

## REGIONE PIEMONTE – ANNEX TO UNDER 2 MOU

### **General overview and weather conditions information**

Piedmont is one of the most dynamic, innovative, rich and productive regions of Italy.

Most of Piedmont consists of rural areas, a large part of which is located in mountain areas (53% of the region) and high hills with socio-economic inhomogeneous characteristics. Mountain areas, abandoned and impoverished by the tumultuous decades of industrial development in the plains, have a large natural, landscape and historical-cultural heritage to be preserved and celebrated.

As of 31 December 2013 the resident population was 4.436.798 (7.3% of the national population) distributed in 1.206 municipalities out of a total area of about 25.400 km<sup>2</sup> (corresponding to approximately 8.4% of the Italian territory). The population density is 175 people per km<sup>2</sup>, below the national average.

The Gross Domestic Product of the region, amounting to 8% of the Italian GDP in 2012, is generated by a production system characterized by the strong presence of micro, mini or small enterprises.

Because of the geographical features of the area, which is surrounded by the Alps and mostly hilly, emissions stagnate worsening air quality, making Piedmont particularly vulnerable to the impacts of climate change.

The data of the last 60 years in Piedmont confirms the upward trend in temperature, statistically significant and estimated at approximately 0.030 °C / year for maximum temperatures and 0.028 °C / year for the minimum, that have determined the whole period an increase of about 1.5 °C, with higher peaks on mountain and foothill areas. In particular for the maximum temperature, during the last 20 years, it has been registered an increase in the frequency of the highest values: an increase of approximately 0.7 °C in the value of the 95th percentile of the distribution and of 0.91 °C in the 99th percentile, demonstrating how temperature extremes have increased.

Rainfalls, analyzed in the same period, however do not show statistically significant trends in average values, on the contrary there is a statistically significant positive trend for intense rainfalls (1.45mm / year).

Even the average and the maximum length of dry periods per year, that is, the number of consecutive days without rain, show a positive linear trend quantifiable respectively in 0.23 and 0.26 days / year in the last 20 years. Snowfalls decreased both as total thickness of snow on the ground both in duration, especially in middle-mountain areas.

Past trends and future projections of climate models show a marked increase in average temperature, changes in the distribution of seasonal rainfall, increase in the frequency and intensity of extreme events such as heat waves, floods and droughts with a decrease in snow and ice cover.

Sectors that mainly contribute to greenhouse gas emissions are, in descending order, transport, civil sector, agriculture and industry.

Emissions provided by some sectors is particularly heavy; especially oxides of nitrogen NO<sub>x</sub> emissions due to road transport, ammonia NH<sub>3</sub> from agriculture and dust arising combustion.

In recent years, the collapse of industrial production and policies to increase energy efficiency and development of renewable energy sources, has already reduced emissions of greenhouse gases mainly caused by the manufacturing sector.

In Piedmont GHG emissions are estimated to be:  
Total **31.433.830** t CO<sub>2</sub>eq (2010)  
per capita **7,05** t CO<sub>2</sub>eq (2010).

#### ▪ **Goals, climate policies and trading emission**

By signing Under 2 MOU Piedmont Region commits to reduce by 2050 at least **80%** of greenhouse gas emissions, compared to 1990 emissions.

In order to considerably reduce air emissions and to achieve the reduction targets that Piedmont assumes, it is important to act incisively on the most important sectors.

The Region intends to pursue its objectives of reducing emissions by 2050 through a significant reduction of the atmospheric emissions (reduction of 30% by 2030 of the registered values of nitrogen oxides NO<sub>x</sub>) due to:

- **traffic** through policies encouraging the use of zero-emissions vehicles and with the progressive reduction in the use of endothermic motor vehicles, both for the local public transport, and for commercial and private mobility, without restricting citizens mobility.
- **domestic heating sector** by upgrading the energy efficiency of the building-plant system, with particular attention to the housing stock built between 60's and 90's, and reducing costs and improving the buildings comfort.
- **industry** by promoting the use of best available technology (BAT) to the new plants or improving the requalification of the existing ones with a consequent reduction of production costs.
- **agriculture** through the use of innovative techniques that allow an improvement in productivity and avoid impoverishment of agricultural soils (BAT application in the sector, with special emphasis on animal waste).

It is important to stress that most of the measures to reduce emissions contributes positively both to the mitigation of the effects of climate change and to prevention of health damage caused by air pollution.

#### ▪ **Sector policies**

Piedmont Region recognizes climate change as a cross-cutting theme to scheduling in different areas of expertise on which it aims to develop effective and coordinated regional policies to mitigate and adapt involving different levels of territorial government and ensuring a gradual approach to the strategic objectives signed in the Protocol.

For adaptation, in particular, the sectoral actions will be enclosed within the drawing **Regional Adaptation strategy**, in line with the general principles of the National Strategy, in which the priorities will be identified on the basis of vulnerability and will be supported and facilitated win win, low cost and no-regret intersectoral actions.

The Region addresses special attention to the principles, methods and content of the Green and Circular Economy, engaging in disseminating their values both to characterize regional policies in terms of environmental, social and economic sustainability, and to address diffusely towards these principles the local economy.

## ▪ *Energy*

In the energy sector, the goals for Piedmont Region are defined by the 2012 Burden sharing, that provides for 2020 to reach 15,1% of gross final consumption of energy produced from renewable sources. The Region, through the proposed Regional Environmental Energy Plan, assumes the commitment to increase the aforementioned target value to **15,6%**.

To achieve this goal the Region will operate both to increase the production of renewable energy and to reduce the demand by continuing the measures that encourage improved energy efficiency.

As for the production of renewable sources the Region will concentrate on a mix of photovoltaic, solar, geothermal, hydro and bioenergy sources by emphasizing sectors in which it is estimated a discrete future potential ie bioenergy, geothermal and photovoltaic-solar, and only marginally hydropower related to the high level of exploitation of water resources already in place.

However, as regards the objective of limiting the gross final consumption by 2020, the Region will commit to implement energy efficiency measures envisaged in the residential, service, industry and transport sectors, that will lead to a reduction of 335 ktep compared with a gross final consumption (2010) of 11.771 ktep.

In order to achieving the objectives set by the current and future plans, in line with the commitments of this protocol, the Region will:

- promote energy efficiency measures and use of renewable sources for consumption by supporting interventions (funds already provided in the 2014-2020 financial programming):
  - in the productive cycles and plants and integration of renewable energy sources;
  - in public and public use structures, non-residential and integration of renewable energy sources;
- promote through the Action Plans for Energy Efficiency shared actions between various local authorities in support of economic, social, energy and environmental and governance development aimed to an integrated use of the funds available for improving energy efficiency;
- promote the use of new financing schemes, by using financial instruments provided by the European Investment Bank (as Elena Program and the European Energy Efficiency Fund) or by experimenting innovative financial instruments (such as *project bond*<sup>1</sup> and *performance bond*<sup>2</sup>), based on the principle of payment according to results obtained);
- encourage the use of "energy performance contracting" in tendering of public administrations, for awarding the service-energy in air conditioning systems in public buildings as well as management of public lighting, according to the model that provides for the intervention of an ESCO (Energy Service Company) on the basis of technical specifications already approved by this Region or similar;
- enhance the use of tools provided by the Italian government, such as: incentives, tax deductions, white certificates, "renewable-energy support cost counter" and other resources of the National Fund for Energy Efficiency.

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<sup>1</sup> The project bond mechanism is similar to that of traditional bonds. They are, in effect, debt securities with medium and long term maturities, aimed at attracting private capital to finance specific projects. In Italy they are governed by the laws of 27, 134 and 221 of 2012 and can only be issued by companies involved in the construction of road infrastructure, telecommunications networks, electricity networks and gas transportation, and other services of public importance.

<sup>2</sup> The performance bond is a guarantee, usually issued by a bank, with which the guarantor undertakes to pay a certain sum of money at the first written request of the beneficiary.

▪ ***Transportation and infrastructures***

The strategic guidelines document for the preparation of the Regional Transportation Plan (hereinafter called DSPRT) - entered into force on 23rd December 2013 - will assume the characteristics of a policy instrument of long-term vision and identifies the main challenges that will have to meet the new Regional Transport Plan.

The DSPRT addresses the Regional Transportation Plan towards strategies focused on the transition towards a low-carbon emissions economy such as promoting environmentally sustainable transport.

The transport policy has an integrated approach, at regional level, with the strategies enclosed in other planning tools such as the **Regional Plan for Air Quality [PRQA]** and the **Regional Environmental Energy Plan [PEAR]**.

Today, road-transport fulfils the overwhelming majority of transport needs and the possibility to obtain greater energy efficiency and fuel saving in the transport sector will therefore be sought in a **change in the mobility models towards a multimodal mobility approach.**

Piemonte Region forward-looking commitments aim at:

- addressing movement of people and goods to rail for longer distances and to public transport modes within urban areas
- supporting, at private level, measures able to improve engine efficiency (in terms of efficiency, performance and use of greener alternatives - such as electricity - to fossil fuels) together with a system of disincentives addressed to big-engined vehicles
- enhancing measures able to increase the load factor of vehicles (with mobility management policies, incentives for car-pooling but also measures with the objective of monitoring and supervising road traffic)
- minimizing travel distances and times (and hence emissions) using Intelligent Transport Systems technologies
- supporting fuel-efficient driving habits measures.

▪ ***Industry***

Piemonte is one of the Italian regions most affected by the international economic recession started in 2007- 2008; regional economy is still feeling today the effects of the crisis and internal demand remains extremely weak, at consumption and investment level. The Regional Government has the objective to stimulate and boost the piedmontese productive system and therefore it aims at:

- stimulating and supporting actions (also with European funding opportunities) able to address the regional production system (both at industrial and agricultural level) towards a greener and smarter economy;
- consolidating the clean economy productive chain, made of an efficient material management and a reduction of energy consumption – both through the development and upgrading of innovation clusters and through the diversification and production of "clean" systems, components and goods for the market;
- increasing and supporting circular economy processes by minimising waste, optimising resources use and adopting technological innovative solutions (and hence preserving the environment); as well as promoting consumers awareness on virtuous product life cycle approach
- investing in Information and Communications Technologies and other enabling technologies;
- encouraging local development projects dealing with renewable energies production and with energy efficiency through the implementation of short supply chains.

## ▪ *Agriculture*

Climate change presents a double challenge today for the agricultural sector: on the one side it must reduce its greenhouse gases emissions by changing its production processes and on the other has to adapt to the new climatic conditions ensuring sufficient and secure food supply.

In relation to greenhouse gases the agricultural sector contributes primarily with emissions of nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>). Nitrous oxide is derived from the fertilizers used in agriculture, while methane is derived from ruminant's digestive process. For both of these greenhouse gases emissions results as well from manure storage and spreading. Besides atmospheric emissions reduction, agriculture can effectively contribute to increase carbon absorption in soils.

At the same time policies aimed at increasing the "resilience" of the agricultural sector to climate change - that will inexorably produce its effects such as those related to long-lasting periods of drought or repeated flooding - must be adopted.

Within this overall framework, on which European, national and regional policies proceed, Piemonte Region commitments of on these issues are:

- to mitigate greenhouse gases emissions of methane and nitrous oxide;
- to intensify carbon capture and storage via agricultural and forestry practices (such as increased forest cover);
- to enhance soil conservation preventing its overuse, consumption and erosion;
- to increase an efficient use of water resources in agriculture;
- to facilitate the development and use of renewable energy produced with agricultural wastes;
- to protect agricultural systems biodiversity.

## ▪ *Forests*

Carbon capture and storage capacity in forest bio-mass and soil is quite important, and can be strongly affected by a good forest management.

Forestry carbon reservoirs can be empowered by applying cultivation techniques able to restore or even increase bio-ecological efficiency.

In detail, Regione Piemonte is involved on the following intervention guidelines:

- restoration of deteriorated soils
- increase of wood mass, where necessary
- controlled increase of construction wood exploitation, related to medium-long LCA wood.

The woods of the Piemonte region are rapidly growing up, by a quantity point of view, and wood exploitation remains far under the limit of the increasing mass, not considering the "capital mass".

The regional forestry policy doesn't aims to expand forest surface but to act on soil quality, with the target of increasing the carbon absorption capacity and so lessen and poise the CO<sub>2</sub> emissions, by the following engagements:

- managing of the forest holding, picking out intervention policy
- administrate the forest areas by:
  - upgrading abandoned forests to exploitation
  - financing measures of forests "resilience capacity" improvement (with the contribution of Rural Development Plan funds).
- prevention of forest fires and other natural disasters to grant the maintenance of carbon absorption capacity (with the contribution of Rural Development Plan funds)
- financing measures of training and updating of wood operators in order to develop working quality (with the contribution of Rural Development Plan funds).

The Piemonte Region Administration, being the carbon-trade an effective instrument to reduce GHG emissions, is committed to activate a “Regional Carbon Trade”, by the adoption of regional guidelines “voluntary carbon credits by forest managing”, aiming to develop a voluntary carbon trading in the forest field, based on a regulation of the regional credits offer.

▪ ***Water resources***

Concerning water resources, in accordance with the strategies reported in Po District River Basin management Plan, Piemonte Region is committed to:

- strengthen monitoring and evaluation systems of climate-related impacts on water resources quantity and quality;
- maintain and restore riparian vegetation to guarantee correct morphological process and increase the resilience of natural systems to climate change;
- develop buffer strips along natural and artificial water bodies located in the plan;
- providing water balance estimation to assess trends in water resource availability in relation to different climate change scenarios and promoting measures to improve the river basin management and to increase river basin resilience to extreme events through:
  - early warning systems for extreme events, such as floods and droughts - based on water and meteorological forecasting modelling - to support decisions of the Po water basin managing authorities dealing with the control of water balance, forecast and prevention of exceptional droughts in the Po basin,
  - 5% reduction on water abstraction and consumption by 2021 through increasing water-saving practices, adopting agricultural land-use changes and the introducing ecological focus areas;
  - adoption of ecoflows systems in rivers to preserve water ecosystems and increase resilience to climate change;
  - review of Great Lakes water resource management rules to prevent water scarcity and adapt to climate change effects;
  - increasing water supplies, harmonizing surface and groundwater uses;
  - development of management planning tools aimed at reducing the impact – at environmental and socio-economic level – of water shortage and droughts, mainly for the civil and agricultural sector;
- strengthening water resources governance with stakeholders participation and involvement in defining projects, such as contracts of rivers and lakes contracts processes;
- disseminating knowledge, best practices and support research and innovation.

▪ ***Biodiversity and Green Infrastructure***

Regional commitments are part of the National Biodiversity Strategy which aims to: “*Substantially reduce in the national territory the impact of climate change on biodiversity within 2020, defining appropriate measures of adaptation to induced changes and mitigation of their effects and increasing the resilience of natural and semi-natural ecosystems*”.

A particularly critical area in Piedmont in relation to climate change concerns the Alpine region where recent studies on flora and vegetation showed that over the past 50 years the species has undergone a substantial upward migration. The alpine flora is at risk of extinction, especially where there is no possibility of altitude ascent.

Regional commitments on these issues are as follows:

- make a drawing of ecological network on the entire regional territory to ensure the presence of a system of corridors that allow species to react to environmental changes;

- realize, in areas particularly affected by urbanization, infrastructures and human presence spread, measures of protection and preservation of natural areas where they still exist and guarantee a minimum level of connectivity;
- realize, in areas that no longer allow a sufficient level of connectivity, measures of territorial retrain and measures of ecological de-fragmentation in order to restore ecological corridors and/or overcome barriers (for example realize eco-infrastructure for overcoming road infrastructures).
- locate and activate measures of protection, preservation and conservation of habitats in the annexes of the "Habitat" Directive 92/43/CEE (within or outside the Natura 2000 Network);
- support and strengthen the network of national and regional protected areas and Natura 2000 Network areas present in the region;
- locate and activate measures of protection and conservation of habitats that are of greater sensitivity to climate change as wetlands and alpine habitats of high altitude (grasslands, rocks, cliffs, snow valleys);
- locate and activate measures to support centres for ex situ conservation of rare wild flora, endemic and/or at risk flora with inability to shift as those of mountain peaks or with poor dispersal ability and/or long regeneration times (Centres for the preservation of seeds, pollen and living collections - in Piedmont is active the "Centre for the conservation of plant biodiversity" at the Park of Marguareis).

▪ ***Natural hazards management***

The ongoing climate change increases the frequency and intensity of extreme events of hydrological and geomorphologic nature that, in connection with the change of territorial vulnerability, results in an increased risk of floods.

Today strategies and objectives has been defining by Piedmont Region in agreement with the Po Basin Authority, in order to assume the general purpose of flood risks reduction, precisely:

- update and upgrade the general framework of knowledge already reported in the PAI (Piano Assetto Idrogeologico - Landslides and Flooding Hazard Plan), concerning hazard flood mapping on both main and secondary river network;
- define criteria in order to implement a hydro-morphologic monitoring system aimed to provide an updated framework of morpho-dynamic evolution of river network and related sediments balance;
- implement the Programmi di Gestione dei Sedimenti (PGS) in order to provide a global knowledge framework concerning sediments transport;
- promote an approach to floods risk mitigation based not only on classical engineering structural remedial works but also on the improvement of morphologic rivers equilibrium. This also provide a global positive improvement of ecosystems at any scale as required by both the Water Framework and Floods EU Directives;
- provide a new legal framework for land use planning which includes the hydraulic invariance concept, deepening the knowledge framework concerning floods related hazard, vulnerability and risk.

▪ ***Territorial government***

Territorial government policies in Piedmont are characterized by the principle of "no land consumption".

The Piedmont Region is committed to implement this principle through the land use and landscaping planning as well as guidelines for local scale design and urban planning.

In particular:

- monitoring of land consumption at the regional and local scale in order to verify the effectiveness of policies and territorial and sector planning instruments, at the different levels of territorial Government;
- the widespread identification and exploitation of green areas (service areas, lanes with trees, ecological connections, etc.), the reduction of land consumption (reuse of compromised areas according to sustainability criteria, containment of expansion trend and urban sprawl), the enhancement of urban and suburban river areas, the implementation of green infrastructure. In this context the Landscape Regional Plan promotes the protection and enhancement of the landscape taking into account natural, historical, cultural and perceptual components of the region;
- promotion of synergies between land use planning and public transport planning instead promotion of “slow mobility” (cycle paths and walkways) within the urban and spatial planning instruments;
- support and coordinate urban construction projects aimed at the creation of a metropolitan railway infrastructure;
- address of the urban planning at the local level with the aim to reuse and improve the efficiency of existing buildings and redevelopment of derelict industrial areas (for example activating processes of redevelopment and regeneration of degraded areas through the guidelines of Ecologically Equipped Productive Areas);
- promote and increase of territorial governance models trough the implementation of multi-Funds Programme projects based on environmental sustainability.

▪ *Warning systems*

Climatic change strongly increases the general environmental and social exposure to natural hazards. On one side it acts as an amplification factor of extreme meteorological events and on the other side it may harmfully affect a number of environmental elements, thus increasing the general vulnerability of both natural and social systems. This may, therefore, affect the production system, i.e. for natural resources management.

Increasing resilience has to take into account climate changes and can be supported by means of “climatic services” which integrate environment features; these services are necessary in order to promote protection and adaptations measures that are able to reduce negative consequences e.g.:

- early-warning systems integrated into decision and technical evaluation processes (natural hazard, effects on health produced by extreme temperatures, wildfires hazard, forecasting of pollen distribution, forecasting of thermal conditions for plant and cycle production management) can be also consider as “soft” measures of resilience to climate change;
- long-term services (monthly forecast of water bodies and drought, wildfire hazard, seasonal estimation of snow contribution to spring and summer rainfall, seasonal estimation of land cover role for autumn rainfall, snow scenarios) can be also supporting measures for programming and spatial planning.

Multidisciplinary Warning Systems contribute to gain global benefits from environmental, social and economic point of view aside from uncertainty of future scenarios and they create significant synergies with the policies of environmental sustainability.



▪ ***Communication, Education and Awareness Raising***

The difficult issue of climate change calls for a communication strategy to act from one side on the effective communication of scientific concepts and their spread, in the other side on the awareness that the effects are visible even in our territory.

Through communication and training initiatives and actions the Piedmont Region contributes to raise awareness of climate change in the population and to promote sustainable lifestyles.

In particular Piedmont Region undertakes to support the promotion and dissemination of the measures for mitigation and adaptation adopted by the regional planning instruments, by providing specific Information and Communication Plans and taking care of their implementation.

Piedmont Region undertakes to support territorial agreements, education projects (schools) and training projects (enterprises, professional associations, etc.) for the dissemination of green and circular economy models.

▪ ***Methodologies and Instruments***

The implementation of mitigation and adaptation measures will be ensured as follows:

- detailed monitoring of physical and chemical parameters;
- update of emission estimation tools concerning climate-altering gases in order to quantify the contribution of specific policies, actions and instruments made for the assessment of the carbon footprint also in connection with management methods and soft adaptation measures, and in order to monitor the commitments made in the MOU;
- high resolution climate scenarios adapted to the region and impact scenarios taking into account also economic and climate change impacts;
- identification of indicators of the effectiveness of adaptation and mitigation measures and their regular assessment;
- identification of the environmental benefits of adaptation measures.

The Piedmont region intends to promote initiatives aiming to contribute to the maintenance and/or the implementation of those instruments, also through the orientation of its Financing Programs and promoting projects financed by EU Funds.

**Safeguard clause**

This Memorandum operates in accordance with the applicable obligations of international law and in full compliance with Italian national legislation, with particular reference to the obligations arising from Italy's membership of the European Union. It is not a treaty or a contract.

This Memorandum of Understanding on Subnational Global Climate Leadership signed as of the 27<sup>th</sup> day of November 2015.

THE REGION OF PIEDMONT

By: 

Sergio Chiamparino

President

