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Some fundamental remarks on the transition to climate neutrality and in the energy sector, as pursued by the EU and Germany

### Summary

Climate change as such and the necessary adjustments to it, are beyond doubt, but not so its purported predominantly anthropogenic nature. The EU and German climate and energy policies aim at CO<sub>2</sub>-neutrality by 2050. They are due to hyped alarmism, are based on a questionable scientific basis, and are in sharp conflict with economic sense.

The cost increase for most forms of energy due to a thriving and still forthcoming regulation to abate climate change, means more complicated and more expensive products for the internal and the world markets. The resulting complicated and expensive products will drive unemployment. The revenue from steering taxes and similar financial burdens (certificate prices, duties) will be shrinking away, while the social need for maintaining a livelihood for everybody raises. The sheltering of the EU internal market by a cross border adjustment mechanism will create a "fortress Europe" and is not compatible with the WTO obligations. The green policy of the European Central Bank exceeds its mandate to keep price stability and creates new risks, especially bubbles of technology and market risks.

The EU policy, the German policy, and the recent German Federal Constitutional Court decision on climate law are based in the belief that the state rather than the markets may successfully steer the economic development into a good future, a belief that has been proven erroneous throughout history. The creation of additional cost in an economy by regulation and taxes creates social need and diminishes the potential for savings and investment.

It is negligent not to consider whether it makes sense to reach territorial climate neutrality while CO<sub>2</sub> reductions can be achieved outside the national territory, but within the respective bubble, on the basis of contracts.

In Germany, the widely applauded fast transition into a green economy and CO<sub>2</sub> neutrality by 2050 or even 2045 will be extremely expensive. A study by Prognos for the public bank KfW estimates that it will take private and public investments in the amount of some 5,000 bn EUR in order to reach climate neutrality by 2045. It will be an open point for discussion why cheaper solutions for climate change adjustment or CO<sub>2</sub> abatement abroad may not be pursued.

In Germany, the present transition of energy production as fixed by laws is loaded with problems, as there must be a replacement of the power generation facilities running on uranium or coal (hard coal and lignite), which are in an accelerated shut-down process. The only viable alternative is an interim switch to natural gas as a back-up energy for electricity generation; notwithstanding the increasing power demand from digitalisation, E-mobility, and conversion of heating systems, there is a need for at the least an additional 70 GW of gas power. This increases the dependence on natural gas imports.

Hydrogen, especially the hyped „green hydrogen“, has limited applications due to the technical challenges to avoid the dangers from its highly explosive derivative, oxyhydrogen.

The present energy price hikes in the EU are in part a consequence of the enacted and the planned new energy and CO<sub>2</sub> consumption taxes, as the producing nations strive for a higher quota of the price total realized from the final user, the consumer. A change from the market clearing price to an average of the prices for all sold volumes, which cover the demand, is discussed as a remedy in view of imminent social need. However, such a change of the pricing mechanism will induce further price hikes as it will quickly effect further shortages in the market; those who have sold above the average price would make losses and discontinue their offers although they are necessary to cover demand.

## 1. Background

In view of urgent warnings by the Intergovernmental Panel on Climate Change (IPCC) and in the latest report of its Working Group 1<sup>1</sup> that the planet is heating up and that this global warming is due to CO<sub>2</sub> as a result of the burning of fossil fuels<sup>2</sup>, growing protests by activists and court require more speed for the transition of industry and economy into CO<sub>2</sub>-neutrality.

This hectic steering is in unison with the *Green Deal* of the EU of December 11, 2019<sup>3</sup>, which has been presented by the President of the European Commission<sup>4</sup>, and its financing with the program „Next generation EU“ and the Multiannual Financial Framework for 2021-2027. The Green Deal now comprises of the new Communication „Climate Target 2030“ and the proposals<sup>5</sup> for a reduction to climate neutrality by 2050, a financial plan<sup>6</sup>, a European climate law<sup>7</sup> including the tightening of the European Trading System and the laws for the energy sector including the promotion of green energy, a climate pact between government and society<sup>8</sup>, a new industrial strategy<sup>9</sup>, a plan for a

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<sup>1</sup> Sixth Assessment Report, Part I, available at <https://www.ipcc.ch/>

<sup>2</sup><https://www.ipcc.ch/report/ar6/wg1/#FullReport>, especially: [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Full\\_Report\\_smaller.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report_smaller.pdf); for this sixth report of August 2021, authored by the IPCC Working Group Physical Scientific Basis, there is a summary in German: [https://www.de-ipcc.de/media/content/Hauptaussagen\\_AR6-WGI.pdf](https://www.de-ipcc.de/media/content/Hauptaussagen_AR6-WGI.pdf)

<sup>3</sup> COM(2019) 640 final, Brussels 11.12.2019, available at: [https://ec.europa.eu/info/sites/info/files/european-green-deal-communication\\_en.pdf](https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf); for a survey see [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>4</sup> Available at: [https://ec.europa.eu/germany/news/20191211-green-deal\\_de](https://ec.europa.eu/germany/news/20191211-green-deal_de)

<sup>5</sup> [https://ec.europa.eu/clima/eu-action/european-green-deal\\_en](https://ec.europa.eu/clima/eu-action/european-green-deal_en)

<sup>6</sup> Survey available at: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_17](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_17)

<sup>7</sup> Proposition of the EU Commission available at: <https://eur-lex.europa.eu/legal-content/DE/TXT/?qid=1588581905912&uri=CELEX:52020PC0080>

<sup>8</sup> [https://ec.europa.eu/clima/policies/eu-climate-action/pact\\_en](https://ec.europa.eu/clima/policies/eu-climate-action/pact_en)

<sup>9</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy\\_de](https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_de)

hydrogen economy<sup>10</sup>, a plan for a waste recycling economy<sup>11</sup>, a plan for the agriculture and food sectors<sup>12</sup>, the biodiversity strategy 2020<sup>13</sup>, etc. The European Council resolved in its meeting of July

17-21, 2020<sup>14</sup> the Multiannual Framework for 2021-2027 with 1,075 bn EUR and a Corona pandemic recovery fund „Next generation“<sup>15</sup> with 750 bn EUR, all this partially financed with loans repayable by 2058. Roughly one third of the means, viz. 550 bn EUR shall be used for projects with climate effects. The philosophy behind all this has been described in the fundamental Commission communication „Stepping up Europe’s 2030 climate ambition - Investing in a climate-neutral future for the benefit of our people“<sup>16</sup>. This policy and the accompanying proposals have been specified in July 2021 with the catchphrase „Fit for 55“: a program aiming at the reduction of the CO2 emissions by 55 % for 2030 (vs. 1990) and the achievement of climate neutrality by 2050, implying a fitful full rebuilding of the EU economies and societies<sup>17</sup>. The remodelling shall be safeguarded against a relocation of production into other countries (*carbon leakage*) and against cheap imports from countries with less strict climate protection laws by a *carbon border adjustment mechanism* (CBAM)<sup>18</sup>; this tax, a custom duty upon imports, shall add a cost factor to imports equivalent to the cost for any (additional) emission certificates which would have had to be acquired by the producer, if the production were located in Europe, to the extent that more CO2 is generated than in a European standard production. However this cost increase will be calculated without the price increase resulting from such additional demand for certificates in the EU market, if it were non-fictitious. In the first step, five product groups shall be taxable<sup>19</sup>.

## 2. Scientific questions

In contrast to fluorocarbons, CO2 is an inert gas; it does not start a chemical reaction with other gases of the air. Because of its molecular weight. It sinks through the atoms of the gases in the atmosphere (nitrogen, oxygen) to the bottom, like a piece of metal through water, depending on the height to the emission within hours, days, or weeks. There is no observation of a higher compression in the atmosphere which would slow or impede the sinking in such a way as ice hinders the sinking of metal. In consequence, CO2 does not accumulate over time in the atmosphere.

<sup>10</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/clean-energy\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/clean-energy_en)

<sup>11</sup> Available at: [https://ec.europa.eu/commission/presscorner/detail/en/fs\\_20\\_437](https://ec.europa.eu/commission/presscorner/detail/en/fs_20_437)

<sup>12</sup> COM(2020) 381 final, Brussels 20.05.2020, available at:

<https://ec.europa.eu/transparency/regdoc/rep/1/2020/DE/COM-2020-381-F1-DE-MAIN-PART-1.PDF>

<sup>13</sup> Available at: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/eu-biodiversity-strategy-2030\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/eu-biodiversity-strategy-2030_en)

<sup>14</sup> <https://www.consilium.europa.eu/en/meetings/european-council/2020/07/17-21/>

<sup>15</sup> [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en](https://ec.europa.eu/info/strategy/recovery-plan-europe_en)

<sup>16</sup> COM(2020) 562 final, Brussels 17.09.2020, available at: <https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=COM:2020:562:FIN&qid=1600340170947&from=EN>

<sup>17</sup> Survey at: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_3541](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3541); for the links to the various proposals see: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en); for a brief summary see H. Kafsack, So soll Europa seine Klimaziele erreichen, Frankfurter Allgemeine Zeitung (FAZ) 13.07.2021, S. 16 und ders., Das steckt im Klimapaket, FAZ 15.07.2021, p. 15; see also: [D. Coppens](#), [M- W. Kamau](#), [S. Perantakou](#), [J. Tiskowiec](#), [I. Willemyns](#), [S. de Knop](#), [N. J. S. Lockhart](#), [I. Sandford](#) & [A. R. Willems](#), EU ‚Fit for 55‘ Overview, Sidley White Paper, Chicago (Sidley Austin) Dec. 2021, 18 pp. .

<sup>18</sup> Survey at: [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661)

<sup>19</sup> Cement, iron and steel, aluminium, fertilizers, electricity; this comes at a time, when at the G20 meeting in Rome in late October 2021 the US and the EU reached an agreement to end their import duties on steel and aluminium; see C. Schubert & W. Mussler, EU und USA beenden Zollkonflikt, FAZ 01.11.2021, p. 17. .

The second condition results from the first law of thermodynamics: During daytime, the heavy CO<sub>2</sub>-molecule warms up slower than the other gases, and at night, it keeps its energy load longer. However, the CO<sub>2</sub> molecule, once loaded by incoming or reflected radiation, neither stores the energy load nor reflects it back to its origin. Rather, the CO<sub>2</sub> molecule starts to move faster, transforming the radiation energy into movement. As the molecule is not alone in the atmosphere, it bounces on

the gases and makes them move, which means that it loses its energy while the other gases take up the energy, until there is an energetic equilibrium. During the night, all the gases lose their energy; they cool down and move less. As the cycle of night and day remains stable, the atmospheric uptake of energy from the sunrays and the loss of energy – mainly - into the cool space remain stable, unless there are other factors interfering with the exchange of energy.

There has been a geologically very recent increase of the CO<sub>2</sub>-level in the atmosphere ; it has risen from 3/10.000 in pre-industrial times by 1/10.000 to 4/10.000 nowadays. First it was thought that this is a result of volcanic gases and fossil fuel burning, the exact ratio of these two causes not being definable; later studies have related the increase only to the fossil burning, viz. human activity. The IPCC tries to explain why, *ceteris paribus*, an additional 1/10.000 part of carbon in the atmosphere fundamentally changes the energy exchange of the earth, and this rapidly so. However, it is obvious that other factors like water vapour (clouds) and dust and ash particles (from the Sahara, forest fires, volcanic eruptions, other burnings) as well as gas emissions (from volcanic eruptions) also influence the weather and the global climate.

Human energy consumption (all fuels combined) is also roughly 1/10.000 of the energy uptake by the earth from the sun; the warmth from such burning is negligible for the earth energy balance, this being pretty comparable to the effect of the simultaneous jumping of all humans on the course of the earth in space<sup>20</sup>.

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<sup>20</sup> The anthropogenic heat production, especially from non-renewable sources, is roughly 1/10.000 of the – fluctuating – insulation:  $5,4 \times 10^{24}$  J insulation with a terrestrial constant vs.  $5,9 \times 10^{20}$  J = 14 bn. toe (2019); the warming effect is considered negligible, as it obviously evaporates into space.

As for the global warming, the first theory for its anthropogenic origin seems to be the 1981 paper by J. Hansen, D. Johnson, A. Lacie, S. Lebedoff, P. Lee, D. Rind & G. Russell, *Climate Impact of Increasing atmospheric Carbon Dioxide*, *Science* 213: 957-966, available at:

[https://pubs.giss.nasa.gov/docs/1981/1981\\_Hansen\\_ha04600x.pdf](https://pubs.giss.nasa.gov/docs/1981/1981_Hansen_ha04600x.pdf).

The authors postulate a correlation between CO<sub>2</sub> and volcanic aerosols and foresee the global warming by about the numbers accepted today; their theory has been refined ever since. However, neither could the theory explain the global cooling in the period 1940 to 1970 in spite of a rapidly increasing use of fossil fuels, nor did it take into account e.g. that under the assumption of infrared opacity of the atmosphere because of CO<sub>2</sub> the radiation energy can find other ways to dissipate into space.

Today's widely accepted numbers for insulation and deflection are reported in popular terms, though insufficiently and perhaps misleading, at the German source for weather data:

[https://www.dwd.de/DE/wetter/thema\\_des\\_tages/2019/2/20.html](https://www.dwd.de/DE/wetter/thema_des_tages/2019/2/20.html).

For climate change, there are a number of causes to be considered:

- The earth is not on a straight course through space. The course is influenced by gravitation forces resulting from the position of the other planets, which circle around the sun on pretty much the same plane, but with differing speeds. So they and their gravitation can be more or less in line and the forces of the inner planets and those of the outer planets may add to each other or neutralize each other in different magnitudes. This may bring the earth closer to the sun or farther away from it, and it may change to position of the earth axis, which is not vertical. All these deviations are hard to measure exactly.
- The activities of the sun like sunspots are considered not to have an effect on the course of the earth through space, but are known to have effects on the earth like e.g. electromagnetic storms.
- The glowing earth core is turning with another speed than the earth mantle. As the tectonic plates swim on this core and change their positions which in the long run changes the effect of insulation. A consequence of this tectonic movements is volcanism, the individual effects of which are hardly foreseeable. Effects on the dip of the earth axis are possible though not known exactly.
- The large deforestation and wild fires as well as man-made vegetation changes (e.g. in the Sahel zone, the Mediterranean region, the area of the Caspian Sea and the Aral Sea, in California, Florida, and Australia, in the tropical rain forest regions etc.) not only change the respective local climate but also create chimney effects which may influence even the jet streams circling the earth.

The scheme model referred to in that source is not fully cited, as the original can be found with good and comprehensive explanations in the 1997 article by J.T. Kiehl & K.E. Trenberth, Earth's Annual Global Mean Energy Budget, *Bulletin of the American Meteorological Society* 78 (2) 197-208, available at: <http://www.geo.utexas.edu/courses/387H/PAPERS/kiehl.pdf>.

The numbers of that article in its model have been slightly changed for 2009, but there is neither a reference to this basic study nor a hint at

- the estimates and uncertainties underlying and mentioned in that study,
- the corrections and their mechanisms now applied, and
- the global changes that have occurred on our planet.

The amplitude of estimate e.g. for the net absorption is indicated at: [https://de.wikipedia.org/wiki/Strahlungshaushalt\\_der\\_Erde](https://de.wikipedia.org/wiki/Strahlungshaushalt_der_Erde).

It remains open whether these figures of this estimate are ultimately based on the flat terrestrial acreage rather than on the surface acreage. But this summary at least admits that the insolation fluctuates with the sun activity (for this and further complexities see [https://en.wikipedia.org/wiki/Solar\\_irradiance](https://en.wikipedia.org/wiki/Solar_irradiance)) resulting in changes (a) of the albedo (reflection and other radiation) as well as (b) of the net absorption. There are no exact measurements for any of this, let alone really long-term observations for at least a substantial part of the geological earth history. Furthermore, even for an estimate the band-width of total radiation must be taken into effect. The extrapolation of today's figures and the calculation of net absorption (by physical, chemical, meteorological, and biological reactions) are based on models with wide factor insecurities. Given the broadness of the various factors influencing the climate, it is astonishing that scientists can reach purportedly exact conclusions without bias.

- Finally, a warming leads directly and via the melting of ice into the seas to the release of CO<sub>2</sub> from the seawater. Everybody knows that from the warming of a soda drink. This release may be a main effect for or may contribute to the acceleration of the increase of atmospheric CO<sub>2</sub>.

The result of all these observations is clear: There is a correlation of CO<sub>2</sub>—content in the atmosphere and global warming, but there is no proof of a casual nexus.

The assumption of causation provides a clear culprit, but it is audacious in view of further factors:

As CO<sub>2</sub> sinks through the atmosphere and only a portion of it travels into neighbouring atmospheric areas, there are CO<sub>2</sub>-bubbles in regions with high CO<sub>2</sub>-emissions. Here the weather should change more noticeably, and this change should have influence on neighbouring areas and finally on the world climate. However, there is no proof for this yet; it will be difficult to obtain as the critical local effects are mainly caused by desertification through the sealing of the

surface by urbanization and the soil compression and change of vegetation cover by agriculture and forestry.

Now add counter-effects of an increase of CO<sub>2</sub>: The global greening, the increase of plant and algae activity on land and in the seas, was proven by NASA in 2016<sup>21</sup>.

Finally, the climate researchers work with factors of high variability. When adding these variables into the calculation, the result should show a great variability rather than a narrow margin. The narrow margin of the final result stems from a rather discretionary acceptance of probabilities for the scopes of variation. Thus, the result is a potential result, not an exact forecast. With a variation of each factor and its assumed probability and the direction of the influence of the factor the final result of the calculation may change or – due to countereffects – may not change. Thus, the forecast has a low probability of coming true. This does not change, if many people with a similar belief and/or interest add their discretions to agree on the amount of the factor probabilities.

The result of the Scientific Panel of the IPCC is then compared to previous climate changes, and it is said that the present climate change is much more rapid. But recent changes, which have occurred in historic times, throw doubt on this hypothesis: The temple of Babylon and the pyramids of Sudan and Egypt, each of them with efforts by thousands of labourers, have not been built in a desert but rather in a mesic environment. The ancient city of Petra with 30-40.000 inhabitants did not exist in today's desert of Wadi Rum. The Mediterranean basin was wooded. The Little Ice Age starting in the 15th century came quickly and culminated (at the latest) in the famine of 1845-1852: since then, it is getting warmer, and we do not know when this trend will culminate or starts to reverse, as it has always done before. Just extrapolating the current trend into the future means playing with probabilities.

After all these considerations, it is quite unsure whether we see a causation or just a permanent or temporary coincidence of CO<sub>2</sub>-concentration and global warming. Asserting an all-important role of fossil fuel burning, viz. the anthropogenic effect, makes for a scientific theory based on some facts and some assumptions, but does not reconcile with other sets of fact and of course, it does not provide or replace proof for a law of nature so that a judge of sound mind should be convinced of the soundness and practicability of the theory for the situations of everyday life.

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<sup>21</sup> NASA, Carbon Dioxide Fertilization Greening Earth, Study Finds; available at: <https://www.nasa.gov/feature/goddard/2016/carbon-dioxide-fertilization-greening-earth>

This does not mean that a CO<sub>2</sub>-reduction or countermeasures against global warming should be dispensed with, in contrast to the principle of precaution. But it is highly questionable whether today's alarmism is adequate. Other measures (like the protections of forests, especially rain forests, and wetlands; the protection against soil erosion; the preservation of habitats etc.) may be even more urgent. And it should be remembered that - in view of the former common opinion of all leading scientists for centuries that the earth is a disk – it does not make sense to overreact in the wake of panic and fear of catastrophe by putting the wealth of our national economies and the wellbeing of our societies at risk.

### 3. Economic and legal concerns

#### a) European Union

##### aa) Mistakes in the „Green Deal“ concept of the European Commission

The European *Green Deal* policy brings about chances<sup>22</sup> and risks. It demands huge investments<sup>23</sup>. German industry alone calculates that they have to invest some 3,000 + 4,000 bn EUR, and add to that the private investment into houses and mobility and the state investments for retrofitting in the public domain. A recent estimate by Prognos AG for the state-held bank Kreditanstalt für Wiederaufbau calculating the investment necessary to reach CO2 neutrality in Germany by 2045, arrives at an amount of some 5,000 bn EUR<sup>24</sup>. All these investments turn into costs of production and finally into costs of living. A price surge will be the consequence.

State regulation and incentive taxes like the price on CO2 emissions shall induce “green” investments<sup>25</sup>; this policy works, if the additional cost from investment and its operation are lower than the additional cost imposed by sovereign acts.

The result is a surge of cost in all sectors. As this additional cost does not trigger a gain in productivity, there is hardly any room for an increase of labour cost. In real terms, all EU citizens will have to shoulder the additional cost of living and taxes from unchanged earnings. This is problematic for the poor and those, who become poor. Those, who can bear the burden, have less to spend and less to save so that the amount of money for investments dwindles. Prosperity vanishes quickly.

Please add that the price increase and the added complication of products diminishes the chances for exports into non-EU countries. While EU products are expensive and complicated, cheap and workable products are offered from elsewhere. About 1/5 of the EU GDP is earned by export and will be at risk. This does not only effect the few EU members with finalization industries and export hubs, but via the supply chains, which today extend into all EU countries, in the end all EU economies. EU internal market demand alone will not be able to make up for the loss of revenue resulting from a loss of export. The demand shift into quality labour, the reduction of the production of goods, and the reduction of productivity of the population (due to educational, compliance, and monitoring requirements) intensify the trend.

With a diminishing demand in the EU and third countries, we face unemployment and raising social need.

The EU Commission proposes to balance this rising financial need in the societies of the member states with the revenues from the issuance of CO2-certificates and the customs revenues from CBAM<sup>26</sup>. These are incentive taxes, which are supposed to steer the subjects into action so that

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<sup>22</sup> For the positive aspects see A. Löschel, V. Grimm, B. Lenz & F. Staiß, Die große Klima-Chance, FAZ of 16.08.2021

<sup>23</sup> The situation in the US is parallel: B. Lomborg, Wie Klimaklagen den Armen schaden, FAZ of 27.05.2021, p. 17

<sup>24</sup> Kreditanstalt für Wiederaufbau, Pressemitteilung vom 07.10.2021, mit link auf die Studie H. Burret et al., Beitrag von Green Finance zum Erreichen von Klimaneutralität in Deutschland, Frankfurt am Main (KfW) Mach/July 2021, available at: [https://www.kfw.de/%C3%9Cber-die-KfW/Newsroom/Aktuelles/Pressemitteilungen-Details\\_673344.html](https://www.kfw.de/%C3%9Cber-die-KfW/Newsroom/Aktuelles/Pressemitteilungen-Details_673344.html)

<sup>25</sup> Ironically, these investments are not green as they take away what plants need for existence and growth.

they can avoid these taxes; according to this design, the revenue from these taxes will decrease over time.

In effect, the Commission proposes to meet a growing financial need with dwindling revenues: Economic nonsense at its best!

In addition, the legality of the CBAM is at least doubtful<sup>27</sup>. Art. XX lit g) of the GATT allows duties comparable to domestic rates for the protection of domestic natural resources. But it is doubtful whether the climate can be such a domestic natural resource, as domestic air quality is improved by the import of merchandise produced with foreign natural resources. The – potential<sup>28</sup> - effect of the duty to diminish CO<sub>2</sub> production in the exporting country, cannot justify the duty. Furthermore, it is questionable whether GATT permits penalizing the exporting country for allowing a high CO<sub>2</sub> emission. This is even more questionable, if the exporting country abides to the Paris Convention by minimizing its CO<sub>2</sub> production, though perhaps in other economic sectors, or by neutralizing it with forests or storage. Finally, there is a discrepancy with the Paris Convention as it allows the developing countries to increase their CO<sub>2</sub> production as long as the increase is less than the growth of their respective GDP. Another contradiction arises from the contradiction that on the one hand the developing countries receive money from the climate fund for e.g. the installation of CO<sub>2</sub> sinks (like e.g. the preservation of rain forests), while the CBAM makes their export goods more expensive and lessens not only their market success, but also the income of the exporting state so that it has less money for (further and costlier) CO<sub>2</sub>-reduction investments.

Apart from international legality, the CBAM seems to be in conflict with today's EU trade policy which aims at open markets and free trade. However, there are signs that the EU will limit this policy objective<sup>29</sup>.

#### bb) Mistakes of the European Central Bank

The allocation of funds by the EU for CO<sub>2</sub> avoidance – rather than the adaptation to climate change – is helped by the monetary policy of the European Central Bank. According to the Treaties<sup>30</sup> its task is to keep price stability for the EURO-zone. But now it wants to support the EU economic and climate change policies and works on an action plan to further green investments by the purchase of green debt and the lowering of bank minimum capital requirements for the financing of green investments<sup>31</sup>. The ECB assumes that climate change puts the financial markets risk<sup>32</sup>.

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<sup>26</sup> EU Commission, Carbon Border Adjustment Mechanism: Questions and answers, Brussels 14.07.2021, available at: [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661); For an overview see C. Hatcher, The EU Carbon Border Adjustment Mechanism, Lexology 19.08.2021, available at [www.lexology.com](http://www.lexology.com)

<sup>27</sup> See also the hints in H. Kafsack, Die falsche Hoffnung vom Klimaklub, FAZ of 05.07.2021

<sup>28</sup> G. Felbermayr & K.M. Schmidt, CO<sub>2</sub>-Grenzausgleich: Klimaklub statt Klimafestung, FAZ of 28.05.2021, p. 18

<sup>29</sup> H. Kafsack, Handlungsunfähige Handelspolitik, FAZ 28.10.2021, p. 16

<sup>30</sup> Art. 127 para 1 sentence 1 TEUF

<sup>31</sup> The European Council has competency to decide, after consultations with the EU organs, on the basis of the economic policy for the member states and thus the EU (Artt. 120, 121 TEUF), and in particular it can define the guidelines for the economic and monetary policies of the EURO member states (Art. 138 para 1 TEUF); I do not think the Commission or the ECB have the competency to deviate from such a defined policy or to antecede such a decision.

However, such a concentration of financing induces further state debt and creates a new financial bubble<sup>33</sup>. A further devaluation of savings and pension moneys by the current ECB low interest policy is avoided only, if the total volume of EURO-money remains limited; it may be redirected, but not increased under the action plan. The redirection of funds into investments in green projects means that more innovative and more risky projects receive financing in spite of the fact that new technologies by themselves represent a higher risk of failure. Therefore, it can be argued that the ECB lacks competency for the contemplated action plan<sup>34</sup>.

Beyond its own monetary policy, the ECB has also to monitor member state indebtedness<sup>35</sup> in order to avoid a repetition of the Greek situation of 2010. It should watch very carefully the plans presently discussed in Germany to circumvent its constitutional break for public indebtedness<sup>36</sup>.

## b) Germany

What has been said above, is also relevant *ceteris paribus* for Germany. This member state is a forerunner for climate change abatement in the world and in the EU and has consented to carry additional burdens.

Upon the judgement of the German Federal Constitutional Court on the German Climate Protection Law (CPL)<sup>37</sup>, the CPL has rapidly been updated by parliament<sup>38</sup>, setting even stricter limitations to CO<sub>2</sub> generation than internationally consented.

The German Federal Constitutional Court<sup>39</sup> has ruled the CPL unconstitutional for reasons of insufficiency by not defining the CO<sub>2</sub> reduction aims for the time beyond 2030, although it is the stated aim of the law to reach climate neutrality for Germany by 2050. The lack of a plan for CO<sub>2</sub> reduction from 2030 to 2050 might mean a back-end loading of climate protection measures which burdens future generations with an accelerated pace of climate protection and thus an undue financial hardship and a restriction of fundamental rights.

The court ruling<sup>40</sup> is based on some misconceptions<sup>41</sup>:

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<sup>32</sup> W. Mussler, Klima-Stresstests für Banken, FAZ of 01.07.2021, S. 27; idem, Unterstützen grüne Anlagen die Finanzmarktstabilität?, FAZ of 07.07.2021, p. 29; C. Siedenbiedel, Europäische Zentralbank will mit Geldpolitik das Klima schützen, FAZ of 09.07.2021, p. 1

<sup>33</sup> Critical voices cited by C. Siedenbiedel, Eine grüne Strategie für Europas Notenbank, FAZ of 09.07.2021, p. 15

<sup>34</sup> In the same direction G. Braunberger, Das unterschätzte Ziel, FAZ of 09.07.2021, p. 1

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<sup>36</sup> E.g. J. Löhr, Wird aus dem Corona- der Klimafonds?, FAZ of 15.10.2021, p. 17

<sup>37</sup> Ruling of 24.03.2021, available at:

[https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/2021/03/rs20210324\\_1bvr265618.html](https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/2021/03/rs20210324_1bvr265618.html); the press release 31/2021 of 29.04.2021 is available at:

<https://www.bundesverfassungsgericht.de/SharedDocs/Pressemitteilungen/EN/2021/bvg21-031.html>

<sup>38</sup> Dated 12.12.2019 (BGBl. I S. 2513) with addition of 08.08.2021 (BGBl. I S. 3905) in the wake of the court ruling cited above

<sup>39</sup> See above footnote 3

<sup>40</sup> See above footnote 3

<sup>41</sup> For a criticism see also C. Calliess, Verfassungsänderung durch die Hintertür?, FAZ of 20.05.2021, p. 6; dissenting in part: R. Müller, Eine Popularklage auf Umweltschutz?, FAZ of 14.05.2021, p. 8; the ruling as a trigger for further regulation: J. von Altenbockum, Holterdiepolter in die Klimaneutralität, FAZ of 15.05.2021, p. 1; with similar criticism K.-H. Ladeut, Freiheit als Anspruch auf staatliche Planung, FAZ of 06.05.2021, p. 7

A procedural mistake is founded in the assumption of the court that already today German emissions have an adverse effect in countries like Nepal, Bangladesh and Chile so that peasants from those countries have a standing to claim for damages. However, even the dust from the Sahara that fertilizes the Amazon basin does not cross the Andes, and neither do our emissions. The same is true for such remote areas like the Indian subcontinent. Why is it necessary that, outside crimes against humanity, somebody not damaged by German acts and therefore without a claim against Germany or German persons shall have the right of standing in a German court?

But even more important is another erroneous assumption<sup>42</sup>:

The Federal Constitutional Court decision is based on the ideas of an absolute emission quota added up from annual emission amounts and of this sum being diminishable year by year, such a play being comparable to water reserve on a trip through the desert which, in order to suffice till the end of the trip, may be used only according to a firm plan.

However, this is not the case with CO<sub>2</sub> as the emissions are not adding up year by year to a deadly total. Rather, the annual emissions have to be reduced according to a national multi-annual allocation plan that foresees a reduction of the emissions and will be consented by the EU; the plan allows for the choice between diminishing the amount of generated CO<sub>2</sub> and neutralizing CO<sub>2</sub> e.g. by plants, capture and storage, or transformation<sup>43</sup>.

Only indirectly there is an obligation under international commitments to achieve climate neutrality or even climate enhancement. Rather, the contractual obligation is a global one: It is the common aim to restrict global warming to an annual global average of 2° C or preferably only 1.5° C<sup>44</sup>. The EU has lodged a promise for CO<sub>2</sub> reduction in comparison to 1990 amounts. Furthermore, there is the EU legislation for CO<sub>2</sub> reduction in the EU territory with national allocation plans submitted by the member states, which leave the sectorial allocation to the member states and allow for a carry-over of not achieved reduction amounts into the next five-year-period. Again, all these schemes and declarations do not take arrangements into account, which reduce CO<sub>2</sub> extraterritorially (though within the appropriate bubble); in view of a global risk, this territorial view is neither economically feasible nor appropriate for industrialized societies<sup>45</sup>.

Germany with its current contribution of less than 2 % of the global CO<sub>2</sub> emissions<sup>46</sup> may help to achieve the general aim of reduction by avoiding or neutralizing CO<sub>2</sub> amounts, but cannot even balance the allowed CO<sub>2</sub> emission increase of the developing nations<sup>47</sup>. An impact for the global aim can only be achieved by inventing and producing technologies which are manageable and affordable for the world, and this – apart from showroom demonstrations - has hardly anything to do with a large-scale application and the absolute amount of CO<sub>2</sub> abatement in Germany.

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<sup>42</sup> Applauding the reasons of the ruling as a „cornucopia of climatological expertise“ J. Müller-Jung, Im Namen der Freiheit, FAZ of 05.05.2021, p. N1

<sup>43</sup> A. Frey, Und wo bleibt das Negative, Frankfurter Allgemeine Sonntagszeitung of 19.09.2021, p. 58 thinks that climate neutrality cannot be achieved nowadays without carbon capture and storage (CCS) and CO<sub>2</sub> transformation into chemical products.

<sup>44</sup> Paris Agreement of 12.12.2015, available at:

[https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg\\_no=XXVII-7-d&chapter=27&clang=\\_enm](https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-7-d&chapter=27&clang=_enm); For a survey see: [https://en.wikipedia.org/wiki/Paris\\_Agreement](https://en.wikipedia.org/wiki/Paris_Agreement)

<sup>45</sup> The five-year-plans and their monitoring remind of economic steering in communist countries.

<sup>46</sup> <https://de.statista.com/statistik/daten/studie/179260/umfrage/die-zehn-groessten-co2-emittenten-weltweit/>

<sup>47</sup> C. Hein, Kohle im Klimawandel begehrter, FAZ of 15.09.2021, p. 23

Any planning of a path with a continuous abatement is not realistic, as the development of technologies is characterized by the irregular progress and marketability of technical solutions. It is common experience that sovereign market planning and real market development never meet, and this exponentially less with longer time horizons. In consequence, any central planning by the sovereign and the compulsive definition of aims for the economy leads into a tremendous mis-allocation of funds and the failure of national economies<sup>48</sup>.

It has already been explained that the sudden transition into climate neutrality leads to rising cost of production (for all kinds of goods like agricultural and industrial products, housing, mobility, and services) and rising prices for the consumers. These effects shall be levelled – according to the planning - by the disbursement of state income, especially a redistribution of taxes and certificate prices to the poor. This has two effects:

The „rich“ people cannot pay – at least on the medium term - the amounts necessary for redistribution to cover the expenses for essentials by the poor. Any such burdening, especially by taxes, leads to higher cost and higher prices, an endless spiral, this especially so, if an increasing scarcity of investment capital comes into play as an additional cost driver. A taxation of income that has already been taxed, leads into an additional risk-aversion of the holder of investment capital, and this means another brake for progress.

History has shown: An increase of tax revenue based on economic growth is more stable than an increase based on higher tax rates. Private sector players make sounder and more successful investments than the state administration, and this is pivotal: All investments create demand and help economic growth in the initial period. Investment failures, however, do not regain the stake, and the resulting loss at the taxation subjects diminishes the tax revenues in part directly and in part via the loss of jobs with taxable income. Therefore, it is dangerous for the state revenues to drive investors into state-preferred investments.

The new reason for such steering by the state, which has already been accepted in various court decisions<sup>49</sup>, is based on the assumption that damages from not investing and risking a continuation of climate change are higher than the potential losses from ungainful investments. This line of reasoning, however, neglects the wisdom of a multitude of private investors as well as the effects of rising insurance premiums for extreme weather coverage. The assumption that private parties are generally unsusceptible for common good losses is discretionary as it is based in the idea of prevalence of short-term greed rather than long-term prospects for investment cost recovery, viz. in the idea of prevalence of bonus-seekers with a regular income over capital providers with obligations to creditors and savers; but guess who has the longer reach: a greed manager or an investor with responsibility of the capital.

A state regulation of investment leads to a market congestion as capital is forced to be invested at an early time although better and more gainful solutions may be on the horizon. Early runs into present technologies hinder the success of later technical progress. Timing of an investment is of essence, and a master of capital usually has a better sense for timing than an administrator or a public servant.

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<sup>48</sup> This does not preclude that for a limited time there are also winners, see e.g. W. von Petersdorff, Alles auf Grün, FAZ of 24.04.2021, p. 19

<sup>49</sup> For some criticism see J. Pennekamp, Die Schattenseite der Klima-Urteile, FAZ of 02.06.2021, p. 16

Four examples for this:

- Insulating houses for warmth retention leads to a packaging into hazardous waste and hinders air circulation, room adaptation, and better technical solutions.
- Subsidies for wind power lead into less and less windy areas and the necessity for regulatory change in order to achieve a re-powering and to make good for a sinking average productivity.
- The abandonment of nuclear power leaves us with highly energetic wastes instead of useful energy. It means a brake or even an obstacle for technical progress, such progress not being restricted to the nuclear field but also swapping over into other applications.
- The subsidies for electric cars diminish the chances for alternative and „green“ fuels which would allow the further use of good cars, viz. previous investments, viz. existing resource consumption.

### 3. Preparing the energy transition

The energy transition has special importance for the abatement of climate change<sup>50</sup>. Today an increased use of wind and solar energy shall make the transition faster and shall bring about an early end of the use of fossil fuels. This political ambitious plans for Germany and the EU demonstrate an exemplary collision with reality.

#### a) Electricity and natural gas

Not only households and public administration and services, but also practically all economic activities, especially industrial processes, are depending on a stable, uninterrupted availability of electricity: Water, telecommunication, productive devices, fuel pumps, traffic lights, alarms ... everything runs on electricity; in case of heating failure, an electric oven may help. Therefore, the security of supply of electricity is paramount for social and economic life<sup>51</sup>; in Germany, the annual time of non-provision of electricity is 12 minutes<sup>52</sup>.

In Germany, power generation is put into a precarious situation:

Wind and solar power contribute up to 50 % cover to the present demand of 580 TWh/a, which is so low because of the effects of the pandemic. However, this contribution comes like a deluge on sunny and windy days and is not yet sufficiently levelled out with storage devices. The installed wind and solar power generation amounts to about 120 GW, but on an hourly base the production securely covers only about 10 % of the demand as it fluctuates during the 8.760 hours

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<sup>50</sup> <https://www.bundesregierung.de/breg-de/themen/energiewende/energiewende-im-ueberblick-229564>

<sup>51</sup> The last example has been the Texas black-out of February 2021, see W. von Petersdorff, Auf Gas und Erneuerbare war kein Verlass, FAZ of 19.02.2021.

For the following arguments see also N. Záboji, Dem Blackout vorbeugen, FAZ of 05.07.2021, p. 16

<sup>52</sup> N.N., Weniger Stromausfälle in Deutschland, FAZ of 22.10.2020, available at: <https://www.faz.net/aktuell/wirtschaft/stromausfaelle-in-deutschland-im-schnitt-zurueckgegangen-17014621.html>

of the year; so the reliable availability of power from these sources is about 10 GW out of the peak power demand of 80 GW. Multiplying these numbers and adding a lot of storage plants for levelling out production fluctuation is technically doable<sup>53</sup>, but is expensive financially and ecologically<sup>54</sup>.

Today, the remainder of 70 GW is covered by nuclear (9 GW), hard coal (25 GW) and lignite (21 GW) power stations, a few combined cycle natural gas power stations and some others; with the exception of pump storage plants, the production by hydro-electric and biomass power stations fluctuates on a longer time-scale than that of wind and solar parks, as precipitation, soil fertility and agricultural product prices change by the season as well as from year to year.

Nuclear and fossil fuel power stations are progressively phased out according to time-plans enshrined in laws: Nuclear energy shall end by 2022<sup>55</sup>, the use of coal for electricity production in principle by 2038<sup>56</sup>. Given a time of at least 10 years for planning and realizing new power generators and much longer periods for bigger power stations, this speedy shut-down obviously cannot be met in time with new investments, even if massive, into further solar devices and windmills, bio-fueled power stations, storage units, and hydropower stations and with power imports from other European nations which up to now have installed power stations for their own, national demand and not for export. In order to cover half a winter day of German demand, storage should be about 180 GW (because of the slow recuperation rate from storage and the transformation losses) and 720 GWh<sup>57</sup>. Power imports require that our neighbours, which have in principle identical weather conditions, install power stations and power lines for the fluctuating German demand, and that Germany transforms its highest voltage network to accommodate large importations. The EU aims at an interconnector capacity of 10 % of each national production capacity<sup>58</sup> and 70 % of each national demand in order to have an effective internal market; but I think that these figures are illusion, run counter to the responsibilities of grid operators for the national security of power supply<sup>59</sup>, and are way too high in view of the national demand of an industrialized country like Germany. Storage in batteries is expensive, in power-to-gas stations is tested, suitable valleys for pump-driven hydro-electric power stations are rare and the most economic sites are already used; high transformation and transportation

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<sup>53</sup> Refuting some myths against a transition to renewable energy I. Overland, *The geopolitics of renewable energy: Debunking four emerging myths*, *Energy Research & Social Science* 49 (2019), 35

<sup>54</sup> E.g. heat chimneys above solar parks, bird bat and insect shredding by wind turbines; furthermore, there are human health hazards from infra-sound, circulating shadows, and glare effects..

<sup>55</sup> 13. Novelle zum AtomG (13th Amendment to the Atomic Law) of 31.07.2011, BGBl 2011 I 1704

<sup>56</sup> Gesetz zur Reduzierung und Beendigung der Kohleverstromung (Kohleausstiegsgesetz) (Law on the reduction and termination of electricity generation from coal, Coal Exit Law) of 08.08.2020, BGBl 2020 I 1818

<sup>57</sup> Bundesnetzagentur, *Regelungen zu Stromspeichern im deutschen Strommarkt*, Bonn March 2021, p. 5, available at:

[https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen\\_Instituten/ErneuerbareEnergien/Speicherpapier.pdf?\\_\\_blob=publicationFile&v=2](https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Instituten/ErneuerbareEnergien/Speicherpapier.pdf?__blob=publicationFile&v=2)

<sup>58</sup> Regulation (EU) No. 347/2013 of 17 April 2013 on guidelines for the trans-European energy infrastructure, EU-OJ 2013 L 115/39

<sup>59</sup> Correctly Burmeister & P. Kistner, *Zu weiteren Europäisierung der Netzwirtschaft durch das Clean Energy Package*, *Recht der Energiewirtschaft* 2021, 179, 183; an example for the working of this obligation is the case of the South-European black-out in June 2021, see N.N., 63 Minuten "Inselbetrieb": Europa schrammte am Freitag am Blackout vorbei, *Money-online* 29.06.2021, available at:

[https://www.focus.de/finanzen/energieversorgung-europa-schrammte-am-freitag-knapp-am-blackout-vorbei\\_id\\_12864728.html](https://www.focus.de/finanzen/energieversorgung-europa-schrammte-am-freitag-knapp-am-blackout-vorbei_id_12864728.html)

losses make on-site availability for demand expensive, this even more so, if there is local demand close by the power generation site<sup>60</sup>. And owners of electric cars will protest, if their car batteries are low at rush hours in the morning or in the evening because of national peak demand. An alternative, albeit due to stand-still cost with workers present a very expensive one, is to broker industrial unit shut-downs on the power exchange; however, industrial demand is about 50 % of today's total, and the units available for shut-down on short notice are few.

This situation calls for a back-up production with natural gas<sup>61</sup>, which means that the existing 30 GW installed gas power need to be completed immediately for today's demand of 600 TWh and a foreseeable future demand of at least<sup>62</sup> 650 TWh (increase due to progressing digitalisation and electric mobility)<sup>63</sup> by new stations with a combined power of 40 GW<sup>64</sup> to 60 GW<sup>65</sup>, these latter numbers to be decreased by 9 GW, if the law is changed and nuclear power plants are allowed to continue operation beyond 2022. An economical gas supply for the additional gas stations is depending on the additional transport capacity of the new pipeline NorthStream II and a new calculation of the national gas transport system<sup>66</sup>. The new stations and the future power demand also require a recalculation of the national power grid, not only for the high voltage grid<sup>67</sup>, but due to small inputs from local production devices also for the local networks.

Even without these additional requirements today's plan for the national gas network foresees investments for 1 bn EUR<sup>68</sup>. As households and industry are required by law to save heat<sup>69</sup> in order to combat climate change and thus reduce gas demand and these efforts will be intensified<sup>70</sup>, new investments into the pipeline system will usually be made for the benefit of gas power stations, viz. electricity production. This means that such network expansion cannot be paid with the network charge borne by traditional gas consumers; rather they have to be allocated to the gas power units and, being due to the energy transition, they will finally have to end up in the renewable energy charge for power consumers.

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<sup>60</sup> Obviously Overland (footnote 46) does not concur.

<sup>61</sup> See also J. Hauser & P. Plickert, Stromausfälle werden zur Gefahr, FAZ of 20.09.2021, p. 23 with reference to statements of high-ranking network officials

<sup>62</sup> For critical voices holding the estimate to be too low, see M. Schäfers, E-Autos und andere Stromfresser, FAZ of 14.07.2021, p. 15; see also N. Záboji, 13 Millionen E-Autos nötig, FAZ of 17.04.2021, p. 18, holding that by 2030 the demand is expected to be 745 TWh due to the additional demand from heat pumps and electric cars.

<sup>63</sup> Bundesministerium für Wirtschaft, Pressemitteilung Energie vom 13.07.2021, available at: <https://www.bmwi.de/Redaktion/DE/Pressemitteilungen/2021/07/20210713-erste-abschaetzungen-stromverbrauch-2030.html>

<sup>64</sup> E.g. L.J. Jarass & C. Siebels, Netzentwicklungsplan Strom 2035 riskiert die sichere Stromversorgung Deutschlands, ZNER 2021, 255; it is obviously a net estimate without servicing, maintenance, repairs and accidents.

<sup>65</sup> This is the gross number. For this magnitude also C. Geinitz, Gaskraftwerke für den Klimaschutz, FAZ of 20.06.2021, p. 20

<sup>66</sup> For the insufficient Draft Network Development Plan Gas 2020 for Germany see: [https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen\\_Instituten/NetzentwicklungUndSmartGrid/Gas/NEP\\_2020/Entwurf.pdf?\\_\\_blob=publicationFile&v=1](https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Instituten/NetzentwicklungUndSmartGrid/Gas/NEP_2020/Entwurf.pdf?__blob=publicationFile&v=1)

<sup>67</sup> For the Second Draft of the Network Development Plan Electricity 2025 for Germany see: <https://www.netzentwicklungsplan.de/de/netzentwicklungsplaene/netzentwicklungsplan-2035-2021>

<sup>68</sup> see footnote 59

<sup>69</sup> Gebäudeenergiegesetz (GEG) (Buildings Energy Law) of 08.08.2020, BGBl 2020 I 1728

<sup>70</sup> The aim is to have all buildings climate-neutral by 2050, see:

[www.bmwi.de/Redaktion/DE/Dossier/energiewende-im-gebaeudebereich.html](http://www.bmwi.de/Redaktion/DE/Dossier/energiewende-im-gebaeudebereich.html)

with links to the funding programs.

The new calculation for the power network is even more complicated due to the increase in demand, the new green power production and storage units (including wind-turbine driven power-to-gas units on the coast which can either retransform the gas into power or sell it in the gas market), the shut-down of traditional power sources, the increasing production of prosumers (auto-production and production for local use), the potential for load reductions by demand management etc. and the physical requirements for the maintenance of frequency and voltage as well as blind current compensation. There can be only a roughest estimate for the ensuing financial consequences.

These considerations show:

1. Electricity from the grid is becoming more and more expensive, even without further subsidies for power from renewable source.
2. By substituting coal and nuclear power with gas, the import dependency of Germany and the EU increase substantially. In case of import difficulty, not only heating is in a limbo, but also the security of supply of electricity<sup>71</sup>: It will not only be cold, but also dark.
3. This is even more dangerous as digitalisation and electric mobility also depend on the secure power supply and because the short-term substitution of heating gas with power is frustrated. It is easy to imagine that such an increased gas-import dependency has severe implications for foreign relations.

In view of this cornering of the power market, voices get louder which require a time extension for the shut-down of nuclear power<sup>72</sup>, and it may also be a good idea to extend the use of our national power resource, which – after shut-down of the coal mines - is lignite.

## b) Hydrogen

A way out of the gas dilemma is supposed to be offered by changing from natural gas to hydrogen. As of today, it takes about 9 litres of water to produce 1 litre of hydrogen and the transformation ratio for energy is 2-3 by 1<sup>73</sup>; so hydrogen is a costly energy source and will mainly depend on the availability of intermittent surplus electricity production from wind and solar farms. In the dry areas of the world, where wind and solar electricity seem to be cheaper energy sources, sweet water is made available by desalination; ca. 2.5 litres of salty sea water make 1 litre of sweet water, and it takes 1.5-21 kWh, on the average 7 kWh to produce one cubic meter of sweet water. This is why hydrogen is called “the champagne of the energy transition”<sup>74</sup>.

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<sup>71</sup> Hauser/Plickert (Footnote 54) with reference to the present GB situation; more details at P. Plickert, Gaskrise trifft Britannien ins Mark, FAZ of 21.09.2021, p. 15

<sup>72</sup> Geinitz, Zweifel am Atomausstieg wachsen, FAZ of 19.10.2021, p. 15; idem, Die Atom-Diskussion Wagen, FAZ of 21.10.2021, p. 15

<sup>73</sup> TGA-Fachplaner, Wasserstoff: Wie viel Wasser wird dafür benötigt, Stuttgart (Gentner) 06.03.2021, available at: [www.tag-fachplaner.de/energietechnik/energietraeger-wasserstoff-wie-viel-wasser-wird-dafuer-benoetigt](http://www.tag-fachplaner.de/energietechnik/energietraeger-wasserstoff-wie-viel-wasser-wird-dafuer-benoetigt)

<sup>74</sup> See footnote above.

It is planned that power-to-gas units<sup>75</sup> shall take the surplus production from wind and solar power and transform the electricity into hydrogen which may be used for industrial production, in the mobility sector (mainly as a fuel for cars, trucks, locomotives, and ships), and for heating and cooling (especially in fuel cells)<sup>76</sup>. Hydrogen is to be transported in special pipelines, but also in natural gas pipelines.

Upon the hype of a new idea, Germany has already initiated a 9 bn EUR r+d programme<sup>77</sup> and drafted a regulation of the subsector in its Energy Law<sup>78</sup>.

I think that hydrogen will be a substitute for natural gas only on a small scale, as hydrogen is quite difficult to handle safely. Oxyhydrogen must be avoided. All in contrast to natural gas, a simple oxidation makes for a very effective explosive, as oxyhydrogen does not smell by itself, cannot be odorized, is so light that it evaporates through the slightest leak and disperses up in the air, and reacts explosively with oxygen in a sudden and hefty explosion (which gives it the German name „bump gas“).

These features allow for a use in big plants like power plants and heavy motors as well as for all high-caloric uses as e.g. in blast furnaces<sup>79</sup>. The use for heating in buildings is limited by its problematic distribution and handling<sup>80</sup>. Due to its easy escape and its high caloric value, oxyhydrogen

can be mixed into natural gas pipelines only at 6-8 % and even in this dilution may require an adjustment of the burners.

The absolute tightness of hydrogen pipelines makes them feasible only for short distance, e.g. from the power-to-gas unit to the power station or another big user of the hydrogen. I think we shall not see a dense network of hydrogen pipelines covering regions or even a city.

In consequence, tariffs for hydrogen transport will be tied to hydrogen pipelines and paid by hydrogen users and not the customary natural gas consumers.

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<sup>75</sup> Energieagentur NRW, Power-to-Gas, available at:

<https://www.energieagentur.nrw/brennstoffzelle/brennstoffzelle-wasserstoff-elektromobilitaet/power-to-gas1>; see also <https://www.erdgas.info/energie/erneuerbares-erdgas/power-to-gas/strom-zu-gas/>

<sup>76</sup> With a detailed analysis of the German market Michalski, J.; M. Altmann, U. Bünger & W. Weindorf, Wasserstoffstudie Nordrhein-Westfalen, Düsseldorf (Ministerium für Wirtschaft Innovation, Digitalisierung und Energie) May 2019, S. 38 ff, available at:

[https://www.wirtschaft.nrw/sites/default/files/asset/document/bericht\\_wasserstoffstudie\\_nrw-2019-04-09\\_komp.pdf](https://www.wirtschaft.nrw/sites/default/files/asset/document/bericht_wasserstoffstudie_nrw-2019-04-09_komp.pdf)

<sup>77</sup> Bundesregierung, Bundesregierung beschließt Wasserstoffstrategie, Berlin 10.06.2020, available at:

<https://www.bundesregierung.de/breg-de/themen/energiewende/wasserstoffstrategie-kabinett-1758824>

<sup>78</sup> German Law of 16.07.2021, BGBl. 2021 I S. 3026, amending the German Energy Law

<sup>79</sup> Vgl. z.B. Thyssen-Krupp, Grüner Wasserstoff für die Stahlproduktion ..., 10.06.2020, available at:

<https://www.thyssenkrupp-steel.com/de/newsroom/pressemitteilungen/gruener-wasserstoff-fuer-die-stahlproduktion-rwe-und-thyssenkrupp-planen-zusammenarbeit.html>

<sup>80</sup> C. Haack, Grünes Gas für den Wärmemarkt der Zukunft, FAZ Special „Quantensprung Energiewirtschaft“ of 15.09.2021, p. 1

### c) Present energy price hikes

The current price hike for energy (fuels, gas, electric power) can make Germany as well as the EU aware of the issue of energy cost<sup>81</sup>. Affordable and secure energy is a glue for social peace and stable internal relations. Cutting a substantial number of good people from their power supplies - without giving them the chance to adjust in time their demand (e.g. through energy saving measure, auto-production etc.) - is a recipe for social unrest and the failing of societies and their politics. Historic experience tells us that whenever the governments of industrialized nations raise the tax rates for energy use, producer nations see that the demand is ready to pay more and try to increase their share of the available money. As we see this „greed cascade“ today again, we should put the blame on our politics first and question the increase of taxes and financial burdens, even if driven by the good intention to protect the world climate. Direct subsidies for energy saving measures and new energy production do not have this effect on producer nations.

However, it does not make sense to pretend – as all politicians did in the 2021 electoral race in Germany - that a decrease of the German charge on electric power for the benefit of production from renewable sources is lowering the retail power price<sup>82</sup>: Today, the surcharge mainly stems from making good the difference between the market price and the respective promised feed-in tariff. The higher the market price, the lower the difference to be covered with the surcharge, and *vice versa*. If the market price increases, the difference decreases. At a 50/50 rate of kWhs from traditional and renewable sources, the purchase cost for 100 % at a higher market price outweighs by far the reduction of the surcharge for the 50 % of renewable power sources, and in consequence the retail price must be higher.

The current price increases will help the energy transition, as new saving measures, a shifting of power sources, and auto-production come into the focus and into the money. This may even be more effective than an overboarding regulation with micro-management tendencies and strict enforcement<sup>83</sup>.

The same is true for the power exchanges where power contingents are traded. The daily clearing price in these exchanges is the price for the last unit necessary to fully satisfy demand; this means that everybody who has been able to offer below the clearing price earns a margin which may be put to use for an increase of production and savings. In view of the resulting retail prices, the EU Commission proposes to take another starting point for retail price calculation:

The average power market price, which is the average price of all offers which are accepted for satisfying the demand. This average price discourages all producers with high than average cost to make new offers and reduces the earnings of the producers with offers which are lower than the market clearing price; the main effects are an immediately lower retail price on day one, but also an increase and a prolongation of the power shortage forever thereafter<sup>84</sup>. Results

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<sup>81</sup> J. Pennekamp, Die Krise nach der Krise, FAZ of 20 October 2021, p. 1

<sup>82</sup> A. Hoenig, Wie lässt sich der Strompreis stabilisieren, Rhein-Zeitung of 16 October 2021, p. 7

<sup>83</sup> For this tendency of the EU Commission see H. Kafsack, Die Kommission werfelt herum, FAZ of 14.10.2021, p. 15

<sup>84</sup> See also H. Kafsack, Planlos marktlos, FAZ of 23.10.2021, p. 17; his earlier versions are complicated by a simultaneous view on the gas market: idem, Aufgeheizt statt abgekühlt, FAZ of 18.10.2021, p. 17 and idem, Von der Leyen will Krise mit Wind und Sonne lösen, FAZ of 21.10.2021, p. 16

The current discussion about climate change, CO<sub>2</sub> abatement and the energy transition is characterized by a lot of good will and high morale, but a distance from reality. It does not make sense to bet the prosperity of the EU and Germany with speedy regulations and central planning driven by a media-hyped moral public. This may be curing symptoms rather than the cause of illness. Neutral science by unbiased scientists should prevail in order to prevent a Galilei effect. It seems to make more sense to prioritise adjustment to climate change rather than to try to avoid it, this especially in view of the facts that the developing nations have no absolute limits for the growth of their CO<sub>2</sub> production under the Paris Agreement, that the EU should not and cannot turn into a self-sufficient economic fortress and that its plan for a Carbon Border Adjustment Tax meets with serious GATT concerns.

A factual approach is also required for the energy transition. Illusions at the conference tables are hurt when reality comes into play, as can be learned from the Desertec failure, the unstable and financially and environmentally expensive power production by wind and solar power and the ensuing storage systems, and the limitations for the use of hydrogen. Neither alone nor in combination these “green” energy sources will be able to save the climate. It is necessary to have a mix of power sources and power plants to ensure the security and affordability of supply and to have a wide spectre of research and trials for additional ways to meet an increasing energy demand. Technical and affordable progress comes from tedious work step-by-step and not as a result of grand schemes which may at best put the social fabric at risk. The state may counter short-term market risks, but it has always failed to drive the markets and national economies. Regulatory prescriptions by the legislative, executive and judiciary powers have always lead into an economic offside.