THE STRATEGIC VALUE OF EUROPEAN RENEWABLE ENERGY PROMOTION POLICY*

*Mischa Bechberger***

When writing these lines about renewable energies (RES) as the only real strategic option for the future European energy policy, the world is faced with one of the most serious nuclear disasters as the consequence of the strongest earthquake ever experienced in Japan (with a magnitude of 9.0 on the Richter scale) followed by a very powerful Tsunami which possibly led to partial meltdowns within at least three of the nuclear reactors of Japan's oldest nuclear power plant Fukushima I, 250 km North of Tokyo contaminating a wide area of a densely populated country like Japan (Greenpeace 2011). Although being too early for a serious analysis of the overall consequences of this catastrophe, there is no doubt that the Japanese disaster will strongly influence the opinions on nuclear power as a future option in Europe's energy policy mix/development. In the recently released European Union (EU) Low carbon road map for 2050 nuclear power still plays a quite prominent role as it is mentioned as one of the main low carbon energy technologies within the associated impact assessment, where nuclear energy, in the so called Global Action Scenario, would account for up to 29 percent of power generation in the EU in 2050, whereas RES would only represent 44 percent having in mind that in 2020, following the National Renewable Energy Action Plans (NREAPs) of the 27 EU Member States should already reach 34.3 percent of RES-electricity (ECN 2011: 6 et sqq.; European Commission 2011: 104).

As the approach of a global climate regime, based on strong and binding greenhouse gases (GHG) reduction targets for

* To be published as a foreword in: Morata, & Solorio – eds. – (forthcoming) *European Energy Policy: The Environmental Dimension*, UAB-IUEE.

** Mischa Bechberger, 1974, is an expert on renewable energy promotion policies. Since 2009 he is responsible for the international relations of the Spanish Renewable Energy Association (APPA) in Barcelona.

industrialised countries as well as growing reduction commitments for emerging and developing countries, decided on world climate summits, have largely failed as demonstrated in Copenhagen (Scheer 2010), the most efficient, effective and less costly solution to rapidly bring down global GHG emissions to a level necessary to keep global warming below 2°C until 2100, is clearly through a most rapid expansion of renewable energies in the global and European energy mix. This would also strongly help to decrease Europe's growing energy import dependency of fossil fuels, which in 2008 (latest data available from Eurostat) already reached 54.8 percent for the EU-27 (Eurostat 2011: 26). That this benefit of RES is of every day bigger strategic importance for the EU is demonstrated lately through the political upheavals in the Arab World since the beginning of 2011, part of them being the main oil and/or gas suppliers of Europe (Eurostat 2011: 40 et sqq.). The EU RES promotion policy should therefore be seen as the only strategic option to bring down quickly the European GHG emissions (becoming also an example for other strong GHG emitters like the United States (US), but also China and India) and the before mentioned energy import dependency. Having in mind that due to the political upheavals in North Africa and the Middle East oil prices in March 2011 with around 115 US$ per barrel have already reached the second highest levels since the historical peak in summer 2008 (Manager Magazin 2011), RES can avoid a lot of costs for GHG emission rights and fossil fuel imports which in total would be much higher than the needed financial support/investments for a massive deployment of RES. In the same time RES would create a lot of new jobs, very important in times of global economic downturn, as shown at the end of this foreword. The best way to do so, as shown in various recent studies (EREC 2010; ECF 2010; Jacobson & Delucchi 2009; EREC & Greenpeace 2010), would be through stable (macro-) legal frameworks, binding mid and long-term targets and a combination with strong energy efficiency measures. Whereas there are still many doubts when and to what extent a new global climate regime might be established (Scheer 2010), RES is growing with fast pace, both at European and global level thereby being one of the most important means of GHG reductions in the last years.

According to the European Photovoltaic Industry Association (EPIA), in 2010 the growth of the photovoltaic (PV) markets worldwide has reached a newly installed capacity of 16.7 GW, experiencing a 132 percent growth compared to the previous year. The total installed global PV capacity has therefore reached 39.6 GW (EPIA 2011:

3 et sqq.). Thereby in Europe PV in 2010 became for the first time the RES electricity technology with the largest amount of newly installed generation capacity before wind (and only outperformed by gas fired plants) (EWEA 2011: 6). This also translates into investments of over 50 billion € in 2010. PV technology has reduced its unit costs to roughly one third of where it stood 5 years ago, thanks to continuous technological progress, production efficiency and to its wide implementation. The trend of decreasing unit cost will continue also in the future. Therefore, PV technology has all the potential to satisfy a double digit percentage of the electricity supply needs in all major regions of the world. Going forward, a share of over 20 percent of the world electricity demand in 2050 appears feasible. Such amounts of PV would avoid a cumulative total of CO2 emissions of 65 billion tons between 2020 and 2050 (EPIA & Greenpeace 2011: 3 et sqq.). In the case of wind, following the Global Wind Energy Council (GWEC), although hit by the financial crisis of 2008/09, the global wind market nevertheless grew by 22.5 percent in 2010, with growth of investment of 31 percent reaching a record level of USD 96 billion and an overall installed global wind capacity of 194.4 GW. By 2015, annual market additions are expected to reach 60.5 GW, up from 35.8 GW in 2010. This will lead to a doubling of the overall installed world wind capacity to nearly 450 GW by 2015 (GWEC 2011: 10 et sqq.). Regarding global investments in RES, in its latest Global Status Report of 2010, the Renewable Energy Policy Network for the 21st Century (REN21) showed that investment in renewable energy power capacity (excluding large hydro) in 2009 was comparable to that in fossil-fuel generation, at around $100 billion each. If the estimated $39 billion of investment in large hydro is included, then total investment in RES exceeded that in fossil-fuel generation for the second successive year. According to REN21, in 2011 the world as a whole will add more capacity to the electricity supply from renewable than non-renewable sources (REN21 2010).

At European level the originally capacity targets for RES-E for 2010 established for the first time in 1997 by the RES White Paper have been widely exceeded. In the case of wind at the end of 2010 more than 84 GW have been installed instead of the 40 GW foreseen. Regarding PV the target of 3 GW has even been surpassed by more than 9 times reaching an installed capacity above 27 GW (EREC 2011: 11). How has this impressive development been possible? At global level, mainly regarding wind and solar energy as the main renewable power resources installed in the last couple of years, and mainly looking at the US, China

and Germany as the three major wind and/or solar markets worldwide, in the case of China the high speed growth in wind chiefly steams from the pure necessity of satisfying the energy hunger of the most populated country and the second biggest macro economy worldwide. In its recently presented new 5-year-plan for the period 2011-2015, China, within the context of RES, adopted new major targets to be fulfilled until end of 2015 including a growth of RES use of 65 percent and to invest 11.5 billion € in clean car technology (Runge-Metzger 2011).

Regarding the US, the strong growth in mainly wind (and to a certain extent also PV) is predominantly based on a leading wind industry, strong and growing incentives both at state level thanks primarily to quantitative targets in form of the so called Renewable Portfolio Standards (already adopted in 29 of the 50 US States) as well as on Federal level through the production tax credits, even though on a less stable basis due to the missing long term legal security as these credits are normally only prolonged on a yearly basis, at the moment guaranteed until end of 2012 (GWEC 2011: 66 et sqq.).

At European level, one has to focus mainly on the German success of PV development, reaching more than 17 GW of installed capacity at the end of 2010, signifying 43 percent (EPIA 2011b: 18) of the cumulated world PV market thanks to an exemplary FIT law since 2000 which always guaranteed a high planning and investment security and allowed small private investors to invest in clean, smart and local distributed generation facilities. In wind energy Germany also is still leading the European ranking with 27.2 GW of installed capacity at the end of 2010 (GWEC 2011: 11).

But not only Germany shows an impressive growth of RES electricity capacity, also other EU Member States like Italy (at least 2.3 GW), the Czech Republic (1.4 GW) and France (0.7 GW) in the case of newly PV capacity installed in 2010 (EPIA 2011b: 16), or Spain (1.5 GW), France (1.1 GW) the UK (1 GW) and Italy (0.9 GW) in newly installed wind capacity in 2010 (GWEC 2011: 11), on the one side based on strong national RES-E support schemes, but on the other hand basically thanks to an ambitious and forward looking EU RES policy which saw its starting point already in 1997 through a first White Book on RES, followed by two important Directives for the promotion of RES-E in 2001 and biofuels in 2003 with indicative targets for 2010 both at European and national level and lately the new EU RES framework Directive of 2009 which for the first time comprised all RES subsectors (including RES heat and cooling) and relatively ambitious binding targets for RES

at EU and country level (Bechberger 2009: 536 et sqq.). To secure the fulfilment of these targets, the RES Directive also included the obligation by the Member States to elaborate and subsequently submit so called National Renewable Energy Action Plans (NREAP) to the European Commission following general guidelines in form of a template where they had to forecast the overall RES share in final energy consumption (at least fulfilling the minimum overall RES target fixed within the RES Directive for each Member State) as well as the different subsector and single technology targets and most important describing the measures already established or still necessary to adopt to make possible the fulfilment of the different RES targets until 2020. The Member States had to submit its NREAP until end of June 2010 but it took until end of 2010 to have all the 27 NREAPs delivered.

As a first analysis of all the NREAPs the following main results can be highlighted: The Member States altogether expect to overshoot the minimum target of 20 percent of RES in final energy consumption by 0.7 percent in 2020. Regarding subsector targets NREAPs foresee reaching a share of RES to meet 34.3 percent of electricity demand, 21.3 percent of heating and cooling demand and 11.3 percent of transport consumption (ECN 2011: 6 et sqq.). Following these numbers, on a first glance it looks like a reaffirmation of the ambitious EU RES policy by the majority of the Member States.

Nevertheless, the EU project REPAP 2020 (www.repap2020.eu), which in a first project phase gave strong scientific input to the authors of the NREAPs by preparing own national RES industry road maps and in a second phase both closely follows the transposition of the RES Directive into national law as well as evaluates the national NREAPs, in its recently published analysis of the NREAPs stated that “it can be seen that substantial optimisation potential exists for all five categories [administrative procedures and spatial planning, infrastructure development and electricity network operation as well as support measure for RES electricity, heating & cooling and within the transport sector; A.N.]. The strongest deficits exist in the field of administrative procedures and spatial planning followed by the category support measures for RES heating and cooling. The highest optimisation potentials exist in these two areas. But even the section of support measures in the electricity sector receives only a neutral evaluation on average showing room for improvement in many EU member states (Ragwitz et al. 2011: 2).”

Therefore the same project, in its also recently published EU RES industry roadmap, based on the national RES industry road maps elaborated in 2010, showed that even quite higher shares of RES in the EU energy mix could be reached by 2020. The European RES industry – based on the NREAPs' energy demand scenarios – shows that 24.4 percent renewable energy in final energy demand can be achieved, always provided that appropriate policies are in place like clear, stable (never retroactive!) technology specific promotion schemes for RES-E technologies, new incentives for CHP, and district heating & cooling, priority access/dispatch of RES in all Member States, an improved storage capacity planning, the streamlining/facilitating of permit procedures mainly for small(er) RES installations including one-stop shop approaches, to reestablish access to equity finance for SME/small private investors & project bonus & national RES funds to be fed by auctioning money of European Emissions Trading Scheme (EU ETS) from 2013 onwards, strong infrastructure investments based on the new infrastructure package of the EC of late 2010 including several priority projects (like new interconnection lines) and last but not least and of utmost importance, the adoption of ambitious, binding and long term energy efficiency targets (which in a first step might be established within the recast of the Energy Service Directive) just to mention a few of the policy recommendations of the Repap2020 project (Fouquet 2011). Besides, the NREAPs expect the share of RES to meet 34.3 percent of electricity demand, 21.3 percent of heating and cooling and 11.3 percent of transport consumption, while the RES industry – based on the NREAPs' energy demand scenarios and supposing the introduction of the above mentioned measures – suggests that 42.3 percent of electricity consumption, 23.5 percent of heating and cooling and 12.2 percent of transport consumption is attainable by 2020 (EREC 2011: 6).

Although these estimations for 2020 already might look like ambitious and would need the deployment of at least a larger part of the mentioned measures, they could only mean a first, even though very important intermediate step to a complete ecological transformation of Europe's and the global energy mix based entirely on RES by 2050. To make such a transformation come true, what would be needed beside the before mentioned supportive measures, one the one hand is a fast and complete transposition of the RES Directive, a close and effective monitoring by the European Commission including infringement procedures in case of incompliance of the main provisions and targets of the Directive

and on the other hand an adoption of 2030 (and on a later stage also 2040) EU targets for RES as early as possible to give these only completely carbon free energy sources the strategic importance in the future EU energy mix they deserve as mentioned at the beginning.

That such a complete switch to RES at the latest until 2050 at EU level (or even until 2030 as demonstrated by Jacobson and Delucchi 2009 for the global scale) not only is possible already with the latest available RES technologies today, but also would lead to huge overall macroeconomic benefits, was shown in 2010 by the 100 percent RES scenario for 2050 by EREC called "Re-thinking 2050". Therein EREC demonstrated that that even without an aggressive energy efficiency policy, the EU could achieve an effective share of 96 percent renewable energy in final energy consumption by 2050 (the remaining 4 percent steam from the assumption of remaining fossil fuel uses of aviation and inland navigation by 2050). Based on this nearly 100 percent RES share by 2050, only the avoided CO2 costs in 2050 (assuming a CO2 price of 41 €/t in 2020, 45 €/t in 2030 and 100 €/t by 2050) would exceed the cumulative investment of 2,800 billion € necessary to reach 100 percent renewable energy by 2050 by 1,000 billion €. When taking into account the avoided fossil fuel costs (expecting an oil price of $100/barrel in 2020, $120/barrel in 2030 and $200/barrel in 2050) the economic benefit would increase to €2,090 billion in 2050. Therefore, higher upfront investment needs do certainly pay off in the long-run for European citizens. Besides, more than 6 million jobs in the EU RES sector would be created (EREC 2010: 3 et sqq.).

What finally is still missing to make possible such a strategic transformation of Europe's energy system but what is of equal importance as long term targets of RES and GHG reductions are binding and strong targets for energy efficiency, not only for 2020 but also for 2030, 2040 and 2050, as this would strongly help to fasten the increase of RES in the overall energy consumption and to bring down the total GHG emissions of Europe in general and those of the energy sector in particular, still being one of the biggest GHG emitters of all sectors. The recast of the Energy Service Directive, foreseen for 2011/12 should be a good windows of opportunity to finally establish binding energy efficiency targets, the only still missing pillar in the strongly interdependent energy and climate strategy of the EU, based on RES, GHG reductions and energy efficiency.

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