

Germany's Energy Supply Transformation Has Already Failed

Imagine a script for a political issue is handed over to a TV station. Contents as follows:

“There's a severe earthquake in Japan that is followed by a gigantic tsunami that causes a vast number of deaths. A huge nuclear power plant at the coastline also gets badly damaged. Many thousands of kilometers away, Germany plunges into panic - even though the world's safest reactors are located there and neither large earthquakes nor tsunamis occur there. The German chancellor Ms. M gets an idea.



More than just a missing grid. Photo: G. Sturm; Pixelio

Ultimately she wants to wrestle away the nuclear fear issue from the hands of the opposition once and for all, as she is constantly hampered by it. She only wants to eliminate nuclear power for good and, acting like she never knew it before, she announces that nuclear reactors are unsafe. Ms. M happens to be a physicist. Eight nuclear power plants are shut down instantly and the remaining 10 will follow later. Because the reactors' safety experts unfortunately declare them as safe, Ms. M assembles a so-called *Ethics Council*. This council is not assigned to discuss the matter of shutting down the plants, but is asked to discuss a single question: “How can the shutdown be done carefully...?” Not a single energy expert is on this council, but it does include two bishops....

This council delivers the desired answer: a package of laws is enacted and driven through Parliament and the *Bundesrat* (Upper House of Parliament) at record speed. There's plenty of fear because the reactors could explode any time, at least the ones that had been shut down instantly. Not now for the others, but maybe later. Most of the resulting missing power has to be imported from neighboring countries, which just happens to be nuclear power. But that does not disturb anyone. Germany gets away again. Ms. M calls it the *Energy Supply Transformation*..“

To nobody's surprise, this script gets rejected because it's unrealistic, and no one would ever believe such a storyline. But in fact, this really happened in Germany – it's no fiction.

It is well known that this is precisely what happened in the spring and early summer of 2011. Now that the first effects are becoming clear, the mistakes in the law and the government's arguments, and the methods used for hiding them, are emerging, and the first reactions from abroad are appearing, we can now begin to examine the so-called energy supply transformation.

1. Exaggerating, euphemizing, ignoring, concealing

When critically examining the official statements behind the reasoning of the laws for the promotion of certain energy technologies, as well as the political explanations for all governmental action on this behalf, one cannot comprehend the unbelievable mistakes that were made.

Gone are the times when a leading governmental office would never under any circumstances mock the citizens and mislead them with false information. The only pardonable sin during these earlier “grand old times” was perhaps leaving out too many embarrassing details – but never was there betrayal and lies. All that has changed.

Intentional manipulation of facts and false information has become the order of the day in the German government’s public relations.

As the topics of energy economics and energy technology are subjects that ordinary citizens are rather unfamiliar with, the politics of systematic misinformation have been extraordinarily successful – as surveys on this topic reveal.

The main battlefield of this war with the media is the so-called renewable energies, which of course do not exist. Energy is not renewable. What is actually meant are regenerative energy technologies for generating power from solar radiation, the kinetic energy of air currents, or the energy from biomass. It was the political aim of the last federal government and is now also the aim of the current one to achieve public acceptance for these energy technologies, despite their many and massive disadvantages, and to neutralize resistance from experts. A tool for this is systematic disinformation. It is a political instrument for driving through a political aims.

The fundamental claim used to legitimize “renewables” is the replacement of coal-fired plants, mainly with wind and solar plants. But in fact, until this very day, despite hundreds of billions in investment, not a single coal plant has been shut down because these fossil fuel facilities are indispensable as a back-up - even when there is a strong feed-in of “green” power. If wind and solar power die down due to certain weather patterns, then coal plants must be restarted as quickly as possible to serve as substitutes.

Moreover, they have to be restarted within 30 minutes, meaning they cannot be switched on if they find themselves in a cold status. A cold start takes hours. Short term regulation of grid disturbances becomes impossible. Therefore the plants must be kept warm at all times by constantly running them in the idling mode. This requires plenty of coal. Therefore wind and solar power cannot replace the equivalent of coal use one-to-one – but rather just a part of it.

The energy supply transformation has made the situation precarious

In response to an urgent plea by the federal government and its Power Grid Agency, the power plant operators had to restart even older power plants because their electricity was so badly needed after shutdown of the 8 nuclear power plants in the wake of the Fukushima disaster.

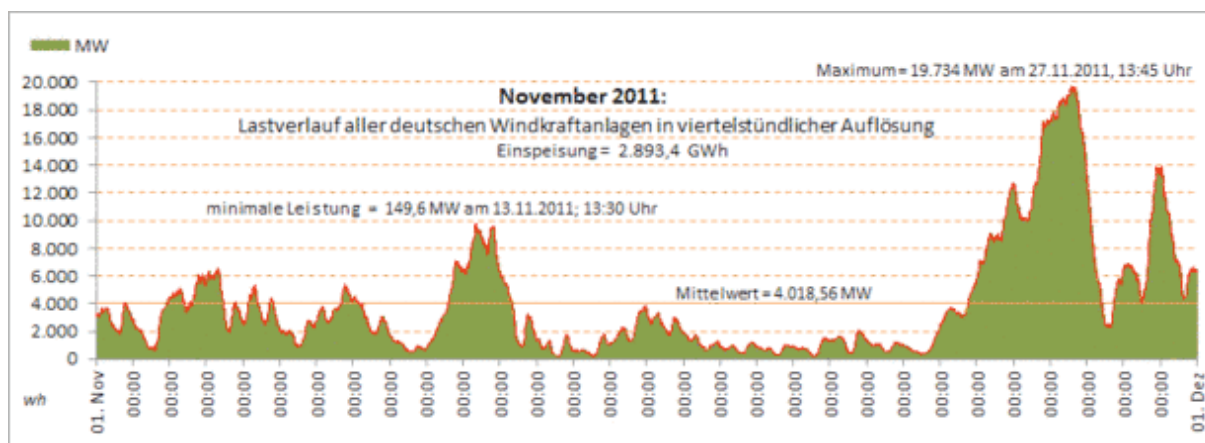
Therefore one can safely say that the fuel for Ms. Merkel’s energy supply transformation is now coal – and indeed much more than ever. This too will be troublesome for several reasons, and will be described in Part 8 “The quiet end to grand declarations” and in Part 14 “Becoming more and more expensive for citizens”.

The so-called energy supply transformation that Ms. Merkel seeks includes the nuclear shutdown. This has been the core aim of governmental energy policy for the last 6 years. What’s new is the downright messianic ambition to reach these self-made aims in a relatively very short time. The claim to be a model for the rest of the world is not new, and is rather typical.

A short overview of the politically most important fields of promotion in the sector of energy reveals the obvious, yet concealed flaws.

2. Wind power – supply according to the weather

Generating energy with wind involves extreme fluctuations because it depends on the weather and includes periods without any recognizable capacity for days, or suddenly occurring supply peaks that push the grid to its limits. There is a threat of power outages over large areas, mainly in wintertime when the demand is high and less gets delivered from abroad. One is simply playing a game of roulette.



November 2011: Load curve depicting all of Germany's wind generators every 15 minutes (source: wilfriedheck.de)

A very impressive chart showing the range of weather related variations in capacity of wind and solar power was provided by the head of Policy and Markets at RWE Innogy in Essen, Germany. Holger Gassner stated at a VDI (German Association of Industry) at the end of November 2011 ([here](#)):

“In the first half of 2011 alone, variations in wind power capacity of about 23 GW (23,000 MW) and about 13 GW for photovoltaic power were observed.”

This is a nightmare for power grid operators and utilities. Claims made every dedication ceremony for a new wind farm boasting that thousands of households will be supplied are part of the package of standard lies. The reality is that no households at all can be powered as soon as the wind dies down.

Not a single coal-fired power plant could be shut down despite the already installed gigantic capacity of wind farms because, unlike coal and nuclear power plants, wind farms don't provide any steady base supply – and that's every hour and every day. Just the opposite is true: We need quick, adjustable power plants in case the supply from wind farms changes too quickly. The power plants that are able to do just that are nuclear power plants. But these are now being shut down one after the other and thus can no longer contribute to grid stabilization.

As a result, new gas turbine power plants have to be built, although this is not profitable.

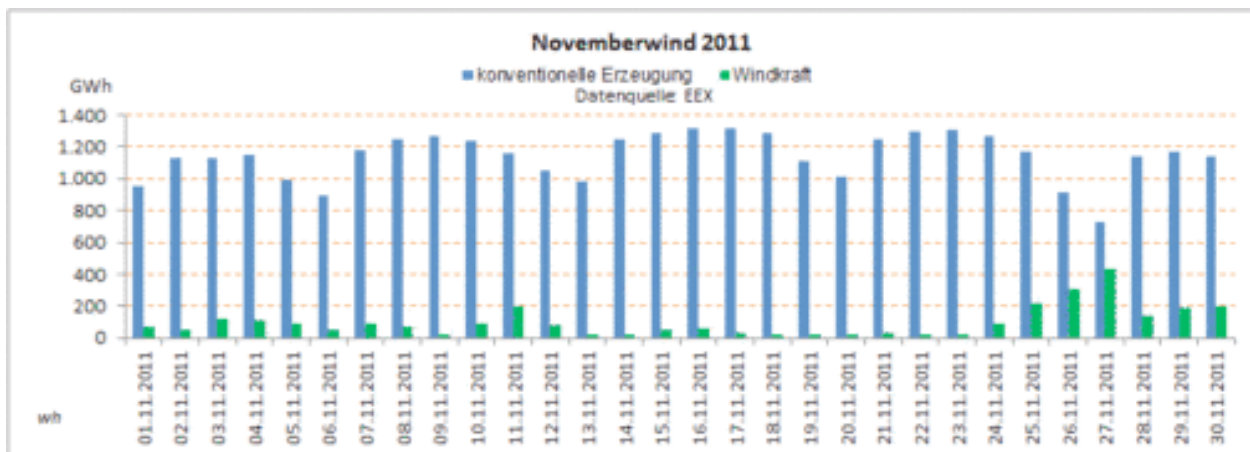
Because of the huge lack of energy storage facilities, Germany has to literally try to deliver surplus wind power to neighboring countries. Sometimes it's necessary to pay to do this. This involves selling the surplus power at a “negative price”. Even more absurd is that the wind park operator continues to get paid the full amount for the unneeded energy that is generated – thanks to the German EEG Energy Feed-In Act, which guarantees green energy producers fixed rates for 20 years. In the end, the consumer pays two bills for this excess green power.

The principles of the free market economy simply get disregarded by Germany's energy supply transformation, and in fact get turned on their head by the so called *hardship regulations* in §12 of the EEG Energy Feed-In Act. It states that any generated wind or solar power that is refused by the grid operator, and thus does not get generated, must still be paid for in full (see Part 5). That means if a grid operator asks a wind farm owner to stop generating in order to keep the grid stable, the grid operator must still pay for the power that does not get produced. The consumer of course gets stuck with the bill.

The rapid construction of more wind power is now in full swing. This will only amplify the problem. Yet, this gets denied. In principle, pump storage stations could balance out these supply variations. But in Germany there are far too little of these storage stations, and the ever growing demand for them could never be met.

We need long-term storage facilities to cope with longer periods of windless or low-wind conditions. A calm lasting ten days is not unusual in Germany. Indeed in October and November, 2011, the country experienced a protracted high pressure blocking weather pattern for 44 consecutive days, causing a spectacular breakdown in wind generated power.

The wind-power breakdown data already exists:



Conventional power generation and wind power during November 2011. Blue bars = conventional power, green bars = wind power (wilfriedheck.de).

During 24 days in November, of all the 27,215 MW (as to the EWI, June, 2011) of wind power capacity installed in Germany, the wind turbines were able to only provide the following:

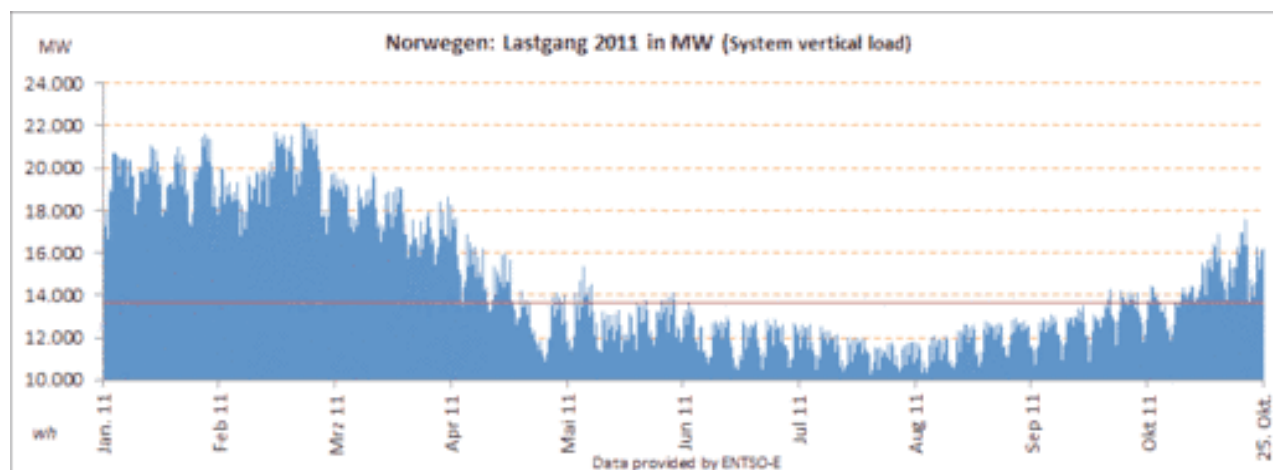
- 30% of their potential electric power for just 2 days
- 15% for 4 days
- 7 – 8% for 5 days
- 4 – 5% for 2 days
- 2-2,5%.....11 days

Prof. Dr. Fritz Vahrenholt of RWE Innogy Ltd. writes [here](#) that German annual consumption is 450 TWh (terawatt-hours = billion kWh) and thus making the average daily consumption 1.25 TWhr, or 12.5 TWh over 10 days. Currently in Germany available pumped storage power station capacity is 7,000 MW, which is enough to generate a measly 0.04 TWh of power if emptied completely.

Therefore, in order to compensate for periods of calm wind over 10 days, Germany would need 313 times the currently available pump storage capacity installed today. For Germany and the Alps region, this is fully unrealistic, particularly when it comes to gaining public acceptance for these pump storage plants.

As a result, many studies are looking to Norway

Most storage capacities in Norway are in the form of simple dam reservoirs that have natural water feed-in. They are capable of providing power during shortages, but are not able to serve as a sink (collection and storage of power) in times when wind power is excessive. Moreover, if there was a calm wind period in Germany, Norway nevertheless would first have to supply its own needs first.



Load curve for Norway 2011 (Source: wilfriedheck.de)

The last week of October and the entire month of November revealed in total that Prof. Vahrenholt's "worst case" estimate of 10 windless days was actually a huge under-estimation. This period of calm wind lasted 4 weeks!

Concerning the great problems regarding storage, the German government has been floating out new hopes of entirely new storage capacities. Despite the hopelessness described above, the government calls for the use of Norwegian hydro power plants to supply power via undersea cables, generation of hydrogen using surplus wind power, or the use of electric cars as storage capacity for the grid. Read more about these pie-in-the-sky visions below.

A further gigantic project, presumably born through pure despair, is the construction of at least 3000 km new high voltage power lines from northern to southern Germany for the purpose of transporting surplus wind power generated in northern Germany to the southern German states of Baden-Wuerttemberg and Bavaria, where the recent shutdown of nuclear power plants has produced huge shortfalls in power supply. Of course, the unreliable wind power by far cannot even come close to closing this huge gap in basic supply.

There are other reasons why this plan is unrealistic. Read Part 6: "The twice forgotten grid"

If all the systematic weaknesses of wind power are ignored and just the installed maximum capacity (which is rarely ever reached) is regarded, and thus presented as a reliable power supply, one could regard wind as the strongest "renewable" form of energy available. But in reality, wind energy is just an occasional, unpredictable, and randomly available power. It is not only very expensive, but it also acts as a power supply disruption.

But the government is not allowed to admit it

Wind power is the key component of the German government's new energy concept and is supposed to supply a giant 50% of the demanded power by 2030, 15% by the offshore wind parks alone.

Despite the systematic weaknesses mentioned above due to weather and physics, there are already difficulties tapping into the offshore wind turbines, which will be mostly useless in the future. Grid operator Tennet bought the 11,000 km long grid network from E.ON last year and now has to connect to all wind parks situated in the North Sea. In an urgent letter, Tennet warned the German federal government of looming bottlenecks. Grid operators have been given deadlines for connecting the offshore wind parks to the onshore power grid. [Tennet stated:](#)

"Indeed for all projects currently underway, there are major difficulties in planning and building progress."

All participants "have reached the limits of their resources", and "there are severe problems with financing" in addition. That's the difference between what's on paper and reality.

The *Bundesnetzagentur* (the Federal Power Grid Agency) in Bonn – an official government agency – in early December 2011 estimated the size of the required new wind turbines to be built by 2022. It calculated three scenarios ([here](#)) for the power demand and generation in Germany. This is to serve as the basis for expanding the grid.

Whichever scenario becomes reality will depend on wind power's growth, said office head Matthias Kurth. In the intermediate scenario, the Agency expects an expansion of wind power capacity:

- from 27,000 MW to 47,500 MW inland
- and from 100 MW to 13,000 MW offshore

Therefore the German Power Grid Agency anticipates a considerable excess of power. How this will harm the consumers is described in Part 5 "Beyond the central planned economy".

Regarding the numerous and troublesome difficulties involved with the current expansion, the German Federal Power Grid Agency's estimate is basically a catastrophe projection of what Germany is about to unleash onto the entire European power grid. Already neighbouring countries are taking steps to protect themselves against it. Poland has announced that it will no longer accept German power surpluses – described in Part 12 "The energy supply transformation threatens neighbouring countries". As this is much more likely to occur before the expected degree of expansion is reached, we will get the catastrophe for several billion euros cheaper.

3. Solar power – little benefit at a huge cost

Power generation using sunlight also suffers from Germany's ever changing weather, as well as the time of day. At dusk, dawn and during the night there is no power at all. The output from photovoltaic (PV) modules is also close to zero when the sky is overcast, when it's raining, and when the panels are snow-covered. As solar irradiance is less in Germany than in southern countries, even when the sky is clear, all photovoltaic panels, which are installed at a very high cost, manage to supply only a small 1.9% of the inland power generation despite its installed giant maximum capacity of 16,900 MW (late 2010).

Photovoltaic is causing problems because of its decentralized nature of power feed-in into the grid's lower levels, which is intended to supply users and not to accommodate numerous power generators. PV plants are currently designed in a manner that all plants, as required by the hitherto low voltage directive of the German BDEW, all go off grid at the same time at a grid frequency of 50.2 Hz, which is a result of a dangerously too high feed-in.

This abrupt collapse then can lead to a power grid failure like one mentioned by the German BMU (Federal Ministry of Environment) in a draft report in May 2011 – see Part 6.

That's why it is planned to expand the authority of §6 of the EEG Feed-In Act to include PV systems as well. Then they too will then be handled by the feed-in management according to §11 of the EEG. That the operators of the lower frequency grids have the chance of intervening in the countless single systems is simply not the case.

"This simply does not work for solar systems when clouds pass by," says Prof. Rolf Witzmann, head of the Electrical Power Supply Grids Department at the Technical University of Munich. The grid operator is powerless against the generated abrupt changes from zero output to full PV capacity. Only an automatic shutdown of the single system helps, and not "feed-in management".

This is precisely what the Federal Ministry of Environment is now considering. Measuring instruments that constantly measure the network frequency, and shut down single systems in case of excessive total feed-in, should be installed in the PV systems. The shutdown would occur as soon as the 50.2 Hz limit is exceeded. But this would require an expensive retrofitting of all existing PV systems. And if that is not enough, we also have to expect that here the operator will still be paid in full for the power that he is unable to feed-in. This is, after all, the government's principle – see the *Härtefallregelung* (hardship regulation) of the EEG Feed-In Act, §12.

The (non-)generator of solar power thus would have to supply proof of stopped power feed-in to the network operator. This all promises the creation of an interesting new bureaucracy.

Of course the cost of this would be paid for by the consumers, and so would all the technical retrofitting costs.

Solar power generation is extremely expensive

For every kilowatt-hour that is fed in, the owners of such systems installed in Germany after June 30, 2011, receive 24.4 euro-cents – in accordance to the EEG Energy Feed-In Act – and this cost of course gets passed along to the consumer. And much of the money paid for the solar panels goes to China, which now supplies more than 60% of the German market with solar modules. Due to Germany's overzealous forcing of solar power expansion, the country has become China's biggest customer for new solar panel industry. Jobs have been created there – with money from German power consumers, many of whom do not have a home or building for their own PV system.

In the meantime, China has invested this vast amount of money from German consumers in the expansion of its photovoltaic panel production and has become the world's largest producer. China's solar panels are unrivalled in price, and therefore German producers now face severe losses. In 2010, Germany exported solar power systems worth 138 million euros to China. China on the other hand exported 5.9 billion euros worth of such systems to Germany!

Red ink, bankruptcy, and job losses threaten

Like wind power, solar does not contribute in any way to the base power supply. Just the opposite is true. This weather-dependent power feed-in mostly disturbs grid stability and requires huge storage facilities that still do not exist.

A stunning confession was made in a 2011 EEG report from the German Ministry of Environment ([here](#)):

“Payments for compensation within the framework of the EEG 2010 amounted to...more than 12 billion euros ... Over the last years a faulty development has taken place. There have been investments in the power sector of about 23.7 billion euros, of which 19.5 billion euros, or 80%, have been in photovoltaic.”

And concerning power prices we read:

“All in all, the average compensation for renewable generated power since 2000 has risen from 8.5 cent/kWh to 15.5 cent/kWh (2010). This development urgently has to be stopped.”

With the amendment of the EEG on January 1, 2012, the so called “new EEG”, the government has

“...reacted substantially and worked decisively, especially by decreasing the excess-subsidies for photovoltaic.”

That the government confesses there is an over-subsidy is interesting, but the claim that it has been decreased is not true.

In a Ministry of Environment memo about the “Numbers and Facts for Financing Photovoltaic” dated 11 November 2011 ([here](#)), it is written that after the “new EEG” goes into effect on 1 January 2012, the “expansion extent” could be reduced down to 2500 to 3500 MW of additional capacity per year. It remains unclear whether and when this will actually occur. Definite and reviewable numbers have been avoided.

This has little to do with a decrease because on a yearly basis the further expansion of photovoltaic is just a little under the additional 3400 MW built during the first 9 months of 2011. This means everything continues pretty much as it did before, only not as extreme as in 2010, which saw an addition of 7200 MW of capacity.

But the further desired development financed via the EEG, and therefore by the consumers, intentionally has not been quantified here.

This Ministry of Environment's tactics of concealment have been broken through by the Federal Power Grid Agency – which is also an official government authority – in Chapter 2 “Wind currents...” of its cited report of December 2011:

The report addresses the expected expansion of photovoltaic and provides the numbers. In its probable scenario until 2022, the authority expects an increase from 18,000 MW today to an enormous 54,000 MW. This too will lead to expensive surpluses of power for the consumers.

Like the expected extreme expansion of wind power (see above), this enormous rise in PV power will fail due to grid disturbances and the unbearable costs – but not before consumers will have paid additional billions of euros more – the biggest part flowing to China.

The government is in a serious jam

On the one hand, the German government is fully counting on photovoltaic power. It is the second pillar of the energy system transformation after wind power. It must not in any way fail, no matter the costs.

But on the other hand the “over-subsidy” is ruining the overall “necessary acceptance of the Feed In Act” (cited in the above mentioned Ministry of Environment report). But without such over-subsidization and neutralization of market mechanisms, the much wanted additional expansion would not be possible. Also the “new Feed-In Act” continues to assure this.

4. Biogas: when food gets burned

Unlike wind and solar power, biogas is an energy-source that provides a consistent supply of power. It can be easily stored and you can generate electricity for long time periods. However, it is probably the worst source of energy. Like geothermal, it is completely inappropriate and quantitatively marginal for generating electricity. A far better use would be to convert it to natural gas through simple methods, and to supply it to the heating fuel markets.

The reason for its use as a source of electricity is the ideological over-valuation of electrical power generation, which has led to the excessive and expensive expansion of wind power and photovoltaic. At the same time, the overpayment for green electricity has led Germany to neglect the use of regenerative energy sources for heating. Solar heat and the use of warmth via heat pumps should be funded more, and effectively.

The problems with biogas are not solely because of inefficient use

The main problem is that the vast swaths of land used are impacting areas formerly used by agriculture. Now energy crops are being grown in place of food. Although biogas is intended to use plant waste, a huge incentive exists to convert agricultural acreage over to the production of canola, corn, miscanthus and other biofuel crops because of much higher profits – a direct consequence of over-advocating. Even when manure slurry is fermented to produce biogas, the gas yield is increased significantly when wheat is added. As a result, no one thinks twice about adding food crops into biogas plants.

The same problems occur when ethanol is produced. Here a further negative aspect concerning the environment arises. For example, large amounts of palm oil are imported from subtropical countries like Indonesia and are processed further ([here](#)). But in the country of origin, tropical forests are being cleared away and thus leading to widespread deforestation.

The conversion of agricultural areas and the use of food as a source of energy have been decried as unethical and outrageous for years now, mainly by churches and religious leaders. Even the German Environment Office – an authority under the German Ministry of Environment (BMU) – denounces the use of biogas and biodiesel for environmental purposes. In his sorrowful and unsuccessful defence of introducing the E10-fuel (10% ethanol fuel additive to petrol), German Environment Minister Norbert Röttgen did not dare to declare it as positive to the environment in any way.

The question arises: how long will politics and the public just stand by and watch this government-aided and abetted destruction of agricultural areas. Simple calculations refute any claim that this source of energy can contribute significantly to the energy supply transformation. These simple calculations show that there is nowhere near enough area in Germany for growing biofuel plants. These calculations do not even take the devastating consequences to the environment into account.

5. Beyond the central planned economy! Payment for non-production of green electricity, crystal ball fortune-telling, and “negative prices”

The German EEG Energy Feed-In Act contains some hard to believe rules. What follows are some examples:

Payment for the non-generation of electricity

The Feed-In Act's hardship regulation – §12 – requires: “Should the feed-in of renewable-power be reduced because of a grid bottleneck...the renewable affected energy operators must be compensated...95 percent of the missed income. If the missed income exceeds one percent of his annual income, the operator has to be refunded...100 percent”.

In other words: If grid disturbances occur very often, the green power producers receive more money. Technically there is an incentive for renewable energy suppliers to destabilize the power grid.

This reminds us very much to the methods of the centrally planned agricultural economy within the EU, where the avoidance of production is also rewarded. In Germany it's now the energy industry's turn to be condemned to degeneration by the methods of the centrally planned economy.

Legally required fortune telling

Energy Feed-In Act §12 also contains an obligation for the grid operators, who are apparently regarded as notorious fraudsters, to peer into future and to bindingly declare the output to the green energy producers. [Citation:](#)

“Operators of green systems are to be informed of the expected time, extent and duration of the feed-in management action no later than the day before (i.e. meant is the intervention by the grid operator, for example stopping the feed-in into his grid).”

This means the grid operator has to foresee “no later than the day before” an overload or a disruption in the grid. As such overloads are caused by a sudden and massive rise in wind power within hours, the grid operator has to determine and notify “no later than on the previous day”, the “expected time-point”, as well as “the duration” of the next day's disturbance and the subsequent necessary intervention.

Predictions of probability, like those that meteorologists like to use because not even they can predict exactly the regional weather events, are not allowed here. Grid operators are de facto required by law to accurately see into the future.

By now readers are of course curious of the results of certain-to-occur lawsuits by green energy producers against grid operators for not having fulfilled their tarot cards and crystal ball duties.

This regulation alone tells us everything we need to know about how well the German Ministry of Environment is connected to reality.

Selling green electricity at “negative prices“

As to the hardship regulation, it is remarkable that the grid operator is not allowed to switch off the supply of green electricity when it is not sellable at the energy exchange or to reject its feed-in. Instead, he either has to give away the power that the market rejects, or even pay money for someone to take it. This euphemistically is called “negative pricing”.

The German Ministry of Environment (BMU) writes in a 2011 draft [here:](#)

“In September, 2008, negative prices were introduced on the electricity market. This so far is unique in the world. In fact, negative prices have occurred several times already, in an extreme case to minus 500 euro/MWh.”

To limit the level of negative prices, the German *Ausgleichsmechanismus-Ausführungsverordnung*, shortened to *AusglMechAV* (balancing mechanism-execution ordinance) of 22 February 2010 provided a transitional period limited to the end of 2010 which freed the grid operator of his requirement to sell green fed in electricity on the market at any price. To reduce the risk of costs beyond this time, there is the possibility of limiting negative prices until Feb. 28th, 2013. Afterwards there will be limits between minus 150 and minus 350 Euro.”

It has to be noted that the bureaucrat authors of the draft are clearly proud of the above-mentioned uniqueness. And so on it goes. Of course the green electricity generator receives the full feed-in tariff, which just gets passed along to the consumers, who ends up having to pay twice for the green electricity.

Here the analogy to the EU's agricultural policy is correct: surplus commodities that no one needs are made cheaper, meaning they are exported at prices well below the costs of production. This acts to squeeze out regional producers from the market. The damage done by the export of surplus product to receiving countries just adds to the financial damage in the EU countries. An exact analogy to the double-subsidized export of surplus wind and solar power practiced by Germany is leading to damages in the receiving countries. That is the reason why Poland announced banning the import of "green" German surplus power (see paragraph "Germany's energy supply conversion threatens neighbouring countries" in Part 12.

Even the former Soviet Union and its satellite countries, with their planned economies, did not succeed in completely destroying the whole system by rewarding the non-production of goods. This feat is reserved exclusively by green Germany. The Ministry of Environment is right about one thing: "It is *unique*".

6. The twice forgotten grid

Two inevitable problems arose as a result of the growing number of wind turbines and solar panels, not driven by the market, but forced by EEG-subsidies which the former German government was not at all aware of, and which the current German government became aware of only after serious warnings were issued:

Problem No. 1:

The biggest share of installed wind turbines is located in windy northern Germany – an area where its power is not needed. The problem in Southern Germany is just the opposite: after the shutdown of some nuclear power plants in the wake of Fukushima, a huge demand there emerged. If only there was enough transmission capacity in north-south power transmission lines. Unfortunately this is not the case. Surplus power in the north has no way of reaching the demand in the south.

Problem No. 2:

Another grave grid problem went unnoticed until October 2011. It has to do with the far bigger power distribution network, which was installed technically only for supplying consumers, and not at all designed for the widely varying input of energy by numerous decentralized local wind farms and photovoltaic systems (see below) and transmission to the high voltage grid.

Regarding the already existing extent of this situation, Holger Gassner, head of the Department Policy and Markets at RWE Innogy, informed in late November that in the first half of 2011 very enormous variations of the available wind power capacities occurred with a magnitude of 23,000 MW. Observed variations with regards solar power were 13,000 MW.

Concerning problem no. 1: For improved feed-in of wind power, the German government wishes to install 3000 km of new high voltage power lines from northern to southern Germany already by 2020. But former Economics Minister Rainer Brüderle presented the following general requirements on March 21st, 2011 ([here](#)):

“For the ambitious expansion of renewable energy, we need about 3,600 km of new lines.”

German energy agency DENA however goes on to calculate a need for 4,450 km of new high voltage power lines, and state secretary Katherina Reiche from the Ministry of Environment called for 4200 km. The chances of this getting built are vanishing. Citizens are already fighting this successfully. Planning and approval processes take time, and the costs are enormous. So far, just 214 km have been installed (see Monitoring Report below)!

Because the shutdown of the nuclear power plants (which earlier contributed to the net's stability in coping with the ever-varying green power production, as they could even out capacity variations the fastest), wind parks have had to be shut down more and more frequently recently. There was a loss of 150 million kWh in 2010 alone because of this.

This did not lead to a smaller burden for the consumers in any way because of §12 of Germany's EEG Energy Feed-In Act, the government made sure that money would flow to wind and solar energy producers even in these cases of non-production. The wind power producers, whose power was rejected by the grid operators due to stability disturbances within the grid, nevertheless received payment for the power that the grid operators refused to absorb. Payment for non-production. For more details, see Part 5. The costs of course just get passed on to the consumers.

The German Federal Power Grid Agency provided interesting numbers in its “Monitoring Report 2011”. Half of the 24 especially important expansion projects are delayed, and the existing grids are “close to their limits of capacity due to the many demands of transmission and the change in production processes recently” (in plain English: due to the massive expansion of wind and solar power generation and the shutdown of 8 nuclear power plants).

The Federal Power Grid Agency refers to lines having been rated prior in August 2009 – with introduction of the *Energieleitungsbaugesetzes* (translated: energy power line extension act).

Delay concerning these 12 projects is between 1 and 4 years

Just 214 km of a total of 1807 km have been built so far. According to the online *Der Spiegel*, 73 further projects were named in this Monitoring Report as being delayed, according to grid operators (figures from second quarter of 2011).

The connection of new offshore wind parks to the inland power grid is running into trouble as well. Grid operator Tennet, who is running the power grid from E.ON in Northern Germany, recently warned of bottlenecks in an urgent letter to the government. There are considerable difficulties with all ongoing projects concerning planning and building progress. All participants “have reached the limits of their resources”, and there are also massive financing problems.

The reaction of citizens to the planned massive expansion of high voltage power lines is described in detail in Part 9. The influence of the numerous citizens’ initiatives is regarded by grid operators as even more serious than the time needed for regulatory approval.

The targets are completely unrealistic, but are kept alive because Berlin refuses to back down from any of its objectives concerning the energy supply system transformation vision, even if on the verge of shattering. But even the well-tuned machinery for projecting the image of a future completely based on “renewable” hits a few bumps once in a while, and a fragment of truth gets exposed to the harsh light.

The Ministry for Environment (BMU) released some remarkable, almost resigned-sounding sentences on pages 38 and 39 in its “Draft Report 2011 On the EEG Energy Feed-In Act” ([here](#)).

“We must realize that the expansion of the grid installation will not proceed with the demanded scale even in the future.”

And further on it writes:

“Although the affected grid operators struggled to overcome the existing bottlenecks in the grid, the amount of power regulated by feed-in management [Note: i. e. the power rejected by the grid operator] has risen 7 times the amount during the years 2004 to 2009. Isolated measures of expanding the grid at critical places resulted in big effects and weakened this trend. But nevertheless the feed-in management in the course of an expansion of renewable energies will gain further importance because grid bottlenecks will increase more and more.”

Concerning problem no. 2: As described in Part 3 “Solar power...” grid problems are not only occurring in just the high voltage transmission grids that are unable to cope with the varying feed-in of wind power, but are also increasingly occurring in lower voltage distribution grids. Responsible for this development is the growing number of photovoltaic systems, and also the inland wind parks that are bringing the grid into trouble because it was never designed in the first place to accept thousands of weather-dependent feed-ins.

Now they are struggling with the “50.2 Hertz problem” of abrupt mass self-shutdown of photovoltaic modules caused by too high feed-in. This safety mechanism is required and very reasonable. It’s just that the government oversaw it in dealing with the new problem of a vast number of PV systems (which no sensible person could have expected in poorly sunlit Germany) shutting down all at the same time.

The now necessary technical retrofitting of all PV systems with automatic measurement and shut-off-equipment, as well as the payment of the PV operators for undelivered electricity, will all be dumped onto the consumers once more.

The only realistic solution therefore is not only the expansion of the highest voltage grids, but also the lower voltage grids along with their networks and local network transformers. Finally there is a number for this – and it’s a really high one. In late November 2011 Katherina Reiche of the Ministry for Environment (BMU) stated that the grid would have to be “massively

altered”. “There is the necessity of about 4,200 km of new high voltage power lines and of about 200,000 km of modern grid technology within the distribution networks.”

Presumably here she was reacting to a study conducted by order of the *Bundesverband Windenergie* (Federal Bureau of Wind Power) ([here](#)), which contains a sentence of grave importance (my own addenda in brackets):

“The loss because of the shutdown of wind and solar power feed-in due to bottlenecks in the power transmission network (high voltage 380,000V or 220,000V, 35,000 km) so far is very much smaller than the loss due to bottlenecks in the regional networks (with a size of 1.7 million km)”.

Thus the main problem for grid stability is in the local distribution networks

In a statement issued on November 17, 2011, the German Union of Municipal Companies (VKU) therefore demanded that politicians and regulators address these 1.7 million km of local distribution networks and to not just focus on the 35,000 km of highest voltage power transmission lines because more than 80% of “renewable energy” systems in 2009 were connected to the lower voltage local networks and they were generating the problems.

The VKU calculates that such an expansion and integration of the local energy supply in the local distribution networks would cost 25 billion euros by 2030. The costs of constructing smart grids are not even included. Profound impacts on electricity bills are inevitable.

An embarrassment for the government

In the new law concerning the installation of power lines, only the high voltage power transmission lines are mentioned. The lawmakers only have the transmission of wind power from North Germany to South Germany in mind, and nothing more. The threat to grid stability of the much larger size local distribution networks because of the multitudes of uncontrolled green, weather-dependent power producers are overlooked.

While the German federal government and its Power Supply Grid Agency are playing down the rising threat to grid stability – Environment Minister Norbert Roettgen recently called such warnings a horror scenario – a concern growing only among industry. But it is not out of the pure joy for horror scenarios. These involve real experiences from the year of the much trumpeted Energy Supply Transformation of 2011.

On December 29, 2011, German daily *Handelsblatt* reported on the diminishing quality of electricity supply: “...with the advanced energy supply system transformation, there are already today critical quality losses in energy supply,” said Volker Schwich, director of the Union of Industrial Energy Business (VIK). The stability of complex production processes is threatened – long before the community takes notice of a blackout. Short interruptions in the size of milliseconds and frequency variations today will lead to problems earlier than they did before.”

In an urgent letter to the Federal Power Grid Agency’s director, M. Kurth, an affiliate of the Norwegian Norsk-Hydro trust, running as the world’s third largest producer of aluminium at 14 locations in Germany, listed the instability problems. One observes “an alarming accumulation of variations in the power supply and frequencies since July 2011.”

The letter listed the 5 essential cases of the past months that led to expensive damages. The rising number of power supply-related disruptions in production is alarming. Such an accumulation of incidents never occurred during the last decades.

The Power Grid Agency that keeps statistics on network disturbances only regards unexpected interruptions lasting more than 3 minutes. The index resulting from this (the so-called SAIDI) therefore optically looks good. But from the point of view of the industries, it does not regard the accumulating and growing problems caused by disturbances lasting less than 3 minutes.

The reliability of power supply was a central topic during the brief debate that led up to the energy supply transformation. Heinz-Peter Schlüter, head and owner of Trimet-Aluminium, warned of the inevitable problems industries would face before the Ethics Commission dubbed “Safe Energy Supply”. He said that with the lack of a reliable power supply, he would lose the fundamental basis for the company’s existence.

“Just four hours without power, and the production machines of my factory would be irreparably destroyed,” Schlüter warned.

Klaus Toepfer’s ethics commission however rejected this.

Meanwhile citizens of Hamburg are preparing for the possibility of a major blackout this winter, as [WELT Online](#) reported Nov. 21, 2011.

Grid operator *50Hertz* is working on an emergency plan and is in negotiation with big power consumers over outages. Olivier Felix of 50Hertz:

“The situation could occur when high pressure patterns in winter provide little wind energy and the Brokdorf nuclear power plant has to be shut off unexpectedly in addition.”

The nuclear power plants Stade (will be torn down), Brunsbuettel and Krümmel (have been shut down) were in operation not that long ago. Their output is now missing.

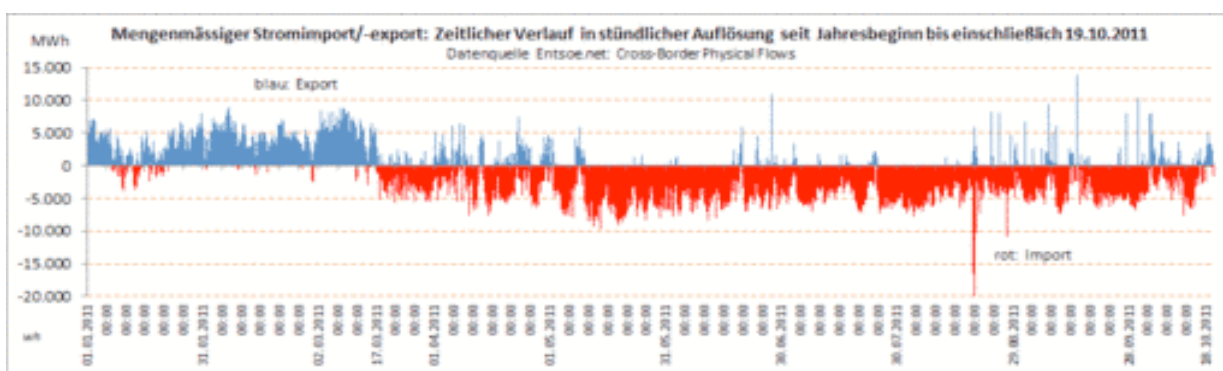
One needs to recall that the planned giant expansion of the power grid is just a consequence of the wrong decision of over-subsidizing wind power and photovoltaic until their giant variations and unforeseeable surpluses reach the stage of threatening the stability of the grid. Without this faulty decision, the grid would of course have been completely adequate.

If our neighbouring countries follow Poland’s lead and decide to no longer import any green power, the German power grid will collapse every time a gale force wind hits because the self-inflicted disturbances will not be exported (see Part 12 “Energy supply transformation threatens neighbouring countries”).

But the annihilation of money in the name of the supposedly benefitting environment continues unabated. The government continues to subsidize wind and solar power via the EEG Energy Feed-In Act, and now finds itself fighting the problems it newly created with billions more.

7. Redistributing the damage

Not even the government contradicts the fact that the energy supply transformation will lead to higher electric power prices. But it plays down the scale of it. External experts consider the increase will amount to 20% at least. The main reason for this is the shutdown of 8 nuclear power plants in 2011 in the wake of Fukushima, which before had generated cheap base load power. These now have to be replaced by imported electricity from France, Czech Republic, and Poland – which had been explicitly excluded by Ms Merkel at the outset.



Balance between power import and export in Germany, January – October 2011 (red = import, blue = export). Germany turned into a net importer after shutting down a 8 nuclear reactors in the wake of Fukushima. Source: wilfriedheck.de)

Another reason for higher prices is the continuing expansion of the expensive “renewable” energies of wind, solar, and biogas fuelled micro-power-plants whose feed-in tariffs are guaranteed by the EEG Energy Feed-In Act, and eventually are paid for by consumers.

Thus this part of the electricity bill will rise systematically. It must be stated that the government provides far lower numbers than energy economists do.

Energy Commissioner Günther Oettinger warned already back in early March, and again in June, August, September and on October 22, 2011, that the rising energy costs in Germany would have severe consequences. High energy costs not only endanger the industry, but also the social peace, especially if a part of the citizenry has problems affording the electricity bills. “I am surprised how thoughtlessly the development in energy cost is accepted,” Oettinger said at an international economic forum in Baden-Baden. Germany is among the leaders worldwide when it comes to energy costs. This is one reason for Germany’s steady deindustrialization – energy intensive production will be moved abroad, Oettinger said.

The government has been informed by economic institutions and labour unions of how serious the situation already is for the energy intensive industries of chemicals, paper, fertilizer, glass, building equipment, cement, aluminium and metal.

The loophole: The power grid compensation act (StromNEV)

The government’s reaction to this has been characteristic. The state does not refrain at all from helping itself to the various taxes and fees on the price for electricity, which makes it expensive in Germany. It simply redistributes the burden. The tool for this is the above mentioned *StromNEV* Act amended July 27th, 2011. In order not to attract attention, it was hidden among a convoy of other bills related to the energy supply transformation. The press didn’t take notice until three months later.

Written in real legal gobbledygook language to the layman’s ears, there hidden is the golden clause in §19: Industries with a high demand for energy are completely exempt from paying the grid fees – even going back for the whole year of 2011. Industries hooked to the power grid more than 7000 hours annually and consuming more than 10 million kWh of electricity do not have to pay any grid fees at all.

For those consuming 100,000 kWh per year and more, the grid costs will decline significantly and thus leave thousands of factories not having to pay the full price. The grid costs saved will therefore be passed in full to the consumers’ electric bills. It is estimated that the electricity prices just through this discount alone will rise by 0.75 to 1.0 euro-cent per kWh. For a household consuming 4000 kWh per year, this amounts to an additional burden of 40 euros annually.

Consumer advocate Holger Krawinkel was quoted by the *Frankfurter Rundschau* newspaper saying: “Relieving the industries and making the small consumers foot the bill is an unprecedented insult!”

But this is the underlying principle of the energy supply transformation: squeezing the citizens with overly expensive energy. With this on-going redistribution at the expense of defenceless citizens, the warnings of energy commissioner Oettinger concerning the end of social peace may become reality.

It is an unprecedented arrogance to misuse the power grids of our neighbouring countries as a buffer for unused wind and solar power in Germany. Variations in voltage and frequencies have to be absorbed by the grid operators of these countries.

Without the exports of the unusable surplus (see Part 5 “Beyond the centrally planned economy”) the grid disturbances would be uncontrollable.

This explains why the energy supply transformation legislation, with its massive shut down of the base load from 8 nuclear reactors, was done without any consultation or advance warning to the governments of neighbouring countries. The German government very well knew what their reaction was going to be. (This is described in Part 15 “An international verdict”)

8. The quiet end to grand declarations

You have surely noticed how climate protection is suddenly out. For years the government has purported Germany as the lone precursor and moral beacon in reducing CO₂ emissions. The industrial breakdown in the former communist East Germany followed by its subsequent modernization of the remaining industry led to a huge decline in emissions as a consequence – which the federal government claimed as its own accomplishment. With a reduction of 23.4%, it even exceeded its own commitment to reduce CO₂ emissions by 21% when compared to the convenient year of 1990. Following this the federal government demanded a reduction of emissions by 40% by 2020 – dubbed as an “ambitious pioneering task” by the Greens.

Since the announcement of the energy supply transformation, it's all gone with the wind

The shutdown of 8 undisputedly CO₂-free nuclear power reactors and replacing the resulting loss of power with imports – partly from coal-fired plants – and the re-commissioning of even the oldest and most inefficient coal-fired plants abruptly transformed all the earlier grand commitments into an embarrassment. Moreover, Germany urgently needs new power plants to provide a base load, which in the current situation can only be coal-fired plants, and only very modern ones at that. The German states that are rich in brown coal and the mining, chemicals, and energy labour unions welcome this greatly.

But the Greens and numerous citizen action groups, who have yet to hear about the end of climate protection, will surely restrict the building of new coal-fired plants using any means, see [here](#). For example, the construction of three plants were stopped or delayed in North Rhine Westphalia alone. The E.ON Datteln plant has been stopped by law, and so has the Trianel-Plant in the town of Luehen. Activist group BUND demands the end for both. The Trianel anthracite coal-fired plant in the city of Krefeld was given up after massive demonstrations by environmentalists. Maybe a natural gas plant will be erected within 6 years. And the new block 10 of the STEAG Walsum plant will be connected to the grid three years later due to technical problems.

Today there is a need for new coal-fired plants. The government has no choice but to make a 180° turn concerning so-called climate protection. Yet, it is bickering about the new construction issues, see the topic “It's becoming more and more expensive” in Part 14.

These will not even be plants that use the carbon capture and sequestration (CCS) as previously grandly announced. Recently the government was dealt a bitter defeat: the *Bundesrat* (the upper house of Parliament) rejected the draft bill to allow the pumping of CO₂ underground into former gas storage facilities. As a result, the underground storage of CO₂ is dead on arrival.

The merits of the CCS technique were actually supposed to be shown with a demonstration power plant that energy company Vattenfall was authorised to build in the small town of Jaenschwalde in the German state of Brandenburg.

But in early December 2011 Vattenfall declared that the project would be stopped

The reason is the unsuccessful struggle to attain a solid legal basis over the last years. Vattenfall presumably also referred to the CO₂-storage rejection mentioned above. Environment Minister Norbert Roettgen was disappointed. Now both the sequestration technique and the possibility of energy storage are missing. As a result, all the lip service concerning the installation of CO₂-free coal plants has become meaningless. But new coal plants are urgently needed because 8 nuclear reactors were shut down recently. Therefore ordinary coal plants will be built without CO₂ sequestration – that is if public resistance doesn't stop them and investors are ready to bear the risk.

This means more CO₂-emissions in Germany

The government does not stand alone in this dilemma. The EU is pursuing the aim to emit 90% less CO₂ by 2050, thus making CCS essential. The EU Commission thinks that in 2035 CO₂ emitted by 35,000 MW capacity coal and natural gas plants can be sequestered and stored. However, reports about success are missing. Only Spain, the Netherlands, and Romania have made the EU directive to geologically store CO₂ into national law. In all other EU countries, investors lack legal certainty.

And of the 6 pilot projects planned by the EU Commission, only the one in Rotterdam will be going into operation in 2015. The German village of Jaenschwalde has no place to store the gas.

The main problem with CCS is the lack of economy. It costs 50 euros to sequester one ton of CO₂. The cap-and-trade price of one ton of CO₂ is about 10 euros, and that could fall further later when new sources of natural gas in Europe are exploited – see Part 13.

But with the use of CO₂ as a raw material (CCU), just a small part of the emissions can be used. This was clearly stated at a conference in Düsseldorf. However, the biggest hurdle, mainly in Central Europe and Scandinavia, is the lack of public acceptance for CO₂ storage just next door. More concerning the role of citizens' action groups in Part 11.

According to the power plant operators, the government's expectation that many new gas power plants will be built in the future will not be fulfilled. Gas-fired power plants are regarded as more climate-friendly and capable of balancing out feed-in variations. But this would not pay off because on one hand natural gas prices are too high, and on the other hand power plants

operating just occasionally to stabilize the power grid are costly and do not justify investment. So only coal remains as an option. It is not certain if Germany will ever use cheap natural gas from “unconventional” sources (shale gas) – see Part 13.

Germany has been experimenting with climate protection through cap and trade for 6 years. The result equals capitulation. The state gives free emission rights to energy intensive industries, for instance the makers of steel and cement, the chemical industry (in all 164 industries). From the point of view of environmental protection group BUND, the state gives the industries much more than what’s necessary to keep them from offshoring. Now they can sell these emission rights. The pressure to reduce CO₂ is simply not there; the effect is near zero.

The government thus will constantly register rising CO₂ emissions during the next years, but presumably will not comment. Perhaps it hopes that the rising emissions worldwide (they rose 6% to 32 billion tons from 2009 to 2010 alone - mainly in China, India, the USA, Russia, and Japan) will draw attention away from Germany’s supposedly “ambitious leadership”.

One now could get the idea that a government that so easily backs away from its moral role of self-anointed saviour of the world would one day also easily retreat from its energy supply conversion project. However, one cannot count on that because of the strength wielded by the lobby behind the EEG Feed-In Act.

9. The principle of hope as a Substitute for reality

One method used by politics for strengthening the persuasiveness of plans is to project the promise and hopes of new opportunities, where the illustration of new technical solutions are well suited, because the scrutiny by citizens is not possible and the media can be successfully used to create publicity.

No other business uses this method more excessively than the green energy production business. And the more uncertain that the new solutions are – for instance the energy supply conversion – the more they appear they are working with mere visions, hopes, and promises.

The method used the most is describing technologies that do not yet exist and making them appear that they can be safely and successfully used in the future.

The attempts to justify the so called energy supply system conversion very often use such examples. Their characteristics are:

- Not naming the time the technology will be truly mature, instead just give the impression the technology will be available soon.
- Hiding important coefficients of efficiency, especially losses and efficiency along with costs – for example the investment costs per generated kilowatt and the cost of one generated kWh.
- Hiding the subsidies for certain technologies and their impact on the consumer. Drastic example: the EEG Energy Feed-In Act.
- Hiding the direct damage to the environment associated with it, such as land use (biomass and growing plants for fuel), noise emissions (wind turbines), emissions of inhalable dust (heating with pellets), health dangers (storage of CO₂), endangerment to buildings (geothermal), destruction of scenery and landscape (high voltage power lines). Also hiding the indirect harmful effects like losses in biodiversity through monocultures (plants for biofuels), the rise of food prices worldwide because of excessive demand for crops and losses of agricultural land, or the social impact of rising energy costs on people with low income (see statements by Oettinger).

Here is a list with some examples:

- Technologies for CO₂ sequestration of emissions from coal and natural gas power plants. Quote from Prof. H.-J. Wagner, Institute for Energy Technology at the Ruhr University Bochum: “Power plants with the sequestration of CO₂ will not be generally used before the generation after the next, i.e. in 30 – 40 years from now”.
- CO₂ underground storage: Already the legal framework for testing this has been turned down by angry citizens.
- Expansion of the high voltage power grid by 4200 km within the next 20 years. So far just 214 km have been built. In face of the high resistance from citizens’ groups, even small fulfillment of such plans is hopeless.
- Compressed air reservoirs for equalizing variations in fed-in wind power: The first and only project for adiabatic storage of compressed air called ADELE was introduced by RWE in the town of Stassfurt (state of Saxony Anhalt) on November 22,

2010. Conditions to be created: “Successful completion of technical research and planning, financing including the necessary subsidies (!), site geology”. Many essential components must be developed as well. Whether this will be ready for the markets within the next 30 years remains unclear.

- Sea cables to Norwegian pumped storage stations with a capacity of at least 5000 MW. See the remarks of Prof. Dr. Vahrenholt in Part 1. The first small project of this kind already faces obstacles: the Nord Link cable with a length of 530 km. Such a cable is supposed to be in operation by 2017. It is designed to transport 1400 MW. This is equal to the capacity of a power plant and just 4% of the wind power capacity installed in Germany today. Several partners have already left this project.

Five to ten undersea cables would be necessary but are not yet planned. And there are other problems. Most of the Norwegian hydropower plants are not designed to work both ways (uphill and downhill). They must be reconstructed – expensive and time-consuming – should the Norwegians even want this to begin with.

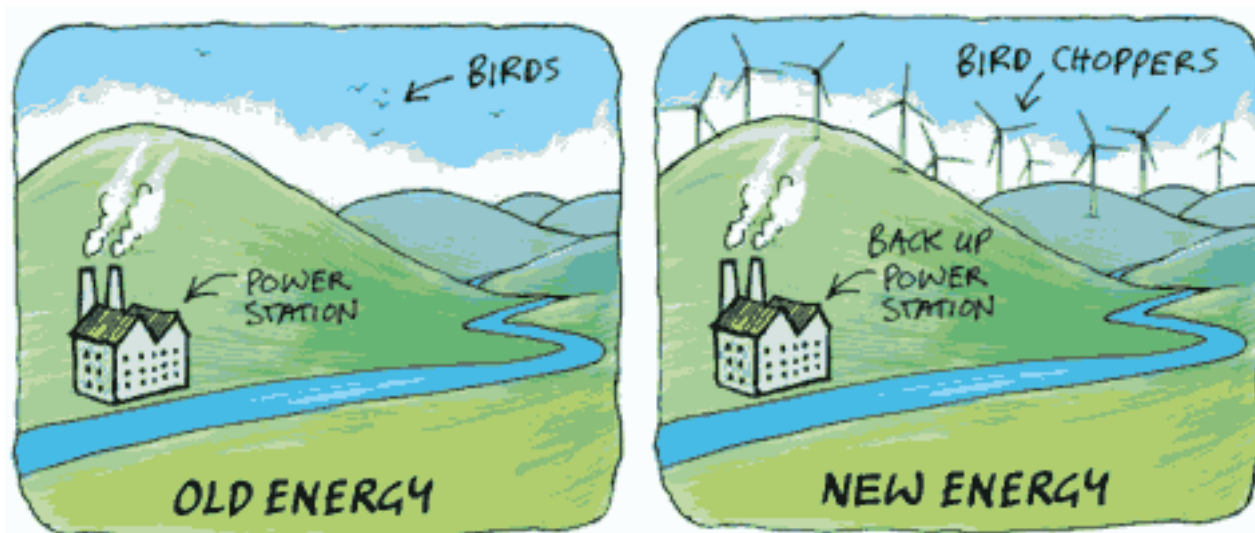
In addition, all North Sea neighboring countries that have built wind turbines also wish to be connected via undersea cables to Norwegian hydropower. The Netherlands has already done so. Thus there is not enough storage capacity for everyone. And finally already today citizens’ action groups in northern Germany are mobilizing to fight inland transformer stations and especially the new high-voltage power transmission lines. See also Prof. Vahrenholt in Part 2: “Wind power”.

- Affordable, efficient and long-life batteries for electrically powered cars. This development will presumably take more than 20 years. Few car owners will make his car batteries available for this: their lifetime will suffer.
- Fuel cells for generating electricity from hydrogen generated by surplus wind power via electrolysis. Too expensive, lifetimes are too short, poorly conceived technique.
- Solar power from North Africa for Europe, the DESERTEC project. Besides the enormous costs, there are huge losses in generating and transporting the power to Central Europe. Very long high-voltage power transmission lines would have to be built – and are hardly feasible. Moreover, all the political instability in Northern Africa has made these plans obsolete.
- Pump storage stations in old underground mines: These are merely concept plans. At least 25 years before they can be operable. Problem: they are very large and deep storage lakes must be built at the surface.
- Hybrid storage: Generation of hydrogen through wind power electrolysis along with the generation of electricity via turbines and power. This system destroys 81% of the fed-in wind power due to losses as waste heat. This is an energy destruction technique that has no chance, presumably advocated with taxpayer’s money. For details see Part 5.
- Geothermal power plants for generating electricity. The tiny small temperature difference these facilities would have to work with (about 140°C) leads to a deplorably small efficiency that is kept a secret. Interesting numbers have been named first in autumn 2011 in a technical report concerning the planned “petro-thermal” power plant near the town of Munster-Bispingen (Lower Saxony): temperature of thermal water 160°C, thermal capacity 14.7 MW, electrical capacity 1.2 MW. The electrical efficiency in spite of the relatively high thermal water temperature is just 8.2%. This results in a very little electrical capacity at very high investment costs amounting here to 43 million euros, or 36,000 euros for 1 kW. Compare that to 1 kW capacity of a coal-fired plant costs 1,140 to 1,480 Euro. Even with a small block heating station 1 kW capacity costs 3,700 to 7,500 euros. Thus power generation via geothermal energy is extremely unprofitable. This system only makes sense for district heating.
- Solar generation of hydrogen by CO₂-fed algae. Now being tested in laboratories. Uncertain future, several decades away from being profitable.

These and other techniques are indeed achievable, but are still far from being ready for the market. They are hampered by excessive costs, involve unacceptable losses, or their operation is delayed far beyond the politically desired time due to other deficits. Therefore they cannot play a role in fulfilling the aims of Germany’s energy supply transformation.

Another hope concerning the energy supply transformation is the government’s assumption that the demand for electrical power will fall 1.7% per year. This assumption taken out of the blue in order to get better numbers.

And it has already been refuted by a study by the task force “Power supply and environment” issued by the German VDE in 2009 ([here](#)). The long term trend so far is to the contrary, and shows a rise of 1.2% per year. Since 2006 it has been +0.6%. This yearly 0.6% rise in consumption is also the most probable scenario for the future, even if further progress in efficiency is achieved. It is assumed that the use of electrical energy will increase.



10. Misdirected investments: subsidizing the unsuitable

The ideological over-valuation of power generation by so-called renewable energy sources and ignoring their use as energy to produce hot water led to an extreme error that can be traced back to the EEG Energy Feed-In Act, through which billions of euros are siphoned from the consumers and fed into unreliable, unprofitable, and, in the case of large-scale production of biogas, even are harming the environment. In the case of wind and solar power, they do not serve to secure the supply and even endanger it. Instead of curbing these hugely misdirected investments, they were strengthened instead. One only has to look at the aims of the energy supply system transformation. To limit the damage, additional billions are planned to be spent for a completely unnecessary grid expansion and several power storage concepts. Most of these plans belong in the dustbin because of their extremely high costs and equal extremely high losses.

One of the most absurd examples is a hydrogen-hybrid-storage station ([here](#)) recently introduced near Prenzlau, Germany with Brandenburg's Prime Minister Michael Platzeck in attendance.

Surplus wind power is used to produce hydrogen, which in turn is used to generate electricity that is fed back into the grid when needed. The media reported on this enthusiastically. However, significant numbers on the facility's efficiency and costs of producing a kWh stored in this way never got mentioned.

A calculation shows that changing wind power from AC to DC for the electrolysis produces losses of about 10%; the generation of hydrogen via electrolysis causes losses of about 25%; the gas-fired turbine to power the generator to regenerate power has losses near 70%. This accumulates to a total loss of at least 80% - mainly as worthless waste heat. The little remainder of the already not cheap wind power has become five times more expensive after such a "storage process".

Not a power storage facility, but rather an expensive energy destruction facility

Such inefficient plans are booming today in Germany. Obviously there is no longer any expert oversight within the German ministries to keep these politically correct projects from being advocated.

The problem of governments subsidizing such absurd projects comes down to physics. Physics are natural laws that cannot be compromised, neither by studies nor by platitudes or pompous christening ceremonies. The only effects such projects have is to produce a positive echo in the media and to gain a little more time before the inevitable crash arrives. Of course, this never gets reported. It seems that this is all worth the taxpayer's money.

A serious and honest energy and environment policy would have avoided the physical and economical dead ends of generating power via unsuitable sources, and would have opened regenerative energy sources for the heating markets instead. Solar heat and use of the Earth's warmth should have been advocated more effectively, yet this never came to pass. The use of distant heat from the deep layers of the Earth instead of the absurd unprofitable geothermal power plants (see Part 9) would have been far wiser. The exclusive generation of biogas from usable waste, and not from crops, should be part of every policy.

Available wind power in this country, where the potential for pump storage is poor, should be used solely to produce hydrogen which can be used in return as fuel or as a chemical commodity. New installations should be prohibited by law, or left to the laws of the free markets.

The series of examples to intelligently improve the supply of heat is long

And this would directly hit the expensive imports of oil and natural gas. Such an efficient energy politics could be named “Kaizen” – the Japanese term for “continuous improvement” known in industry. A “U-turn” in contrast means a change of direction by 180°, thus making this term more suitable. But abrupt turns in energy policy are not bearable by the economy of an industrialized country, all the more so when you have a turn that is filled with the described deficits.

11. The ghosts of yesterday...

This refers to a very famous poem by Johann Wolfgang von Goethe called *Der Zauberlehrling* (the sorcerer’s apprentice).

For many years environmentalists have been treated by governments with much sympathy, and numerous hopes have been fulfilled. Both sensible and senseless things have happened. At the same time local and regional action groups have formed to fight airport expansions, storage facilities for nuclear waste, street building projects, river regulations, deforestation, transmitter masts for mobile phones, and much more - often with remarkable success.

Citizens have learned that they can quite successfully prevent developments in their surrounding areas. It is precisely these abilities that they have been exercising against almost any project that is an essential part of the energy supply system conversion.

A virtually inconceivable number of citizen action groups – now referred to by the media as “Wutbürger” (“angry citizens”) – are fighting wind parks:

ArGe, the Working Group For a Windfarm-Free Home, is a people’s initiative against wind turbines that has 26 associated unions such as (names translated from the German) Wind Power Opponents, Wind Delusion, NAEB, European Platform Against Wind Parks EPAW, Citizen Group Against Wind Noise, Free Forest, and many more.

A few still planned pump storage stations in Germany also face stiff resistance by citizens:

- Atorf / southern Black Forest: The Black Forest Union as the citizens’ advocacy group has criticized in hearings that the region “must not be just an object for energy-economic exploitation”. The local union of The Greens voted against the project.
- Riedl / Bavaria: the project is politically controversial; a citizen’s group has been founded to oppose it.
- Blautal / Birkhau: massive citizen’s protests in Arnegg and Markbronn led to significant changes in planning – including the location of the facility. Right now security doubts are being expressed. The resistance is now in its 6th year and beginning of construction is nowhere in sight.

Another citizens’ group has successfully prevented the construction of a transformer station in Northern Germany, which was supposed to be used as the final point for an undersea cable to Norway that would enable the use of Norwegian hydroelectric plants for storage of German wind power (See Parts 1 and 9).

Already there’s massive resistance against any new high voltage power transmission line

Fear of electro-smog, property loss, and defaced landscape are driving citizens’ groups out into the field. This will only escalate if plans to build 3000 km of new power transmission lines from northern to southern Germany should advance. So far, 214 km have been built, see Part 6 “Grid”.

The Berlin government suffered a far-reaching defeat with its legal draft to enable sequestered CO₂ from power plants to be stored in former gas mines. The *Bundesrat* (Upper Parliament) voted against it and does not want to apply the *Vermittlungsausschuss* (Arbitration Commission) - both are part of Germany’s Constitution.

The reason for this rejection was the clause in the bill that would have enabled every federal state to test this technique on its territory or to forbid the test. In face of the large resistance in the northern federal states – numerous citizens' groups are fighting the storage of poisonous CO₂ “beneath their feet” – the latter surely would have been the case.

Massive protest before the Upper House of Parliament vote

Many “Stop the final storage” car stickers were seen in the area around Flensburg, Germany and countless front yards in Frisian. Along the North Sea coast of the state of Schleswig Holstein and in Lower Saxony many bonfires were lit as symbols of protest. The protest initiators also rejected offshore storage because experts think that CO₂-storage facilities could also have impacts over a distance of 100 km.

This exit clause was especially rejected by the federal state of Brandenburg, which hoped for the construction of a huge CCS facility by energy producer Vattenfall as a pilot project, the CO₂ of which then would have had no possibility to be stored underneath. Vattenfall is now afraid of losing an EU subsidy.

Greenpeace was delighted by the Bundesrat's vote

The so-called CCS technology is now a condition to operate coal-fired plants economically because CO₂ emission certificates would have to be bought. This could prevent all plans of new coal plants that could act as substitutes for the shut-down nuclear plants. Thus an essential condition for the energy supply transformation is missing.

It is not sure whether unconventional discoveries of natural gas (shale gas; see Part 13) within 10 years will lead to a reduction of cap-and-trade prices and therefore to better chances for new coal and gas plants without sequestration.

There's also resistance against photovoltaic systems from the solar power advocates themselves

The small home systems being installed on rooftops have been dramatically crowded out by far bigger areas in open fields. In July, 2011, small systems contributed just 2% to the installed capacity.

Wolf von Fabeck, head and senior member of the SFV [Solarenergie-Foerdervereins Deutschland e.V. \(Solar Energy Promotion Association\)](#) wrote on September 21, 2009:

“Here, a regrettable development continues.”

The SFV rejected open-field installations of photovoltaic systems for the following reasons:

- They unnecessarily use field areas and therefore drive the unplanned occupation of open countryside.
- Solar areas compete against food production areas.
- Areas collect too much solar energy which in return is missing for photosynthesis. Plant growth underneath the solar panels does not bind anywhere near as much as CO₂ from the atmosphere as they would without being shaded.
- The ecologically better alternative is wind power.
- Due to the increase of land use, public acceptance is decreasing, as indicated by some citizen groups against open-field-installations.

Unfortunately, the citizens did not just learn how to block projects successfully, but also learned how to use irrational technical proposals as arguments.

For instance, to avoid new power transmission lines, it was suggested that the steel cables should be substituted by high temperature cables capable of transporting more electricity. Moreover, the use of high voltage direct current is demanded because more capacity can be sent through existing lines.

Annoyed representatives of the grid operators see themselves being forced to point out during on-site discussions that hot lines are hot because excessive loading leads to losses. Incidentally, there are not even any complete system suppliers, just cable suppliers. And High Voltage Direct Current only makes sense for transporting large capacities over long distances – and is an intruder in the alternating current grid, and whose power can only be collected via very expensive transformer stations.

Much favored is the suggestion to substitute overhead power lines with underground cables. However, underground high voltage lines are not a realistic alternative. They also need the wide gaps like overhead power lines, their electrical smog is the same – and they lead to soil dry-out. In addition, they have not been tested over longer distances and are 8 times more expensive than overhead power lines.

Government officials are learning again what the experts of the Ministry of Research experienced from 1975 to 1978 in hearings about their huge information campaign “Citizens dialogue on nuclear power”: It is impossible to successfully fight anxieties with objective facts.

12. Germany’s energy supply transformation threatens neighboring countries

When 8 German nuclear power reactors were shut down in the middle of March 2011 by order of the government, it led to a loss of base load capacity of 8,800 MW in a single blow. This was carried out without any warning in advance or even consultation with neighboring countries, although it was clear that they would be heavily affected by this intervention in the European power market.

The time point was coincidentally and momentarily convenient because in early spring the neighboring countries France and the Czech Republic were well able to fill the capacity gap with their electricity exports. France, exporting electricity from spring to fall in general, had to export on average 2000 additional megawatts – namely to Germany.

Before this Ms. Merkel had declared Germany would not need any electricity imports whatsoever. However, the fact is that imports were 4000 MW before winter 2011/2012 started. What the German government apparently oversaw – or simply did not know – was that the situation in France during the winter months is entirely different because the country becomes an *importer* of electricity. These imports average 2500 MW with peaks of 5000 MW.

The numbers tell the story

While demand for base load in the summer on average is 32,000 MW and peaks at 50,000 MW, the demanded base load rises to 55,000 MW on average and peaks at 95,000 MW during the winter months. This significant rise of consumption is because the French often heat their homes with electricity. That’s why France always imported electricity in winter – also from Germany.

Now Germany needs to import electricity itself in the wintertime and much more so than during the summer of 2011. Thus France will no longer be supplied by Germany. And Germany will not be supplied by France. Therefore not only Germany has to be afraid of a shortage in winter 2011/2012, but more so France, as French power producer EDF warned in early November.

The power industry in Switzerland is preparing for shortages in power supply in the coming winter months, according to a report by the NZZ Swiss daily dated November 26, 2011. The operator of the high voltage Swissgrid confirmed this in November. In the 3rd week of November, the European Union of grid operators Entso-E published a report discussing the effects of the nuclear shutdown in Germany for the reliability of supply.

There could be problems with a longer lasting cold snap, says Swissgrid-speaker Thomas Hegglin

According to Entso-E, there could be widespread bottlenecks if for example France needs imports from Germany which Germany could no longer supply due to the earlier shutdown of 8 nuclear power plants. The last alternative would be to ration electricity.

According to a report by *Der Spiegel* dated December 5, 2011, neighbors are starting to defend themselves against the ill effects of ruthless German energy politics. In Warsaw there’s concern that Polish power plants may not be able to endure the constant powering up and down, and that there even could be blackouts. Therefore in the future so-called phase shifters should interrupt the flow of electricity between the two countries. Excessive electricity then would have to be distributed over the German grid, thus increasing the risk of blackouts there.

Taking this into consideration, Stephan Kohler, head of the German Energy Agency DENA, said, “If excess electricity can no longer be exported abroad, then the German grid will become more unstable.” He asked the German government to start negotiations with its neighbors “to secure the energy supply transformation within an European framework.”

As expected, the unilateral, sudden and dramatic drop in German electricity generation led to greater problems in the European power grid, and independent of dangerous bottlenecks of electricity. The prices are now rising in neighboring countries too. They are allowed to pay for Ms Merkel's energy supply system transformation as well. All energy economists were instantly aware of this. Apparently Merkel's government was not.

That the German government's actions are regarded in neighboring countries as egotistical and arrogant is confirmed by fellow citizens who are in contact with local government officials there.

“If everyone reacted like the Germans did, the energy supply of Europe would be in danger,”

said Holger Kramer, member of the European parliament ([here](#)) in a statement by The Netherland's government.”

If economic damage due to Germany's go-it-alone results, then Germany likely will be presented with the bill via Brussels. The statements from the foreign experts in a survey of the World Energy Council– see Part 15 – show that they all expect both rising prices as well as a disruption in the supply in Europe as a consequence of the Germany's actions.

13. Global development going in a different direction

There are three strong trends in energy politics and business in the world:

1. The ongoing dominance of generating electricity from coal
2. The worldwide renaissance of nuclear power
3. The extraction of vast new sources of natural gas (shale gas)

Generating electricity with coal

In the face of the nuclear-power shutdown, Germany must considerably expand coal-generated electricity – without the sequestration of CO₂. Even this is marked by significant uncertainties, thanks to the long lasting and very successful climate catastrophe propaganda made coal out to be the most dangerous primary source of energy, as described above.

However, this kind of electricity generation will soon be under heavy pressure because of the recent discoveries of natural gas, to which Germany will likely arrive at too late – see below.

Nuclear power

As opposed to Germany, there is much activity to expand and especially to introduce this technology for the first time over the rest of the world.

Numerous innovative new developments are expanding the application field of nuclear technology to all kinds of energy applications. Especially the development of small reactors, which are opening up numerous fields of applications for nuclear technology, must be mentioned.

A brief overview:

- There were 443 nuclear power plants (6 reactors more than on December 31, 2009) with a grid capacity of 376 gigawatts (376,000 MW) in operation, 5 gigawatts more than the previous year.
- 6 new nuclear power plants went into operation in 2010.
- In late 2010, 62 nuclear power plants in 15 countries were under construction – 9 more than in the previous year: (Argentina 1, Brazil 1, Bulgaria 2, China 27, Finland 1, France 1, India 5, Iran 1, Japan 2, South Korea 5, Pakistan 1, Russia 10, Slovakia 2, Taiwan 2, USA 1)

With its decision to instantly shut down 8 nuclear power plants with a capacity of about 8,800 MW, Germany stands quite alone in the world. Especially emerging nations have a huge demand for electrical energy and they can choose only between coal and nuclear power. The biggest of these nations – China and India – have chosen both options and have in the meantime become the most dynamic developers of nuclear technology worldwide.

Unconventional natural gas reserves (Source: Wikipedia)

Shale gas

The new technologies for drilling and making the giant, long known, but so far inaccessible reserves of shale gas accessible have set off a revolution in the world energy market during the last years. The international energy agency estimates that there are enough reserves to supply 250 times the annual world energy consumption.

In the USA shale gas is exploited on a large scale and Americans now supply themselves from own their sources and are starting to export natural gas. America has since replaced Russia as the world's largest producer of natural gas. There are about 3000 wells for natural gas, and every month about 135 are added.

ExxonMobil in a recent prognosis expects that natural gas will pass coal and become the most important fuel for electricity. Presumed reserves of unconventional (shale) gas and conventional natural gas:

- Conventional: 241 trillion m³
- Shale: 1720 trillion m³, of which Europe has 84 trillion m³

The German federal state of North Rhine Westphalia (NRW) is presumed to have the second largest reserves in Europe. In this state and in Lower Saxony about two dozen companies are searching for economically exploitable reserves. However, it will take years before data from the test boreholes are evaluated. In Poland officials have granted 70 concessions for test drilling during the last two years. Already now citizen action groups have formed against test boreholes in the Emsland area and in NRW. They are afraid of dangers to the environment, for instance poisoning of drinking water.

Jesse Ausubel, environmental researcher at the Rockefeller University New York, said in an interview concerning shale gas in 2010 [here](#):

“It’s unstoppable. Gas will be the world’s dominant fuel for most of the next century. Coal and renewables will have to give way, while oil is used mainly for transport. Even nuclear may have to wait in the wings.”

And British journalist Matt Ridley wrote in 2011 [here](#):

“The best thing about cheap gas is who it annoys. The Russians and the Iranians hate it because they thought they were going to corner the gas market in the coming decades. The greens hate it because it destroys their argument that fossil fuels are going to get more and more costly until even wind and solar power are competitive. The nuclear industry ditto. The coal industry will be a big loser (incidentally, as somebody who gets some income from coal, I declare that writing this article is against my vested interest).”

It is no surprise that a curious alliance of Greens, coal industry, nuclear power industry, and conventional gas producers are against the exploitation of shale gas and expressing concerns for the environment. In Germany this was to be expected. However much to the dismay of these critics, officials in Lower Saxony dryly said that they do not share these concerns because they themselves have years of experience with these technologies and have not had any problems.

The views of the SPD socialist - Green coalition government concerning the reserves in NRW will be interesting. The Greens are definitely against it, even though they’ve always claimed that natural gas is a desirable alternative that is friendly to the environment. The SPD (Social Democratic Party) will regard the additional tax income with great joy. In Germany’s neighboring countries – especially Poland – also abundant with shale gas, the unexpected energy boon will by all means be exploited.

The German attitude thus presumably will be a mixture of drilling here and a walk on eggshells there, meaning it will be dragging its feet and take longer than its neighbors.

Gas-fired power plants with its very high costs for fuel (gas price is 74% of the power generating costs in a modern combined cycle power plant) would be able to generate electricity significantly more [cheaply](#). The heating costs would drop considerably and natural gas in the transport sector will become more attractive.

Because the burning of gas generates half the amount of CO₂ compared to coal, this new boom will have consequences for cap and trade. The prices for “pollution rights” would fall, and this in turn would have consequences for the “renewable” energies. The more the prices for CO₂ certificates fall, the more difficult it is for wind and solar power to compete on the market. One would then wonder why all these expensive wind turbines and photovoltaic systems had been erected in the first place.

In this case, there indeed would be an energy supply transformation, but one that is completely different from what was first expected by the government. Whether it sees this as a big opportunity, like all other nations do, is not at all sure when one considers the unplanned zigzag course it’s been on thus far.

14. It’s becoming more and more expensive for citizens

It is an ironclad rule of the free market economy, even for ideologists, do-gooders, and others alike: Violation of the principles of economic efficiency is punished by rising prices. The German energy policy of the previous and present governments has led exactly to this result.

Ms Merkel’s energy supply transformation basically is nothing but a continuation of the former socialist-green government’s energy policy, which was in power from 1998 to 2005. Its strongest weapon has been the EEG Renewable Energy Feed-In Act of April 1, 2000. This Act is still in effect.

The increase of wind, photovoltaic, and biogas power arising from the EEG Feed-In Act, where green energy has to be bought by the electric utilities at high feed-in tariffs, leads to constantly rising electricity prices as these costs get passed on to the consumers.

In the BMU’s (Ministry of Environment) EEG report of 2011, self-critical points could be found

“Payments to green energy producers within the framework of the EEG amounted to more than 12 billion euros in 2010... adverse developments have taken root over the last years.”

And concerning the topic of electricity prices we read:

“All in all, the average payment for electricity from (all) renewable energies has risen from 8.5 Cent/kWh in 2000 to an expected 15.5 cent/kWh in 2010. This development has to be stopped urgently.”

But it has not stopped, as we are about to read in the following paragraphs.

The consequences of the EEG Renewable Energy Feed-In Act.

The following statements originate from the publication of the 4 electric power grid operators (UENB) of October 15, 2010 [here](#) (in German). They are required to calculate the EEG-compensation for the following year each year on October 15 – compensation that is the additional costs caused by the EEG that the consumer is saddled with:

“The UENB has... based on prognoses from independent reviewers, calculated an EEG feed-in tariff of about 16.7 billion euros for the year 2011 (Remark: an unbelievable 8.38 billion euros go to photovoltaic operators although these contribute just a measly 1.9% of Germany’s power generation). The projected value of the feed-in electricity is 4.7 billion euros. Additional difference (from 3 quarters of 2010): 1.1 billion euros. Thus all in all about 13 billion euros are refinanced via the EEG.”

This sum is what consumers have to pay additionally for green electricity.

“As the 4 UENB tells us, this means a burden of 3.350 cent per kWh in 2011. In 2010, the EEG apportionment was 2.047 cent per kWh.”

That’s a rise by 73% in just one year. For a household with a yearly consumption of 2500 kWh this means: 88 euros additional costs caused by the EEG in 2011 compared with 51 euros in 2010. However, much more interesting is the forecast for 2012. Chancellor Merkel explained just last summer ([here](#)):

“The EEG payment should not rise above today’s level. Today it is about 3.5 cent/kWh.”

Environment Minister Norbert Röttgen promised the same.

Following this, the Federal Power Grid Agency announced that the EEG payment will be 3.6 cent/kwh. Now the new prognosis of the grid operators from October 15th, 2011 shows for 2012...

“...that the range for eco-green power payment is between 3.66 and 4.74 cent/kWh.”

The German Energy Agency DENA also contradicted in early December ([here](#)):

“It will not be successful to limit the EEG payments at 3.5 cent per kwh,” DENA spokesman Stephan Kohler told the *Frankfurter Rundschau*.

According to Kohler, the DENA calculations show that the payments in 2013 will be just under 4 cents/kwh, and in 2020 5 to 5.5 cents. For a three-person household, this means additional costs of 210 euros annually.

“This prognosis shows clearly what is driving the energy supply transition costs.”

The apartment tenants are getting hit twice by the energy supply transition

The energy savings law for buildings has turned into a serious financial threat for tenants. In addition to constantly rising electricity costs, there will be a significant rise in rental rates. “Tenants pay more for the energy supply transformation,” Bernhard von Gruenberg, head of the Tenant’s Union, said to the *Bonner Generalanzeiger* daily.

According to applicable law, German landlords could add 11% of the modernization costs to rental rates every year. On average, the rental fee rises by 2.40 euros per square meter after the modernization. But energy saving is worth just 50 cents. “The rental fee rises in fact by 1.90 euro per square meter,” Gruenberg calculates.

The tenant’s union in North Rhine Westphalia rejects the draft for reforming the tenancy law of the federal government with the 11 percent cost apportionment to rentals.

The LEG Housing Society in Ratingen, Germany has determined that many retirees no longer switch on their heating because they cannot afford the prices.

Meanwhile social tariffs are demanded for consumers with low income and are still rejected by the government.

Additional electricity price rises threatened by the energy supply system transformation plans enacted in 2011 and by the implementation of some projects introduced already in 2010:

- The shutdown of 8 German nuclear power plants removed 8800 MW of base load from the European power grid in a single stroke. Electricity prices at the exchanges rose instantly. Estimates are calculated to be about 20% - and not just for Germany alone. The grid operators – see above – were not able to include that in their projections of October 15, 2010.
- A large number of energy-intensive plants – not mentioned at the announcement of the energy supply conversion – were widely freed of charges by the government. These costs too have been passed on to the private consumers, thus adding further to the burden.
- In the event the planned huge expansion of the high voltage power line grid should happen (much says it will not), then all costs related to this will also be added to the electricity price.
- The expansion of wind power (especially the expensive offshore wind power), photovoltaic systems, and biogas generation continues unabated. There’s only a slowdown in photovoltaic systems. But because of its high cost, it is still driving prices up. Thus the EEG Feed-In payments made by utilities (and thus the consumer) will continue to rise.
- Because the power plant operators are reluctant to build new gas-fired plants, it can be expected that the government will encourage it by handing taxpayers’ money and tax cuts as gas plants alone are the government’s favorite among all fossil fuel plants. Unfortunately the electricity generated by them is very expensive, and so citizens will have to pay more.

- Contrary to expectations, in case the government is successful in gaining access to Norwegian hydroelectric plants and using them as a storage facility for power surpluses from wind power, this wind power will become considerably more expensive. This will add even more to the EEG Feed-In payouts.
- It is feared that the further expansion of photovoltaic systems also out in open fields will only worsen the power grid's problems that are now already visible at middle voltage levels and that it will be necessary to also expand the regional power lines in addition to the planned 3000 or 4400 km of high voltage lines. These regional grids are not supposed to in much many feed-in, and thus extreme weather-related peaks in capacity could result. The consumers will have to pay for all this as well.

In 2011, EU Commissioner Guenther Oettinger at times warned of the dramatic consequences of rising electricity prices for Germany. High energy costs are not only a threat for the business location, but also risks upsetting social peace if part of the citizenry struggle to pay their electricity bills.

“I am surprised at how thoughtlessly the development of electricity prices is accepted”, Oettinger said [here](#).

In Germany, prices are amongst the highest worldwide.

The intrusions listed in Part 16 “The Planned Economy Becomes Reality” are without a doubt driving prices up because they are aimed against the free market. Therefore a list of the many components that will lead to an endless rise of electricity prices for the citizens is presented.

However, all the government's actions described above that are driving prices higher and higher will be overshadowed by an event due to take place January 1, 2013.

On this very day the auction of emission certificates will begin. Up to now the certificates have been assigned to the industry. According to an estimate by energy expert Dr. Alfred Richmann, electricity prices will rise 50% “overnight”.

It is just yet another absurdity of the EU's energy and “climate protection” policy that these certificates won't reduce emissions within the EU by a single because they will only serve redistribute the emissions among countries and industries, as pointed out countless times by a number of experts.

In the meantime, two federal ministries are bickering over the expansion of fossil power plants and the feared rise of electricity prices. In mid-December, 2011, *Der Spiegel* reported that Minister Philipp Rösler plans to “invest more than planned so far in additional coal and gas-fired power plants”. According to *Der Spiegel*: one document speaks of “about 17 new large power plants by 2022”. Furthermore: “fossil power plants are essential for a secure energy supply” because these must substitute the ceased nuclear power plants and equalize the varying power generation of wind and solar”.

This was instantly contradicted by Environment Minister Norbert Röttgen, who denied any existence of bottlenecks in generation capacity. There is “no problem” with power plant capacity until 2020. Only the coal plants requested or already under construction may go into operation.

15. An international verdict

The World Energy Council is the largest international network of the energy business. It has been operating more than 80 years in almost 100 countries. It was planned that this council would present the result of an international survey among experts concerning the German energy supply system conversion on October 10, 2011. It is a survey that the German government would have well advised doing itself before announcing its dramatic change of politics.

The survey was done in the more than 90 country committees. The results are based on the answers: Experts from 21 of the World Energy Council's country committees sent answers, among them 14 from Europe.

The main results are ([here](#), in German):

- None of the experts believe that Germany will achieve all the aims within the set time limit.
- Only 38% think that Germany could achieve some of the aims – with delays.
- Just 29% estimate that Germany could achieve all aims – with delay.

- 76% expect an economic weakening in Germany by 2020.
- Also in longer terms – after 2020 – 48% expect such a weakening. Just 33% expect economic growth.
- The vast majority of the surveyed experts – 71% – expect rising prices for electricity in their own country.
- 29% expect rises in electricity prices by up to 10%.
- 24% expect rises between 10 and 20%.
- Some countries even expect rises exceeding 20%.
- Almost two thirds – 62% – see an increased risk in the supply reliability in Europe.
- 81% of the countries surveyed reject the German way as a model for the world.
- None of the experts could imagine their own countries following the German way.
- 62% could imagine adopting some components of the German energy conversion. 33% think that not even a single aim could be adopted.

This verdict from the international experts is devastating.

16. The planned economy becomes reality

Many journalists and authors of the economic media have already harshly criticized that more and more basic free market principles, which have brought Germany much success as an industrial nation, are being disregarded by the government in the energy sector and have been substituted by politically motivated infractions.

The list of these infractions is a long one:

1. The EEG Feed-In Act (the extreme forced subsidization of uneconomic and technically inappropriate methods of generating electricity) in addition with the forced feed-in of this generated electricity and to give it priority, and forcing utilities to pay in order to sell it, if necessary.
2. Obligation to pay for the non-production of an economic good – see §12 EEG.
3. The shutdown of a large base load generation (nuclear power) based solely on scenarios of irrational fear. The consequence is rising prices and bottlenecks in supply – even beyond Germany's borders.
4. Giant, expensive expansion of power grids which would not be at all necessary without the wrong decision of opting for unprofitable power generation methods – see point 1.
5. Exempting energy intensive productions from paying higher prices caused by the EEG's Feed-In Act's consequences – and passing the higher costs on to private consumers.
6. Planned new subsidies to fight the further consequences of the EEG's negative consequences and shift away from nuclear power: The favoring of wind and solar power makes the still operating gas and coal plants unprofitable. That's why investors are hesitating. The gas industry even emphasized that the operation of suitable gas turbine power plants to quickly balance out the grid's variations is not profitable due to the high gas prices. Therefore the federal government has offered yet another subsidy to support new fossil fuel plants during 2013 – 2016. It is now negotiating with the EU on this matter.
7. Power storage facilities are being searched outside of Germany– such as the expensive connection to Norwegian pump storage facilities via undersea cables – because unneeded surpluses of wind power have to be stored at times. Subsidies are flowing into new storage projects. Without the EEG's adverse consequences the available pump storage facilities would have been fully sufficient.
8. Because of the legal act to conserve energy, homeowners are forced to massively renovate their houses, even if they don't want to. They can transfer the costs on to the tenants.
9. For new buildings, the installation of the so-called smart meters is already mandatory. It is requirement that all consumers buy these devices because energy politics is about patronizing the citizens.
10. In German state of Baden Wuerttemberg, homeowners already are required by law to make sure that part of their heating system be supplied by “renewable energy” when modernizing the heating system.
11. The governmental deluge of money for repair measures concerning the energy supply transformation is attracting further interested parties: At a conference concerning storage of energy in Berlin, a feed-in tariff like that of the EEG was demanded for energy storage facilities intended to stabilize the grid. Subsidies for investments also are appropriate...

The underlying principle of this policy is to remove the energy sector from the free market economy and to force both the economy and the citizens by law to behavioral changes – of course just for their own good.

History shows without exception that this policy, which is nothing but a planned economy, will definitely fail. The inevitable consequences are huge faulty investments, the prevention of economic growth and the plunder of citizens – all in all an impoverishment of the nation and a lowering of its potential for competition.

The most profound example of a planned economy now existing for a long time is the regulated, subsidized, and very costly agricultural sector.

Peculiar is that even a government made of CDU/CSU conservatives and the market liberal FDP is advocating this dismantling of the free market by any means.

17. How does it continue?

The conclusion that all aims of the EEG laws are not achievable means that this energy policy has already failed. None of the topics relevant for a secure energy supply has even a small chance of reaching its aims.

This explains the international expert's devastating verdict, which was uninfluenced by subsidies and unimpressed by the German media propaganda, and was based on their expert knowledge and experience.

Unfortunately, we are not able to answer the question above. German energy policy is in a way unpredictable, determined by the politics of the day, and therefore has become incalculable and irresponsible for our neighbors. Any prognosis based on old fashioned continuation of necessary, sensible and realistic developments is not possible.

For Germans, the outlook is bleak.

However, one prognosis is compelling: the planned mismanagement is heavily damaging the economy and will fail spectacularly some years later because its economic and social costs will have become unbearable. The question remaining open is how many billions of euros will have to be destroyed before a new energy policy (a new energy transformation?) will pick up the shattered pieces.

Prof. Helmut Alt of the University of FH Aachen summarized the final result of the German energy policy in just one sentence ([here](#)):

“German policy has declared energy to be a luxury. The poorest will notice first, but they don't have any lobby.”

And a former American President once said a sentence that is forever valid:

“It's the economy, stupid!”

Dr.Günther Keil,

Sankt Augustin, December 2011

Translator: Chris Frey

Remark of translator: The links indicated here refer to German pages, except otherwise indicated. Passages in brackets [] were added by the translator.