

## PROBABLE SUCCESS IN THE 20% OBJECTIVE OF THE EU WITH THE RENEWABLE ENERGIES

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**Abstract-** European Union (EU) proposed in 2008 for its members some energy targets to be carried out till 2020: 20% cut in energy-related greenhouse gas emissions compared to 1990, 20% of primary energy savings, and 20% share of renewable energy in total consumption, heating and cooling included. But this year, an economic crisis of unprecedented scale started. Lower economic growth has effectively reduced the stringency of the 20% targets and the achievement of renewable energy targets and efficiency measures reduce emissions further. At the same time, renewable energies have created job opportunities but also energy security needs. This energy situation implies important changes, particularly in the energy system and the distribution of the different types of energy generation. At the end of the paper, some scenarios are analyzed to understand future ways for research and markets.

**Keywords:** European Targets, Renewable Energy, Greenhouse Gas Emissions, Energy Policy.

### I. INTRODUCTION

When the EU decided in 2008 to cut its greenhouse gas emissions, it showed its commitment to tackling the climate change threat and to lead the world in demonstrating how this could be done. The agreed cut of 20% from 1990 levels by 2020, together with a 20% renewable target, was a crucial step for the EU's sustainable development and a clear signal to the rest of the world that the EU was ready to take the action required [1].

But it has always been clear that action by the EU alone will not be enough to combat climate change and also that a 20% cut by the EU is not the end of the story. EU action alone is not enough to deliver the goal of keeping global temperature increase below 2°C compared to pre-industrial levels. All countries will need to make an additional effort, including cuts of 80-95% by 2050 by developed countries. An EU target of 20% by 2020 is just a first step to put emissions onto this path [2].

That was why the EU matched its 20% unilateral commitment with a commitment to move to 30%, as part of a genuine global effort. The European Council in

December 2008 confirmed that "the European Union's commitment to increasing this reduction to 30 % within the framework of an ambitious and comprehensive global agreement in Copenhagen on climate change for the period after 2012 on condition that the other developed countries undertake to achieve comparable emission reductions and that the economically more advanced developing countries make a contribution commensurate with their respective responsibilities and capabilities".

### II. 20-20-20 FOR EU

Since the EU policy was agreed, circumstances have been changing rapidly. We have seen an economic crisis of unprecedented scale. It has put huge pressure onto businesses and communities across Europe, as well as causing huge stress on public finances. But at the same time, it has confirmed that there are huge opportunities for Europe in building a resource efficient society.

We have also had the Copenhagen summit. Despite the disappointment of failing to achieve the goal of a full, binding international agreement to tackle climate change, the most positive result was that countries accounting for some 80% of emissions today made pledges to cut emissions, even though these will be insufficient to meet the 2°C target. It will remain essential to integrate the Copenhagen Accord in on-going UNFCCC negotiations. But the need for action remains as valid as ever.

The economic crisis has had a major impact on the assumptions made when the 20% was agreed. But its impact has worked in different ways. Between 2005 and 2008, the EU cut its emissions from 7% to 10% below 1990 levels. So when the crisis hit, stepped up climate action and high energy prices had already led to an acceleration in EU emission reductions.

The crisis brought an immediate further reduction. Verified emissions in the ETS in 2009 were 11.6% below 2008 emissions. Carbon prices fell correspondingly, with a drop in early 2009 from some €25 to €8 per ton of CO<sub>2</sub> [3]. But the fall in carbon prices has shown how the impact of the ETS on companies and consumers can also adapt to changing economic circumstances. This one-off reduction in emissions meant that in 2009, the EU emitted around 14% less greenhouse gases than 1990.

But, of course, as production recovers in energy-intensive industries like steel, this rate of reduction cannot be simply extrapolated into the future.

However, the absolute costs of meeting the 20% target have fallen. In the analysis presented in 2008 underpinning the climate-energy package, based on the expectation of continued economic growth, the costs of reaching the target were estimated as at least €70 billion per annum in the year 2020. Today, the analysis also takes account of the recession. The price tag is now estimated at €48 billion (0.32% of GDP in 2020). This represents a reduction of some €22 billion, or 30% less than expected 2 years ago.

Nevertheless, this reduction in absolute costs comes in the context of a crisis which has left businesses with much less capacity to find the investment needed to modernize in the short run, and great uncertainty over how long it will take to recover. The lower cost of the climate and energy package today is due to the interplay of several factors. Firstly, lower economic growth has effectively reduced the stringency of the 20% target. Secondly, the rise in oil prices proved an incentive to improve energy efficiency: energy demand has fallen. Thirdly, the carbon price is likely to remain lower as allowances not used in the recession are carried forward into the future.

In addition, the achievement of renewable energy targets and efficiency measures reduce emissions further. The result will be a carbon price well below the projections made in 2008. At the same time, the crisis has put heavy pressure on the EU economy. Businesses today are squeezed by depressed demand and the challenge of finding sources of funding. With a lower carbon price, government revenue from auctioning could also be halved, adding to pressure on public finances and reducing another potential source of public funds available for climate purposes. The requirement has not gone away to find the investment needed in areas like electricity, heating, and transport to reach the agreed 20% renewable energy target.

As countries worldwide sought to boost their economies in the crisis through stimulus packages, there was a clear pattern of investment being directed towards infrastructure for less polluting transport modes, such as public transport, intelligent traffic management systems (ITS), low-carbon energy production, smart electricity grids and clean transport- and energy-related R&D. Signs of the transition towards a low carbon economy are emerging across the world, with countries attracted to the greener option also because of its potential to create large numbers of new jobs.

In energy sector, renewables accounted for 61% of new electricity generating capacity in the EU in 2009. But Europe's lead is challenged. The 2010 "Renewable Energy Attractiveness Index" now cites USA and China as the best investment opportunity for renewable energy. In 2009, China topped the global league table for wind power installation. Chinese and Indian wind turbine manufacturers now appear in the top ten. China and Taiwan now produce most of the world's PV panels.

A further reason for needing change is energy security. Despite a blip in 2009, energy consumption continues to rise. The International Energy Agency has warned that, by 2015, oil supply could face difficulties to keep abreast with increasing demand, leading to further increases in oil prices, potentially stifling renewed economic growth. Domestically-sourced energy like renewable energy brings major benefits in terms of reduced reliance on imports.

However, as stimulus packages are phased out and an era of tight public spending begins, the incentives are being reduced. Other drivers exist, such as the target for renewable energy, product standards for energy-efficient products and vehicles and green public procurement.

### **III. ENERGY SCENARIOS AND ASSUMPTIONS FOR FUTURE**

This energy situation implies important changes, particularly in the energy system and the distribution of the different types of energy generation. Among the various scenarios that can be analyzed, and basing on modeling analyzed admitted by EU through some energy system models, we can underline the called Reference scenario of the Technical report accompanying the analysis of options to move beyond 20% GHG emission reduction [4].

This scenario includes the entire Energy and Climate package and the country targets for renewable energy; the scenario does not include the National Renewable Energy Action Plans (NREAPs) as these were not available at the time of scenario construction. Consequently the NREAPs and other measures adopted by the national governments in 2010 and in 2011 have not been included as such in the Reference scenario.

Further the assumptions for nuclear energy development reflect the legal situation as of mid 2009, i.e. including a phase-out of nuclear energy in Germany. They do not include the possibly higher risk premiums and social acceptability problems which may be a result of the Fukushima accident in March 2011.

The technology assumptions also reflect the knowledge at that point in time. For example they do not include the difficulties in licensing which the CCS power plants and storage facilities have encountered over the last recent years, and they did not incorporate recent progress in renewables such as strong solar cost reductions and enhanced offshore wind potentials.

Compared to present situation, substantial restructuring of power generation is projected to take place in the Reference scenario [5]. The changes are driven by the obligation to increase RES as % of gross final demand to 20% by 2020, which implies very significant use of RES in power generation as a result of a least cost distribution of the RES target among the sectors. The ETS carbon prices is another driver of changes, equally important, but the carbon prices projected in the Reference scenario are rather small (below 20€/ton-CO<sub>2</sub>), as the scenario assumes full implementation of RES obligations and implementation of some further energy efficiency measures.

The ETS carbon prices favour low carbon sources of generation but are not sufficient to drive CCS investment in the Reference scenario. Both the RES and the carbon prices reduce the use of solids and oil in power generation, and at a lesser degree reduce the use of gas, although gas increases in share among the fossil fuels.

In addition, the carbon prices change to some degree the merit order of unit commitment: highly efficient gas plants displace the less efficient solid fuel plants in the merit order. However, the cost-effective substitutions among the fossil fuel plants are rather limited when imposing also RES targets because these targets induce high penetration of RES generation to the detriment of other means for CO<sub>2</sub> reduction. The main effect comes from the additional RES power units which reduce both coal and gas power generation and investment. Nevertheless gas-fired power is less reduced than coal-fired, because of the carbon prices but also because the intermittent RES power requires extensive support by flexible reserve power for balancing and backup, which is supplied mainly by gas units.

## VI. CONCLUSIONS

Since the EU took its historic decisions on combating climate change in 2008, the economic crisis has brought some fundamental changes to the political and economic landscape of the EU's climate policy. The pressure on the EU economy is intense. The EU, however, remains deeply committed to action on climate change. While the absolute costs of meeting a 20% target have been reduced, representing a welcome relief for businesses facing the uphill battle of recovery, it also represents a risk that the effectiveness of the 20% target as a motor for change diminishes. This all comes at a time of severe economic constraint, for governments and businesses.

Therefore, it is important to analyze the direct consequences of a possible move to a 30% target. A political decision to move to this target cannot be taken without consideration of the international context. At present the conditions set for stepping to 30% have not been met. In addition, such a decision also needs to be taken in full consciousness of the economic consequences at home. Both the international context and the economic analysis suggest that the EU should maintain the option for moving to a 30% target: we should be ready to act whenever the conditions are right to take this decision.

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