ADVANTIS ENGINEERING x SUSTEQ SUSTAINABLE TECHNOLOGY x SEASIGHT GROUP

DEVELOPMENT OF FLEXIBLE BLADE CUTTING SYSTEM FOR END-OF-LIFE BLADES

ADVANTIS, CO-FOUNDER – PETER EJS ELTZHOLTZ

“Developing technology, machinery and services enabling sustainability”

SUSTEQ
SUSTAINABLE TECHNOLOGY

ABOUT

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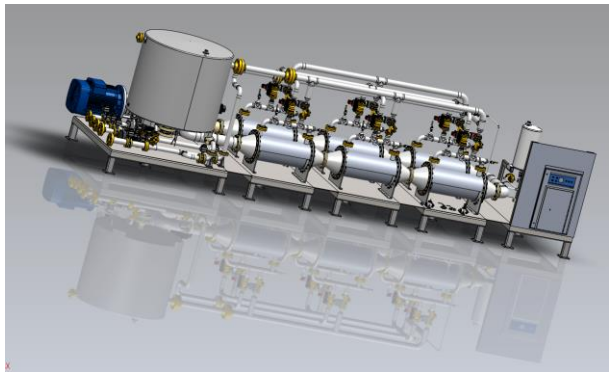
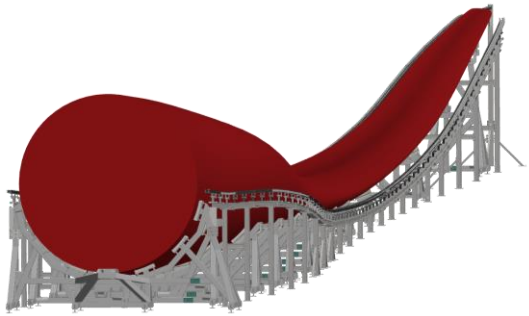
ADVANTIS ENGINEERING



KEY FACTS

- Founded in 2017 by Allan Wad Petersen, Kim D. Jensen & Peter Ejs Eltzholtz
- Consulting Mechanical Engineering Company
- Currently 10 Mechanical Engineers & 2 Projects Managers
- Renewable Energy Sector – OEMs - Vestas & Siemens Gamesa
- Incubating own products - development and commercializing of own products e.g. Flexible Blade Cutter System -> separated into own entity “SUSTEQ”
- Partnering and exploring new business opportunities



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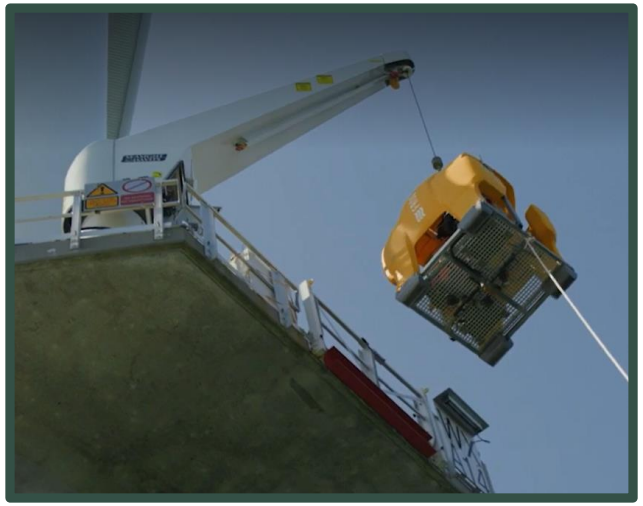
SEASIGHT GROUP

KEY FACTS

- Founded in 1950 | Shipyard, Customized solutions & Manufacturing, Seasight Davits (cranes)
  - Electrical, hybrid, Hydrogen/Methanol Ferries
  - Customized solutions within Renewable Energy Sector
  - Davits (own brand Seasight Davits)
- 270 employees in Seasight Group
- Offices in DK, US, UK & Taiwan
- Currently involved with decommission / cutting of blades



ABOUT

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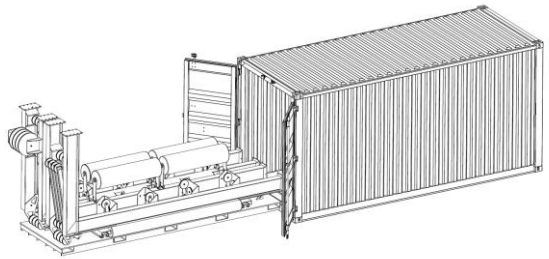
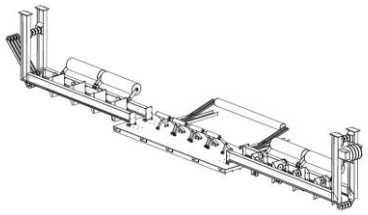
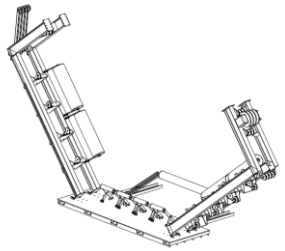
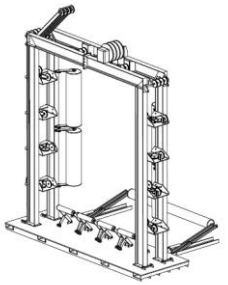
KEY FACTS

- Startup founded by Advantis & Seasight Group in Q1 2023
- Company spin-off from technology developed in Advantis (Advantis Patent)
- SUSTEQ core business is development of technology, machinery and services enabling sustainablity
- Advantis, SUSTEQ & Seasight Group is currently developing a flexible end-of-life blade cutting system – the equipment is expected to be operational in 2024
- Turn-key solutions for End-of-Life Blades









WHAT

Key Challenges

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Wind industry calls for Europe-wide ban on landfilling turbine blades by 2025

https://windeurope.org/newsroom/press-releases/wind-industry-calls-for-europe-wide-ban-on-landfilling-turbine-blades/

Vattenfall commits to landfill ban and to recycle all wind turbine blades by 2030

https://group.vattenfall.com/press-and-media/pressreleases/2021/vattenfall-commits-to-landfill-ban-and-to-recycle-all-wind-turbine-blades-by-2030

Ørsted commits to either reuse, recycle, or recover all of the wind turbine blades in its global portfolio of onshore and offshore wind farms upon decommissioning

https://orsted.com/en/media/newsroom/news/2021/06/702084352457649

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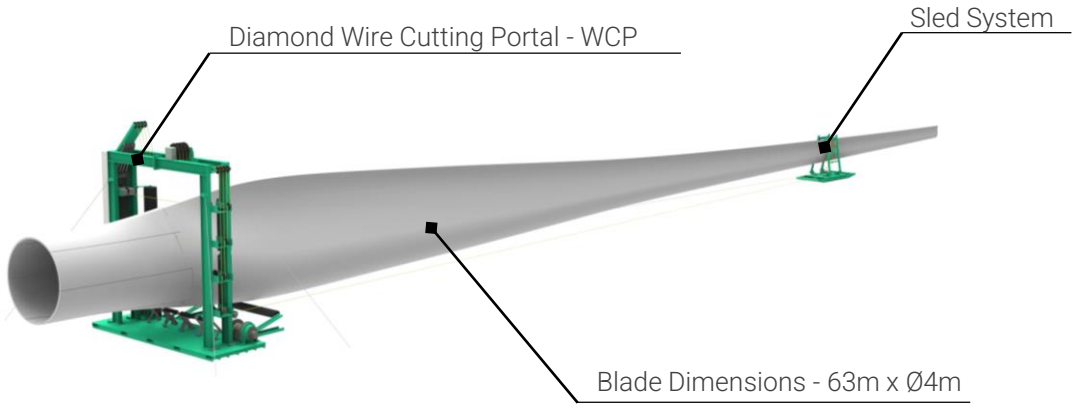
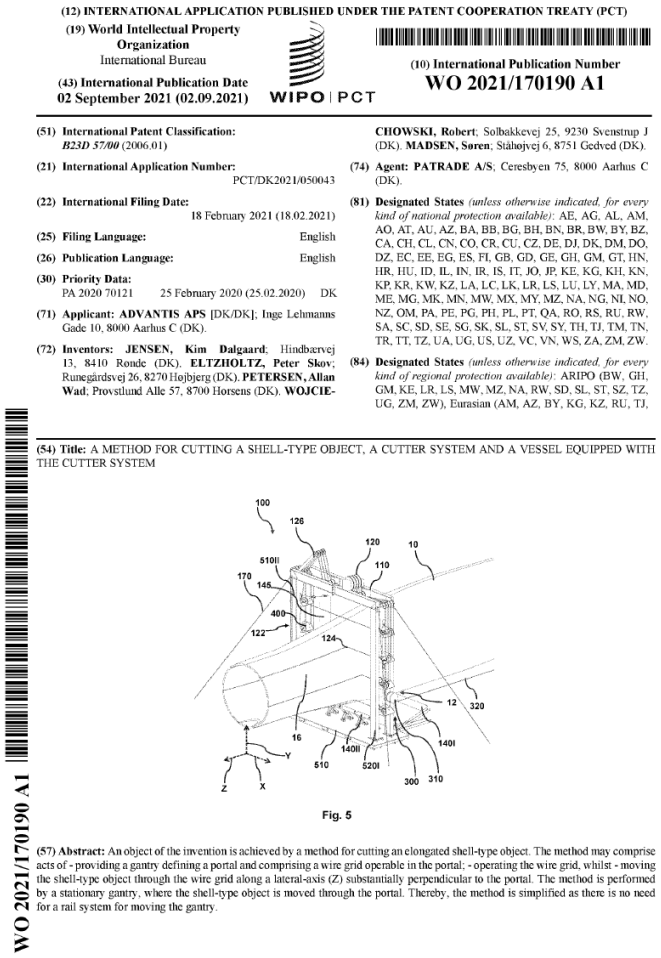
Equipment developed by Advantis

(WO2021/170190 A1 [A method for cutting shell-type object, a cutter system and a vessel equipped with the cutter system])

WCP Features

- Diamond Wire Cutting Portal – WCP
- Environmental Protection System – Dust Collection System
- Fully scalable solution – Can handle all current existing turbine blades on the marked
- On-site solution – reduction of CO2 emissions and cost related to blade return transport
- Semi-automatic wire guiding feeding system
- Light equipment weight to size ratio (5-7 tons pr. system)
- Several systems can be fitted on standard truck 20” HQ Containers
- Fully flexible site system that can be moved around site to accommodate several blade locations
- Sectioning in manageable pieces before pre-shredding (utilizing commercially available pre-shredding systems)
- Sectioning in customized pieces allowing for several post treatment options





(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
02 September 2021 (02.09.2021)

WIPO | PCT

(10) International Publication Number
WO 2021/170190 A1

(51) International Patent Classification:
B23D 57/00 (2006.01)

(21) International Application Number:
PCT/DK2021/050043

(22) International Filing Date:
18 February 2021 (18.02.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PA 2020 70121 25 February 2020 (25.02.2020) DK

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

(54) Title: A METHOD FOR CUTTING A SHELL-TYPE OBJECT, A CUTTER SYSTEM AND A VESSEL EQUIPPED WITH THE CUTTER SYSTEM

Fig. 5

(57) Abstract: An object of the invention is achieved by a method for cutting an elongated shell-type object. The method may comprise acts of - providing a gantry defining a portal and comprising a wire grid operable in the portal; - operating the wire grid, whilst - moving the shell-type object through the wire grid along a lateral-axis (Z) substantially perpendicular to the portal. The method is performed by a stationary gantry, where the shell-type object is moved through the portal. Thereby, the method is simplified as there is no need for a rail system for moving the gantry.

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HOW

01 Pre-Processing Blade

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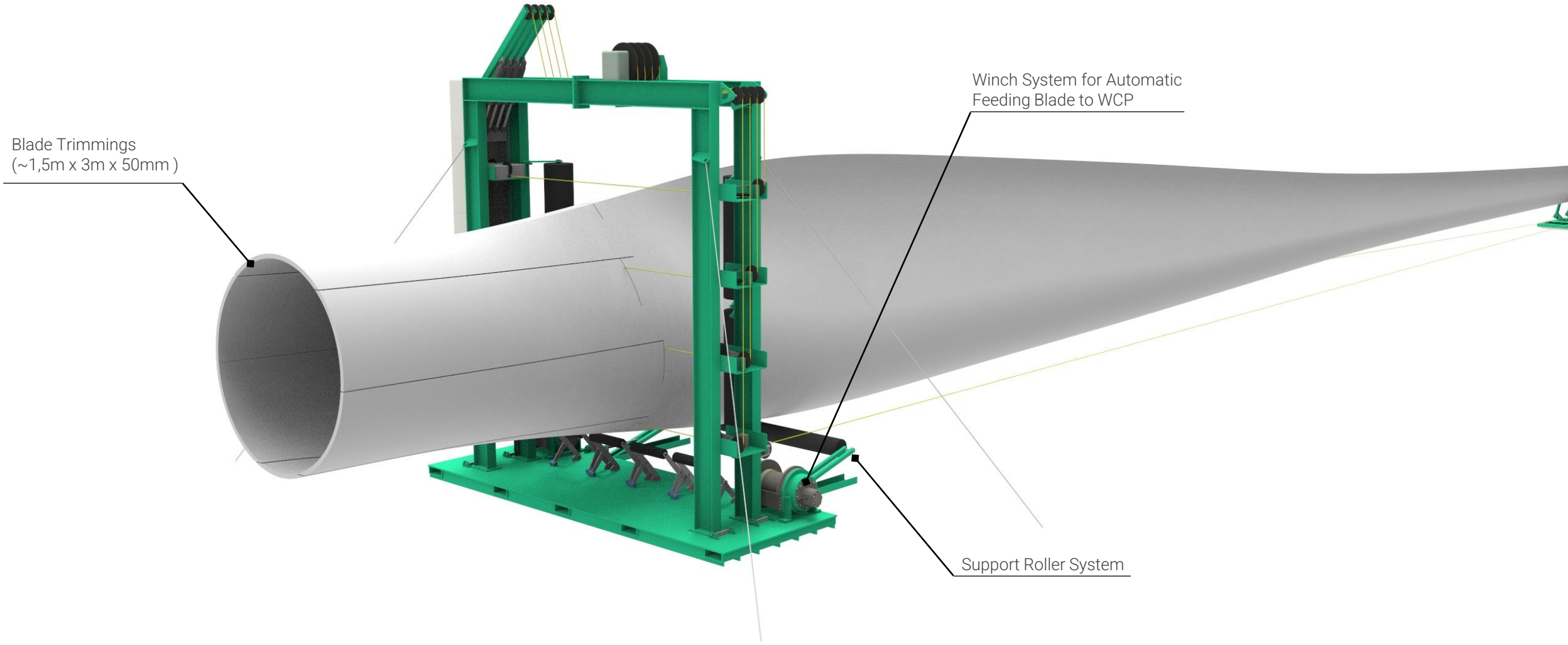

HOW

01 Pre-Processing
Blade

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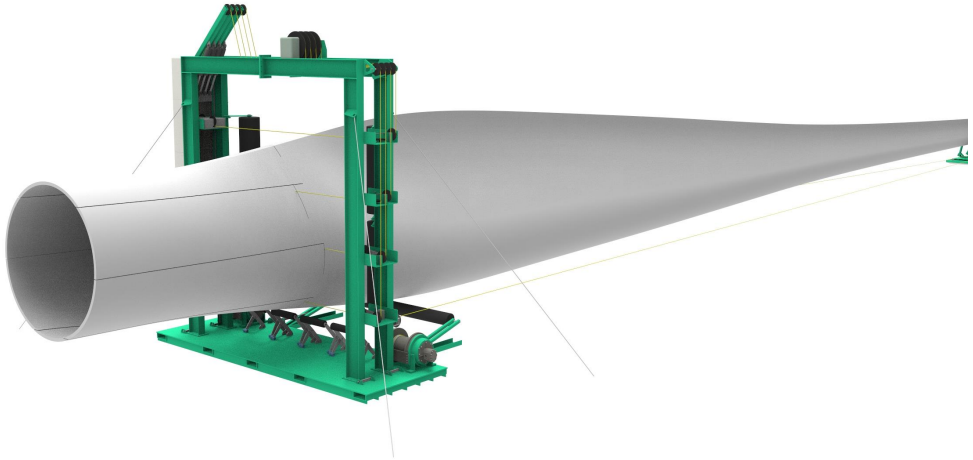
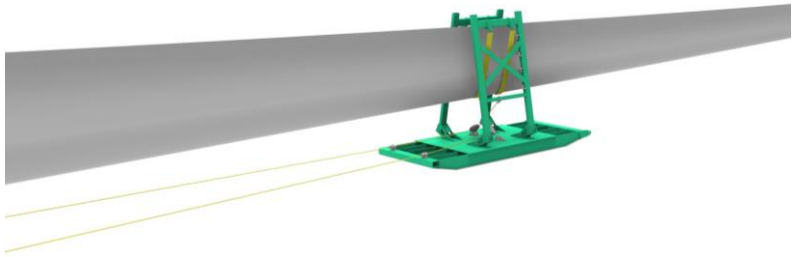
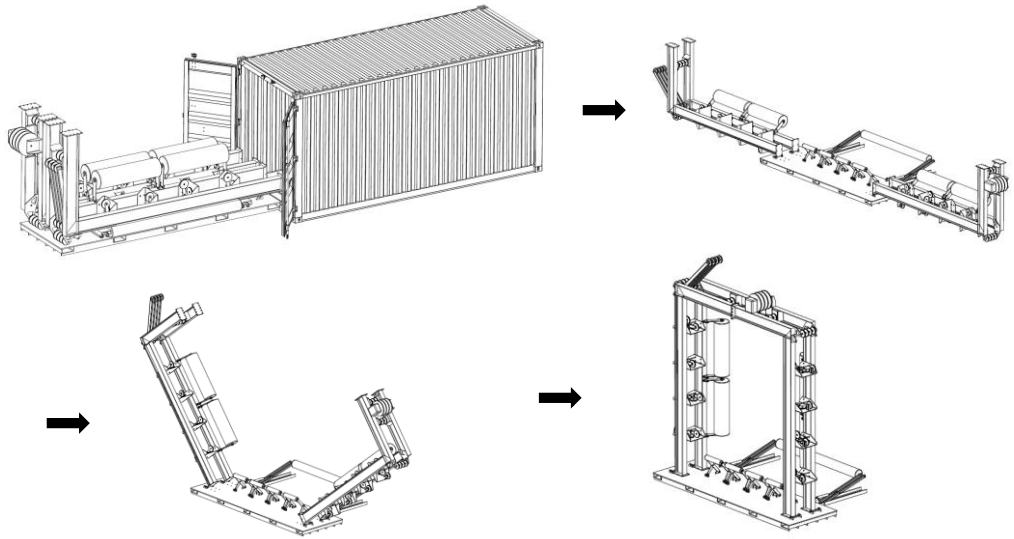
Diamond Wire Cutting Portal - WCP



Sledge System





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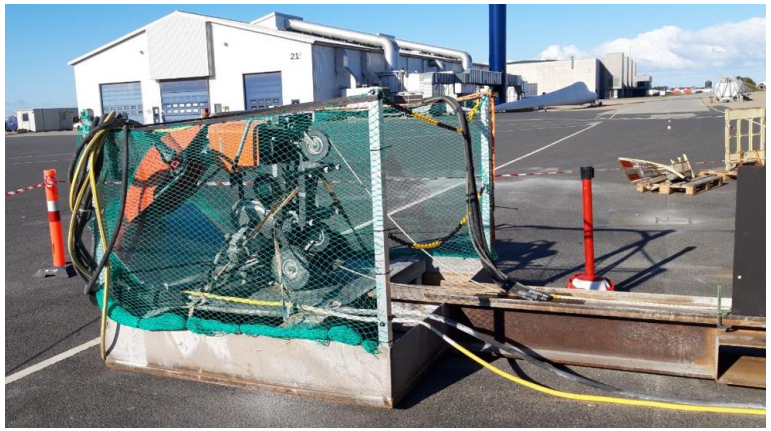
Sectioning of blade with generic construction cutting equipment (DWC)

- Diamond Wire Cutting Portal – WCP – wear on diamond wire (OPEX cost)
- Dust when cutting in blade – environmental protection system and collection system at WTG site







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Funding history for Development of Blade Cutter

- ✗ Multiple Innobooster application (National DK Funding) from 2019&2020 - DECLINED
- ✗ 2021 EUDP (Energy Technology Development and Demonstration Program – National DK Funding) – "Blade Cutter - Maximizing value of end-of-life blades" - DECLINED
- ✓ 2022 Horizon 2022 - HORIZON-CL5-2022-D3-01-02 – "Demonstration of innovative materials, supply cycles, recycling technologies to increase the overall circularity of wind energy technology and to reduce the primary use of critical raw materials" – GRANTED – Kick-off Spain Q1 January

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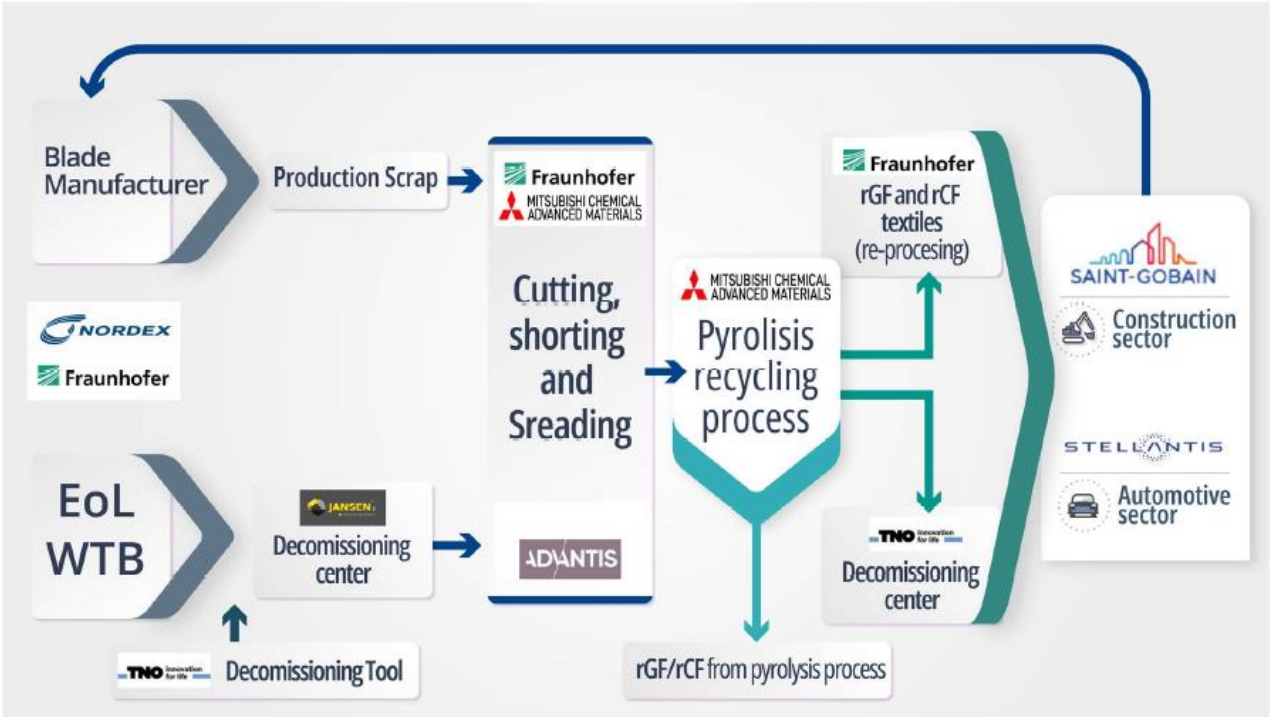
Horizon 2022 - HORIZON-CL5-2022-D3-01-02

KER4: Blade cutter for WTB decommissioning	Developed by: **ADV** Used by: **JRG**	**Related to: SO4**
Value proposition: The intelligent and flexible blade cutter will be the only technology that **enables both horizontal and vertical cuts** without any manual handling and ensuring a **high level of safety.** It reduces the decommissioning cost for wind farms owners by its **time eficient** technology able to cut WTBs in 2-3 times faster Transport and on-site installation. Besides that, the system contributes to decarbonisation of the wind energy sector, as it guarantees no parts of the handled WTB has gone to disposal or incinerator.		
Target: Recycling and Decommissioning companies engaged in decommissioning either directly on wind turbine site or local recycling facilities.		
Exploitation strategy: In a first stage, ADV's Blade Cutter will be mainly commercialized and targeted at onshore wind farms. The offshore market is presented as a potential market expansion. ADV envisaged extra revenue of 120€/ton per decommissioning service, and 253€/ton per blade disposal. A total of 587M€ in European market during period 2025-2035.		
Scale up: The system starts from TRL3 to TRL7 at project completion. Actual builder of the machine needs to be determined. Iterations can be expected. Measuring of the performance needed (ton/h, wearing of the diamond wire, use of energy), integration with environmental protection system.		
Impact: Expected CO2 reduction associated with transport of blades by a factor ~9 (onsite cutting with Blade Cutter System can reduce 120 special transports to 14 truckloads), cost reduction in transportation: 400 k€. Example of 120 blades (10 ton/per blade), reduce operating risks by automatization, reduce EoL issues. Reduction of the decommissioning costs for the wind park owners.		
Linked specific COM/DISS actions: ADV plans to attend 1-2 conferences on topics related to the wind sector like WindEurope.		



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Horizon 2022 - HORIZON-CL5-2022-D3-01-02

N.	Proposer name	Country
1	FUNDACION AITIIP	ES
2	NCC OPERATIONS LIMITED	UK
3	UNIVERSITY OF LEEDS	UK
4	ECHT regie in transitie B.V.	NL
5	NORDEX ENERGY GMBH	DE
6	MOSES PRODUCTOS SL	ES
7	MITSUBISHI CHEMICAL ADVANCED MATERIALS GMBH	DE
8	THE MANUFACTURING TECHNOLOGY CENTRE LIMITED	UK
9	CONSORCIO AERODROMO AEROPUERTO DE TERUEL	ES
10	Advantis ApS	DK
11	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	DE
12	Jansen Recycling Group B.V.	NL
13	MONDRAGON GOI ESKOLA POLITEKNIKOA JOSE MARIA ARIZMENDIARRIETA S COOP	ES
14	SAINT-GOBAIN PLACO IBERICA SA	ES
15	GLOBAL EQUITY & CORPORATE CONSULTING SL	ES
16	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO	NL
17	CENTRO RICERCHE FIAT SCPA	IT
18	POLYMERIS	FR
	Total:	

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QUESTIONS?

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