

The operation of the electric sector and the energy supply to industry are the main challenges to decarbonize the Spanish economy in 2050.

Experts recommend introducing long term economic and institutional incentives to boost energy savings and to facilitate the investment in efficient renewable technologies.

Madrid 13th december of 2017. Complying with the decarbonization objectives established by the European Union for 2030 will be relatively straightforward for Spain in different economic and policy scenarios. Nevertheless, attaining a model without fossil fuels in 2050 presents a number of challenges on a technological and a regulatory level, as well as in the investments to be made and in the configuration of a sustainable and efficient energy mix. It is important to reach solutions that make electrification feasible, while also changing the electricity mix from fossils to renewable sources, together with the necessary supply of thermal energy for the industry to replace coal, oil and gas.

These are some of the conclusions from the last report of the “*Economics for Energy*” Research Center, presented today by its directors, Pedro Linares and Xavier Labandeira, at the Ramón Areces Foundation, in Madrid.

The decision on the degree of desirable decarbonisation of the Spanish economy, within the boundaries of international agreements, implies decisions that the society as a whole (public administrations, companies and consumers) must assess in an informed manner to achieve an energy transition which allows a correct response to such an obvious and urgent challenge as climate change.

In order to contribute to this process, the report details the economic, environmental and technological consequences according to four different scenarios for the Spanish energy sector: decarbonization, maintaining current energy policies, accelerated technological progress and secular economic stagnation.

Electricity as a protagonist

Decarbonizing in the 2050 horizon implies that by then fossil fuels (coal, oil and gas) will disappear from the Spanish energy mix. Instead, electricity from renewable sources would be the absolute protagonist of the new mix.

The electrification of supply in the energy transition process leads in general terms to a significant increase in the demand for electricity, which must be produced without the use of fossil fuels. Electricity generation must be completely decarbonised in 2050 thanks to renewable energies (mainly wind and solar), except in the scenario where the emission reductions are less ambitious. This implies important challenges related to the need to adapt variable generation to demand (and vice versa) through large-scale storage systems or with the support of other sources free of CO₂ emissions.

In the specific case of industry and freight transport, achieving a high degree of decarbonization necessarily involves developing new technologies or cheapen existing ones to provide high temperature thermal energy to the industry and emission-free fuels for freight transport. Regardless, oil disappears from the energy mix in almost all scenarios in 2050.

In general terms, the importance of making investment decisions through a long-term vision lies in ensuring that the alternatives to accelerate the transition to a decarbonised economy are sustainable in all aspects. Thus, the reduction of CO₂ emissions in 2030 pivots to a large extent on the installation of new electric power powered by natural gas, which, as a fossil fuel, could not continue to exist in the context of total decarbonization by 2050. This raises important challenges for both the remuneration of these new investments and the maintenance of existing ones, which calls for an anticipation of the measures that allow correcting or redirecting possible inconsistencies of this type.

Furthermore, in all cases, it is essential to promote savings and energy efficiency. These are essential aspects to achieve the decarbonisation objectives at a reasonable cost, so it is very important to eliminate barriers to the penetration of efficient technologies in the market, especially those related to the electrification of final consumption.

Four possible scenarios

These challenges are common, to a large degree, to the four scenarios contemplated in the Economics for Energy report.

The first of these, decarbonisation, assumes that EU countries have a staunch commitment to reduce greenhouse gas emissions, while other countries have a bit more reluctance. Economic growth is sustained, which favors the financing of the decarbonisation process, and energy efficiency technologies are experiencing an important boost. The electrification process is profound, mainly in the transport and the tertiary sector. In 2030 nuclear maintains its part in the energy mix, while gas leads the energy mix. However, in 2050 the leading role shifts radically to renewable energy (wind and solar), coupled to the immense challenge of having carbon-free energy sources capable of supplying thermal energy to the industry.

A second context, characterized by the continuity of current policies, assumes a lukewarm reaction on the part of the countries in fulfilling the commitments of the Paris Agreement and a lack of citizen pressure, which in Spain would result in the impossibility of achieving a decarbonized model in 2050. The lower requirement for reducing emissions is reflected in a lower degree of electrification and, although the presence of renewables is increasing, oil and, to a lesser extent, coal, are still present in the energy mix even in 2050.

When we find ourselves in a scenario of accelerated technological progress, the economy grows as a result of innovation and the costs of generating renewable energy are drastically reduced. The combination of these factors causes a rebound effect on demand, which increases significantly since it is no longer as necessary, from either a cost or emissions point of view, to save that much energy: the demand for electricity increases in 2050 to more than double the current one. The problem with new gas investments appears here with a particular intensity, since the larger energy demand implies using more gas in 2030 to replace the limitation of the installable quantity of renewables. That is why in 2050 nuclear energy appears in the energy mix of this scenario, which would disappear if annual renewable installation were increased above maximum historical levels.

Finally, the assumption is made that a secular economic stagnation will happen, accompanied by a lower capacity for innovation and greater socioeconomic inequality, which form the roots of an unstable political context. In 2050, a strong dependence on fossil fuels continues (oil maintains 20% of the mix)

and the contribution of renewables is very limited, although the demand for energy (and, consequently, pollutant emissions) will have been reduced in a very important way because of the economic slowdown.

Complete report at: <http://eforenergy.org/publicaciones.php>

About Economics for Energy

Economics for Energy (www.eforenergy.org and @ecoforenergy) is a private research center constituted as non-profit organization that has the support of the Universidad Pontificia Comillas ICAI-ICADE, the University of Vigo and several foundations and companies. The center, specializing in the economic analysis of energy issues, is directed by Xavier Labandeira, professor of Economy of the University of Vigo, and Pedro Linares, professor of the Escuela Técnica Superior de Ingeniería (Comillas ICAI) of the Comillas Pontifical University ICAI- ICADE. Economics for Energy carries out its research work independently and, in this sense, the results of its activities do not necessarily reflect the positions of its partners.