THE HEAT PUMP, A KEY TECHNOLOGY IN THE INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN

Roberto Saccone - Assoclima

The HVAC sector has been growing again: 2018 closed with positive numbers and the first three months of 2019 bode well for the current year.

The annual statistical survey of Assoclima, the Italian Association of heating, cooling and ventilation systems manufacturers, shows for 2018 an Italian market value of just over one and a half billion euros, up 10.8% compared to the previous year.

The national production was also positive (+5.4% compared to 2017), which amounts to around 718 million euros, with an export quota of over 60%. The Assoclima survey shows that the sectors linked to renewable thermal sources and, in particular, heat pump systems have grown above all.

In the 2017 National Energy Strategy and in the proposal of the Integrated National Energy and Climate Plan (NECP), heat pump systems are widely highlighted, which fully correspond to the current social culture of respect for the planet and its resources. In the NECP the thermal sector plays a very important role in achieving the objectives by 2030; Italy is therefore asked to face a technological change towards electrification and towards solutions that favor the penetration of renewable sources.

The proposal of the NECP indicates: an objective 2030 of annual energy savings from energy requalification of the buildings of 5.7 Mtoe in the residential and tertiary sectors; a target of 33.1% for thermal renewables, compared to 20.1% in 2017, which mainly involves the energy consumption of the residential and tertiary sector; a target of 33% reduction, compared to the 2005 level, in greenhouse gas emissions from sectors not subject to the ETS (Emission Trading Scheme) mechanism such as residential and tertiary.

The NECP proposal starts from the important contribution that heat pumps already provide to the consumption of renewable thermal sources, in 2017 equal to 2.6 Mtoe, and which today represent 23.6% of renewables in thermal consumption. The objective scenario of the NECP predicts that this contribution will be more than double in 2030, reaching 5.6 Mtoe (+111%), but above all this increase will have to ensure 85% of the increase in consumption of renewable thermal sources necessary to achieve the 2030 objective. This result can be achieved by acting on civil consumption (residential and tertiary).

The combined effect of energy efficiency improvements and the replacement of traditional fossil fuel heating systems with heat pump systems would also lead to a reduction in CO2 emissions in the civil sector of around 39% compared to the 2005 level. This reduction, which would make it possible to reach the 2030 target of a decrease in CO2 emissions (33%) in non-ETS sectors, 59% would be attributable to the penetration of heat pumps and 41% to the reduction in consumption due to the objectives of energy efficiency.

Scenario of penetration of heat pumps in the building stock to 2030

The scenario of evolution of the heat pump stock is constructed starting from the objective scenario of growth of consumption of RES from heat pumps expected to achieve the objectives of penetration of renewable sources in thermal consumption. This objective scenario indicates a first phase with a substantial continuation of the current growth trend, from 2650 ktoe in 2017 to around 2800 in 2020 with an average annual increase of around

50 ktoe (+ 5.6% in three years). The acceleration expected in the growth from 2800 ktoe in 2020 to about 5600 indicated for 2030 is much stronger, with an average annual increase of 280 ktoe.

The first phase takes place with the current framework of accounting rules for RES from heat pumps that will be in force until 2020. Based on these assumptions, the NECP requires an increase in the stock with a total installed capacity of 6 GWt in 3 years. To estimate the growth of the total installed capacity from 2020 to 2030 it is assumed that the new accounting rules assume a SCOP of 3 and a progressive increase in the average hours of use for heating from 395 to about 535 in 2030 as an effect of the recognition of the greater use for heat pump heating purposes. On the basis of these hypotheses the growth of the stock of total installed capacity required by the NECP would be 56 GWt in 10 years, equal to an average annual growth of 5.6 GWt.



Penetration scenario of heat pumps for heating in the residential and tertiary sector to 2030

To estimate the development required by the NECP target scenario for heat pumps used as the main heating system in the residential and tertiary sectors from 2018 to 2030, it is assumed that the systems used for this purpose have 1500 hours of operation and continue with the same trend of the years preceding the growth of the installation of the systems used for cooling only.

On the basis of these hypotheses, the overall growth of the installed capacity of heat pumps for heating required to achieve the role assigned to this technology by NECP from 2018 to 2030 is 32 GWt (from 33 in 2017 to 65 in 2030), with almost a doubling (+ 95%). The additional 32 GWt should lead to investments of around 9.6 billion euros over 13 years, with an average of 750 million a year, with positive effects on the economy and employment.



HVAC industry ready to take on the NECP challenge

At the moment the growth trend of heat pumps is positive, but to reach the targets by 2030 a doubling of the penetration rate of this technology will be necessary. 2019 is therefore a decisive year for laying the foundations for the new cycle of energy-environmental policies. The results obtained so far are in fact only the starting point and the objectives of the Integrated National Energy and Climate Plan are demanding.

The companies in the HVAC sector are ready: they have the tools to make the investments necessary to increase production, they have been working for several years to improve equipment efficiencies through constant technological changes and are proceeding to place on the market equipment that uses not climate-changing refrigerants, in line with the HFC phase-down. Furthermore, the HVAC industry is facing a new perspective: moving from a linear economy to a circular economy. Most of the air-conditioning equipment consists of valuable materials that are easy to recover and recycle. The transition to a circular economy would make it possible to make an important contribution to the decarbonisation process in relation to the development of new energy products deriving from the recycling of waste or the enhancement of by-products. Companies are therefore ready to accept the challenge, but there is still much to do on the boundary conditions.

First and foremost, the market demand for heat pump systems must grow, and to make it grow, communication and support tools must be strengthened. As far as communication is concerned, it must be directed towards two objectives: the advantages offered by heat pump systems and the incentive tools available for restructuring and energy upgrading. The private sector has been benefiting for some years from 50% and 65% tax incentives, which are giving interesting results. The Italian state has been very active in encouraging the private sector to switch to more efficient technologies, but invests very little in the buildings it owns, despite the availability of the *Conto termico*. To make the *Conto termico* better and better, it is necessary to act more incisively on communication, communicating with all local public administrations and explaining the advantages and opportunities.

The challenges of the NECP must therefore be supported by a greater push in public buildings, where it will probably be necessary to find new mechanisms or financial instruments that allow the administrators to carry out real energy requalification policies, for example excluding from the 3% limit the investments in energy efficiency of public buildings or using the proceeds from the CO2 auctions, which in 2018 amounted to 1 billion 400 million euros and which, according to a European directive, should be allocated partly to environmental qualification policies.

It is also necessary to simplify and not to question the topic of tax incentives, it is necessary to inform users of the possibility of monetizing the tax credit by assigning the credit or reviewing the methods of payment of the Ecobonus. On this topic, Assoclima, on the occasion of a hearing in the Chamber of Deputies, put forward three alternative proposals: to reduce the incentive payment period from 10 to 5 years, to establish a first deduction installment equal to 25% of the entire contribution and spread the remaining 75% in the following 9 years or provide a mixed system with a partly cash return and partly with tax deductions.

The HVAC sector represented by Assoclima faces many challenges and is ready to face them, but achieving the objectives of the Integrated National Energy and Climate Plan requires the involvement of all citizens and a general change of mentality.