify

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[1] European Free Trade Association

the economic effort undertaken by society and businesses for the implementation of the "polluter pays principle". They became mandatory in 2017.

- There are also two European indicators with no legal basis: *Forest accounts* and *Environmental subsidies and similar transfers accounts.* The first one concerns the value of wooded lands, from a natural, economic and environmental point of view. The latter includes subsidies and other State support methods that follow the cause of environmental protection.

As environmental accounts cover a wide range of sectors and many environmental issues, they are suitable for measurement, modelling and predictions regarding different fields, such as politics, social matters and economic strategies at both national and international levels. They represent a fundamental source of knowledge for policymakers, as they are multidisciplinary and they draw the overall relationship between human activities and the environment.

1.2.2 Environmental Goods and Services Sector Classification

EGSS focuses on environmental protection and resource management. Its statistics include data on the monetary value of producers' output, on the gross value added and on the employment deriving from this production. In particular, those economic activities are taken into account, which are favorable or less harmful to the environment. Data are collected into three main domains: economic activities, environmental protection class (wastewater and waste management, biodiversity and landscapes protection) and resource management class (water and energy resource management).
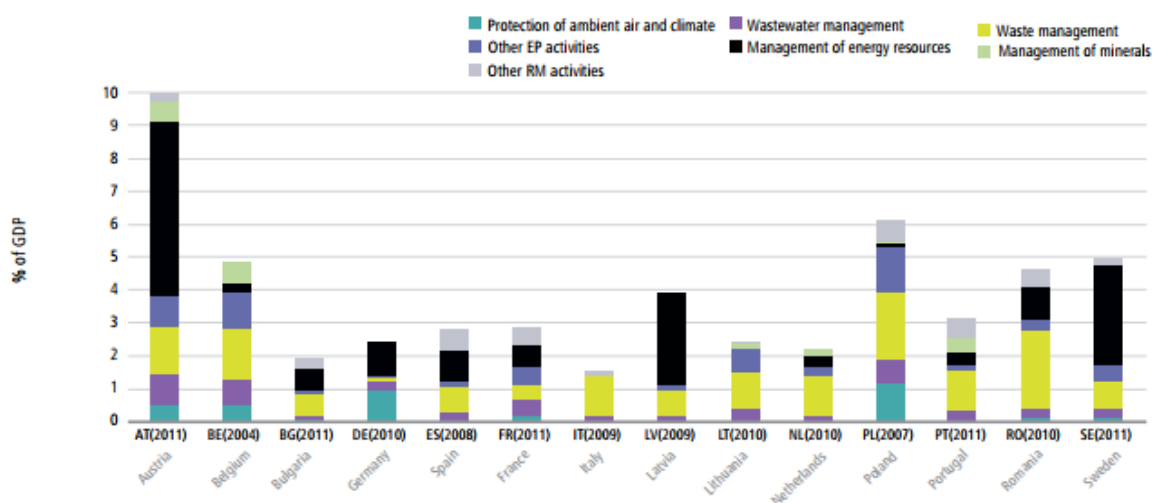

Figure 4: EGSS market output by environmental domain, latest available year (GDP %). Source: Eurostat

Cap 1. The Green Sector, How Is It Defined?

It is currently used by many EU countries and some developing countries. Products are classified as environmental goods or services if their primary aim is environmental protection or resource management, hence the technical nature of the product is taken into account. In case of uncertainty, the producer's intention can help the classification, meaning his awareness of impacting on the environment or being environmental-friendly. Some categories of environmental products can be listed:

- *Environmental specific (or "characteristic") products* are produced by principal, secondary or correlated activities focusing on environmental protection and resource management, such as waste and wastewater services, energy and water saving, production of energy from renewable sources, management of pollution, repair of environmental damages etc.

- *Connected (or environmental "sole–purpose") products* are solely connected to environmental protection and resource management and they do not represent an output of these activities, i.e. catalytic converters, rubbish containers, septic tanks…

- *Adapted (or "cleaner and more resource-efficient") products* are more environmental-friendly or less polluting when created or used than equivalent normal products sharing the same utility. They can also reduce the use and exploitation of resources if used as an alternative to normal products. For example, organic farming products, mercury free batteries, resource-efficient appliances.

- *End-of-pipe technologies* are used to control, measure and treat pollution: waste and wastewater treatment facilities, filters, incinerators, equipment for the recovery of materials or measuring air pollution.

- *Integrated (or "cleaner" and "resource efficient") technologies* are made of technical processes and skills which are less polluting and less resource intensive than the equivalent standard technologies, such as technologies producing renewable energy.

The economic variables taken into account:

- *Output* (goods or services inside the production circle)
- *Gross value added* (difference between the output value and intermediate consumption)
- *Employment* (full-time work needed to produce environmental outputs)
- *Exports* (exchange of goods and services from residents to nonresidents)

EGSS data are collected from existing information, reports and statistics, while surveys, estimations and research could also take place.

1.2.3   Green Jobs

The framework of EGSS provides the perfect location for the category of green jobs. Several guidelines concerning green jobs and jobs in the environmental sector have been created by ILO (International Labor Organization) in 2013. In particular, the focus was on

> "… a distinction between employment in the production of environmental goods and services for consumption by other economic units (i.e. employment in production of environmental outputs) and employment for consumption by the economic unit in which the activity is performed (i.e. employment in environmental processes). Green jobs are specifically referred to as a subset of employment in the environmental sector, meeting the requirements of decent work, including adequate wages, safe conditions, workers' rights, social dialogue and social protection." (UNEP, 2014, Measuring the Environmental Goods And Services Sector: Issues and Challenges).

Thus, they perfectly match the definition of sustainable development and green economy: they are involved in the production of environmental output or in environmental processes and they also empower social and community aspects.

As the "greening" of economy and society progresses, radical changes will occur in several sectors and consequently new jobs will appear, some old ones will be replaced and some modified. It is actually already happening:

> "…a 1% increase of the rate of growth of the water industry in Europe can create between 10,000 and 20,000 new jobs. Tourism and recreation in Natura 2000[2]

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[2] Network of protection areas in the EU territory. It includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and both terrestrial and marine sites.

sites are estimated to directly support around 8 million jobs corresponding to 6% of the total employment in the EU. Implementing existing legislation on waste prevention and management could create more than 400,000 new jobs and the review of the waste legislation now proposed by the Commission could create an estimated further 180,000 jobs, while opening up new markets, making better use of resources, reducing dependence on imports of raw materials, and lowering pressure on the environment." (EU Commission, 2014, COM(2014) 446 final).

Green components are likely to affect a large amount of different jobs, not only in the energy and water sector, but also in transport, agriculture, building, the biomass and biofuel sectors, forestry and tourism. They all can provide environmental services.

In the already quoted document "Green Employment Initiative: Tapping into the job creation potential of the green economy, 2014" the EU Commission suggests some priorities to be pursued in order to promote job creation and the transition to a greener economy:

- "Improving integration and coordination of existing European and national level policies and initiatives.

- Further developing governance structures and methodological tools to facilitate the transition towards a green and resource efficient economy, to better coordinate policies and to ensure consistent monitoring of reform measures; and establishing a closer working relationship and dialogue with social partners on the employment challenges for greening the economy.

- Further strengthening the existing Commission skills intelligence tools and networks to better anticipate and monitor developments in sectors and occupations linked to green growth, resource efficient and circular economy.

- Ensuring that EU and Member States funding programs and policies support the job creation in the green economy.

- Monitoring progress related to green employment in the context of the Joint Employment Report.

- Working towards an international playing field in promoting green and inclusive growth.

- Building on the recommendations of EREP[3] to develop a broad strategy for greening jobs, skills and education." (EU Commission, 2014, COM(2014) 446 final).

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[3] European Resource Efficiency Platform

2. Green Educational Policies

Environmental education is a fundamental instrument to spread awareness and responsibility among people, and to train future generations to protect and respect the planet and the resources it gives to human beings. This chapter deals with environmental educational policies: the first section addresses an international overview, moving afterwards to the Italian and French policies and their specificities. This green educational context is fundamental to the A.P.P. VER. project, as it operates in secondary schools: it is based on the international, national and regional green educational policies and it tries to modify educational schedules in a green, territorial and active perspective.

2.1 Broad Educational Policies

2.1.1 Global Policies

The main international instrument for the implementation of green economy and its related policies is the **2030 Agenda for Sustainable Development - "Transforming our World"**. It was adopted on September 25th 2015 and it comprises a series of goals to end poverty, protect the planet and ensure prosperity for all, to be achieved over the next 15 years. The 17 Sustainable Development Goals (SDGs) include a subset of 169 targets, which are not legally binding, but they are universally applicable by anyone and governments are requested to take action at their national level in order to implement the goals and reach the targets.

Figure 5: Sustainable Development Goals. Source: un.org

Figure 5 shows the 17 goals: they include every aspect of sustainability, both from an economic and social point of view, but for the present purpose the focus will be on number 4, i.e. "Ensure inclusive and quality education for all and promote lifelong learning". The subset of targets comprises an equitable access for boys and girls to quality education at all levels (preprimary, primary, secondary and tertiary, including university), the elimination of gender inequalities in education, an increase of literacy and numeracy rates, an upgrade of education facilities and expansion of the number of scholarships in developing countries and an increase of international cooperation with the purpose of improving the supply of qualified teachers. In particular, target 4.7 is directly linked to environmental education:

> "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" (2030 Agenda for Sustainable Development, 2015)

Thus, national governments all around the world are requested to implement environmental education in their school programs, in order to make the new generations understand that everyone's contribution is fundamental to protect and respect the planet and that society must work as a unique entity to sustain the cause. In particular, the target aims at shaping the minds of the youngest ones, as change is already happening worldwide and informed and advanced individuals are needed to promote the green lifestyle.

As for the ongoing results achieved by nations, one of the main sources of information is represented by "**Education at a Glance: OECD indicators**" (EAG). It is a report on the status of education around the world; its latest version was published on September 12th 2017 and it includes for the first time an entire chapter about SDGs. It pictures the situation of all 35 OECD countries and of some partner countries. Data and indicators used in this report are agreed with UNESCO and under the aegis of the United Nations. However, data collection and measuring on a global scale are particularly difficult for target 4.7, as it is linked to social aspects of education. Its associated indicator is

"percentage of 15-year-old students scoring at or above level 2 in science in PISA[4] 2015" and it pictures at least one part of the target: "…the extent to which learners acquire the scientific skills needed to promote sustainable development. At least 50% of students participating in PISA 2015 score at or above level 2 in science in most of the OECD and partner countries. The highest proportions of students achieving level 2 in science are in Estonia (91%), Japan (90%), Canada and Finland (both 89%)." (EAG, 2017, OECD).

Another instrument, which has already concluded its operations, was promoted by UNESCO: "**The United Nations Decade of Education for Sustainable Development (2005-2014)** (DESD) aimed at integrating the principles and practices of sustainable development into all aspects of education and learning, to encourage changes in knowledge, values and attitudes with the vision of enabling a more sustainable and just society for all. The mandate of the DESD has energized a vast number of stakeholders – across Member States, UN agencies, the education sector, the private sector and civil society – to work in partnership to reorient education systems towards sustainable development." (UN DESD Final Report)

This program thus aimed at reorienting education towards sustainability, in order to impact people's way of thinking. The main goals included:

- Acquisition of skills such as critical and creative thinking, communication, conflict management and problem solving strategies, to take action in the contribution to the life of society
- Respect of the Earth and life on it
- Promotion of democracy in a peaceful society
- Inclusion of education in sustainable development plans
- Increase and spread of public awareness on this topic

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[4] OECD Programme for International Student Assessment

ESD, an enabler for sustainable development	ESD is galvanizing pedagogical innovation
1. Education systems are addressing sustainability issues 2. Sustainable development agendas and education agendas are converging	6. Whole-institution approaches help practise ESD 7. ESD facilitates interactive, learner-driven pedagogies
Importance of stakeholder engagement for ESD	**ESD has spread across all levels and areas of education**
3. Political leadership has proven instrumental 4. Multi-stakeholder partnerships are particularly effective 5. Local commitments are growing	8. ESD is being integrated into formal education 9. Non-formal and informal ESD is increasing 10. Technical and vocational education and training advances sustainable development

Figure 6: ESD achievements. Source: sustainabledevelopment.un.org

Figure 6 shows the final results achieved by the program: the national and international visibility of education for sustainable development has increased, many governments, schools and institutions took steps in the direction of sustainability and they understood that a skilled workforce is needed to promote greener economies. In particular,

> "There is now an increased recognition at the international policy level that education is essential to the advancement of sustainable development, with many countries committed to continuing to work to advance ESD at the national and local levels." (UN DESD Final Report)

However this program left some challenges to be faced in order to realize the full potential of ESD, for example more institutions and more political support are needed, as for more research and innovation in the field of education for sustainability.

A further step was taken in 2013 to fill up the blanks left by DESD, and it was the **Global Action Programme (GAP) on ESD**, also based on target 4.7 of the SDGs. It aims to cooperate substantially with the 2030 Agenda, with two main goals: reorienting education and learning, so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to a sustainable future, and strengthening education and learning in all the agendas, programmes and activities that promote sustainable development. At the same time, it focuses on groups that are particularly vulnerable to the consequences of climate change and unsustainable development, such as girls and women, small island developing states and Africa.

The GAP identified 5 priority action areas to work on:

- *Advancing policy*
- *Transforming learning and training environments*
- *Building capacities of educators and trainers*
- *Empowering and mobilizing youth*
- *Accelerating sustainable solutions at local level*

Concerning the implementation, each Member State is supported by UNESCO at the national, regional and sub-regional level, while each stakeholder must raise funds to promote the programme, also using the existing funding mechanisms for education and sustainable development. Progress and ongoing results are monitored and reported regularly at the global level, while country evaluations are under the responsibility of national governments. Seven major goals have been established inside the GAP context, to be reached by 2019: Global monitoring framework finalized, Partner Networks formed, Online Clearinghouse launched in 2015, first Global Forum organized, mid-term report prepared in 2017, second Global Forum organized, and final report for the first phase published in 2019.

2.1.2 European Policies

Green educational policies at the European level follow the international directives, but there are few initiatives on the continent that deserve some attention. First of all, the major European educational policies are included in "**Europe 2020**", a 10-year strategy proposed by the European Commission on March 3rd 2010 for the advancement of the European economy. It aims at a smart, sustainable and inclusive growth and it is composed of some headline targets to be applied by EU Member States. They are listed in Figure 7 and they include some correlated flagship initiatives.

	Targets	Flagship initiatives
Smart growth	• Increasing combined public and private investment in R&D to 3 % of GDP • Reducing school drop-out rates to less than 10 % • Increasing the share of the population aged 30–34 having completed tertiary education to at least 40 %	• Innovation Union • Youth on the move (ended in December 2014) • A digital agenda for Europe
Sustainable growth	• Reducing greenhouse gas emissions by at least 20 % compared to 1990 levels • Increasing the share of renewable energy in final energy consumption to 20 % • Moving towards a 20% increase in energy efficiency	• Resource efficient Europe • An industrial policy for the globalisation era
Inclusive growth	• Increasing the employment rate of the population aged 20–64 to at least 75 % • Lifting at least 20 million people out of the risk of poverty and social exclusion	• An agenda for new skills and jobs • European platform against poverty and social exclusion

Figure 7: Europe 2020's key priorities, headline targets and flagship initiatives. Source: ec.europa.eu

The focus being on education (reducing to 10% the school leavers' rate and raising to 40% the people aged 30-34 having completed tertiary education), from an environmental point of view the main initiatives are:

- *Innovation Union,* which provides benefits to create new jobs, build a greener society, improve the quality of life and also maintain the European competitiveness

- *A digital agenda for Europe,* which aims to boost digital opportunities for people and business and to make Europe a world leader in the digital economy

- *An agenda for new skills and jobs* (together with the *New Skills for New Jobs initiative, 2008):* they promote better anticipation of future skills needs, better matching with the labor market needs and the bridging of the gap between education and work.

Indicators and data used in Europe 2020 are also matched with additional benchmarks set under the EU's **Strategic Framework for Education and Training 2020** (ET 2020), which aims to foster European cooperation in education and training. Its 3rd strategic objective ("Promoting equity, social cohesion and active citizenship") says:

"Education and training policy should enable all citizens, irrespective of their personal, social or economic circumstances, to acquire, update and develop over a lifetime both job-specific skills and the key competences needed for their employability and to foster further learning, active citizenship and intercultural dialogue. […] Education should promote intercultural competences, democratic

values and respect for fundamental rights and the environment, as well as combat all forms of discrimination, equipping all young people to interact positively with their peers from diverse backgrounds." (Official Journal of the EU, 28.5.2009)

Thus, Europe 2020 and its related initiatives and projects focus on green educational policies in the sense that new skills are needed for a changing world, new jobs require trained and prepared workers and principles such as environmental protection and a united society are the basis for a sustainable lifestyle. Again, the shaping of new generations' minds toward a green and inclusive economy is seen as fundamental by European policymakers.

An important sector of education is represented by vocational education and training (VET) and the main actor that handles this subject is Cedefop (European Centre for the Development of Vocational Training): it was founded in 1975 and it is a decentralized EU agency. It is also strictly linked to Europe 2020, as it helps developing the right educational policies to provide the right skills to the workforce. High qualifications are very important for people to find a job, and Cedefop helps them achieving the best technical preparation.

This includes green skills and trainings for a greener economy: as the modern economy is changing, old types of jobs need to be changed as well; in particular, they need to be adapted to new situations and demands. At the same time, new jobs are appearing and educational programs very often show skill shortages and gaps to adapt to new demands.

And without long-term educational investment - particularly in science, mathematics and technology - employers may soon experience a shortage of people with the right skills. Young people with new technological knowledge are needed to replace the old ones, but it happens that they don't have the capacities or they don't want to do a "manual" job, as it is considered "poor" or "dirty".

According to Cedefop's Synthesis Report of "Green skills and environmental awareness in vocational education and training" (2012),

> "The occupations that are predicted to experience employment growth in the largest number of countries are energy auditor, electrician, sheet-metal worker and insulation workers. These occupations require medium levels of skills and are therefore also more likely to experience higher volumes of growth than higher- or lower-skilled occupations, which employ fewer people in absolute terms. […]

Renewable energies, energy efficiency in building and construction, and public transport have been identified as sectors with a high green jobs potential (Cedefop, 2009)".

Therefore these specific jobs will need improvements in their learning provisions, especially in Southern Europe, which appears to be less prepared to the green revolution than Northern countries. Policymakers and Member States should raise awareness of the financial benefits of continuative and updated technical learning provisions and workers themselves should have the chance to actively contribute to the content of provisions, to make them suitable and useful for the job they are doing. Also VET in schools is important to give students the possibility to achieve practical expertise and training, to make them enter the job market with some kind of technical knowledge and raising their environmental awareness. Moreover, both public measures and private investments are useful to boost green vocational education: their joint action could fill the gaps and increase the availability of transferable capacities and skills, also stressing the financial benefits coming from green plans and investments.

Another program that is strictly linked to Europe 2020 is called "**Horizon 2020**", as it is the financial instrument implementing the Innovation Union. It is the biggest EU Research and Innovation programme ever, with nearly 80 billion Euros of funding, available over 7 years (2014 to 2020), in addition to the private investment that this money will attract. Research and innovation are seen as an investment for the future and so governments of Member States focus on them in order to develop smart, sustainable and inclusive growth and jobs. "The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation." (ec.europa.eu) The programme is open to everyone living in an EU Member State or in an associated country; the rules are simple and they allow the projects to start quickly and proceed smoothly; they encourage equity, protect the participants and make sure that funds are adequately used.

Horizon 2020 obviously addresses environmental and societal challenges. They receive the largest share of money and they focus on:

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the Bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency and raw materials
- Europe in a changing world - inclusive, innovative and reflective societies
- Secure societies - protecting freedom and security of Europe and its citizens.

Investments in all these fields witness the willingness of European countries to improve their technologies and knowledge and the programme surely stresses the concepts of green economy and sustainable development. Efforts are being made to promote sustainable lifestyles and habits, to improve the way people impact on the environment and, concerning green education, investments are made to raise environmental awareness and improve citizens' knowledge and skills on sustainability. Innovation in the green sector is the key to the future and EU Member States are making great efforts both in the short and long term.

2.2 Italian Policies

2.2.1 National Level

The Italian sector of environmental and green education follows the international and EU directives and the government set up a series of national strategies and plans aimed at schools and the community.

The latest document on this topic was published on March 13th 2017 and is called "**Strategia Nazionale di Sviluppo Sostenibile**" (National Strategy on Sustainable Development). It consists of a strategic program for the country in order to tackle unsolved environmental, economic and social issues. It covers the period 2017-2030, as it is based on the UN 2030 Agenda, focusing on four main domains (integration, universality, inclusion and transformation) and updates of the strategy are planned on a three-year basis. The strategy aims at the creation of a new circular economy model, with low carbon emissions, resiliency to climate change and ongoing global crises, such as the

loss of biodiversity and soil exploitation. It proposes five areas of action: people, planet, prosperity, peace and partnership; they are complemented by some sustainability vectors, every area contains a subset of goals and, if possible, they are linked to an indicator to be reached at the national level.

Environmental and green education are included in few of the areas and goals:

- To decrease the number of school leavers and improve the compulsory education system (area: people)
- To spread healthy lifestyles and improve prevention systems (area: people)
- To increase and promote R&D investments (area: prosperity)
- To promote social and environmental responsibility in businesses and administrations (area: prosperity)
- To promote the participation of young people to make them 'actors of change', to promote social integration, inclusive education, training and valorization of talents (area: partnership)
- To ensure quality basic education with no gender discrimination (area: partnership)
- To promote education, improve technical knowledge of teachers and operators for development (area: partnership)
- To boost inclusive education in favor of disadvantaged people (area: partnership)
- To promote education and training, know-how transfer, technology and innovation for the protection of cultural and natural heritage (area: partnership)
- To create projects and activities for different kinds of audiences in favor of natural and landscape heritage (area: partnership)
- To improve knowledge about natural ecosystems and resources (area: sustainability vectors)
- To ensure availability and access to data and information (area: sustainability vectors)
- To stress sustainability culture and the importance of sustainable development education (area: sustainability vectors)

There are some other projects on which Italy can rely for the promotion of green education. In 2014 the Italian Environmental Department together with the Education Department published the "**Environmental Education Guidelines for Sustainable**

Development" (Linee Guida educazione ambientale per lo sviluppo sostenibile, 2014), in which they stress the need of a change starting from schools and students. They identify in the youngest ones the category of 'environmental natives', as they develop an everyday attitude towards the respect of the environment they live in. In this context, environmental education becomes the tool to question modern economic models, to improve them and create new ones: changes in the attitude and lifestyles are the focuses towards which young students must be pushed. As there are different types and degrees of schools in Italy, the education for sustainable development should be integrated in and be complementary to the curricula and it should include multidisciplinary topics related to all the subjects.

The guidelines follow the Europe 2020 strategy and the Decade of Education for Sustainable Development. They are composed of eight didactic schedules grounded on main topics, as the environment becomes an instrument for education, rather than an object:

- *Protection of water and seas* (pre-school and primary school)
- *Protection of biodiversity: flora and fauna* (pre-school and primary school)
- *Sustainable diets* (pre-school, primary school, secondary school)
- *Waste management* (pre-school, primary and secondary school)
- *Protection of biodiversity: ecosystem services* (secondary school)
- *Green economy: green jobs & green talent* (secondary school)
- *Sustainable cities: pollution, soil exploitation and waste* (secondary school)
- *Climate change adaptation: hydrogeological disruption* (secondary school)

A distinction between school degrees is made, as students develop different abilities as they grow old. Pre-school and primary school are fundamental for the development of individual personality and ethical behavior, to be respectful of others, nature and the environment. Children start to observe living organisms and natural phenomena and they are introduced to the concept of citizenship. As already said, environmental education is transversal: it touches subjects as history, geography, science, art and technology.

Concerning secondary school, at the end of the educational process students should be able to "[…] recognize geographical, ecological, territorial aspects of natural and anthropic environment, connections with demographical, economic, social and cultural structures and transformation occurred across time. [They should know] how to use technological instruments in order to protect the environment and their territory." (Linee

Guida Educazione allo sviluppo sostenibile, 2014). Also in this case, the educational process develops through a number of subjects and it stresses the link between urbanization, landscape, demography, economy, society, art, global inequalities, climate change, food and biodiversity. Secondary school programs should also guide students towards new jobs linked to environmental protection, that develop as the world and society progress. Students and their families will attend workshops and trainings, in order to make them aware of global changes and patterns and, mostly, to connect them with the territory they live in and use.

Each of the eight didactic schedules include related subjects and topics to be faced by primary and secondary school, they list international and national documents and departments that deal with the subject, they suggest educational paths and methods and they set skills and goals to be met by students at the end of the cognitive process. Graphs and maps are provided to help teachers building proper programs and exhaustive contents.

Finally, technical sheets deal with current problems faced by the eight main topics and they provide solutions adopted both at the national and international level. Green economy and green jobs are also included at the end of the document, to explain changes and needs of the modern society.

The Environmental Education Guidelines for Sustainable Development probably represent the best action programme for schools at the Italian level, as they stress the relationship between citizens and their territory and they try to shape young minds, to make them respect and live in balance with the environment.

A milestone for environmental education and training is represented by **Law 107 2015**, called 'La Buona Scuola', which introduces compulsory school-work alternation in secondary schools, in order to develop skills against unemployment and in favor of modern changes both in the economy and society. The alternation sets up a total amount of 400 hours for VETs and 200 hours for high schools, to be covered during the last three years of schooling. Thus, students are allowed to enter companies, firms or organizations linked to the schedule they are specializing in and they experience few kinds of job they could actually do in their future. Schools and those organizations are supposed to converse to create useful and inspiring experiences for students.

Law 107 also developed a PTOF (Programma Triennale dell'Offerta Formativa), by which teachers and principals organize educational schedules on a three-year basis. This

instrument aims at "the expansion of knowledge and skills of students and the opening of the school community to the territory, with a full inclusion of institutions and local entities." (Law 107 2015, subsection 2). The law lists the main educational goals, including:

> "Development of good behaviors inspired by knowledge and respect of lawfulness, environmental sustainability, natural goods, heritage and cultural activities." (Law 107 2015, subsection 7).

The "**Plan for Sustainability Education**" (Piano per l'Educazione alla Sostenibilità – 20 azioni coerenti con obiettivi Agenda 2030) can be included in the framework of school-work alternation: it was presented to the Italian Education Department on July 28th 2017 and it contains 20 actions following the 2030 Agenda, to promote healthy forms of development throughout society and to transform the educational system, from school to R&D. The actions are divided into four main domains: structures and buildings, didactics and training of teachers, university and research, information and communication.

Some of the major actions related to environmental education:

- 5 million euros will be allocated for operations of energy efficiency in schools, developed by students during school-work alternation periods or environmental education programs
- School-work alternation programs will be developed in partnership with ENEA (National Agency for New Technologies, Energy and Sustainable Economic Development), in which students will engage in energy assessment projects about schools
- The 2030 Agenda goals will be implemented in school programs in order to build an instrument for social, economic and environmental sustainability
- Law 107 2015 will be implemented to fight against stereotypes, violence and discrimination
- 65 PhD scholarships will be given to boost research programs on the 2030 Agenda and on the National Strategy on Sustainable Development.

On December 17th 2014 another program was launched in Italy under the name "**PON Per la Scuola, competenze e ambienti per l'apprendimento**" (National Operative Programme for School): it works on the period 2014-2020 and is based on the Europe 2020 Strategy. It directly aims to boost a smart growth, grounded on knowledge and

innovation in order to produce qualified human resources, suited to new balances and international competitiveness that are quickly changing. It tries to improve the Italian educational environment, with the spread of specific skills, innovation and digitalization. By raising the education level, it aims to reduce the number of school leavers and increase the number of university careers. It indirectly supports an inclusive growth, i.e. economic, social and territorial cohesion, to increase the employment rate, by strengthening the partnership between school and jobs and the competences of young students and adults. The school becomes 'open' to the territory in which it operates, transforming itself into a 'civic center' for all the citizens. It also tries to raise awareness on environmental matters, such as climate change, soil and territory protection, energy efficiency, eco-materials etc. Concerning environmental sustainability and climate change, the main contribution of PON to the creation of a more efficient, greener and more competitive economy, takes the form of redevelopment and energy efficiency interventions on school buildings, using eco-friendly materials and techniques with low impact on climate change.

Regarding human capital, the PON acts on students' major skills and on the raising of educational levels, as they contribute to the whole economy. In this context, a number of initiatives are promoted to raise awareness, direct and train both students and teachers, in order to spread knowledge on sustainable development and good environmental practices. Specific skills are boosted towards energy efficiency and green economy, as they create new jobs and promote a low carbon emissions economy. In this sector, the synergy with VETs is stressed, especially with facilities dealing with climate change.

Finally, at the national level, the Italian government has tried in recent years to develop a strong and more inclusive environmental and green education, mainly because of the financial crisis that troubles the country. In fact the green sector seems to be the answer to the lack of employment and wealth, as it is growing stronger every day. The revolution must start from the bottom, and new generations are the best investment to rely on: green education shapes their minds and attitudes, raising their environmental awareness and attachment and developing skills suited to new technologies and global trends.

2.2.2 Regional Level - Piedmont

Italian regions implement national and international programs concerning education in slightly different ways, as some regions are more independent than others, but they still follow the general directives given by the government.

Piedmont has registered some of the best accomplishments in the field of green economy, as many northern regions, and it has recently produced the "**Protocollo d'Intesa – La Regione Piemonte per la Green Education**" (the Agreement Protocol - Piedmont for Green Education). It was signed in Torino on December 7th 2016 by 26 public and private stakeholders and the regional aldermen of Environment and Education.

At the international level, it is based on the Europe 2020 Strategy, focusing on education for sustainable development and green economy and on the creation of transversal links between education, territory and productive system. At the national level, it relies on Law 107 2015 and on the Environmental Education Guidelines. It aims at the creation of a regional community for green education, it boosts cultural change and new generations' competences to promote the principles of circular and green economy.

"The main goals:

- To support lifelong learning following the job market demand, with sustainable lifestyles

- To implement knowledge and specific skills, in order to train students for new jobs and innovate the traditional ones from an eco-friendly perspective

- To promote active and supportive citizenship, with the purpose of environmental and cultural heritage protection and development

- To sustain school-work alternation and the dialogue between schools, agencies, companies and institutions

- To promote the relationship between schools and their territory, in order to create an effective didactic and educational action

- To coordinate human and financial resources across many sectors to allow the development of the above goals

- To foster curricula innovations in schools and VETs, also through ICT

- To promote teachers and tutors' training

- To identify successful orientating processes throughout every school degree

- To ease information, awareness and education processes for institutions and citizens

- To disseminate experiences and good practices in the field of green education

- To boost shared programs at the regional, national and European level."

    (Protocollo di Intesa, 2016)

Thus, also at the regional level there is evidence that governmental institutions work to push the green revolution, even at a smaller scale. There are many examples of the application of this agreement protocol and one of them will be deeply discussed afterwards.

2.3 French Policies

The A.P.P. VER. project on which this thesis is based, acts on a transboundary territory: its strategies and goals are shared by Italy and France, in particular by the PACA region (Provence-Alpes-Côte d'Azur).

The education for sustainable development (Education au Développement Durable) in France is considered as a transversal process that engages with environment, society, economy and culture. It deals with both primary and secondary schools and it finds its roots in the "Transition Ecologique et Développement Durable" (Ecologic Transition and Sustainable Development Strategy). Environmental education was strongly implemented starting from 2004 and it entered a new phase in 2015 during the Parisian COP 21. Schools often cooperate with national and territorial institutions concerning the main sectors of climate change, fair trade, biodiversity, food, health, energy and waste.

In 2015 France subscribed a law for energetic transition towards green growth to boost a new economic, social and ecological model. The National Strategy for the Ecologic Transition towards Sustainable Development 2015-2020 (SNTEDD in French) ensures the coherence of public action and suggests new solutions. It is complementary to the Horizon 2020 programme and it is divided into 9 main goals.
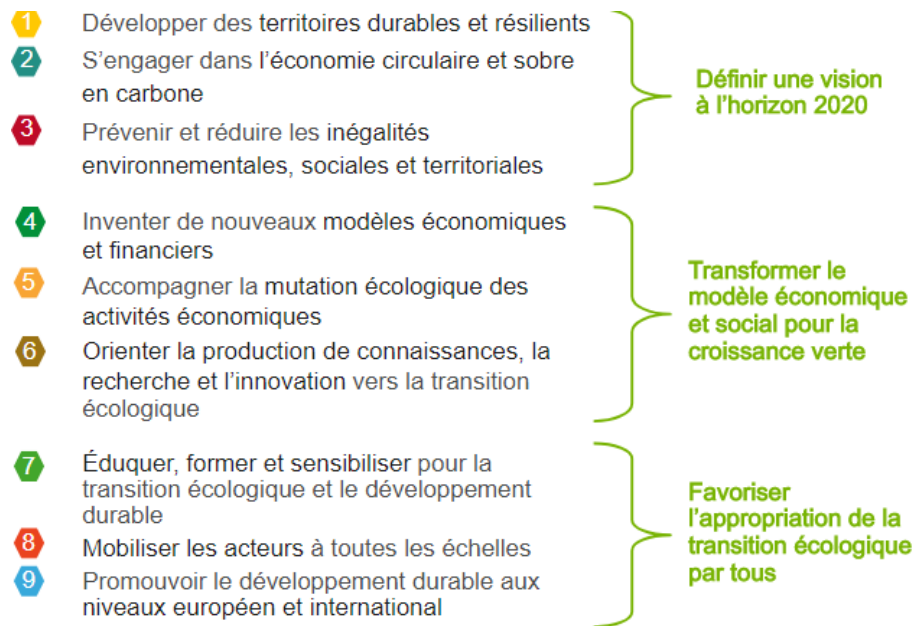
Figure 8: SNTEDD main goals. Source: Ministère de l'écologie, du développement durable et de l'Energie

Number 6 and 7 in particular focus on environmental education. The first one is about orienting the production of knowledge, research and innovation towards a green transition: knowledge, data and technology should be available and consistent public and private investments should be made in favor of R&D. Number 7 promotes the education, formation and sensitization for ecologic transition and sustainable development: they should be increased especially in secondary schools, in order to make information travel across society and modify choices and behaviors of citizens. Under the aegis of this last goal, a specific program called "E3D École/Établissement en démarche de développement Durable" has been created for secondary schools and VETs: it studies the relationship between environment, society and economy, it strengthens partnerships with the territory in which it applies and it supports sustainable development projects.

Inside the A.P.P. VER. context, the dialogue between Italy and France is open in order to build a strong relationship based on the green transition. The offices in charge of the project are working together to join a common goal: to boost environmental education and to make the A.P.P. VER. project an example of good green practice.
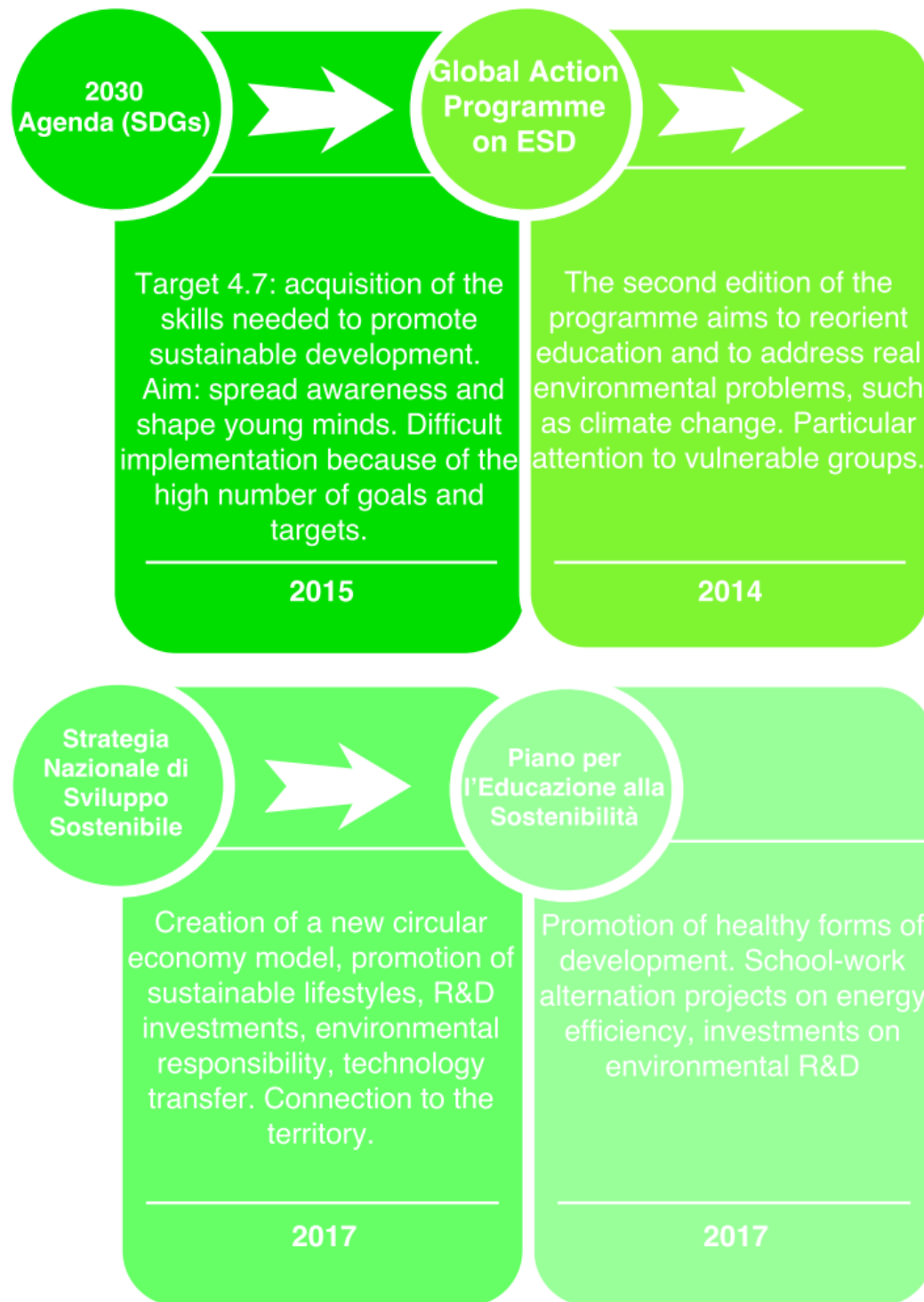
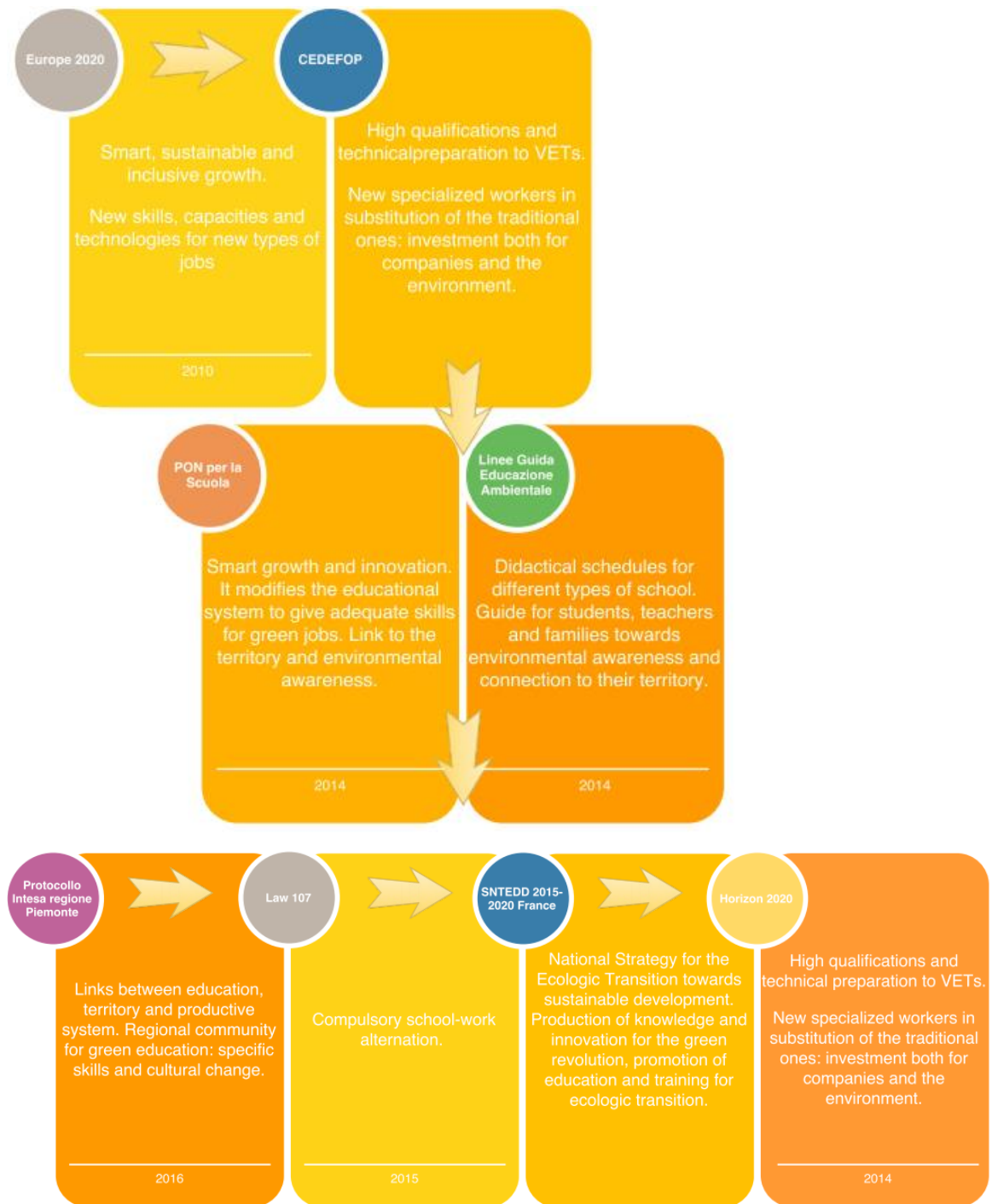**Figure 9: Educational policies based on the 2030 Agenda. Overview**

Figure 10: Educational Policies based on the Europe 2020 Strategy. Overview

3. The A.P.P. VER. Project

The focus of this chapter is on the more concrete application of green classifications and green educational policies. In particular, it deals with the A.P.P. VER. project, which is developing in the metropolitan area of Torino and it addresses the inclusion of green economy in some secondary school curricula of that area.

This study took inspiration from an internship done at "Città Metropolitana di Torino", which allowed the approach to the project and the work on some of its aspects, and subsequently it led to the writing of this thesis.

This chapter starts by describing the institution of Città Metropolitana, the internship, the project and its specificities. It deals afterwards with the reason why international policies and classifications described in previous chapters have been modified in relation to the project context.

3.1 The Context

3.1.1 Città Metropolitana di Torino

"Città Metropolitana di Torino" is a territorial institution covering a quite vast area; it was created in 2014 and it absorbed the public functions previously held by the district of Torino. The metropolitan area includes 316 municipalities divided into 11 homogenous zones, which are located in mountain, hill and flat territories.

It is composed by a number of internal organs, dealing with agriculture, public assistance, culture, buildings, European cooperation, education, jobs, social policies and protection, territory, transport, tourism, etc.

Its most interesting department in the context of this thesis is the environmental department: its activities deal with the municipal planning of waste management, the authorization and control of waste dumps and disposal facilities, the EIAs (environmental impact assessments) and the promotion of good policies and behaviors in favor of the environmental sustainability of the economic and productive system. Plus, it authorizes, controls and monitors the conditions of air, water, energy and water resources, electromagnetic pollution, noise pollution, emissions in the atmosphere, checking also the status of private buildings' heating systems. It is particularly active in the sector of green economy and green education, following the goals of the Agenda 2030, the Italian National Strategy for Sustainable

Development and the Agreement Protocol of
Regione Piemonte for Green Education.
Inside this context, the office created and is
now carrying on many strategical and
territorial projects. Precisely, the A.P.P.

Figure 11: Green Energy. Source: Creative Commons

VER. project has been set up by the environmental department jointly with the
ALCOTRA Programme, which is the Interregional program between Italy and France for
the European Territorial Cooperation. This program was born in 1990 and works on the
Alpine region shared by these two countries. Thus, A.P.P. VER. promotes the
development of green and circular economy in a metropolitan and transboundary context.

3.1.2 The Internship

The internship at Città Metropolitana consisted of 75 work hours during the months of
June and July 2017 and it was possible to extend the stay at the environmental department
until October 2017 with the purpose of writing this thesis. The actual work at the office
initially dealt with the draft of two of the documents necessary for the A.P.P. VER.
project, namely the "Green Economy Reference Framework" and the "Green Economy
Bibliography". This was obviously a preliminary version of the documents, but it allowed
for a more complete and deep knowledge of the green economy sectors and all their
implications. The research process that preceded the writing of these two papers also
brought up information about the educational policies for environmental awareness and
sensitization of the public. This particular topic was recurrent: new generations need a
profound change in the educational system they experience every day, in order to make
them aware of the actual problems the environment is facing nowadays. Very often,
school programs do not address this issue in the correct manner and students do not
realize what kind of good behaviors and actions they could do to protect the planet and its
resources, even at a little scale. Schools represent the right environment for young minds
to be shaped, to be sensitive to real and actual problems and to take action in favor of the
green revolution.

The reference framework and the bibliography try to explain the basics of green
economy, with the exact purpose of informing teachers and, later on, students, about this
subject. The first one contains the international definitions of green economy, circular
economy and sustainable development, together with international law references,
scientific documents and reports sustaining the green lifestyle. As A.P.P. VER. acts on

the Italian and French territories, the reference framework also addresses the contexts of these two countries, listing the initiatives their governments are carrying on to protect the environment, develop green education and raise environmental public awareness.

The bibliography contains some hints about books, reports and official documents that could be useful to readers to better understand and build a stronger knowledge on the topic. It sort of guides the readers into the theme, making it easier for them to get profitable and right information.

3.2 The Project

The European project called A.P.P. VER., which stands for "Apprendere Per Produrre VERde" (to learn for the green production), covers the period between 2017 and 2020 and is based on EU funding. It promotes the development of green and circular economy and it works in the fields of transboundary education and VET, boosting sustainability, green education and the mobility of young students. It aims to guarantee a high quality education and formation inside the transboundary area, to make them adequate to the social and economic transformations that are taking place today.

It will create a network of companies, schools, local bodies and institutions to design and test innovative didactical schedules and it will produce:

- Green Economy Reference Framework and Bibliography
- "Sussidiario" to identify green organizations
- Green organizations dossier
- Report on the diffusion of green competences and profiles in the transboundary area
- Tools and methods to analyze competences and didactical requirements of students and trainers
- Forms and instruments for the orientation and school-work alternation in Italy and France in the field of green economy
- Guidelines for the green economy orientation and school-work alternation
- 11 trainings for 125 business, school and VET tutors
- 13 thematic trainings for 240 teachers
- 1 lab called "Business Creation" for 240 students
- 11 visits and at least 80 internships inside green organizations
- From 10 to 19 new green Profiles

- 19 professional schedules for 480 students for the orientation and green economy

- Evaluation and certification instruments for transboundary competences

- "CVduFutur" to increase the value of experiences and knowledge

Figure 12: the APP VER Project. Source: Città Metropolitana Torino

A.P.P. VER. includes the joint work of different actors:

- Leader of the project – Città Metropolitana di Torino, through which the project promotes and coordinates the economic and social development in terms of environmental sustainability, also making the interaction between education, formation and production/work sector easier.

- Actuator subject – IRES Piemonte (Istituto di Ricerche Economico e Sociali del Piemonte), it carries analyses and functional models for the project and for its territorial impacts

- Municipality of Pinerolo, for which the project is a great opportunity to test and strengthen actions, experiences and good behaviors in terms of green education and circular economy, together with some more territorial initiatives

- C.F.I.Q (Consorzio per la Formazione, l'Innovazione e la Qualità), it is the training agency based in Pinerolo, under the aegis of Piemonte region. It promotes the growth of new professionals and green skills and it collects green jobs requirements on its territory

- GIP FIPAN, the training and VET agency based in Nice, France. It promotes innovation in the field of transboundary education, with the purpose of adapting it to the actual changes occurring in the sector of green economy.

To reach its targets, the project will involve the staff of companies and services, in order to share analyses, tools, training and to welcome students, teachers and principals from schools and training agencies to build a strong and innovative path, which demands a

great collective effort. It will also include classes of students that will follow this path and enjoy the opportunities it gives, citizens to increase its attractiveness and some more companies and facilities with the purpose of sensitizing the cooperation with schools.

Moving to the key concepts of the A.P.P. VER. project, it is obviously based on *green economy,* in a changing background: the global crisis is the opportunity to create a new future for the society and young people. The project was created to reduce the distance between education and the socio-economic system, stressing the components that boost innovation, through "green" processes of change. The threats to ecosystems, to natural resources and the impact they have on society produce a number of changes and they light up the need of a new cultural paradigm that fires new development perspectives. The project acts in these terms, producing knowledge and instruments to be implemented in the transboundary area and in the regional and national systems of both countries.

Green organizations are the foundations of the project: they show that a change is possible and they connect the different realities of the socio-economic territorial system. The green transition of the economy can be seen and understood through a direct relationship with these organizations; the project tries to ease the approach between schools, training agencies and institutions based on the territory. The main instrument for this dialogue is the Sussidiario, experimentally designed and built by G.O.V.I. (workgroup of Italian green organizations), G.O.V.F. (workgroup of French green organizations), schools and institutions working at the project, with the supervision of the Transboundary Technical-Scientific Committee. It is a flexible tool for schools and training agencies to be used for the strategic planning and the school-work alternation schedule. It allows for observation and understanding of the green aspects in many economic and institutional sectors.

Green education is the center of the project, it connects schools, training agencies and institutions on the territory. It eases the acquisition of knowledge, skills and values in a green economy scenario. The A.P.P. VER. challenge comes from the territorial connotation of educational processes: local and global dynamics of green organizations are the real "objects" with which schools and training agencies relate and together they produce new educational schedules, modifications to traditional curricula, new systems of evaluation and development of skills and knowledge in green terms. The action of A.P.P. VER. is not limited to green jobs training: it produces professional and cultural competences for a green-oriented territory, in which the traditional sectors of the socio-

economic system are changing, switching towards the green revolution. For this reason, the project directly invests on the territorial requirements for all the people involved: recipients, participants and promoters. The schools and VETs of the project include 8 secondary schools and 2 training agencies based in Pinerolo (for the Italian side) and 7 secondary school classes based in the Académie de Nice (for the French territory). They all are specializing in some environmental or sustainable sector: they focus on constructions and building, environment and territory, tourism, hotel and food&wine sectors, agriculture, socio-economic studies and energy efficiency.

Organization and governance are the keys to coordinate many stakeholders and create a temporary transboundary territorial entity. This entity welcomes new subjects and connects the territorial components involved in the project. Many workgroups are involved in this territorial organization and each of them has a specific mandate.

Information and communication are fundamental to diffuse a new model of development on the ALCOTRA territory, focusing on environmental sustainability and social inclusion. They promote cultural change and the transfer and sharing of the experience developed by A.P.P. VER. and other projects. A.P.P. VER. produces transferable scientific knowledge and it can be seen as a dissemination process for workers in the transboundary, national and regional systems of the involved countries. It also spreads green information and opportunities to a bigger public. Workshops, meetings, classes, transboundary thematic seminars, articles, conferences and newsletters are some of the informational products that will develop during the next three years.

This dialogic approach witnesses the importance of the territorial connection: a new educational model and a deep knowledge of the green interlacement are fundamental for the understanding of the territory in which they act. Territoriality emerges from many of the aspects of the project, as sustainable and green behaviors and lifestyles start to be practiced in the area where subjects live and take action. Thus, young students have the opportunity to get to know their city, their land and the related natural resources they exploit every day. Various kinds of interactions inside their territory offer the chance to shape their minds and raise the awareness of the green revolution.

The ideal final product of the A.P.P. VER. project, at the end of 2020, will be the adoption of the results in all the territorial educational systems and the implementation of a permanent transboundary cooperation.

3.3 The main instrument – Sussidiario, to identify green organizations

The so called "Green Sussidiario" is the main instrument that is being produced in the first phase of the project. The aim is to facilitate the school and training knowledge about the ongoing changes of green economy, through the direct connection with organizations that are promoting the change, as facilities, companies, associations, local entities, etc.

New cultural approaches, knowledge and skills are needed in an evolving socio-economic system and the innovations have to be identified. The Sussidiario tries to build dialogue between many territorial actors, which have common demands. Thus, it is an instrument to bring schools and professional trainings closer to the socio-economic context in which they act and it shows the changing trends on which the new generations' growth must be implemented. It trains and educates young people to culture and cultural/professional competences towards sustainability. In this context, schools and VETs must:

- Collect data on green changes in their socio-economic system that decrease environmental impacts on the territory
- Select actors with high educational value, representing green economy
- Ease knowledge and understanding with a dialogic approach, based on the direct interaction between those actors

The green organizations, that are part of this dialogue, compose the socio-economic interlacement of the territory and so the Sussidiario must represent a hint to be filled up and modified according to the specificities of each educational and territorial entity. As it is intended for secondary schools, high schools will use it for the strategic planning of principals, for the planning of PTOF and for the interdisciplinary planning of curricula and the school-work alternation. Middle schools will use it for the same purposes and also for the orientation of young students.

The Sussidiario does not classify or judge the organizations for being green or not, it does not address greener organizations and reject the less green ones: contrarily, it develops methods of knowledge based on dialogue, that allow the understanding of why and how the organizations reached some results of product, process, relations and management which are relevant in the green transition, and it takes information from it to develop educational schedules.

Those green organizations can be public or private entities and they can act in every economical sector: no matter what they produce, but they must show some green attitude,

which could be in the products, in the management or in the process of production. As already said, there are no compulsory rules or classifications to be respected, but these organizations must relate with their territory and they must foster a green development and advancement of the society they are inscribed in. They also should be coherent with the educational schedules that have been involved in the project and, as the context will change and develop, new organizations could join A.P.P. VER. Some examples:

- Farms and agricultural companies
- Manufacturing enterprises
- Companies relating to use, management and transformation of wood
- Restauration enterprises
- Professional activities in the fields of buildings, urbanization, design and territorial management
- Touristic services
- Environmental services
- Hotels and welcoming structures
- Public and governance institutions (local entities, parks…)
- Research institutions

When the Sussidiario will be completed and published, the main actors that contributed to it will be charged of finding 80 green organizations in which students will actually engage with the school-work alternation. Out of these 80 organizations, 50 are supposed to be part of the metropolitan area of Torino and 30 must be located on the Nice territory. They will be chosen according to their competences and the descriptive interpretations of the document, but also according to their willingness and interest in being part of the project.

3.3.1 Creating the Sussidiario

The making of this tool consists of a collective process, guided by Città Metropolitana and IRES Piemonte, together with some other actors inside the metropolitan area of Torino and the French territory. First of all, the G.O.V.I has been created with representatives from many productive sectors: industry, agriculture, architecture and buildings, environmental agencies, Italian and French training agencies and VETs, University of Torino and Politecnico of Torino, secondary schools from Pinerolo.

They all have been asked to fill in some surveys, in order to prepare for a two-days workshop held in mid July 2017. The surveys and interviews asked for the general

references about green economy that these actors usually look at for their job and contained a first example of the descriptive interpretations, based on the international green foundations and classifications described here in the first chapter. Their answers formed the groundwork for the workshop, during which all the actors contributed with opinions, suggestions and improvements for the construction of the Sussidiario. This collective session resulted in:

- The arrangement of a draft of the instrument, with the identification of some descriptive interpretations based on regional, national and international documents
- Some technical insights with the IRES agriculture group and GOVI subsections to verify the descriptive interpretations
- The production of an experimental version of the Sussidiario to select green organizations on the territory.

Subsequently,

- The selection of green organizations will be held on the metropolitan territory by GOVI. This selection will start after a work session scheduled for the month of October 2017, that will refine the descriptive interpretations and will share with schools and training agencies the product and the path for its realization
- The final version of the Sussidiario will be realized after the selection phase and after the analysis of the organizations and the evaluation of the work done so far.

3.3.2 Descriptive Interpretations

Knowledge and understanding of the territorial green interlacement require for availability and trust in order to dialogue, for the construction of flexible interpretations which boost critical approaches to build new knowledge and for the elaboration of acquired knowledge to make it available even outside the didactical paths with students.

In order to understand results and changes in the Italian and French socio-economic systems, some descriptive interpretations are needed to enter, know and tell about complex entities. They represent a sort of lens that is changeable during time and in terms of specific necessities, under the acquisition of new knowledge and the evolution of transformations. As already mentioned, these "descriptive" interpretations operate to "describe" the organizations involved in the project, in order to "read" their characteristics and qualities and to include them into the green sector, that represents the

grounding for the school-work alternation and for the modification of educational curricula in a green perspective.

As they are a consistent part of the Sussidiario, a great amount of work has been spent on them. During the first phase of the drafting, the descriptive interpretations were listed starting from international and national documents, such as the EGSS and data about green industries from OCSE (described in chapter 1). They were divided into two groups:

- *Core green organizations*: they produce environmental goods and services, or they are specifically finalized to high environmental performances
- *Go green organizations*: they adopt green models of management, which are defined by the compliance of at least 8 sub-conditions.

These sub-conditions were listed for both core green and go green organizations and they concerned different sectors: industry and building, agriculture, services and trade. The workgroups shaped the sub-conditions on the specificities of each sector, but they were not sure about the compliance of a minimum number of sub-conditions. In fact, this kind of limit, linked to a number of characteristics, would probably have decreased the availability of green organizations to be included in the project.

After many consultations during the July workshop and the following meetings, the workgroups made by GOVI, IRES and Città Metropolitana edited a more complete and specific version of the descriptive interpretations. They proposed a common scheme for each sector:
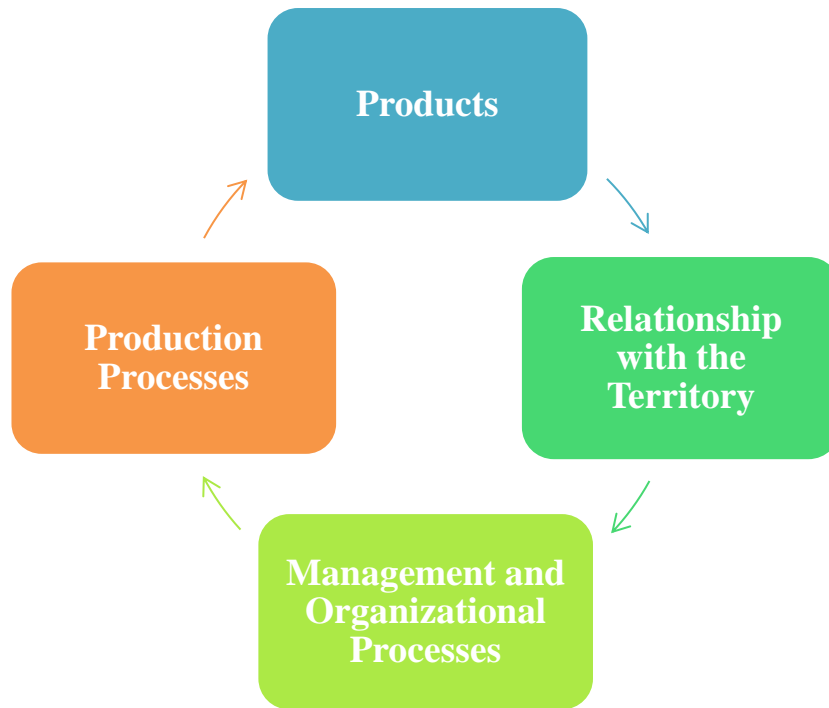
Figure 13: Descriptive interpretations' sections.

On the basis of this distribution, they created different lists of descriptive interpretations, one for every involved sector, containing a number of descriptive indicators suggesting the orientation towards which an organization may be recognized as a green one. No compliance rules or minimum number of conditions were set, as the "reading" of the organizations will be done by schools and training agencies and they do not have the authority to give patents or certifications.

As the Sussidiario and the related tables of descriptive interpretations will be further discussed during the following months and they have not been published yet, it is not possible in this context to attach these documents or to show parts of them. The following tables represent an example of the work that has been done and they follow the general main idea on which the final version of the Sussidiario is founded. They can be modified and expanded and obviously they do not represent the final official document.

Products	Production Processes	Management and Organizational Processes	Relationship with the Territory
Agricultural and Forest Companies			
• Agricultural products with biologic/biodynamic certification • Autochthonous agricultural or farming products which respect the conservation of biodiversity • They reuse waste and biomasses • Positive externalities such as water and energy efficiency, reduction of pollution and of CO_2 emissions, protection of rural landscape	• Environmental quality • Protocols to protect flora and fauna • Biologic fodder for breeding • Conservative agriculture • Water saving procedures • They do not produce GMOs • Sustainable management of pastures and forests • Reduction of waste production, recycling and correct dumping • They use fuel with low environmental impact	• Innovation and multifunctionality based on sustainability, dialogue and cooperation • Continuous environmental training • Ethical management of the staff	• Cooperation inside and outside the territory • Participation to regional and national rural projects • Direct sales and fair trade • Territorial circular economy • Active participation in the local community
Restauration Services			
• They use certified, biologic, fair trade or vegan/celiac ingredients • They use tap or local water • They take part to local environmental projects/events	• They have Ecolabel or other certifications • They use minimum environmental criteria • They use environmental friendly equipment and processes • Water and energy efficiency, waste reduction, recycling • They use green products with less packaging materials • They use less disposable materials	• Innovation and cooperation inside a sustainable management model • Continuous environmental training • Ethical management of the staff	• Cooperation inside and outside the territory • Participation to regional and national rural projects • Strong relationships with local producers • They reduce food waste, also concerning customers • Sensitization campaigns and transparency with customers

Manufacturing Enterprises			
• Products with high environmental performances • Energy or fuel production from renewable sources • Renewable raw materials from waste or organic farming • Efficient equipment from renewable sources or recycling • Buildings and construction equipment are made from renewable materials • Products for environmental management or environmentally certified ones	• They prevent the production of pollution and they build for the environmental improvement • They fight climate change by reducing emissions, through energy efficiency, renewables and sustainable mobility • They reduce waste and do recycling • They use sustainable raw materials	• They use Corporate Sustainability and focus on processes • They integrate sustainability inside the management processes • They carry out Green Public Procurement • Reporting and monitoring of their sustainable activities • Health and safety systems for their staff	• Relationships with stakeholders and suppliers that respect sustainability and society • Ethical respect of human rights • Local cooperation with other territorial entities • Business ethics and responsibility
Public and Governmental Institutions/Entities			
• Environmental-friendly services • Building, urbanization and mobility innovative systems • Smart building, smart cities and smart community • Protection of cultural and environmental heritage and of ecosystems • Transition towards innovative and sustainable sectors	• They use tools and materials with low environmental impact • They reduce fossil fuels emissions through energy efficiency, renewables, sustainable mobility and transportation • Investments for productive innovation in the fields of water, air, soil, energy, waste and biodiversity • They use ICT to solve socio-environmental issues	• They use social and environmental management, green public procurement and evaluation of public policies • They use sustainable tools and processes • They integrate different kinds of sustainability: social, environmental and economic ones	• Innovative sustainable processes for strategic planning and participation • They include governance in sustainable participative processes • Development activities and ecosystem services • They boost sustainable tourism • They sensitize, inform, educate and help citizens • They use ICT to promote change and information

Table 1: Examples of descriptive interpretations

The descriptive indicators listed in Table 1 represent an example of how the international green indicators have been modified according to the A.P.P. VER. context. They reflect the needs, the demands, the innovations and the requirements of the project. As already mentioned, the workgroups of GOVI and GOVF will be charged of choosing the organizations to be included in the project, following the descriptive interpretations, but this is just the first step towards the final target.

In fact once the project will conclude and, hopefully, the results will be positive, schools and training agencies will be the ones responsible for choosing the green organizations to work with and to implement the school-work alternation. Teachers and tutors will visit those organizations and they will try to "read" their green characteristics through the descriptive indicators and the basic knowledge given by the Green Economy Reference Framework and Bibliography. By developing the project, they will acquire the basics in order to understand the dynamics that move the green sector and the relationships within their territory.

There are multiple reasons why the descriptive indicators have been modified, starting from the international classifications and according to the specificities of each situation:

- They fit the needs of each sector, as the touristic facilities have different requirements if compared to building or farming companies
- They are flexible and changeable over time, as the green transition will grow stronger during the next years and so, it will be possible to modify them and make them suitable to changes and innovations that will come
- They take into account green educational policies, especially the ones related to the school curricula of the Pinerolo area involved in the project. Green organizations will be strictly linked to the educational schedules undertaken by the students of the school-work alternation
- They do not have compliance necessities or number limitations, as the main target is the relationship of the actors with the territory. A specific organization will be identified as a green one according to its attitude toward the environment, the society and the connection with all the local dynamics
- Social issues are particularly stressed in the organizational processes, as they represent an important share of green economy. The relationship with the territory also goes through people that live and act in that area, so the organizations will not

be recognized as green ones if they do not respect and appreciate their workers and if they do not try to improve their lifestyles.

The official descriptive interpretations will be soon published inside the Sussidiario, together with the Reference Framework and Bibliography of green economy.

A.P.P. VER. will subsequently proceed with the steps scheduled by the project plan, namely the detection of 80 green organizations and the starting of school-work alternation programs. Local and transboundary reports and monitoring will illustrate the ongoing results and improvements achieved by the project.

4. Conclusions

Modern societies are facing today issues coming from different sources of problems. It is clear by now that the modern economic model is raising social inequalities, overexploiting our planet, overproducing unnecessary goods and pollutants, as a consequence. Many areas of the world are embracing the green revolution as a response to the crisis that are afflicting cities and lands: this process of change is growing stronger every day, but more work needs to be done in many different sectors.

This thesis presented one of the examples of good practice in the green sector, i.e. the A.P.P. VER. project, which is developing in the metropolitan area of Torino. It is promoted by "Città Metropolitana di Torino" in association with other local partners, together with a French committee from the area of Nice. The aim of the project is to promote green and circular economy, working on the transboundary development of education, in order to adjust it to the social, economic and environmental transformations that are taking place today.

First of all, a research process enlightened the concepts of green economy and sustainable development, which constitute the groundings of the project, together with some international green indicators and classifications for green businesses. They are largely used by developed countries, but they are still very general and mainly related to industries and productive sectors.

The second section of this research work dealt with environmental education, which is the center of the A.P.P. VER. project. A great number of international, European, national and local policies are trying to promote environmental education and many advancements have been made at different levels. Investments are fundamental in the field of education and the green revolution is stressing the need of present and future generations: they need to be aware of the current situation and they need to take action in favor of the planet. Schools and educational centers represent the perfect environment for young students to learn how to use natural resources in a sustainable way, how to act to preserve nature and how to integrate in a changing society. All of this can be summarized within the concept of territorial connection: the main target of environmental educational policies is the link between people and the territory they live in, as they use it for their survival and, at the same time, it offers opportunities for interactions between many stakeholders.

As a result, the third section introduced the A.P.P. VER. project, which is a mixture of green classifications and green educational policies. It is being applied in some secondary schools, in order to modify their educational schedules in an environmental perspective and to create a connection with green organizations operating in the designated territories. Students will have the chance to engage in some school-work alternation sessions inside those green organizations, which will be chosen by a workgroup made of the main partners of the project. This workgroup is creating a fundamental instrument, useful both for teachers and students: the "Green Sussidiario" is a sort of lens through which they can "read" those organizations, their activities and their connection with the territory. It promotes a dialogic approach for a deeper knowledge of the territorial green interlacement, which is composed of many complex realities. This territorial complexity and the requirements of a complete educational process are the reasons why some descriptive interpretations are being created inside the Sussidiario: they are not official indicators and they do not classify green organizations through patents, but they reflect economic and societal changes and the specificities of the project. Plus, they are flexible and changeable over time, which are fundamental characteristics in relation to actual transitions, especially the green one.

Thus, it clearly emerges from this thesis project that a profound change is taking place, with the aim of raising public awareness and shaping people's minds, especially the younger ones, towards the green revolution. The A.P.P. VER. project represents a great example of good green practice and the territory on which it operates will surely benefit from this opportunity. The first results will soon be available and, hopefully, they will form the starting point from which other territories will implement the green transition.

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