Autonomous Region of Madeira

The Autonomous Region of Madeira (ARM) is an insular territory of the Portuguese Republic with two inhabited islands, Madeira and Porto Santo. It is one of the outermost regions of the European Union and is located in the North Atlantic Ocean, between the parallels 30° 01' N, 33° 08' N latitude and between the meridians 15° 51' W and 17° 16' W longitude. Madeira Island lies 28 miles from Porto Santo Island and about 500 miles from mainland Portugal. Madeira has a resident population of about 262 302 inhabitants, while Porto Santo has 5 482 inhabitants, according to the 2011 census. The Madeira Archipelago has an important natural heritage with relevance for European and world level. The regional GDP is around 4000 million Euros and its main economic activity is tourism.

In 2009, the final energy demand for internal transport was 55%, for the tertiary sector 22%, for the residential sector 18% and the remainder was for the industry and primary sectors. The mostly used energy carriers were petroleum fuels (diesel, gasoline, fuel oil, propane) and electricity. Renewable energy used in electricity production and heating amounted to 10% of the final energy demand for Madeira and 2,8% for Porto Santo. In the same year, CO2 emissions were 1 058 kt, with 42% of the emissions from the transport sector, 32% from the tertiary sector and 19% from the residential sector.

I. Planning

The ARM began its regional energy planning in 1989. In 2011, it joined the Pact of Islands of the European Union and in 2012 approved the Sustainable Energy Action Plans for Madeira and Porto Santo islands, which main goal is to achieve a 20% reduction in CO2 emissions until 2020, in relation to 2005, through the improvement of energy efficiency and the use of renewable energy. Likewise, all the municipalities of the ARM joined the Covenant of Mayors and have similar goals in reducing their CO2 emissions.

The ARM has the Adaptation Strategy to Climate Change in the Autonomous Region of Madeira, which identifies the vulnerabilities and the measures to adopt in the short, medium and long term.

After 2020, the ARM will continue with the strategy to reduce energy dependence on fossil fuels, through energy efficiency and valorisation of renewable endogenous resources, resorting to the use of intelligent technologies and to the participation of citizens and public and private organizations, in order to achieve a 90% reduction in CO2 emissions until 2050, in comparison to 1990.

II. Energy storage

In an isolated island region without connection to other energy networks, energy storage is a fundamental technical condition to increase the contribution of renewable energy.

The reduction of fossil fuels in the ARM will necessarily be targeted to electrical energy. Due to the intermittency of some renewable energy sources and varied consumptions throughout the day, week and year, energy storage systems are being designed to ensure stability and an uninterrupted electricity supply.

In Madeira Island, energy storage will need to be based fundamentally on reversible hydroelectric systems integrated in multi-purpose power plants which also contribute to the adaptation to climate change, supplemented with batteries to ensure stability of the electric grid. For the island of Porto Santo, a smaller island, a battery energy storage solution is being studied.

Energy storage associated to private photovoltaic systems and electric mobility will also be promoted.

III. Renewable energy

The ARM has electric power plants that use hydropower, wind power, solar photovoltaic, biomass and municipal waste to produce electricity. Solar thermal and biomass are used for local heat production, especially hot water and heating.

In the future, besides the consolidation of existing energy carriers, a decentralised electricity production system with solar photovoltaic systems for private consumption in housing and services buildings, associated to storage systems, will be promoted as well as the use of solar thermal and biomass for hot water and heating. Moreover, the use of other renewable resources, namely geothermal and ocean energy for electricity production is also being studied.

In order to maximize the integration of renewable energies in the electric grids of Madeira and Porto Santo islands, more interactive and intelligent electricity grids will be developed, resorting to advanced communication and management systems.

IV. Sustainable mobility

As the transport sector is the main consumer of fossil fuels, priority should be given to actions to reduce CO2 emissions. In this sense, energy efficiency measures in the transport sector are being implemented and the use of public transport and soft modes of transport are also being promoted.

With regard to improving efficiency, it is worth mentioning the commitment to electric mobility. A public network of battery charging stations already exists in Madeira and in Porto Santo and will be expanded with new public and private charging stations, namely in car parks.

Electric mobility, together with electricity production from renewable energy sources and smart charging systems which contribute to the stability of the electric grid, is a fundamental strategic vector to achieve the CO2 emissions reduction target in 2020 and in 2050.

V. Buildings

Housing and services buildings are responsible for significant energy consumptions, especially electricity, given the large weight of the services sector in the regional economy. Energy certification of buildings has come to improve the energy performance of buildings and to reduce energy needs for heating, cooling, hot water and lighting, among other uses.

Buildings are increasingly more efficient and able to produce energy for own consumption. Through autonomous energy production and storage systems, it will be possible to ensure a neutral balance of CO2 emissions in many buildings.

VI. Public services

Public services, including street lighting, water supply and waste and waste water management, among others, constitute priority areas of the ARM to reduce CO2 emissions, energy dependence on the exterior and public expenditure.

A programme is being developed for energy efficiency and use of renewable energy resources in public services, seeking also to encourage private initiative, which will reflect on the competitiveness of the economy and quality of life of the citizens.

VII. Carbon capture

In parallel with the effort to reduce CO2 emissions from the energy sector, the ARM is also committed to contribute to the capture of CO2, thus reducing its emissions balance. It is worth highlighting the investments carried out planned in nature conservation and forest restoration activities, including the combat against invasive species and fire prevention, in addition to the use of biomass as a renewable energy source and also inventory and monitoring activities.

VIII. Cooperation, capacity building and awareness-raising

Cooperation with other regions and between regional institutions, as well as the capacity building of professionals and the awareness raising of citizens, public and private decision-makers, including their active participation in the planning and implementation of measures, are fundamental aspects to promote a sustainable energy policy with low carbon content in all sectors and to optimize resources to achieve the goals intended. The ARM has research institutions and a regional agency for energy and environment with experience in an insular context, which are relevant instruments to promote technological development and innovation in these areas.

IV. Financing

The availability of financing is a key factor for the implementation of the regional strategy to reduce CO2 emissions. Until 2020, funds and financial instruments of the European Union will be available, as well as private resources from energy service companies through energy performance contracting.

Carbon funds, based on the application of the "user pay" principle, should constitute a priority funding vector. For this, it is necessary to promote a more effective and transparent carbon market to finance actions aimed at the development of a low carbon society.