



# RDRWind e.V.

Repowering, Demontage und Recycling

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## About us: Industrial Association for Repowering, Dismantling and Recycling of Wind Turbines (RDRWind)

Insight into the development of industry standards using the example of an initiative of RDRWind e.V to develop the DIN SPEC 4866.

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Hannover, 05.02.2020





## Start...

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- Dismantling of XXL products will be a real challenge especially for the wind industry, due to the forthcoming end of the feed-in tariff support under the Renewable Energy Sources Act (EEG).
- **2016...**Project engineer Martin Westbomke at the Institute for Integrated Production Hanover (IPH) non-profit GmbH has developed a software model in the “DemoNetXXL - Dismantling Networks for XXL Products” project of the DFG (German Research Foundation) since 2016 to facilitate time saving and cost-effective dismantling.
- **Over the past three years (2016 – 2018), a network of repowering and dismantling experts has emerged from this research project who have drawn up recommendations for action for the dismantling process.**



## Start...

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- After completion of the research project, ten of the companies involved have joined together on **7 December 2018** to create the **Industrial Association for Repowering, Dismantling and Recycling of Wind Turbines (RDRWind)** with the aim of facilitating cross-industry exchange.
- **The aim of the association is to promote the dissemination of new technical applications and sustainable processes, standards and norms.**
- **The recycling economy and health, safety and environment in dismantling will be permanent concerns of the association across industries.**



# Objectives

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## **Our objectives:**

- The Association is an industrial association and supports companies at home and abroad which deal with: • repowering • removal • dismantling • recycling of wind turbines.
- The purpose of the Association is to promote the dissemination of new professional applications and processes, standards and norms in these areas through information, networking, press and public relations work and support of R&D.
- The Association sees itself as a representative of companies which are active and cooperate in this field and develops information materials, market overviews and statistical market data and makes these data available to its members.



## Objectives

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- **The development of new standards and norms is of particular importance.**
- **The Association is also considering the development of a new quality label associated with new standards.**
- The Association is building a national network and is expanding it by an international network of contacts, which is intended to grow on an ongoing basis and to be made accessible to its members.



40 members (see all members:  
<https://www.rdrwind.de/mitglieder/>)

**HAGEDORN**

**VEOLIA**

**BORNMANN**  
**WINDKRAFT  
TECHNIK GMBH**

**CUA** CHEMISCHES  
UNTERSUCHUNGSAMT  
EMDEN GMBH

**GEOlogik**  
Wilbers & Oeder GmbH  
Umwelt-, Ingenieur-, Hydrogeologie  
Planung ☐ Beratung ☐ Gutachten

**EHRICH**  
recyclinghof  
husum

**EnBW**

EnergieKontor

**IPH**

heben + transportieren  
**HOFMANN**

**IRTS**

IRTS Thomas Schicking – Intelligent research and translation services

**DR. DÖRING**  
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**MASLATON**  
Rechtsanwaltsgesellschaft mbH  
Leipzig • München • Köln

**Nefino**

**neowa**

**PRECITORC**

**WÖRMANN**  
TeAm  
Verkehrstechnik - Abbruchtechnik - Beschriftungstechnik

windConsultant

wind-turbine.com

**WALCH**  
RECYCLING & EDELMETALLE

**VSB**  
energy for you

**TSR**  
THE METAL COMPANY

**JHLOGISTIK**  
Transport • Projects • Ferry • worldwide

**emr** Metal  
recycling  
European Metal Recycling BV

Polymer-Consulting  
Dr.-Ing. Lars Peters



## Cooperation partners

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**RDRWind intends to act as a platform for project developers, maintenance and operation companies and dismantling and recycling service providers in the wind energy industry.**

**A key focus will be a cooperative exchange with national and European partner organisations of the wind industry.**

**Cooperation partners since 2019:**

- VGB PowerTech (Germany)
- AD3R (France)



## Repowering

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- **Three options must be considered when wind turbines (WTGs) reach the end of their feed-in tariff support under the Renewable Energy Sources Act (EEG) in Germany: repowering, continued operation or decommissioning of the turbine.**
- **While repowering requires planning and licensing permission, technical and economic aspects are crucial for continued operation.**
- Repowering i.e. replacement of an old by a new more powerful turbine makes sense if it serves to significantly reduce the number of WTGs and boost yield.
- Moreover, operators, property owners and municipalities can continue putting proven sites to good commercial use.
- What's more, the acceptance of the local residents is also higher in the case of repowering sites.





## Dismantling

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- If a wind turbine can no longer be used to generate electricity because it is taken out of service or repowered for reasons of age, it is dismantled and disposed of, and the property is restored to its original condition.
- **In general, dismantling and deconstruction are mentioned in Germany in the building permission and the lease agreement.**
- **Disused wind turbines must be dismantled rapidly, at low-cost and without compromising the environment.**
- **At present, disassembly by the dismantling teams is a complicated process – it takes a good four weeks to dismantle a single turbine.**
- Rotor blades, nacelle and generator are lifted from the tower by a crane, disassembled into their individual parts on the ground and then professionally recycled and/or disposed of.



## Recycling

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- Many materials can be recycled from the dismantled wind turbines such as copper from the cables or steel from the steel tower segments.
- Most time-consuming is the dismantling of concrete towers: they are cut into segments using a sawing process, blown up or torn down by a special height demolition process on site and then recycled.
- The recycling material can be used for road construction.
- The rotor blades are usually shredded and used as substitute fuel in the cement industry.
- **About 80 to 90 percent of a wind turbine can be recycled.**
- **However, there are still challenges and optimisation potentials.**



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Pioneering spirit, professionalisation and standardisation

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**Pioneering spirit, professionalisation and standardisation are essential cornerstones of the success of the wind industry in Europe.**

**With the DIN SPEC 4866, we want to make a small contribution.**



## DIN SPEC – ?

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**“The success of a good idea often depends on how long it takes to reach the market.**

**A DIN SPEC is the fastest way to turn research into a marketable product.**

No obligation to reach a consensus, and smaller, more agile working groups make it possible to develop a DIN SPEC within only a few months.

**Thanks to the worldwide respect for the DIN "brand", DIN SPECs are effective marketing instruments that are widely accepted by customer and potential partners alike.**

**DIN's job is to ensure that a DIN SPEC does not conflict with any existing standards.**

**With its international contacts, Beuth Verlag sees that DIN SPECs are published and sold to a wide circle of customers. And any DIN SPEC can be used as a basis for a full standard.”**

Read more: <https://www.din.de/en/innovation-and-research/din-spec-en>



## DIN SPEC 4866

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- **RDRWind e.V. and partners in the DIN SPEC consortium will likely complete the DIN SPEC 4866 in collaboration with the DIN institute in the 2nd quarter of 2020.**
- **The German Environment Agency (Umweltbundesamt - UBA) has also become a member of the DIN SPEC consortium.**
- **The finished DIN SPEC 4866 may be downloaded after publication free of charge from the Beuth publishing company.**
- **We will produce a German and English version of the DIN SPEC.**
- **Together with the DIN, we will announce the publication date of the DIN SPEC 4866.**



# DIN SPEC 4866 – in preparation



## Geschäftsplan für ein DIN SPEC-Projekt nach dem PAS-Verfahren zum Thema "Nachhaltige Demontage und Recycling von Windenergieanlagen"

Status:  
**Zur Kommentierung durch die Öffentlichkeit**

Anmeldungen zur Mitarbeit sowie Kommentare zum Geschäftsplan sind erbeten und **bis zum 18. Juni 2019** an [amelie.banhart@din.de](mailto:amelie.banhart@din.de) zu übermitteln<sup>1</sup>

Die Empfänger dieses Geschäftsplans werden gebeten, mit ihren Kommentaren jegliche relevanten Patentrechte, die sie kennen, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Berlin, 14.05.2019 (Version 2)

<sup>1</sup> Anmeldungen zur Mitarbeit und Kommentare zum Geschäftsplan, die nach Ablauf der Frist eingehen, müssen nicht berücksichtigt werden. Über die Einarbeitung der fristgerecht eingegangenen Kommentare entscheidet das Konsortium (Gremium) nach seiner Konstituierung.



**DIN SPEC 4866**

### Tagesordnung

zum Kick-Off-Meeting der DIN SPEC 4866  
„Nachhaltige Demontage und Recycling von Windenergieanlagen“  
am 2019-06-27 in Berlin

Sitzungsbeginn: 10:30 Uhr  
Sitzungsende: 16:30 Uhr  
Sitzungsort: DIN e. V.  
Burggrafenstraße 6 (Eingang zurzeit nur über die Budapester Straße)  
Am DIN Platz  
10787 Berlin  
Raum 0104b

TOP	Schriftstück(e)
1	Eröffnung und Vorstellung der Teilnehmer (DIN)
2	Vorstellung des Geschäftsplans: Einführung in Ziel, Anwendungsbereich und Aufbau der DIN SPEC 4866 (DIN/ Initiator)
3	Annahme des Geschäftsplans (DIN)
4	Wahl des Workshop-Leiters und ggf. Stellvertretung (DIN)
5	Arbeit am Manuskript der DIN SPEC 4866 (Workshop-Leiter und Experten)
6	Planung der weiteren Arbeiten (Workshop-Leiter/ DIN)
7	Verschiedenes (Workshop-Leiter)
8	Termin und Ort der nächsten Sitzung (Workshop-Leiter/ DIN)
9	Schließung der Sitzung



# Extract Business Plan - DIN SPEC 4866

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## 3. Goals of the project

### 3.1. General

- The aim of the planned standard is to define framework conditions for sustainable and efficient dismantling and recycling of wind turbines in projects tasked with repowering, decommissioning and damage management.

### 3.2. Planned range of application

- **This DIN SPEC defines requirements for dismantling preparation, dismantling and recycling of wind turbines while taking costs and existing environmental and safety conditions into consideration.**
- **Moreover, the DIN SPEC specifies the procedure for dismantling during the preparation stage. This includes the necessary technical conditions, investigations and planning and also provides an overview of the authority approvals related to the standard.**
- **The DIN SPEC does not define economic or political requirements for disassembly, continued operation or repowering.**



## Extract Business Plan - DIN SPEC 4866

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- The DIN SPEC specifies the technical instructions and qualification requirements for dismantling operations by taking into account existing HSE regulations.
- **While the means and technologies chosen for dismantling WTGs are not covered by the DIN SPEC, it lays down the instructions, how to deal sustainably with the resulting material flows and ways to (re)use, recycle and dispose of them.**
- **By contrast, environmentally relevant guidelines and technical processes for recycling are not specified by the DIN SPEC.**





## Benefits of an industry standard

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Source: Entwicklung eines Konzepts und Maßnahmen für einen ressourcensichernden Rückbau von Windenergieanlagen, Abschlussbericht, 1. Nov. 2019, page 152 ff (German version) / (Umweltbundesamt – German Environment Agency, final report as of Nov 1, 2019)

**Original German version:** <https://www.umweltbundesamt.de/publikationen/entwicklung-eines-konzepts-massnahmen-fuer-einen>

**Translation (short version):** RDRWind e.V.

### 4.1 Necessity of a standard for the dismantling process

#### **4.1.1 Aspects for the development of a standard for dismantling**

**The greatest problem faced in the dismantling process of wind turbines (WTG) obviously is the lack of compulsory, uniform standards that define the requirements for dismantling a WTG in a sufficiently accurate manner.**



## Benefits of an industry standard

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To make sure that technical dismantling requirements for onshore WTGs are in line with the relevant framework conditions (...). Specifications should:

- clarify the scope of dismantling, especially concerning the dismantling of foundations and peripheral installations, such as cable systems, parking spaces or access routes.
- clarify, whether the dismantling methods currently in use (such as crane use, blasting operation, tearing down) are admissible for the respective turbine design, and examine these methods with respect to eco-friendliness, avoidance of land damage, safety requirements and an adequate cost-benefit ratio.
- establish requirements for safety and occupational safety (especially, but not exclusively on the part of the dismantling companies), including presentation of certificates of training/advanced training (such as for working at height, switching authorisations) or inspection plates (for example concerning work equipment).

**Translation short version:** RDRWind e.V.



## Benefits of an industry standard

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- create a standard for the documents/data (quantities, masses, drawings etc.) required for the dismantling process. This applies to both documents/data that wind farm operators need to hold ready and the ones that manufacturers will be obliged to provide when selling the turbine.
- establish requirements relating to the processing / disassembly of components on site, especially with the aim to reduce (GFRP / CFRP) dusts by using appropriate technical measures (e.g. containment or wet separation).
- create uniform regulations (throughout Germany) for the dismantling of WTGs, the quality of processing, as well as regulations to deal with and further use of recycling materials and/or secondary raw materials including the definition of a reasonable depth of recycling. (...)

**Translation short version:** RDRWind e.V.



## Links

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- Bundesverband WindEnergie e.V. (German Wind Energy Association): [https://www.wind-energie.de/fileadmin/redaktion/dokumente/publikationen-oeffentlich/themen/02-technik-und-netze/09-rueckbau/BWE-Hintergrundpapier\\_Recycling\\_von\\_Windenergieanlagen\\_-\\_20191115.pdf](https://www.wind-energie.de/fileadmin/redaktion/dokumente/publikationen-oeffentlich/themen/02-technik-und-netze/09-rueckbau/BWE-Hintergrundpapier_Recycling_von_Windenergieanlagen_-_20191115.pdf)
- DIN SPEC: <https://www.din.de/en/innovation-and-research/din-spec-en>
- IPH Hannover: [https://www.iph-hannover.de/\\_media/files/downloads/IPH\\_Flyer\\_DemoNetXXL.pdf](https://www.iph-hannover.de/_media/files/downloads/IPH_Flyer_DemoNetXXL.pdf)
- RDRWind e.V.: <https://www.rdrwind.de/>
- Umweltbundesamt (German Environment Agency): <https://www.umweltbundesamt.de/themen/abfall-ressourcen/produktverantwortung-in-der-abfallwirtschaft/windenergieanlagen-rueckbau-recycling-repowering>
- WindEurope: <https://windeurope.org/policy/topics/sustainability/>



## Contact us: RDRWind e.V.

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Annette Nüsslein, Board Member

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RDRWind e.V.

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