Expensive legacies - The dismantling costs of wind turbines

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A wind turbine that is in the first row of a wind farm, seen from the direction of the wind, is only 15 years old on average, even under favorable conditions. The wind turbines located behind the first row are between 5 and 12 years old on average, depending on the distance to the first row. The consequences for the yield calculations of wind turbines in sub-optimal wind areas are obvious: they have to be replaced or shut down more often than expected. Decommissioning entails high costs and also environmental problems.

Decommissioned wind turbines must be dismantled

Decommissioned wind turbines must be dismantled and must not remain in ruins in the landscape. This is stipulated by the **Building Code** (§ 35 Para. 5 Sentence 2 Building Code). In order to obtain an operating license, plant operators (or project developers) must submit a declaration of **commitment**for the dismantling of the plant including the removal of soil sealing. This is an additional approval requirement according to § 6 BImSchG for outdoor wind projects. This land law regulation serves the “greatest possible protection of the outdoor area”. Demolition means the "complete demolition of all structures that served the privileged project, including the removal of soil sealing that was functionally related to this project." (External area decree, obligation to demolish). So far so good.
But there is no guarantee that the dismantling will actually be carried out, as this photo from Oldendorf/Bensersiel shows. Angry landscape and nature conservationists regard the old foundation of the so-called "Zeiger mill" as a "monument" to the failed waste disposal policy in the district of Wittmund.

Foundation of the "Zeiger mill" in Oldendorf/Bensersiel, district of Wittmund, which

was moved after a court decision. In the background the offset system, photo (C): Manfred Knake

The declaration of commitment to dismantle the system is **not an enforceable title**. In order to prevent a lessor or a municipality from being left with the dismantling costs in the event of the operator's insolvency or a change of operator, financial reserves and guarantees for the dismantling must be made available. In order to ensure that the obligation is actually met and that the polluter bears the costs for the dismantling, the plant operator or project developer must provide financial security by the start of construction at the latest, usually a joint and several bank guarantee, so that in the event of insolvency the brought-in reserve can be used can come into play. An ancillary provision can also stipulate, for example, that a new bank guarantee must be submitted if there is a change of operator.

Gigantic volume

The modern E 126 reaches a total height of almost 200 meters. It requires a foundation of 1,500 cubic meters of concrete reinforced with 180 tons of steel. On the round foundation, which weighs 3,500 tons, stands the tower made of conical reinforced concrete segments, which weighs 2,800 tons. The machine house with generator on the tower weighs 340 tons, the hub with the rotor blades made of glass fiber reinforced plastic weighs another 320 tons. In order for the ground to be able to bear the total weight of over 7,000 tons, it first has to be compacted using crushed stone, which is pressed into boreholes 30 meters deep.

How expensive is the dismantling of a wind turbine?

The Wind Energy Decree NRW stipulates that the security deposit must "completely cover the dismantling of the wind turbine, including the foundation sealing the ground, at the end of the expected service life of the turbine" (Wind Energy Decree NRW, Section 5.2.2.4). According to this, **6.5 percent of the total investment** costs of the project are to be set as a security deposit, depending on the manufacturer and type of building also higher or lower. A specialist company (e.g. demolition company) carries out the assessment. The competent approval authority has a margin of discretion, it must make a prognostic estimate of the future financial expenditure for the dismantling.

NRW gives an example: If the total investment costs for a system amount to two million euros, a security deposit of 130,000 euros per system (6.5 percent) must be proven (e.g. bank guarantee), provided that no deviating costs are determined. For all wind turbines erected before the amendment of the building code in the summer of 2004, these regulations do not apply in this comprehensive form due to the grandfathering. There are

only possibilities under building regulations to officially order the demolition in the event of the closure of the business. However, this means a financial outlay that one tries to avoid by creating “financial incentives” to replace the old system with a new, more efficient system (repowering).

klimaretter.info also relies on the Brandenburg guidelines .

Ten percent of the shell construction sum, which in turn is set at 40 percent of the production costs, must be calculated for the dismantling - in the end that is four percent of the construction costs. **The online magazine lets a spokesman for the Federal Wind Energy Association speak, who says that in practice one can assume around 30,000 euros per megawatt of installed power plant capacity. This value corresponds to "today's knowledge". Converted to the Enercon WKA E-126 wind turbine, the necessary provision would be around 60,000 euros per megawatt of installed power plant capacity**, a total of 440,000 euros.

It is questionable whether the dismantling costs are really covered. And whether 6.5 percent of the total investment costs of the project are actually set as security deposits is subject to the approval authority's discretion.

From France, the cost estimate of a demolition company in the department of Aisne. He comes to around 345,000 euros per wind turbine, without VAT. The area is freely accessible.

What is included in the dismantling of a wind turbine?

The obligation to dismantle the entire project includes the removal of the structures including **ancillary facilities** , **lines** , **paths** and **squares and the soil sealing** caused by the facilities . The aim is to restore the **original condition** with the appropriate **soil quality .** The CDU MP Steeven Bretz, Brandenburg, received this explanation in response to a small request .

He wanted to know:

"What are the requirements associated with the dismantling of wind turbines - in particular with regard to the complete removal and disposal of the reinforced concrete foundations, the towers and turbines and the restoration of the original condition in the area of the access roads and the area used by the wind turbines?"

The scope of the obligation to remove is not defined in general, but only in individual cases. In the event of the permanent abandonment of use of wind turbines, the competent authority must be presented with a concept for the disposal of the facility. According to § 74 paragraph 1 BbgBO, the lower building control authorities are authorized to issue removal orders to create lawful conditions.

The authority decides on the extent of the dismantling measures. How detailed must the dismantling of the system including the foundation, the removal of the ancillary systems (e.g. transformer station), the removal of the paths and other sealed areas (e.g. crane parking areas), the removal of plantings and the subsequent recultivation be listed? If the authorities underestimated the approval, will they be able to make additional demands?

The calculation of the dismantling costs

When calculating the dismantling costs, the public often only pays attention to the dismantling of the rotor blades, the nacelle and the shaft, perhaps also the access road, the cables and the transformer box, and less the foundation. And as you can see, there are good reasons for that.

The first video shows the spectacular dismantling of a total of three wind turbines on the Hornisgrinde, which were replaced by a single, larger system (repowering). There are two Seewind models, a 20/110 model with 110 kW and a 25/132 model with 132 kW, replaced by an Enercon E-70. The removal of the two foundations is not shown.

The second video documents the removal of the foundation of a relatively small wind turbine (Nordex N50, at the Kirchberg Jagst site in Kleinallmerspann). The foundation is completely removed. The work gives an idea of the effort that has to be made for larger systems.

The foundation of a 200 m high and 7,000 ton Enercon WKA E-126 weighs 3,500 tons and consists of 1,400 cubic meters of high-strength concrete. A YouTube user rightly remarks that such a dismantling of wind turbines is really time-consuming when he watches this video. He was interested in how long it would then take to completely remove the foundation of, for example, an Enercon E-126?

Calculations of the dismantling costs differ extremely strongly from each other. When planning, a tax advisor from a municipality or a citizens' initiative can be helpful in a first step in calculating the profitability of wind turbines, as Johann Richter shows. In 2011, he set an annual amount of €12,500 (€250,000 in 20 years) for a dismantling provision and, because of the extreme differences in profit and loss calculations, recommended having his calculations checked by a neutral expert.

The construction cost of the E-126, for example, is €11 million. With 6.5% of the construction costs in 20 years, as envisaged in the Wind Energy Decree of North Rhine-Westphalia, demolition can cost not only €700,000, but also easily a million euros and more.

No detailed breakdown required for dismantling

In the small question already mentioned , MP Steeven Bretz, from the Brandenburg CDU parliamentary group, wanted to know: “Based on experience, how high are the costs for dismantling?” He asked for a detailed breakdown according to the dismantling of the access roads and used areas, the dismantling and disposal of the tower and the turbine depending on the size of the wind turbine and the dismantling and disposal of the concrete foundation depending on the size of the wind turbine.

The federal state of Brandenburg replied that when determining the dismantling costs and according to the administrative regulation on the BbgBO (No. 67.3.3.7), 10 percent of the shell construction costs. In the case of wind turbines, 40 percent of the production costs must be taken into account as a fictitious shell construction sum in accordance with Section 4 Paragraph 2 Clause 3 of the Brandenburg Building Fees Ordinance (BbgBauGebO), which means that **the provision for an Enercon WKA E-126 comes to €440,000.**
However, the deputy did not receive a detailed breakdown. Reason: "Other empirical values for the dismantling costs are not available."

The devil is in the small print

In 2013, the Neumarkt district office obliged the operator of a large wind turbine to provide a security in the form of a “self-enforceable” bank guarantee of 770 euros before the installation or commissioning of the system . The security should ensure that at the end of a windmill's life there is not a ruin left standing in the landscape, but that the ancient power generator can be "dismantled", eliminated without a trace — even if the operator cannot pay for it because he has long been insolvent is. The district office assumes that the systems

will have a service life of two or three decades. According to him, this behavior is not the case for all investors when it comes to provisions for dismantling: "In some cases, the dismantling costs are set too low",says Jürgen Schreiner from the district authority. The guarantees served to ensure that the public sector had the money to have a decommissioned system removed in an emergency - although the municipalities and districts never became the owners of the wind turbines despite the possible "substitute performance".

But the devil is in all sorts of fine print — especially for property owners. In many cases, the farmers and foresters do not sell the 2,000 to 3,000 square meters per wind turbine to the investors, but rather lease them over the long term and remain the owners. Things could actually get tight for them if the operator has long since gone bankrupt. Because according to the district office, the property owner is first liable if necessary from the private coffers; the bank guarantee obtained by the approval authorities is "subordinate", explains Jürgen Schreiner.

There is no legal basis for a dynamic adjustment of the dismantling costs

The Bavarian Farmers' Association (BBV) and the district as the approval authority both complain: An adjustment of the expected deconstruction costs is only possible after a certain period of time through expert opinion and revaluation if the investor shows himself to be cooperative and agrees to this voluntarily. BBV Managing Director Bayerl unequivocally demands protection “officially”. But Jürgen Schreiner from the district office regrets: "We are aware of the problem, but there is no legal basis for incorporating dynamics."

The wind power lobby likes to tell people about the high cost of dismantling nuclear power plants. The dismantling costs of the wind turbines either remain unmentioned or are set very low.

In connection with the calculation of economic efficiency, it is worthwhile for council members to read a critical publication about " municipal wind farms " in the municipality of Weisenheim, which we reported on in 2014.

Hidden dismantling costs, horse deceivers - all very easy!

"Wind turbines generate environmentally friendly electricity, can be dismantled at any time without leaving a radiant soil and they help to defuse the CO 2 problem." The manufacturers of wind power plants advertise in this or a similar way, but also the supporters of renewable energies. The rotor blades, the nacelle and the generator are hoisted from the tower by crane and then dismantled into their individual parts. The copper from the cables or the steel from the upper tower segments can be reused. The concrete tower is sawed up or blown up on site. The material can be used for road construction. The rotor blades are usually shredded and used as fuel in the cement industry. Much of it can be recycled. topagrar makes dismantling so easy. According to the Institute for Integrated Production Hanover (IPH), to which topagrar refers, it costs between 20,000 and 30,000 euros per system. The income from the sale of the raw materials is already included.

The income from the sale of the raw materials cannot be quantified.

There is no way to dispose of the large number of rotor blades that will be produced in the next few years without serious damage to the health of the population. The reality of the energy transition looks like this: Wind turbines are HAZARDOUS WASTE ! Since 2005, only the thermal disposal and recycling of the rotor blades remains, primarily in waste incineration plants and cement works or export or landfill. After recycling, if it takes place, it is estimated that around 20 percent of the waste is non-recyclable. Radioactivity decays, nuclear waste from nuclear power plants can be recycled, hazardous waste remains toxic forever.

The dismantling of wind turbines is not only complex, but also expensive, and the costs for hazardous waste are incalculable. **The dismantling of a single system can mean economic ruin for the property owner/lessor/the municipality.** The understatement of the costs by topagrar is simply a scandal.

Dismantling companies are waiting for orders. But there is no guarantee that the wind turbines can be dismantled on a large scale, that it is worthwhile for the dismantling companies and wind farm operators. All that is known is that the previous dismantling strategy will no longer be worthwhile, say the employees at the IPH. There are considerations, nothing more. "Must", "could" - the usual subjunctive of the renewable industry.

James Lovelock is one of the founding fathers of the green movement. He became famous for his invention of the "Gaia theory". He has expressed despair that the movement's original intentions have been misunderstood as license to set aside our "priceless ecological heritage". In a letter to a local planning authority , James Lovelock wrote :
"We must ensure that the spinning windmills do not become like the statues on Easter Island - monuments to a failed civilization."

Taken from Ruhrkultur here

Swell:

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Photos: Wind turbine

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