

History of the Windmill Craze

Energy security in Europe threatened by the windmill policy

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Summary: *During the Cold War, peace organizations were militating against nuclear developments while the Soviets were increasing their nuclear systems. After the collapse of the Soviet empire, Russian public goods were privatized. Ancient members of the party become the new owners of natural gas fields. They need to sell their natural gas to have the cash they urgently needed. In this context, their competitor was the nuclear power plants.*

In 1985, a little Danish windmill manufacturer could not pay his debt when the subsidies to the windmills were suppressed in US. Fortunately, new long-term subsidies to windmills are then granted in Denmark. A media campaign transforms nuclear dangers, already publicized during the Cold War, in a frightening malediction. Another campaign was promoting windmills as saviors for the environment. Similar subsidies and campaign are granted in other European countries. Antinuclear pacifist militants become antinuclear ecologists.

To day, media campaigns are orchestrated, not by publicity agencies but by lobbies. The description of the operations of the wind lobbies are used as examples of new efficient propaganda methods developed during the wars.

Marketing campaign for windmills: the hidden aims

Why did we observe such a craze for windmills? This paper explains that after a general study on windmills.

The section on costs has shown that industrial windmills are a very expensive way to generate electricity. The production of electricity on demand requires integrating various types of generators. The whole systems must be studied to find the global price and the global emission of greenhouse gas. The study here shows that windmills have a poor justification to fight the climate warming but their main drawback is to prevent the use of better solutions.

The purpose of this paper is to find why public opinion and politicians have favored a system which has no real justification.

To show that the reasons are strategic and related to the security of energy supply, the presentation starts with similar cases in the history of World War II, and then transposes them to the modern times.

The windmills promotion methods are analyzed. The study shows some tricks used by the wind lobbies to misinform, to give the impression of a spontaneous population love for windmills, love encouraged by the authorities.

A conjunction of circumstances has given opportunities to astute experts on propaganda. The history unfolds here in two phases. First, during the Cold War and then, after the fall of communism and the privatization of Russian goods, changing the owners of the fields of petrol and natural gas.

The history of the windmill craze has also an educative value. This is a neutral real example to teach the modern methods that a lobby must use to modify public opinion, which then modifies the opinion of politicians listening to their electors.

Attacks on the petrol supply line to win a war

How had the Allied win the war against Japan and Germany? The attacks on the petrol supply lines have been a main strategy.

A developed country needs primary materials and sources of energy. If it has none, it must have economic treaties with neighbors, a normal practice between civilized nations but this policy brings the risk of a supply interruption if the producer profits of this situation during a crisis. This had occurred in Japan and in Germany during World War II.

War against Japan (WW II)

Japan had a fast technological development on an island without mineral resources. It depended from foreign sources for energy and primary materials. In 1936, young fanatical officers murdered the Japanese officials opposing military conquests. Under the control of a military sect, Japan has extended his prosperity area, invading East Asia during a bloody war (10 millions Chinese killed).

The US were the main oil producer, being then in the position of the Middle East today. The US set an oil embargo against Japan, effective in 1941. Japan has countered by a surprise attack on Pearl Harbor (1941), hoping to discourage the US by destroying its military marine on the Pacific. But the Americans had succeeded to decode some Japanese communications and had preserved their few aircraft carriers. The US was mobilized for a revenge of this unfair attack (Maechling 2000).

Japan occupies then South-East Asia and takes control of the Indonesian oil fields. But the US marine reoccupies the petrol fields and beats the Japan which must fight with a very limited supply of petrol for its ships and airplanes.

War against Germany (WW II)

Nazis needed petrol for managing war (Momsen 1999). Hitler had negotiated an astonishing agreement with Russians. These will not be aggressed and will get a part of the Poland (if it is taken by the Germans) in exchange of oil from Baku. French and English strategists plan to bombard the oil wells in Baku but France is occupied in June 1940 before they can do that. In 1941, Hitler, dubious of Stalin's fidelity, attacks its Russian allied to occupy the petrol fields of Baku and to get a secure energy supply.

The fast progression of German tanks cuts first the supply from Baku on railways and then the river supply on the Volga. The worried Russians plan to destroy their oil wells but they receive in October 1942 an American support, including new arms against armored vehicles.

Germans had to produce 50% of their petrol in synthesizing it from coal (a process less productive than pumping wells). The Allied could have bombarded the synthesizing plants but this could urge Germans to rebuild them underground. They prefer to wait until the Normandy landing to destroy them within a short period, not letting time for Germans to build new sources of oil supply.

Strategies preventing energetic independence

The destruction of the oil supply has been the decisive strategy for winning against Japan and Germany. Is the dependence to the energy supplier a current plausible strategy? If a supplier does not want to accept European requests, could he use the threat to cut the energy supply?

The next section describes a plausible Machiavellian plan to make Europe fully dependent on its supply of natural gas. One condition is to prevent the use of nuclear power plants which could help Europe to survive without natural gas.

Threats on the supply of energy

How could a future conflict evolve? A country without energy source could hardly survive.

The recurrent belief that there will be no more wars

Europe is very dependent on foreign sources of energy. The following describes hypotheses about the threats that could cut energy supply to Europe.

Suppose that an energy producer has asked Machiavellian experts in geopolitics to study how to threaten the energy supply of Europe. To guess how such a conflict could evolve, let's examine three strategies to prevent Europe becoming independent of energy with nuclear power plants.

- Condition the population so that it rejects anything nuclear.
- Trap Europe in investments that would be lost if it decides later to build nuclear reactors (this would be the case of the investments in windmills).
- Trap local investors to invest in windmills. These people, who are also electors, will lose their savings if the country accepts nuclear power plants.

To understand which operations favor the strategy of the producers of natural gas, five manipulations are studied here.

- Threat on energy supply.
- False information on the nuclear industry and its dangers.
- Efficient methods of propaganda to modify popular opinion on intended topics.
- Campaign to bring confusion into the clear concepts on renewable and intermittency.
- Transformation of an opinion currently accepted into a long term constraining regulation.

Belief in the peaceful resolution of conflicts

Before each modern war, the government threatened did not believe that a modern nation could resort to war. But, while France was the most culturally advanced country in the 1800th century, Napoleon started wars as soon as he was in a position of force. In 1870, 1914 and 1940, the German leaders, although quite civilized, have started wars when they believe fight would be more beneficial than destructive.

In each case, the population aggressed was badly prepared, believing that wars belonged to the past and will not be repeated. Ignoring risks is more frequent and dangerous than the paranoiac attitude of imagining that the neighbors prepare a war, what is assumed here.

Energy supply disruptions before an open war

A modern war would be a catastrophe both for the one taking the initiative and the victim, but a leader can be forced by unpredictable circumstances. There are still arguments whether it was Germany or France that had initiated the war in 1870 or 1914. Future fight may be preceded by small threats (border incidents, terrorism, firing of artisanal rockets or disruption of supplies), hoping that negotiations will achieve the war aims, without the wide destructions of a real war. This poker game was and will again be dangerous.

The problems that Japan and Germany hope to solve through war could happen again on other topics. Disagreements are

everywhere: Human rights, incompatible imperatives between religious and democratic laws, tolerance of Mafiosi methods, secret military technologies used as payments, constraints impacting wealth and prosperity. The producers could be tempted to solve everything by threatening to cut the energy supply until Europe accepts their demands.

The Berlin crisis (1948) started when Stalin has closed all terrestrial roads and railway to Berlin. The Allies could either give up, either start a nuclear war, either supply Berlin's citizens with air carriers. They have chosen this option for a protracted crisis. Eventually, the Soviets, finding that they were not supported by their Allied, have ended the confrontation.

Lower position of a country without energy sources

A country without electricity, natural gas and oil could not resist if it was deprived of most of its outside supply of energy. But, if the nuclear power plants could produce most of the electricity, the country could survive with a little amount of energy for road transport and industries. Most European countries have local coal. Chemical methods can synthesize oil from coal (Germans used it during war). They can extract energies from wood, biomass cultures and geothermic installations. The threatened countries under embargo can thus survive and wait for external help or for the fall of the oppressor regime without having to wage a war. The nuclear energy and the other resources could ensure subsistence and keep homes and work areas warm. Around a nuclear plant, one can store uranium fuels for twenty years.

The readers who believe that the above threats are unfounded speculations should study the recent crisis in Ukraine (January 2006). The interruption of natural gas supply was decisive to force Ukrainians to agree on the Russian imperatives. The creation of a cartel of natural gas producers is not a secret [77].

The next section studies those who control the supply of natural gas and what are the relations between producers and users.

Operations on natural gas in Russia

The fields of natural gas are owned by private investors since the fall of the former soviet empire. But the new management need cash and must sell more natural gas to its only customer linked by pipelines, Europe.

The new owners of natural gas fields

During the dismantling of the Soviet empire, the ownership of its richness was privatized from 1987 to 1992. The oil and natural gas fields were the most precious goods. The former members of the party and those organized as Mafiosi had still the control on operations and get the concessions. They acquire thus large private fortunes but had to sell more gas to get the cash they urgently needed to invest in extracting machinery and to consolidate their position.

Geopolitics of natural gas

In 1990, Europe was the only potential customer to buy natural gas from Russia. Europe was already producing natural gas in the North Sea, but the peak of production happened near 1980. Russia could connect its fields to the network of pipelines from the North Sea. From 1986 to 1991, the exportations of natural gas from Russia have almost doubled.

The next section explains the political situation related to the distribution of natural gas. If Russia was part of Europe, this large country would be self-sufficient in energy and could have a secure and coherent energy policy. But the Europeans politicians did not immediately understand that this dream was impossible as the new power in Russia was not a real democracy.

Since the increase in oil prices in 2006 and 2007, the energetic situation becomes more difficult. Production of Russian natural gas was stable from 1991 to 2005. It may be possible that the production of the giant Urengoy field has decreased faster than expected and that prospection was not very successful (Campaner 2007 [67]).

China is now a rich customer able to purchase the Russian natural gas. China is not more distant than Europe from the fields of natural gas (in North-East of Ural). It is now fed through pipelines.

Since 1990, many gas fields in the world have shown a peak of production. The main producers of natural gas (Russia, Iran) have the intention to become a cartel (called the Gas Cartel in the followings) and could act as a producer monopoly on the international market.

Since 2006, oil and natural gas had become rarer and more expensive. In the Middle East, new plants are developed to convert natural gas to diesel fuel.

Propaganda during Cold War

The methods of propaganda had been improved after the World Wars. Since 1920, the Communists have been leaders to recruit militants and to manipulate and distort information. The efficiency of propaganda methods have been reinforced with the generalization of the new media of radio, television and Internet.

Communists have a long tradition of using propaganda to condition population. They get this expertise from the early days of Soviet revolution in 1920. For instance, their clever and hidden propaganda had diffused information bringing a large proportion of French and Italians to enthuse for Stalin's regime.

Threatened by a nuclear conflict during Cold War, Soviets have tried to generate antinuclear feelings in Occident, mainly in Germany where nuclear missiles were installed. This policy did not prevent them to reinforce their own nuclear might.

Pacifist organizations are not new but contestations during a war were treacheries and were not admitted in any country. But, in 1960, during Vietnam War, this activism was well received by the population and has not been strongly repressed in the US.

Activism on environmental issues

There were already many militants for nature before 1960. They have implemented and preserved national parks. They protected wild animals and whales. They fight against deforestation. They preserved the ecologic system of threatened species. They fight against overfishing reducing the reproductive rate.

The protection of the environment was then a task socially valorized as was evangelism before. The pacifist and antinuclear activism were developed in this evolving context.

The development of the television

The activism was enhanced thanks to the development of new Medias after 1960. The technology of television was developed after WW II. The majority of homes had a TV set around 1953 in US and around 1960 in Europe.

The television is a new media having more convincing power than the usual newspaper. Emotional arguments are more easily diffused and the lone viewer cannot always criticize the presentations. This makes some propaganda more powerful.

Television has been accused to make people more 'conformist' but it has mainly modified the meaning of 'conformism'. Previously, people believed the opinions in their newspapers and the politicians that were supported by the media owners. The businessmen behind this making of the opinion take their decisions after that their experts have assessed their economic impact. Their management has allowed the spectacular

growth of the wealth from 1945 to 1975 (30 glorious years). Since then, new people have taken the control of the media and the opinion.

New aim of the propaganda

Which opinions should be diffused to favor electrical generation with natural gas instead of nuclear power plants? How was the antinuclear propaganda so effective? As there are almost no arguments for wind power, the propaganda task is mainly to assert messages and to persuade on their value, not through logical or verifiable arguments, but through many repetitions in varied forms.

Someone able to compute a return on investment could easily have significant figures on the relative costs of the few methods to generate electricity, but these experts have not a say in the popular media.

Our computations [90] show that the price of natural gas power plants (58€MWh) is almost twice the price of the nuclear system (30€MWh). The wind system (including its backup) is almost 3 times more (81€MWh) than the nuclear.

Why chose what is expensive when there are lower cost solutions? How have the occidental politicians forget about the basic rules of economy when the dramatic consequences of this disregard of profit become so obvious in the collapse of the communist experience?

The following shows that the deformations of the energy problem have been oriented first against the nuclear then for the wind. This manipulation has been orchestrated through the antinuclear political parties (which call themselves Greens or Ecologists), supported by many medias.

Communist militants were trained to reject without examination everything that was categorized as capitalist. The Greens, trained by similar methods, have been put on the same slope, rejecting anything that justifies the nuclear solution without examining it.

The next section shows how anything nuclear has been made frightening.

How to make frightening anything nuclear

Radioactivity has been diabolized since the atomic bombardments on Hiroshima and on Nagasaki. The genes mechanisms were discovered in 1953 and the gene mutation was studied in the 1960. The 1987 propagandists have used this knowledge to amplify the mutations produced by radioactivity. Propaganda is now using defects in spontaneous human reasoning to carry its messages.

The mechanisms of genes and mutations

Risk is inherent to life, before and after industrialization. A defect of human intelligence is a difficulty to estimate the relative importance of risks as shown here concerning radioactivity.

Radioactivity may mutate genes but mutations are also produced by others harmful causes that are much more frequent: poisoning, anti oxidants, free radicals, usual foods, oxygen from air, getting old, being ill and normal physiological activities. These mutations are repaired automatically by a genome mechanism in which repair devices scan the genome, examine corresponding coding segments and replace each damaged coding unit. This mechanism successfully repairs say, 99.9% of defects. There are other kinds of mutations that can appear.

If a defect occurs in both corresponding coding units before that a repair cycle has modified the damaged side, a permanent mutation occurs. This theory is speculative but it would explain that the mutation rate dramatically increase when the destruction rate is much faster than the repair cycles. Thus the number of mutations is not linearly related to the radiation dose but is larger

for brief strong exposition to radiation. Then, the number of long term statistical deaths by cancer is significantly reduced.

How to explain that radioactive radiations are used to cure cancer? Only the infrequent mutations which perturb the regulation of cell multiplication could, combined with other mutations, produce cancers. The other mutations prevent mainly the most complex biological mechanisms, such as the division and multiplication of a cell. If the natural renewal process works only on the non mutated cells, the cure progressively lets the cancerous cells die while the non mutated ones are reproduced and survive.

Some infrequent mutations can be useful for evolution but they produce more frequently defective organisms than improved ones. On the long term, mutations select organisms having a better resistance to epidemics.

The relative size of risks

Human mind is sensitive to the strength of an emotion but less to the frequency of the source of emotion. Propaganda may use this feature to create spontaneous judgments that are biased. One can make believe that horrendous events that occur infrequently are more serious than events that are much more frequent but less spectacular. The fall of a plane is more impressive than the same number of deaths produced by road accidents for a much smaller mileage. Most people do not evaluate the relative risks on their lives. Soviet propaganda has used this human deficiency to exaggerate the nuclear dangers.

We are exposed to natural radioactive rays coming from the Earth, from our own radioactive components (carbon and potassium) and from cosmic rays. Studies on cancer frequency in irradiated areas (de Kervasdoué 2007 [70]), show that a small increase in local radioactivity rate seems to have beneficial effects, perhaps by increasing the frequency of repair cycles, but this question can only be solved with more studies.

Nuclear industry has added a small fraction to the natural radiation, mainly because of the test trials of nuclear weapons and of the accidents in a new industry, especially for arms developments during the Cold War (Charpak et al, 2005 [47] and Durand 2007 [100]). Statistics of cancer in those exposed to heavy and known levels of radiation (Japan bombardments, irradiated persons) are now available. Many irradiated people have reached their old age to measure the number of cancers late in life with some confidence. Preliminary studies show that this number is much smaller than expected in pessimistic views. The observations do not support the thesis that, for small doses, the risk is proportional to the total of the radiation received.

Efficiency of emotional propaganda

One frightens by suggesting that radiations increase the risk to have a child handicapped. This has been statistically observed on a few animals strongly irradiated but still able to procreate. There are no valid statistics on humans. Some propaganda films have shown handicapped children that were supposed to come from Chernobyl but that hoax could only be used as a proof of the reality of an antinuclear campaign.

One frightens in saying that we will live in a world full of cancerous radiation. It is not so easily to frighten by showing that the exhaustion of fossil fuels will threaten life with poverty and coldness, conditions that would abbreviate life and make it miserable. The emissions of dirt and dust from the coal industry are much more dangerous as a cause of premature deaths. Progresses are made in dust removal and pollution control [70] but the coal residual wastes are more dangerous than radioactive wastes stored underground. The heavy metals and the fumes of tobacco have harmful effects well measured. Lands polluted by pesticide and chemical poisons might be more abundant than land irradiated by nuclear wastes (No valid statistics are available in the former Soviet empire).

People can be clouded by a specific risk to the point they loose all references to other dangers. The nuclear threat becomes a superstition easily stirred up by professional activists. In multiplying the threats, propagandist can modify the political orientation of a democratic world. The threat to loose the religious yardstick has had a disproportionate importance in history. Traditions born in different contexts have had a major part on population explosion.

The next section shows the use of Chernobyl for propaganda

Manipulation of facts on Chernobyl

Information on Chernobyl catastrophe has been manipulated. These are indices that an antinuclear campaign was organized, although no one had officially searched who were the organizers. Contestation of military nuclear systems has been combined with contestations of civil nuclear applications in order that people confuse both systems. Antinuclear campaigns have diffused false or confusing information about the treatment of wastes and the estimation of uranium reserves.

Chernobyl (1986) is an accident but the propaganda services of both sides have been quick to build on it. On the one side, Occident has used it to accelerate Communism fall. On the other side, it was observed that most Medias, a few years later, have systematically enhanced all nuclear incidents and have blown Chernobyl catastrophe up to give rise to an irrational fear of anything nuclear, a fear becoming a superstition.

The lower serious estimation of the victims is 56 direct deaths and a controversial number of statistical deaths. These deaths are people exposed to Chernobyl radiation who could develop later a cancer. The estimation of the delayed casualties is about a thousand workers from those who have cleaned the site [70].

The consequences of Chernobyl have been dramatically exaggerated by the Medias. This campaign could only be explained if a lobby of well-trained propagandists having large resources has efficiently organized it. Some delirious numbers (100 000) have been written with self-assurance.

Status of energy for the antinuclear parties

A method to mislead people is to play on their natural difficulty to appreciate relative numbers. One needs some training in economy or in finance to compare the quantities involved in various solutions and to avoid being disturbed by merits based on qualitative data. The nuclear wastes (15 tons per year and per reactor) are easily buried underground locally. There, they present almost no pollution when compared to the 4 millions of tons of waste and dusts produced with the generation of the same energy in coal power plants (the quantity depends on the quality of the coal, being very different for lignite or anthracite). The coal waste contains heavy metals and other dangerous products that could leak on running waters or in dust. The nuclear waste is stored underground near the reactors but could be ungrounded if and when uranium regeneration is done economically. This reduces further the nuclear wastes as the few most dangerous products with a long term radioactivity are then safely grounded in deep and stable sites.

Information on the reserves of uranium in Earth, on the cost of the uranium fuel in the generation of a kWh of electricity and on the disposal of the radioactive waste has been carefully tangled up to give the impression of unsolvable problems. Thanks to the antinuclear parties and lobbies, organizing propaganda campaigns, civil nuclear applications have been banished in the countries producing coal. The antinuclear lobbies still include in their texts messages such as: "*Uranium 235, after its forecast exhaustion,*" [102].

To increase the investment cost of nuclear power plants, legal and administrative difficulties have been developed to slow down the delay of building nuclear plants. The delay to achieve the nuclear plants in the Occident has increase up to 10 years while Japan nuclear plants are still built in 3 to 4 years, as the ones in China, India and Russia. The indices of antinuclear manipulations become more and more obvious [69].

As the windmills are not difficult to dismantle (the concrete foundation remains in the ground and are recovered with earth), the windmills lobbies have included this cost in their investment cost. One knows that a windmill will never be dismantled, except to build a larger one but one also knows that new nuclear reactors will be installed on the same sites where the previous ones were implemented and that it is not necessary to dismantle reactors before most radioactivities have decreased. If the wastes have to be cleaned, this is easier to do later when we will have better solution than nuclear fission. In the comparative costs, the unnecessary cleaning costs of nuclear plants are blown up beyond any reasonable limit.

Europe, specially France and Belgium, have build nuclear plants that have not caused any severe problem of security. They have contributed to the European productivity.

Contestation of nuclear safety has been useful, as small enterprises in the US, although very advanced, have built nuclear plants without all the necessary constraints on security, as shown by the financial disaster of Three Mile Island (and not the nuclear disaster). The activism has then transformed a useful contestation into a tool for dubious lobbies.

According to [112], the oil lobby, very influent in the US, had also supported environment activism in 1987 to destroy its concurrent, the nuclear power plants. In 2003, Poutine did not let Khodorkovsky sells shares of the fields of his group to the big oil corporations, reducing the hope that a cartel of countries or the United Nations would have a monopolistic control to manage and distribute energy.

Since then, oil men and many politicians may still hope that Russia will become a partner. This would explain that they have not changed their antinuclear policy. It seems that some countries have understood the threat on energy supply as they are now adopting nuclear solutions. The large oil corporations and their politicians have still difficulties to adapt their policies to the exhaustion of fossil fuels, to the climate warming and to the changing international control on energy.

The nuclear plants proposed today are more secure and more productive but require larger investments. Nuclear energy is still much less expensive that the generators using fossil fuels, even without taking into account the absence of greenhouse gases, a definite advantage for environment. It would be stupid that Europe could not profit from its advance in secure nuclear systems because an anti nuclear propaganda has intoxicated the population for the aims of foreign strategies, enhanced by local greed.

Antinuclear Pacifists against bombs, not civil applications

In peaceful time, the Pacifist actions are directed against rearming and thus against nuclear bombs. One had guessed that Soviets were supporting the first antinuclear meetings during the Cold War, but no direct connections have ever been proven.

Antinuclear protestations started in Canada (where 150 000 young Americans, avoiding military service in Vietnam, were refugees). The protestations were against the atomic bomb trials in Amchitka in October 1969. Later protestations were directed against French bomb trials. (The French secret services have destroyed the Greenpeace Rainbow Warrior boat in 1985).

To understand the involvement of wind lobbies, we must first describe the technological developments of windmills.

History of windmill technology and marketing

After the first oil crisis (1973), a small Danish enterprise has invested in industrial windmill development, thanks to a few subsidies. Its American subsidiary went bankrupt when subsidies were cancelled in the US. The promoters have then understood that investing in a strong lobby was more important than technology leadership. The Danish enterprise is then salvaged when heavy subsidies to windmills are granted in Denmark. Knowing that the subsidies warrant a good return on investment on making windmills, they have built a factory for the industrial production of windmills. Subsidies similar to the Danish ones are later granted in Germany and in other European countries.

Why and how were windmills installed in Europe although they were not profitable? Investigators [36] thought that this was the result of propaganda by antinuclear lobbies helped by lobbies of oil and natural gas. Their potential operations are explained here after a review of the technology.

History of the technology of giant windmills

A Danish enterprise of mechanical machinery, Vestas [106], has built experimental wind turbines after the first oil crisis (1973). In 1981, a few experimental windmills were paid with subsidies in Denmark and California for trial of electricity generation using wind. The grants for these researches allowed the development of this small enterprise. After the experimental trials of competitive designs, turbines with a horizontal rotation axis and 3 blades were selected against the Darien model whose vertical axis has a visual hypnotic impact less offensive, but the qualities of the horizontal axis model are more commercial. They are stronger, easier to balance and less expensive.

Vestas and others have developed the following improvements:

- Blades with a variable incidence angle as in the plane propellers. The efficiency can thus be tuned for all wind speeds. The power can be reduced in heavy winds, protecting the blades which are less frequently broken. This improves the load factor (ratio of the yearly energy produced to the one which would be produced if the wind was always optimum, typically 20% inshore to 30% offshore).
- Oblique mechanical gears which reduce the mechanical noises as they have done in the car rear transmission in 1913.
- Blades in reinforced plastic as in the wing of airplanes. The improvements continue to increase blade dimension, to improve aerodynamics and to reduce weight and noise.

From technological leadership to lobbying

In 1985, American subsidies for windmills have been cancelled, causing the bankrupt of the American subsidiary of Vestas. The windmills promoters have then understood that investing in a powerful lobby was more important than technological leadership.

In 1989, two years after Chernobyl and two years before the complete fall of Communism, one observes an unexplained policy change on the windmills subsidies in Denmark. The subsidies become larger and were legally committed for longer periods.

Norway has many fjords whose inland end is blocked by dams and hydroelectric power plants. Denmark sells intermittent electricity produced by wind to Norway that indirectly stores it as it uses it while reducing its hydroelectricity. The electricity is thus stored in the higher water level in the dams. Denmark purchases (nuclear) electricity from Germany at peak hours and sells (wind) electricity to Norway. The energy exchange is balanced but not the costs as the intermittent electricity is sold at a low or negative price during off-peak hours while the regular electricity is much more expensive during peak hours.

Thanks to the subsidies giving a secure return on investment, Vestas builds a factory that produces 10 turbines per week (500 annually). In 1991, 1000 wind turbines are installed in Denmark. These are 55 kW turbines. In 1991, the largest turbine has a power of 1.5 MW, i.e. 30 times more than the ones in 1987. 30 giant turbines would have produced the existing power in 1991.

In 1995, Vestas adds a device to vary the incidence angle of each blade according to its position in the rotating system to better use the strong wind in altitude.

In 2002, Vestas sells turbines for a total of 7 GW for a revenue of 1.4 G€ i.e., 0.2 M€/MW. The subsidies paid to promoters are 2.7 M€/MW (assuming that a turbine of 1 MW produces during 2190 hours/year with a load factor of 25%, i.e. 2190 MWh, the total payment is 180 M€ per year with subsidies of 82.5 M€/MWh or, over 15 years, 2.7 M€/MW). The subsidies are thus 10 times more than the cost of the material. This was before the reduction of price per MW of larger turbines.

The windmill cost includes the turbine with its blades and alternator, the preparation of the ground foundations, the assembly of the tower, the lift up of the turbine components by cranes higher than the towers and the installation of the underground cable to the transformer station in the national grid. These costs should not double the price of the material.

The improvements on the grid to accommodate sudden jumps of intermittent power are not supported by the windmill private promoters but by the public grid, a practice that prevented any accounting of the real windmill costs. One could deduce that the outrageous benefits for the promoters explain their dynamism and contributes to their disdain for the destruction of the landscape or the high financing of the wind lobbies or both.

The price for 1 MWh produced diminishes with the size of the windmills while the visual nuisance and the noise increase. Although the return on investment improves, the subsidies are not reduced and the compensation for the homes close to the turbines is still not granted. Faced with this artificial market, even traditional builders of electric generation systems have to join to have jobs for their workers. Capital could be better used.

In comparing investment costs for electricity generation, the investment per MWh produced by onshore windmills is 3 times (load 33%) to 6 times (load 15%) higher than for a nuclear power plant. The only remaining justification for Danish and German windmills was that they provide employment. After the economic crisis in 1848, France has installed "Ateliers Nationaux" (workshops where unemployed could be paid while working), but these workshop never succeeded to do anything worthwhile. Windmills are also useless systems to provide employment. They are very expensive and they also destroy viciously the natural environment.

A more precise analysis of the way subsidies were generalized through Europe is studied in the next section.

New windmill subsidies policy in 1989

The engineering of the windmill subsidies is quite astute. Subsidies are granted but nobody seems to pay for them. All future electricity consumers (not only those who believe to purchase green electricity) will be legally constrained to pay more for their kWh. The subsidies increase the national debt but this is not visible in the national accounts. The investors of windmill enterprise are protected as the national grid has a legal obligation to purchase the windmill electricity as soon as it is produced. The price is fixed and is more than 3 times the purchasing price of regular electricity. The accounting is hidden behind a complex scheme of Green Certificates.

A few years after Chernobyl catastrophe, the Danish Greens succeeded to put into law an astute scheme to subsidize windmills. Investment will be reimbursed with outrageous benefits by legally constraining the future consumers of electricity (who are not aware of the scheme) to pay more for their kWh.

From where do the investments to build windmills come? From a hidden increase in the debt of the customer without having to say it to the citizens and without that the economic ministry have to notice it and react (A debt of consumers is legally different from a debt of the country, even if the consumers are the citizens who reimburse the debt).

The Danish government has forced the grid to purchase the windmill production as soon as it is produced at a high cost (up to 82€ or 112€/MWh). The intermittent power can only be sold at a price much lower than the electricity on demand (gas generators or hydroelectricity) or the electricity on a steady basis (nuclear electricity). It is almost impossible to compare the price of intermittent electricity with the electricity from a reliable source, but the costs are fixed by official rules which may favor intermittency.

This Danish method has been also adopted (without being officially noticed) in other European countries. The new law is supported and pushed by the antinuclear parties (more usually called the Greens or the Ecologists). This is developed in subsequent sections.

Burial of the concept of intermittency

In order to set up a rule fixing the price of electricity, one must use some concepts describing the supply of electricity. An astute method banishes the concept of intermittency indispensable to correctly describe it. This concept has also disappeared in the wording of the protocol of Kyoto, a mistake (a loophole) that was used by the wind lobbies to say that intermittent renewable must be added to renewable biomass as apples are added to pears.

Electricity is not sold and purchased as ordinary goods. The kWh price can strongly vary according to the current time of the day and to the ability to maintain production on demand.

The normal way to study the supply and the costs associated to electricity generation and distribution is to have integrated systems producing electricity on demand.

In the case of nuclear power plants that produce a steady flow of electricity, an integrated system includes hydroelectric dams and pumping stations (which store electricity by pumping water in an upper reservoir and reuse it in hydraulic turbines). The energy is stored during the low consumption in the second part of the night and is reused during the midday peak hours. The reservoir size must store the energy differences for 12 hours.

In the case of the wind system, windmills must have a backup able to produce the same power that the total of windmills. As the wind can disappear within a fraction of minute, the back up must start producing within the same lapse of time. As the windy periods followed quiet wind periods with cycles of 15 days, the hydraulic pumping stations would thus require reservoirs 30 times bigger. As the investment cost of a pumping station is almost proportional to the size of the upper reservoir, the storage of wind energy in dams is doomed because it is 30 times more expensive. The only solution for the windmill backup is thus generation by natural gas power plants which can start and stop in seconds as far as their components are already hot.

If the load factor is 25%, the backup must burn natural gas for 75% of the time, emitting almost as much greenhouse gas as simple gas power plants while nuclear power plants produces no greenhouse gases, a message not diffused by wind lobbies.

The intelligent electric meters used in countries with a sizable nuclear supply allow using a lower price at night. One

can thus store hot water produced at night when price is low and kept in a reservoir with a calorific isolation. The system regulates the daily consumption and reduces the need for hydraulic storage.

Some industrial consumers who accept that their supply could be interrupted can purchase power at a much better price. Customers who ask for large surges of power at any time must pay more for a connection allowing a larger maximum flow of energy.

Cost of energy, intermittent, steady or on demand

The regional electrical grid should be managed to produce electricity on demand at the lowest price.

The grid of a country must deliver all the electricity demanded by the customers. If it cannot provide enough energy, the full grid may collapse. A recent blackout occurred in the North European grid (4 November 2006, in the area having a high density of windmills). These blackouts show that an electric grid cannot be restarted rapidly. The failure was due to a conjunction of events in which the ability of the windmills to be connected automatically and to generate their full power was a crucial perturbing factor [32].

The technology is such that it is better to have one monopolistic authority responsible to optimize the generating units and the grid. In France and in Belgium, the power and distribution were provided by a monopoly. It is still done that way in France, the country having the lowest electricity cost.

In Belgium, the electricity can be purchased at 30€/MWh from nuclear system or be imported from France around this price. There are no efficient rules to purchase intermittent power. The rules may favor an operator and it has not been shown that they do not favor the wind industry.

Grid separated from producers

For political reasons supported by the European Union, the grid was separated from the generation. A grid service is then responsible for ensuring that a sufficient number of generators are ready to satisfy the demand. The price of the supply contracts is fixed by rules. In California, this method was the cause of many blackouts in 2005. In Europe, there were fewer blackouts but it has not been observed that the price of electrical power has been reduced.

The grid management is responsible to always deliver energy when asked. Based on its expected demand, it must have a complex policy of agreements in which the maximum and the minimum amount to be provided is determined. It must have a sufficient number of providers which can adapt to a fluctuating demand.

The grid must have contracts with hydroelectric units and manage that the energy stored in the reservoirs is always sufficient to adapt to the worst variations in the expected statistics of forecast demand. The payment rules must be tuned so that generators having energy ready to be used but not actually used have sufficient rewards to continue doing it.

To provide electricity when there are demands, the grid purchases it higher at peak hours and lower at off-peak hours. When there are no demands, some existing producers must reduce their production. The grid should even refuse electricity or accept it at a negative cost. When the whole power is provided by a nuclear system [115], there are no plants using fossil fuel in operation. There is no room to accept intermittent power.

While the European Commission asked for free competition in the electricity market, it has also imposed rules which are fully incompatible with this ideal, such as the obligation to purchase renewable energy as soon as it is produced and to pay this energy at a fixed high price.

The antinuclear parties set regulations forcing the grid to purchase gas generated energy (58€/MWh) instead of power provided by nuclear systems (30€/MWh). If the windmills provided the full power in Belgium (annual consumption of 82 TWh), the annual expense is $[58 \times 82 =] 4.76$ G€ instead of $[30 \times 82 =] 2.46$ G€, a difference of 2.30 G€/year, i.e. about 1% of the GNP (232G€). The difference is higher if the investment for windmills is included (25 G€ for 10 GW) or 1.67 G€/year for 15 years, while the intermittent power is sold during 25% of the time at half price for 0.6 G€. The additional cost for a full windmills solution is thus $[2.30 + 1.67 + 0.6 =] 3.37$ G€/year. This price increases if the price of natural gas increases.

The natural gas burned for backup would increase the emission of greenhouse gases and the climate warming and would exhaust faster the reserves of natural gas that should be converted into oil for transportation.

The environment business, including the wind business, profits only on a very small fraction of this wasted money, but the numbers are so big that a percent is still a large amount.

The windmill trap has been designed to maximize the sales of natural gas but this aim is now useless when the gas cartel cannot produce enough to satisfy the growing demand for China and India and the growing opportunity for conversion of gas into oil.

How have the Europeans been manipulated to believe in the wind industry and pay their energy twice the price paid in France? The subsequent sections describe how the modern propaganda methods can change the mind of the people making decisions. This study of propaganda is illustrated by the examples of operations from the wind lobby and the antinuclear lobby.

Paradoxes of windmills costs using free wind

The wind energy for windmill seems free but it the most expensive method to produce electricity

Although common sense makes believe that windmills produce free energy without polluting, this common sense also knows that such power is intermittent and that other means should provide electricity when the wind stops blowing. For technical reasons explained in this site, the only practical method is to use generators fueled with natural gas. These machines are the only ones starting or stopping in a fraction of minute. These power plants should be hot to be ready to produce and the grid should pay for their investment and operating cost even when they are not used.

As the load factor of windmills in the Ardennes is usually less than 25% (say 20%), one must produce and pay electricity from the backup gas generators during 75 to 80% of the time. Their cost (58 €/MWh) is much higher than coal plants (27 €/MWh) or nuclear systems (30 €/MWh). The cost of electricity produced by the windmill system is (66 €/MWh).

This hierarchy of costs is still valid when the investment of windmills is fully paid (32 €/MWh). These windmill prices do not include compensation for nuisance.

The windmill lobbies try to hide the fact that backup costs are included in the cost as this is profitable for them. The wind lobby is powerful enough to disqualify any realistic computation of prices.

The style of political discussion of the above topic is illustrated in the Web. The papers diffused by the lobbies determine from which side is the author of a report. If she/he is from an opponent party, she/he is wrong. If he is from the same party, he is right. For instance a lobby called Greenpeace Europe [102] has criticized the report from the Belgian Commission Energie 2030 [101]. Their written critique starts by giving a 'portrait' of the authors. If the author understands the nuclear system (this is the case of those having worked in this domain),

he is supposed to side with nuclear solutions and his advice is thus wrong. If someone knows what he is talking about, he is wrong. If someone is competent, he is wrong. Those who understand that renewable energies have high costs and limitations cannot be a judge because this understanding is a preconceived opinion. A discussion on real arguments with such people is hard but the European politics is now working as that.

(A long section on the intoxication methods used by antinuclear lobbies and wind lobbies is not yet translated)

The windmill trap

When the price of fossil fuels will remain permanently high, it is ineluctable that all countries will switch to electricity produced by nuclear methods. Their investment on windmills and power plants burning fuel will be lost. The gas cartel hopes that, to avoid the revelation that they had done a famous mistake, the politicians would delay the decision to stop burning gas.

If a country has invested heavily in windmills, it would be anyway constrained by the growing price of fuels to install nuclear power plants. The nuclear systems, including pumping stations and dams management, will then provide the needed electricity during most periods. As the generators using natural gas will not be needed and be stopped, the intermittent windmills could not be anymore connected to the grid which cannot accept intermittent supply even at a negative price. The windmills become thus useless but the electricity users would still have to pay for the long term contracts signed by former governments. The investors having purchase wind shares on their advice will lose their savings. If this happens, the authorities could not hide anymore the deal. Everybody will understand that they have cooperated to a faulty scheme.

The gas cartel hopes that the politicians, instead of recognizing this error, would delay the decision to stop burning gas and to invest in nuclear systems, achieving the aim of the wind trap.

Finland had to fight against Russia in 1940 and is then very sensitive to the risks of an insecure supply of fuel. Finland has purchased an additional nuclear system from France in 2003.

Opportunities or plots?

Has the windmill trap be engineered by Machiavellians plotters or is it born from circumstances? As in other periods of history, all explanations are plausible and all have probably concurred to trap Europeans into a dangerous situation. It is not useful to search in the past for insolvent people to be responsible, but we do not have to remain in error.

The energy policy of Europe (and of Belgium) becomes more dangerous every day, jeopardizing its supply security and thus its very security. It is also increasingly damageable for economy.

One hopes, that, taking model on Lovelock, true environmental political parties will take care of the environment without being dogmatic against civil nuclear applications. Their main task is to cure population from a deep intoxication on nuclear risks. If they would be successful, they could improve the purchasing power of Europeans, saving 2% of useless expenses every year and saving the planet at the same time.

The energy problem is known in political areas. An official report (Commission Energies 2030) clearly establishes the economical situation but not the political problem. The trap is known in military groups [110]. There are few media supports against the intoxication, because there is still little official support for a better energy policy.

Conclusion

Sites [60] and books (Gerondeau 2007 [69]) have clearly described the secret aims of the windmill policy. The word 'swindle' (arnaque) is not appropriate for a policy weakening the position of a country in potential future conflicts.

Meanwhile gigantic windmills are erected in the countryside and will stay as monuments to human stupidity and greed.

The present dossier explains why promoters can destroy landscape and country life and why unaware customers get robbed of their future earnings by forcing a debt on them. Knowing what is going on is sometimes useful to prevent it.

References

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The french original paper (more detailed) is in
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The references are found in another document:
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