

German Environment Agency

Umwelt 
Bundesamt

Dismantling of wind power plants in France and in Germany (OFATE, DFBEW)

Wind power plant dismantling and recycling in Germany

(FKZ 3717 31 330 0, AZ: 32 113/1)

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Section III 1.6 Extended Producer Responsibility

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1. Scientific question and task

TASK 1: LEGAL FRAMEWORK

Building permission according to the German emission act (BImSchG) and the German building act (BauGB)

Accrued liability according to different calculation formula

Duties of operators and owners of wind power plants

Waste management legislation

TASK 2: INVENTORY

28.000 wind power plants with a lifetime of 20 years, which are going to be dismantled until 2040

Determination of material for recycling and the available deconstruction and recycling processes

TASK 3: OPTIMIZED DISMANTLING AND RECYCLING

Mechanical dismantling is preferred (neither pull-down nor blasting)

Separation of the components, high valued recycling and harmless disposal

TASK 4: RESPONSIBILITY FOR DISMANTLING AND RECYCLING

Duties of the operator according to the German emission act (BImSchG)

Participation of the legal authorities and observation of the retreat work

TASK 5: RECOMMENDATIONS

Working group of the federal and Länder authority for dismantling and recycling

Standardization by manufacturers

Extended producer responsibility for rotor blades (or intra-industry solution)

2. Results: Legal Framework

1. PERMISSIONS

Permissions according to the building law (BauGB), up to a height of 50 m

Permissions according to the emissions law (BImSchG), higher than 50 m (usual case)

2. ACCRUED LIABILITY ACCORDING TO DIFFERENT CALCULATION FORMULA

Different calculation formula

Financial gaps are expectable, particularly for huge wind power plants

3. DUTY OF DISMANTLING ACCORDING TO THE GERMAN EMISSION ACT

Duty on the operator, including the obligation to inform about dismantling

Waste framework directive as well as the German “Kreislaufwirtschaftsgesetz”

Duty on material separation according to the German commercial waste act

Act on old oil, act on batteries, act on old wood, Regulation (EG) 517/2014 (fluorinated gas) etc.

4. CRITICAL ISSUES

Degree of dismantling referring to grounding, cables, crane utility space

Protection of the environment, the employees and the soil and against noise in place

Recycling and disposal of rotor blade waste

2. Results: Inventory

INVENTORY:

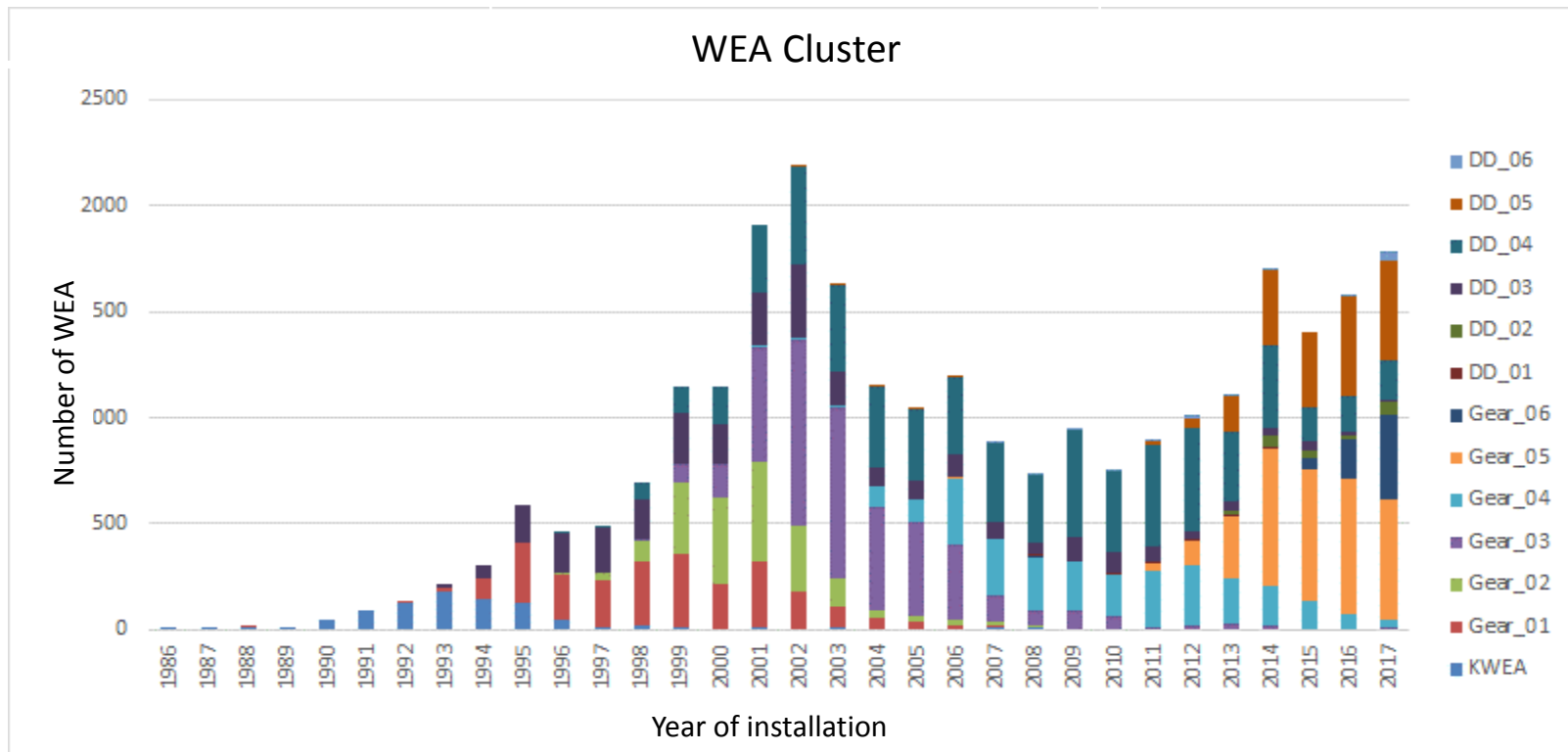
28.000 PLANTS
50.000 MW CUMULATIVE
POWER

DIVERSITY:

GEOLOGICAL LOCATION
TECHNICAL DIVERSITY

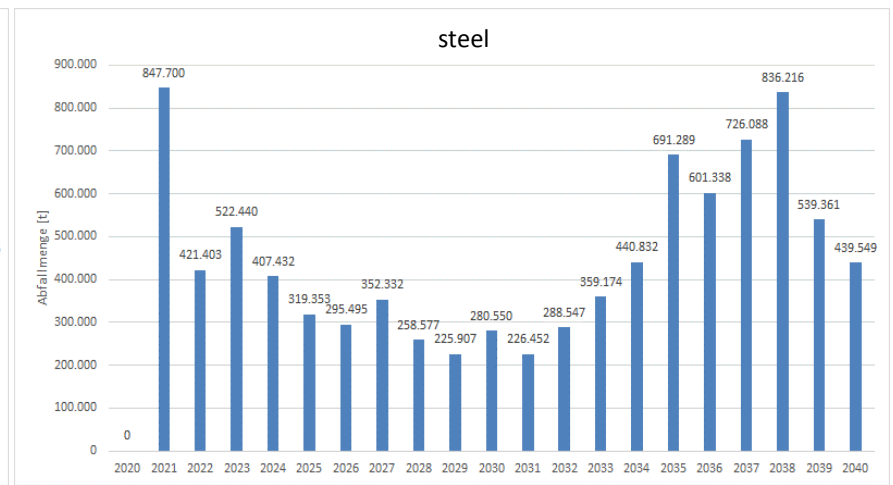
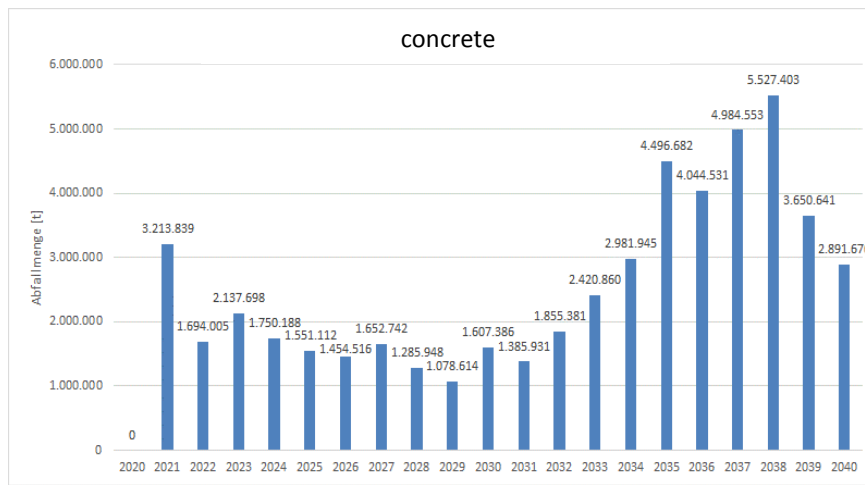
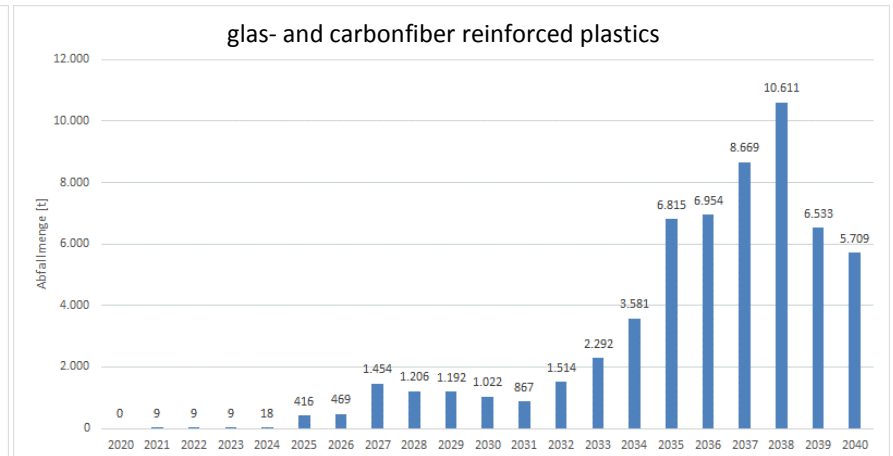
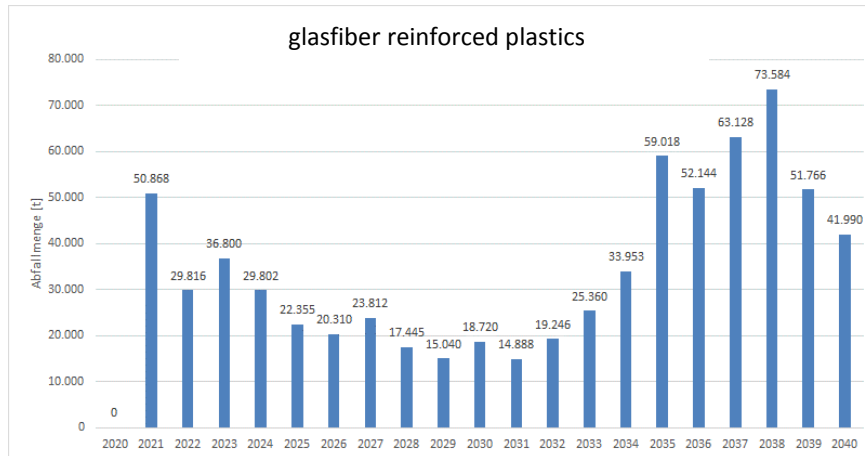
AVERAGE 2017:

POWER: 3 MW
HEIGHT: 125 M
DIAMETER: 110 M

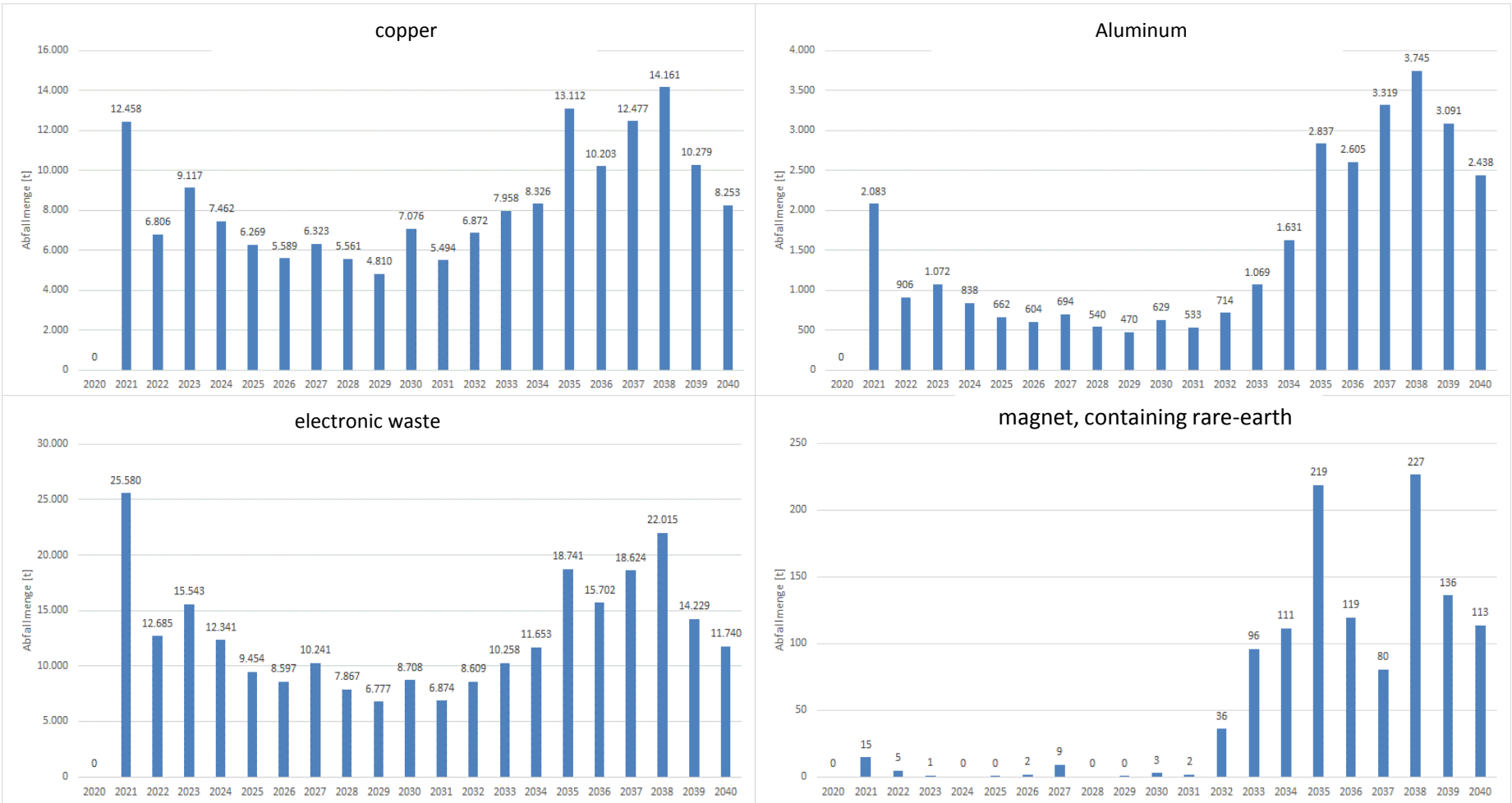


UBA (confidential)

2. Results: Material forecast for recycling



2. Results: Material forecast for recycling



UBA (confidential)

2. Results: Requirements for dismantling

1. DUTIES OF THE MANUFACTURERS, OPERATORS AND THE AUTHORITIES

Information for dismantling by the manufacturer of the wind energy plant

Compulsory archiving of those information

Documentation, if the operator or owner changes

2. DISMANTLING

Mechanical dismantling with a crane

Blasting only in particular cases, such as damage, distinct tower-constructions or blasting of groundings

Prerequisites for non-mechanical dismantling

Materials separation according to the act on industrial waste

Protection of the environment and the employees, e.g. during sawing; protection against noise

3. DECISION ON THE EXTENT OF DECONSTRUCTION

Groundings

Cables

Crane utility space

No particular and distinct rules, so far.

2. Results: Requirements for recycling

1. GLAS- AND CARBONFIBER-REINFORCED PLASTICS AS PART OF THE ROTOR BLADES OR OF THE DRIVE SECTION

Separation of carbonfiber-reinforced plastics

Deconstruction with appropriate and powerful shredders

Separation of the components into ferrous and non-ferrous metals, wood and carbonfiber-reinforced plastics

Recycling of carbonfiber-reinforced plastics via pyrolysis

Energy recovery of glasfiber-reinforced plastic in a cement plant,

Extended producer responsibility for rotor blades to be discussed

2. CONCRETE

Separation of concrete of towers and groundings for an improved recycling of each of them

Fulfillment of the LAGA M20 and DIN 4226-100 in case of recycling

Separation of reinforcing steel

3. STEEL

Usages of the market of secondary raw materials

4. COPPER AND ALUMINUM

Usages of the market of secondary raw materials

5. ELECTRONIC WASTE

Separation standards for a high valued recycling of precious metals

3.1 Recommendations: Guidelines for the authorities

POTENTIAL CONTENTS

1. Interpretation of the BImSchG, BauGB as well as the national laws corresponding to the waste framework directive,
2. Technical information for deconstruction (manufacturer, archiving, transfer to retreating workers)
3. Checking the calculation formula for the accrued liability,
4. Archiving information,
5. Duties of the authorities during dismantling,
6. Duties of the operator on the indication of deconstruction,
7. Extent of deconstruction (groundings, crane areas, cable etc.),
8. Protection of the Environment, occupational Safety and protection against noise,
9. Documentation of deconstruction and recycling and
10. Recycling auf most of the components and materials, harmless and safe disposal.

Is this an issue of industrial law or waste management law?

3.2 Recommendation: Standardization

1. Standardized information of the manufacturer for dismantling and recycling
2. Documentation Standards, if the operator or owner changes
3. Standards for sawing of rotor blades
4. Recycling standards for rotor blades including the separation of metals and carbon fiber reinforced plastics
5. Design for dismantling and recycling
6. Standardized separation of metals, wood, carbon- and glass fiber reinforced plastics
7. Standards for the Separation of electronic wastes

Standardization is the manufacturers or/and recyclers task.

3.3 Recommendation: Extended producer responsibility for rotor blades

1. DISMANTLING IN PLACE

Protection of the environment against fibers and dusts

Protection of the employees

2. MATERIAL SEPARATION AND RECOVERY IN SPECIALIZED RECYCLING PLANTS

Separation of carbonfiber-reinforced plastic, metals and wood

Grinding to loose bulk material

Recovery of recyclable material fractions including solid recovered fuel

3. EVALUATION OF THE EXTENDED PRODUCER RESPONSIBILITY FOR ROTORBLADES

New scientific UBA project in 2020

Aim:

Ensured and secured disposal in a small number of specified plants.

Economic security for operators of those plants.

What is your opinion on the extended producer responsibility for rotor blades?

**Thank you for your
attention.**

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