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Editorial

The Energy Transition and Fiscal Policy

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The aim of the Paris Agreement of 4 November 2016, meanwhile ratified by 184 countries, is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above the pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees. In order to achieve this, a drastic energy transition 'from fossil to non-fossil' is required in order to mitigate anthropogenic emissions of greenhouse gases (hereinafter: 'GHG') by the mid of this century.

In this editorial I will go into the ambitious targets the EU has set itself for reducing its GHG emissions progressively up to 2050, and make some remarks on the consequences for fiscal policy in the EU.

1 EU targets for 2020 and 2030

The 2020 GHG targets (also referred to as '20-20-20' targets) include three topics: (1) a unilateral commitment to reduce its GHG emissions by 20% compared with 1990 levels, (2) binding targets to increase the share of energy from renewable sources (solar energy, wind energy, hydropower, geothermal energy, biofuels) to 20% with a minimum of 10% of renewables in the transport sector, and (3) 20% reduction in energy consumption compared with baseline projections for 2020.

In view of the '20-20-20' targets, the EU adopted a climate an energy package in 2009, including a single EU target for GHG emissions under the EU Emission Trading Scheme (EU ETS), national target trajectories ('shares') for reducing GHG emissions according to the Effort Sharing Decision (ESD), binding targets for each Member State according to the Renewable Energy Directive (RED) and an Energy Efficiency Directive (EED) allowing Member States to set their own non-binding targets.[1]

The 2030 GHG targets include a reduction of domestic GHG emissions to at least 40% compared with 1990 levels, a level of renewable energy consumption of at least 32% and a reduction of energy consumption across the EU of at least 32.5% compared with the 2007 EU reference Scenario.

According to the comprehensive Monitoring Mechanism Regulation (MMR) Member States shall yearly report to the European Environment Agency (EEA) on the results of their national data with respect to the time-path for the energy transition as planned.

The EEA, supported by its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), performs quality control procedures in consultations with the individual Member States and report on the results. [2]

2 Where do we stand?

Within the EU-28, total GHG emissions decreased from 5,720 million tonnes in 1990 to 4,441 million tonnes of CO_2 equivalents in 2016, which means a reduction of 22%. [3]

The Table in this editorial provides a breakdown of the CO_2 emissions of the individual Member States (ranked by Gross Domestic Product – GDP) in 1990 and 2016.

In the four Member States with the highest GDP (Germany, UK, France and Italy, together representing 63.5% of the total EU GDP and 54% of the EU population), GHG emissions decreased by 787million tonnes CO_2e, which counts for 62% of the total reduction in EU-28.

In its 2018 report the EEA mentions that twenty-two Member States met their (individual) annual Effort Sharing targets in 2016.[4] The industry sectors with the highest reduction rates were the energy and manufacturing industries, whereas emissions by the transport sector,

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1 EC, *Climate* Strategies & Targets (2009) and EC, *2020* Climate & Energy Package (2009).

2 Regulation (EU) No 525/2013 of the European Parliament and of the Council, (21 May 2013), Official Journal of the EU, L 165/13.

3 Eurostat, Greenhouse Gas Emission Statistics (2018). More than 80% of the greenhouse gasses (GHG) refer to CO_2; emissions of the other GHG (such as methane) are expressed in tonnes CO_2 equivalents (in the Table: 'tn CO2e'). The figures include emissions from international aviation and exclude emissions or removals from land use, land use change and forestry.

4 EEA, *Trends and* Projections *in Europe* 2018 – *Tracking* Progress Towards *Europe's* Climate *and* Energy Targets (Oct. 2018), at 11. Belgium, Finland, Germany, Ireland and Poland did not meet their targets for the first time and Malta has not met its targets since 2013.

including international aviation, increased over the period 1990–2016.[5]

We may conclude that various (national and EU) policy measures since the nineties, including the EU Emission Trading System (ETS) and various tax incentives for hybrid and full electric cars, contributed to the GHG emission reduction of 22%. According to the EEA, National projections available from Member States indicate that EU GHG emissions are expected to remain below the 2020 target of 20%. Recent economic growth figures, however, may put a question mark to these expectations.

3 Ambitious long-term targets

After 2020, however, the pace of GHG emission reductions is projected to slow and may not be sufficient to achieve the EU's target of a 40% GHG reduction by 2030 (compared with 1990 levels). Moreover, if the EU wants to achieve an 80%, or even a 95%, decrease by 2050, additional policy measures may be necessary.[6] It will require a gigantic, on-going and well-timed plan for energy transition from fossil to non-fossil energy sources. In other words: an ambitious plan to realize a new 'energy mix' within a relatively short time horizon of thirty years.

The present energy mix differs in the various Member States of the EU. In some of them, non-fossil energy sources (e.g. hydropower, biofuels, wind, solar or nuclear energy) already play an important role. Most others are still mainly dependent on fossil sources (coal, mineral oils and natural gas) and they will be forced to boost (green) electrification in the field of industrial processes, heating and transport.

The most recent available EU figures show an increase of 25% of total gross production of electricity from 2,595,179 Gigawatt hour (GWh) in 1990 to 3,255,050 GWh in 2015.[7] Between 1990 and 2015, the part of electricity generated by fossil sources (coal fuels, petroleum products and gas) decreased from 57% to 44% in 2015. Nuclear energy went down from 31% to 26% and renewables increased from 13% to about 30% (12% hydropower, 9% wind, 5% biofuels, 3% solar and 1% other renewables, including only 0,2%-point geothermal energy).

If the electricity production in 2050 would be the same as in 2015 (which is not likely), but with almost zero CO_2 emissions, electricity generated by fossil energy sources (some 1,403,054 GWh) should be replaced by 'green' electricity generated by renewable energy sources. Assuming that power generation by nuclear energy (26%) and by other sources (1% including waste combustion) would not be changed, about 73% of total electricity production should be generated by renewable sources, which is an expansion rate of 2.4 times the 2015 level. However, if we also take into account that industrial processes, heating and transport should be 'decarbonized' in 2050, the expansion rate of 'green' electricity will be much higher than 2.4.

Moreover, uncertainties exist as regards the permanent availability of on-demand 'green' electricity, possibilities of a substantial increase in energy efficiency and storage of electricity, the development of other 'green' energy sources (e.g. Hydrogen H_2) and nuclear energy with its own environmental threats (other than CO_2 emissions).

As said, the targets are ambitious. The time-horizon of the energy transition requires a sense of urgency and we are depending on new or improved (technical) means required for a secure on-demand 'green' energy supply.

And last but not least, energy is not only a sensitive product from an environmental policy point of view, but also from a geopolitical point of view. States, irrespective of whether they are partner in the 2016 Paris Agreement, put high priority on national energy security and can be hesitating to introduce policy measures that lead to trade conflicts with energy producing states.

4 Fiscal policy

Next to creating awareness of the threat of climate change ('soft' measures such as eco-labelling) and regulatory measures (e.g. a compulsory stop of the production of motor vehicles with engines running on fossil fuels), there are three categories of policy measures that are market-oriented: emission trading schemes with a 'cap-and-trade' system (e.g. the EU ETS), subsidies (e.g. on solar panels and heat pumps) and tax measures.[8]

Although taxes are levied primarily for budgetary reasons, many of them are also used as instrument to achieve non-fiscal objectives, such as influencing human behaviour. Since the nineties of the past century we have seen various initiatives to make taxation 'greener', applying the 'carrot-and-stick' method. 'Carrots' in the form of tax exemptions or rate reductions (tax expenditures) for products with less or no environmental damage. And 'sticks' in the form of specific environmental taxes or higher consumption tax rates on products with a damaging effect on the environment (nowadays, excises on fossil fuels and energy taxes on coal and electricity, are categorized as 'green taxes' levied on 'the polluter pays' principle). The rationale is to internalize the external (social) environment costs of emissions in the market price to be paid for the product, with the aim to reduce the demand for these products. The amount of these

[5] Eurostat, *Climate* Change – Driving Forces (2018).
[6] EEA, *supra* n. 4, at 2.
[7] Eurostat, *Gross* Electricity Production *by* Fuel*, GWh, EU28* (2000–2016).
[8] For an analysis of the possibilities to apply environmental driven tax measures in line with the Horizontal Excise Duty Directive and the Harmonised Energy Tax Directive of the EU, I refer to D. Deak, *Environmental Tax Harmonization and Competition-Central Legal Practice of EUCJ*, 26(6) EC Tax Rev. 303 et seq. (2017).

external costs appears to be very difficult to estimate and vary per emission category (e.g. power generation and transport) and in time.[9] Overall estimates vary between USD 50 per tonne of CO_2 in 2030 to USD 350 in 2050.

Although these estimates bear a lot of uncertainty, governments tend to use them as basis for increasing energy tax rates, including excises, or for introducing carbon taxes. However, as long as reliable and cheaper alternatives for 'fossils' are not sufficiently available on the market (e.g. electrical heat pumps for domestic use, or cars, vans, trucks and ships with engines running on electricity or hydrogen), citizens and businesses will perceive such tax measures as an attack by the government on their spendable income or net profit, without any foreseeable benefit for the climate. Even if governments try to 'compensate' the income effect of such measures by reducing income tax rates, it may not help the people to accept the higher tax burden on environment damaging products. Recently, the announcement of an increase of excise rates on motor fuels gave rise to massive protests by the *'Gilets Jaunes'* in France, leading to postponing these announced tax measures.

Energy transition does not only require sufficient availability of green energy, but also investments in new vehicles, new heating systems and other equipment fit for green energy. No doubt governments must provide subsidies for such expensive up-front investments. Without such subsidies the 2030 and 2050 targets of the Paris Agreement will not be achieved. Therefore it may also be necessary to adapt the EU State Aid rules in order to facilitate the Member States in completing the planned energy transition (Table 1).[10]

[9] S. Smith & N. Braathen, *Monetary Carbon Values in Policy Appraisal*, OECD Environment Working Papers No. 92, at 36 et seq. (2015). Within the ETS 'market', the benchmark EU carbon price per tonne CO_2 (that went down from EUR 30 in 2008 to EUR 5 in 2017) increased to about EUR 18 in 2018. Carbon analysts assume that this price increase is caused by the Market Stability Reserve, coming into effect 2019, which will take excess permits out of the market to curb oversupply; also S. Twidale, *What* Is Driving *a* Rally *in EU* Carbon Permit Prices?, Reuters (15 Aug. 2018).

[10] EC, *Memo State* Aid*:* Guidelines *on* State Aid *for the* Environment – Frequently Asked Questions (2008); and *Energy Taxation Environmental Protection and State Aids* (P. Pistone & M. Villar Ezcurra eds, IBFD 2016) and Deak, *supra* n. 8, at 313 et seq.

Table 1 CO2 emissions EU-28 (1990–2016)

Member State	GDP in b ln EUR (2016)	Population in mln (2016)	GHG emissions in mln tn CO2e (1990)	GHG emissions in mln tn CO2e (2016)	mln tn CO2e per capita (2016)	Increase or decrease in mln tn CO2e	Increase or decrease in %
TOTAL EU-28	**14,975**	**510.3**	**5,720**	**4,441**	**8.7**	**–1,279**	**–22%**
Germany	**3,160**	**82.2**	**1,264**	**936**	11.4	**–328**	–26%
United Kingdom	**2,403**	**65.4**	**812**	**517**	7.9	**–295**	–36%
France	**2,259**	**66.7**	**555**	**475**	7.1	**–80**	–14%
Italy	**1,690**	**60.7**	**523**	**438**	7.2	**–85**	–16%
Spain	1,119	46.4	293	341	7.3	48	16%
Netherlands	708	17.0	226	207	12.2	–19	–8%
Sweden	463	9.9	73	56	5.6	–17	–24%
Poland	427	38.0	468	398	10.5	–70	–15%
Belgium	411	11.3	150	122	10.8	–28	–18%
Austria	356	8.7	80	82	9.4	2	3%
Denmark	282	5.7	72	53	9.4	–19	–26%
Ireland	273	4.7	57	64	13.7	8	13%
Finland	216	5.5	72	61	11.1	–12	–16%
Portugal	187	10.3	62	71	6.9	10	16%
Greece	177	10.8	106	95	8.8	–11	–10%
Czechia	177	10.6	200	131	12.4	–69	–34%
Romania	170	19.8	248	113	5.7	–134	–54%
Hungary	114	9.8	94	62	6.3	–32	–34%
Slovakia	81	5.4	74	41	7.6	–33	–44%
Luxembourg	53	0.6	13	12	19.2	–2	–13%
Bulgaria	48	7.1	105	60	8.4	–45	–43%
Croatia	47	4.2	32	25	5.9	–8	–24%
Slovenia	40	2.1	19	18	8.5	–1	–5%
Lithuania	39	2.9	49	20	7.0	–28	–58%
Latvia	25	2.0	27	12	5.9	–15	–56%
Estonia	22	1.3	41	20	15.2	–21	–51%
Cyprus	19	0.8	6	10	12.1	3	54%
Malta	10	0.4	2	2	5.8	0	0%