



Grøn omstilling i hele værdikæden

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RENEWABLE

Gamesa

1. Hvem er vi?
2. Introduktion til Siemens Gamesa
3. Den grønne omstilling set fra en global vindmølleproducent
4. Q&A – jeres spørgsmål

SIEMENS Gamesa



SIEMENS Gamesa

Hvem er vi?

Introduktion til Siemens Gamesa

Kort om Siemens Gamesa



+60 lande
global tilstedeværelse



+26.000 medarbejdere
i hele verden



**97 ud af 100
vindmøller**
installeret udenfor DK



+5.500 medarbejdere
i Danmark



+70 nationaliteter
i Danmark



~18% kvinder
(!)

Brande: R&D center og nacellefabrik



R&D centrum med testcenterfaciliteter i verdensklasse. Mere end 13.000 møller overvåges fra et af verdens mest avancerede diagnostikcentre. Samling af nav, generatorer og naceller. Globale, administrative funktioner.

Aalborg vingefabrik



**Producerer vinger med IntegralBlade® teknologi til land- og havvindmøller.
R&D: IECRE-certificeret vingetestcenter i verdensklasse med verdens største vinge-teststand.**

Esbjerg: For-montage og udslibning



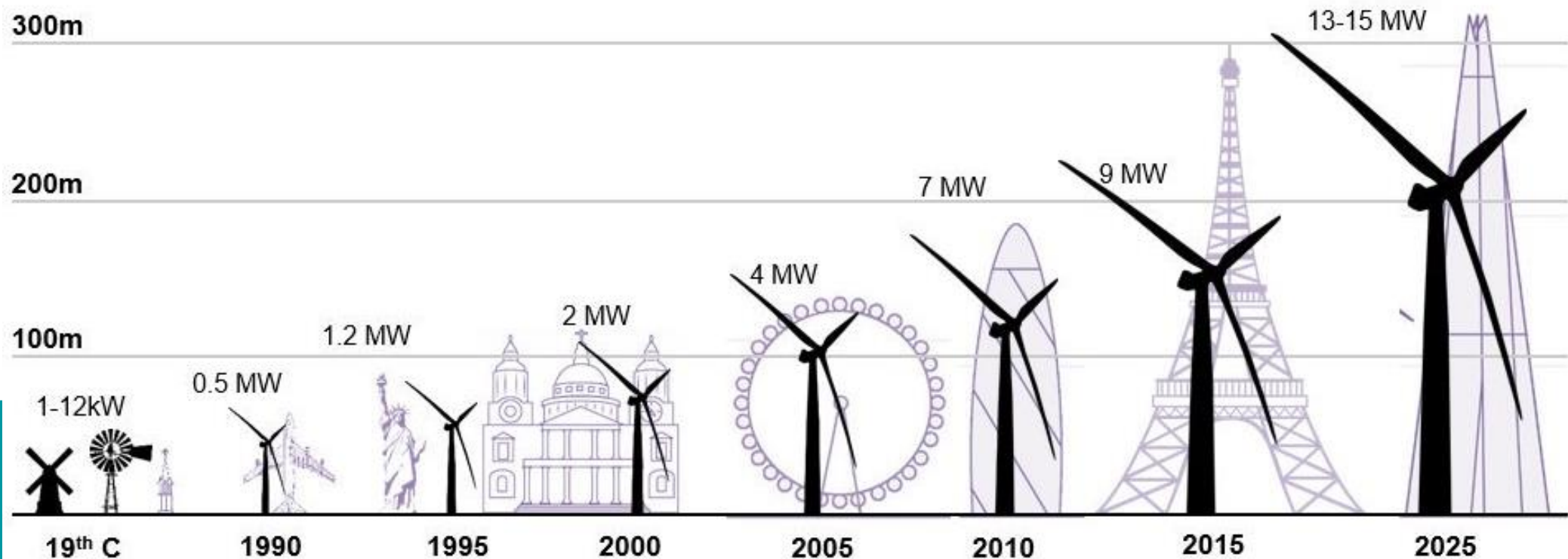
Naceller, vinger og tårne for-monteres til havmølleprojekter. Hver uge afskibes to til tre havvindmøller samt gods til landmølleprojekter. Offshore og Onshore centre for værktøj og udstyr samt specialopgaver for Service.

Vejle: Offshore hovedkvarter og administrative funktioner



Globalt Offshore hovedkvarter og kompetencecenter med alle funktioner repræsenteret – R&D, QM&HSE, Salg, Projekt-eksekvering.

En branche i vild udvikling



Sources: Various; Bloomberg New Energy Finance

32 September 19, 2017

Bloomberg
New Energy Finance



SIEMENS Gamesa
RENEWABLE ENERGY

Mission, Vision & Values

Mission

“We make real what matters –
Clean energy for generations to come”

Vision

“To be the **global leader** in the renewable
energy industry driving the transition
towards a sustainable world”

Results orientation

Results are **relevant**, delivered in a **timely manner** and at **appropriate cost**

Customer Focus

Think from a customer's perspective about how we can **excel in delivery**

Innovativeness

New solutions for customers and ourselves



Impactful leadership

Inspiring our people and **exemplifying the culture** and common values

Ownership attitude

People are motivated and engaged and see themselves as **drivers of business success**

Valuing people

Valuing the **importance of the individual**

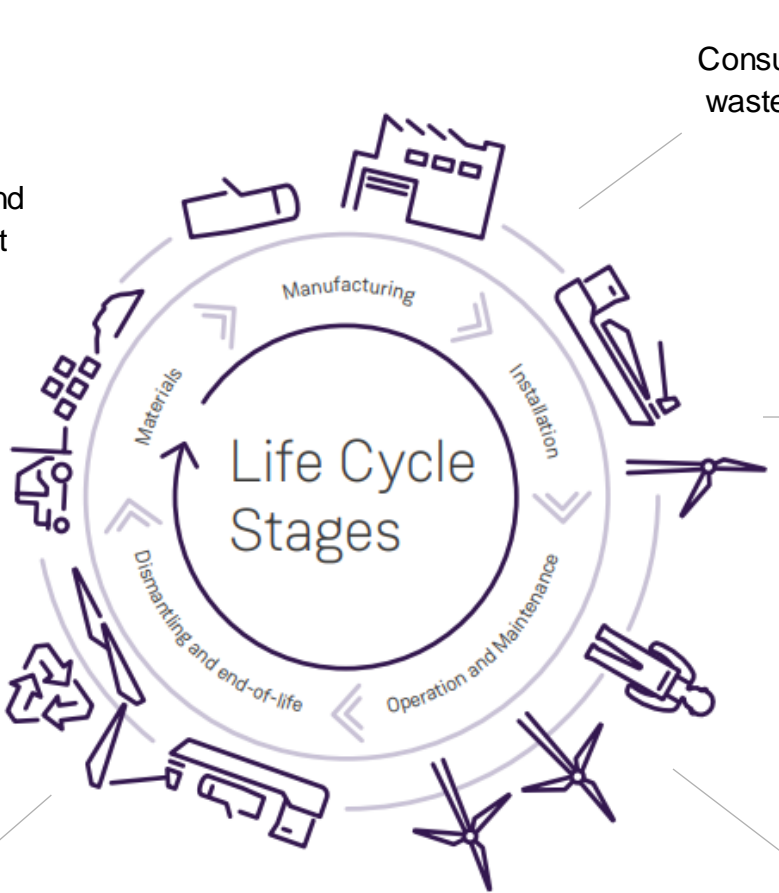


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Den grønne omstilling set herfra

Livscyklusvurdering – forstå impact

Understanding Siemens Gamesa's product life cycle in relation to the environment



Materials

Types and quantities of material and energy extracted and consumed to produce the turbine and elements needed to connect the wind power plant to the grid.

Manufacturing

Consumption data for manufacturing as well as waste and subsequent treatment. Transport of material included.

Installation

Consumption data for manufacturing as well as waste and subsequent treatment. Transport of materials included.

Operation and Maintenance

Manpower, materials and energy required for service and maintenance over the turbine's lifetime. Wake, availability and electrical losses included for a realistic estimate.

Dismantling and end-of-life

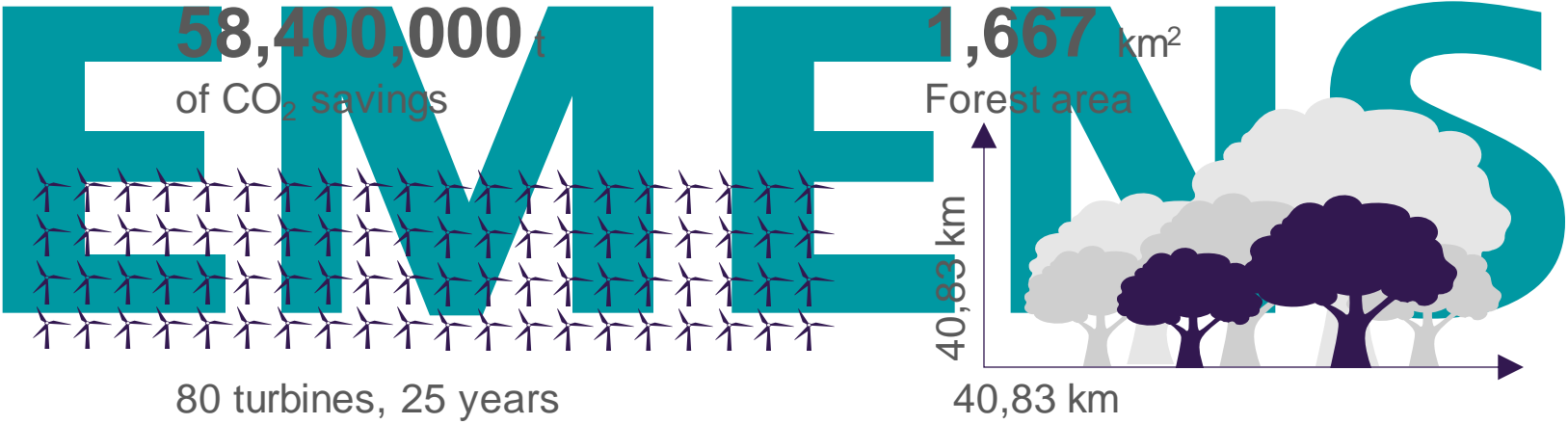
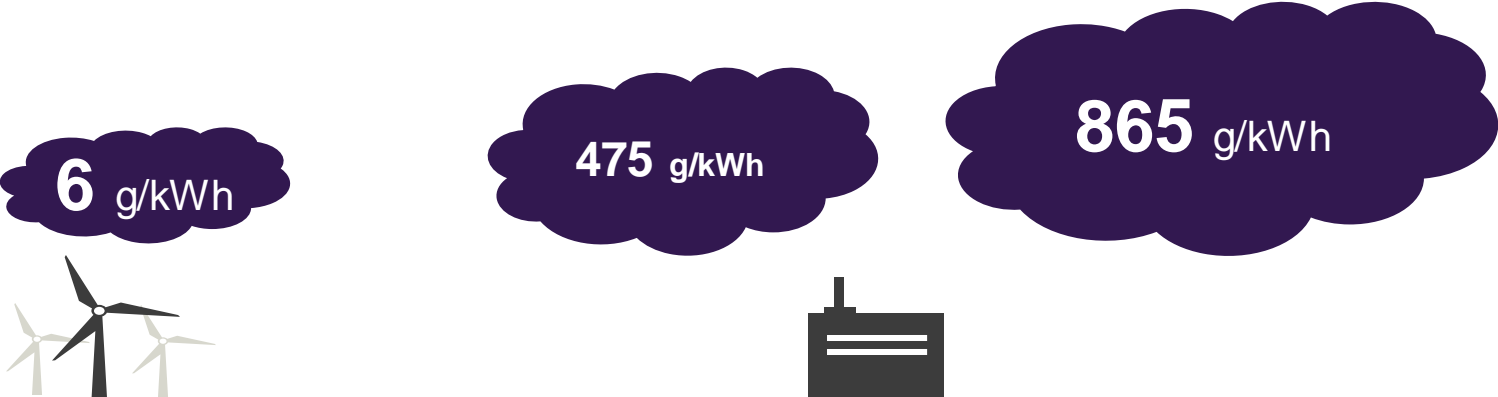
Disassembly, transport of components and materials. Recycling, thermal treatment or landfill disposal according to current waste management options

EM

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Improving our products' performance while focusing on environmental requirements

Energy payback time: <7.4 months



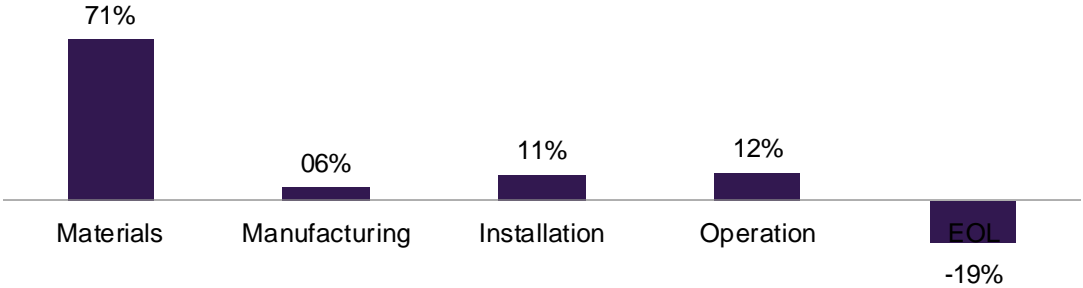
Environmental Product Declaration
SG 8.0-167 DD

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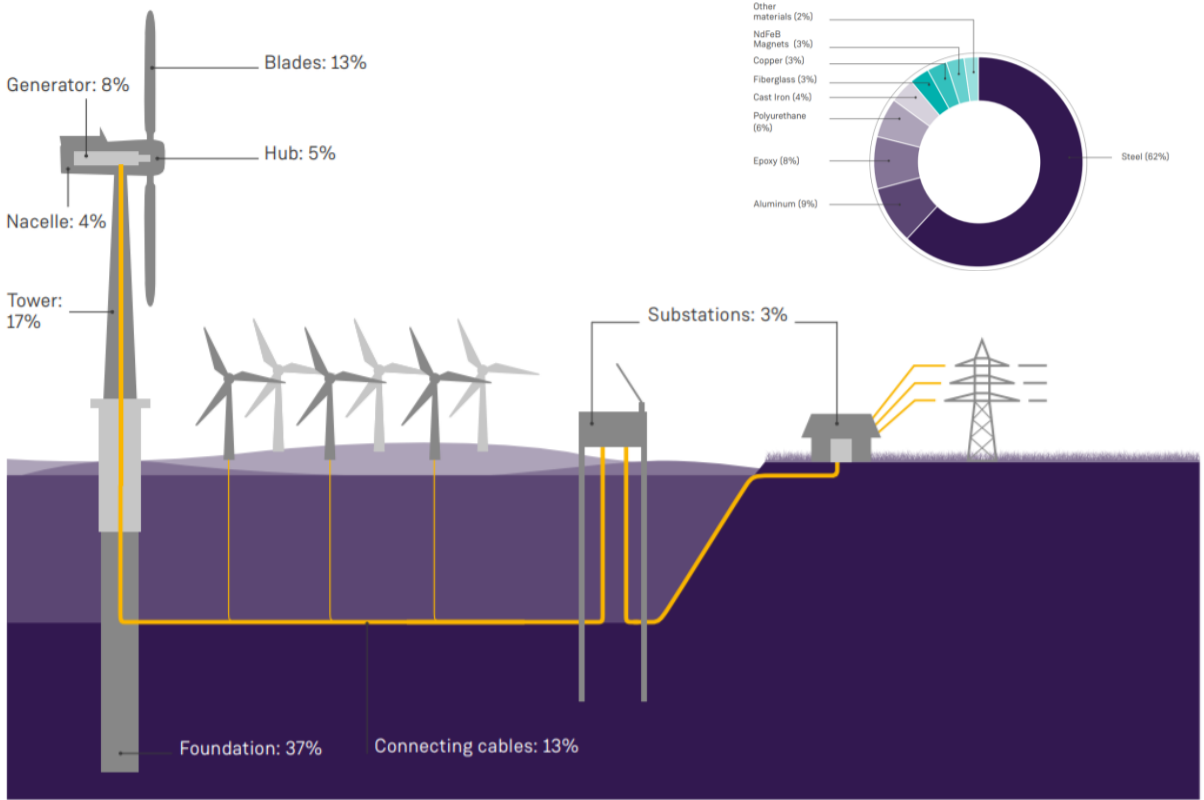
SG 8.0-167 DD

Life Cycle Assessments helps understand and improve environmental performance

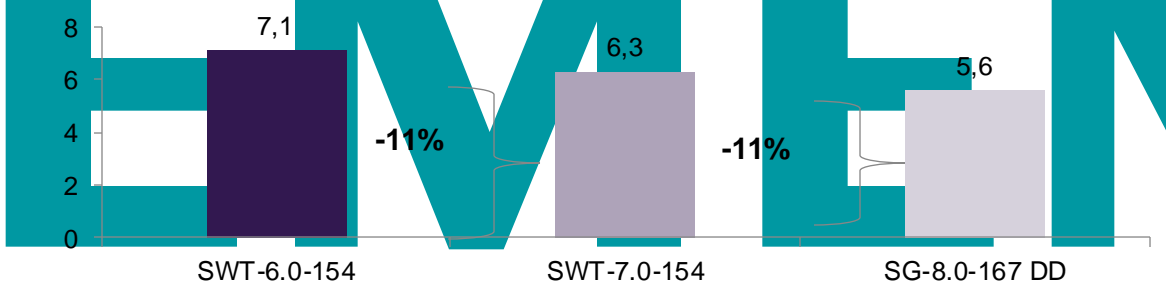
Percentage of global warming contribution from each life cycle stage



Global warming contribution of main components in the wind power plant (CO₂eq)



CO₂-eq. emissions per kWh to grid (gram)

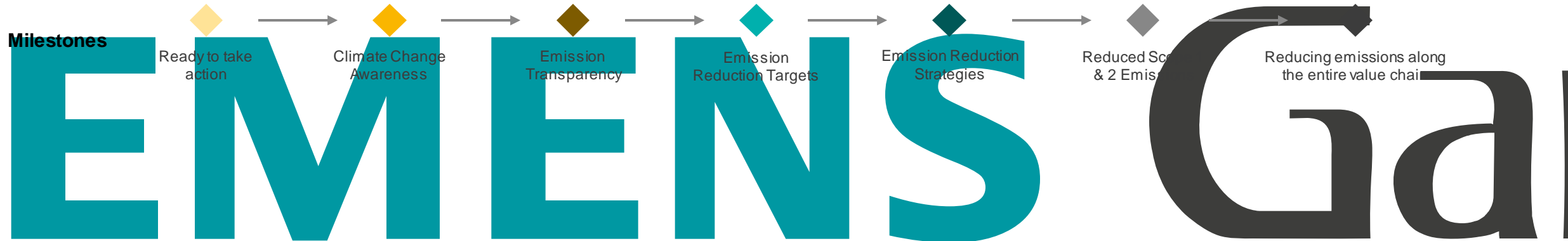


Net zero – hvorfor, hvad og hvordan?

The Siemens Gamesa journey... so far!



Milestones

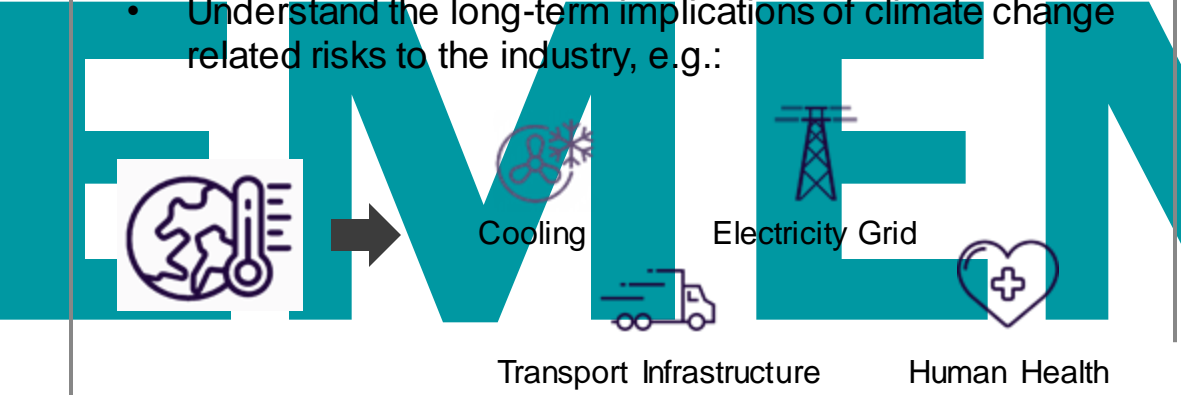


Milestone 1: Climate Change Awareness

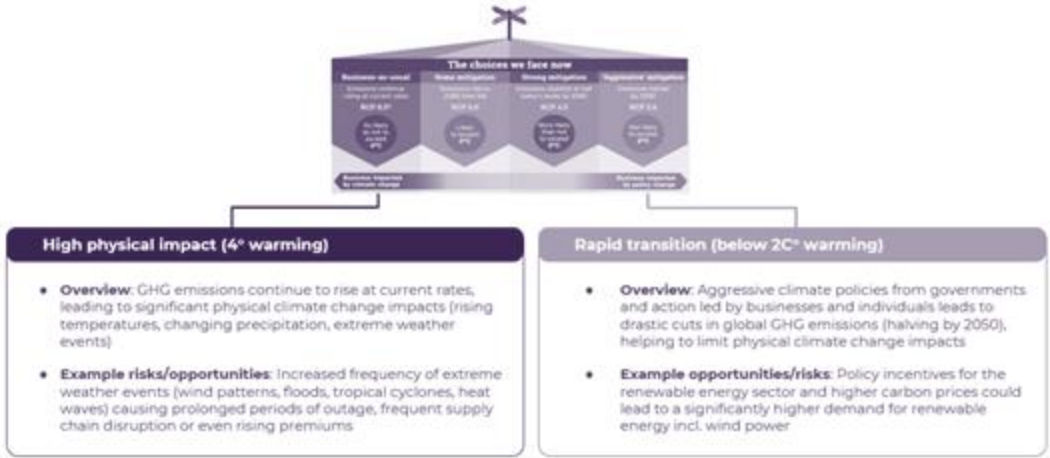


Expectations

- Understand the global emission reduction targets and current trends
- Understand the emission impacts and reduction targets of your regions / countries of production
- Understand the long-term implications of climate change related risks to the industry, e.g.:



SGRE action in brief



Milestone 2: Emission Transparency



Expectations

- Implement a structured system to continuously track and reduce the emissions
- Understand the operational / organizational boundaries of the emissions within the company
- Understand the global warming impact of the different activities in the factory / premises

SGRE action in brief

- Procedure to track and analyze energy consumption and related emissions within operational control
- Procedure to identify and track emission saving projects
- Established operational boundaries
- Document and calculate GHG emissions + external verification
- Communicate transparently GHG emissions on a yearly basis

Milestone 3: Emission Reduction Targets

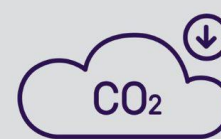


Expectations

- Set an ambitious but realistic carbon reduction target that specifically reflects the findings in your carbon inventory
 - Absolute / intensity target
- Commit to that target as a company and measure the progress and have it approved by Science Based Target initiative

SGRE action in brief

The Science Based Targets initiative has verified that our emission reduction targets are meeting the most ambitious 1.5°C scenario:



70% reduction of scope 1 and scope 2 greenhouse gas emissions per MW installed by 2025 (compared to 2017)



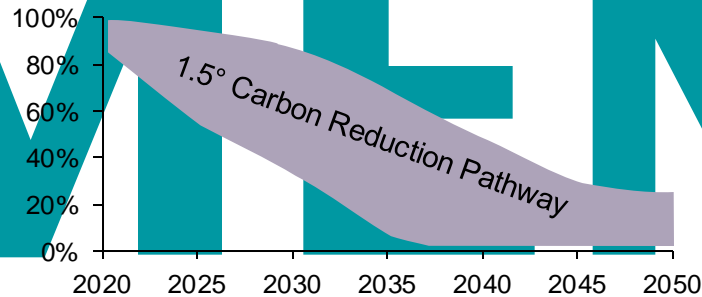
100% of annual electricity sourcing to be renewable by 2025 (up from 58% in 2017)



30% (minimum) of Siemens Gamesa's suppliers to have science-based targets by 2025



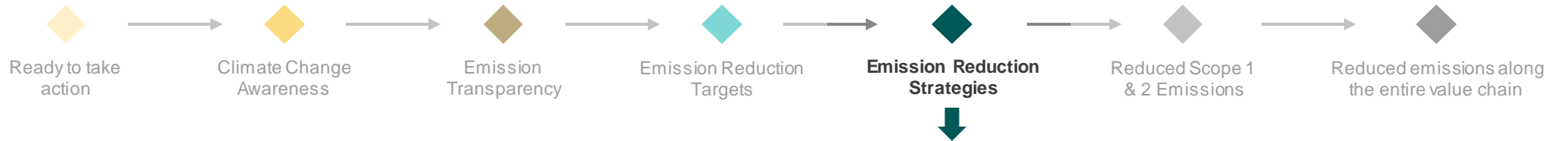
SCIENCE
BASED
TARGETS



SCIENCE
BASED
TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

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Milestone 4: Emission Reduction Strategies



Expectations	SGRE action in brief
<ul style="list-style-type: none"> Develop and implement carbon reduction strategies, using the data from your carbon inventory: 	<p>Energy reductions and efficiency measures Increase energy efficiency in existing factories as well as sustainable new constructions ▶ Energy mapping, reduction targets and actions plans</p>
<p>Scope 1 (examples)</p> <p>Upgrade Technology Optimize Cooling/Heating Change Fuels Improve Recycling</p>	<p>Electricity supply from renewable sources Move towards a cleaner power mix with a strong focus on renewables and bio-gas ▶ On-site, self generation + procurement of 100% renewable electricity</p>
<p>Scope 2 (examples)</p> <p>Energy Efficiency Renewable Energy</p>	<p>Green mobility plan to reduce fleet emissions ▶ Systematically utilize potential low emission cars in fleet, including E-car potential ▶ Low-emission modes of transport for service, commute and transportation</p>
<p>Scope 3 (examples)</p> <p>Value Chain Collaboration Green Procurement</p>	<p>Employee campaigns and idea management ▶ Deploy contests for sustainable behaviour to increase awareness and ownership amongst employees ▶ Capture and implement employee ideas related to sustainability</p>

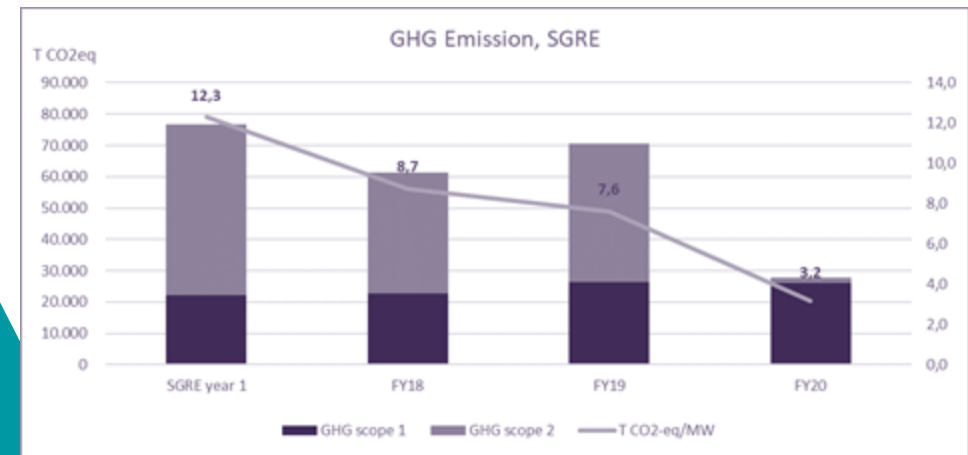
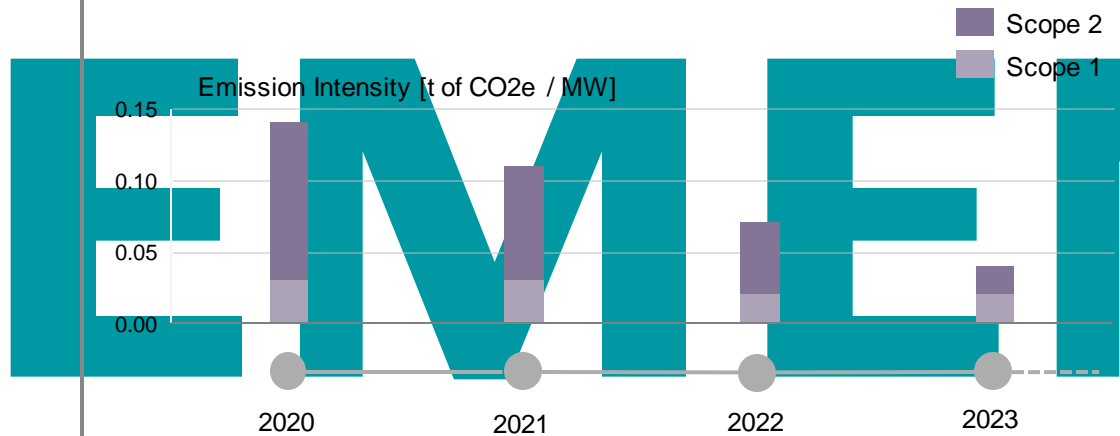
Milestone 5: Reduced Scope 1 and 2 Emissions



Expectations

- Successfully reduced Scope 1 & 2 emissions:
 - Below industry standard
 - With carbon neutrality target

SGRE action in brief



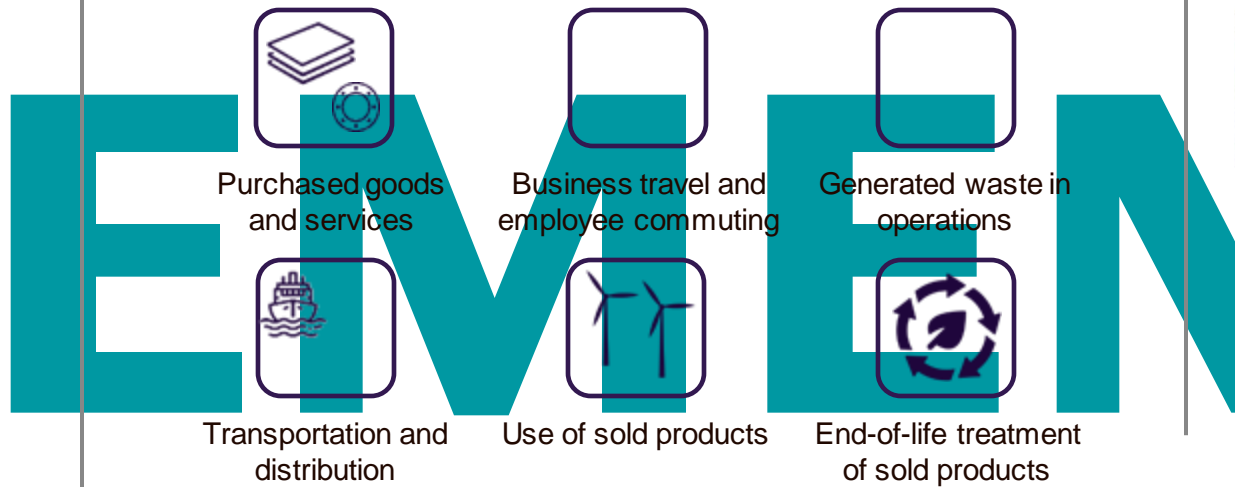


Milestone 6: Reduced emissions along the entire value chain



Expectations

- Collaboration with Supply Chain Partners
- Circular Economy Approach



SGRE action in brief

KLIMAKLAR SMV

Siemens Gamesa har over 1500 danske underleverandører. 30 procent af indkøbsvolumen skal i 2025 være styret af om leverandører har en CO2-plan.

Decarbonizing the supply chain
The next step on our journey to net zero emissions by 2050.

Sustainable Company

SGRE Supplier Maturity Rating 2020
(47 rated Suppliers of Tower Supply Chain)

Component	Progress (0-100%)
Steel	~80%
Flanges	~60%
Internals	~40%
Paint	~20%
Tower	~10%

Cirkulær økonomi – spar på ressourcerne

**Most of the turbine recyclable (80- 90% by weight)
Composites remain a challenge**

Component	Material	Disposal route
Foundation	<ul style="list-style-type: none"> • Concrete • Steel 	<ul style="list-style-type: none"> • Recycling or building material
Tower	<ul style="list-style-type: none"> • Coated steel 	<ul style="list-style-type: none"> • Scrap metal to be re-used in steel mills
Drive train	<ul style="list-style-type: none"> • Cast iron • Steel • Lubricants 	<ul style="list-style-type: none"> • Material recycling or re-processing
Generator	<ul style="list-style-type: none"> • Cast iron • Copper • Electronics 	<ul style="list-style-type: none"> • Material recycling or re-processing
Electronics	<ul style="list-style-type: none"> • Cable • Switch boards 	<ul style="list-style-type: none"> • Material recycling or re-processing
Rotor blades, Nacelle housing	<ul style="list-style-type: none"> • Fibre composites • Resins • Other (Sandwich core, coating, metal) 	<ul style="list-style-type: none"> • Landfilling • Incineration • Cement co-processing

RENEWABLES GOALS

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Blade waste routes

Blade waste management

Recycling concepts

Disposal

Recovery

Recycling

Recycling methods

Landfill

Incineration /
Cement co-processing

Re-use of blades

Mechanical

Thermal

Chemical

Shredding

Chcrushing

Pyrolysis

Solvolysis

Fluidized bed

Supercritical fluids

Examples of secondary outcomes

Energy

Wind turbines
Architectural purposes

Filler material
ie. for noise barrier,
concrete, etc

Reusable fibers +
energy

Reusable fibers + oil
(for energy)

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Blade waste routes

Recycling concepts

Disposal

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Recycling methods

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processing

Re-use of
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Thermal

Chemical

Solvolysis

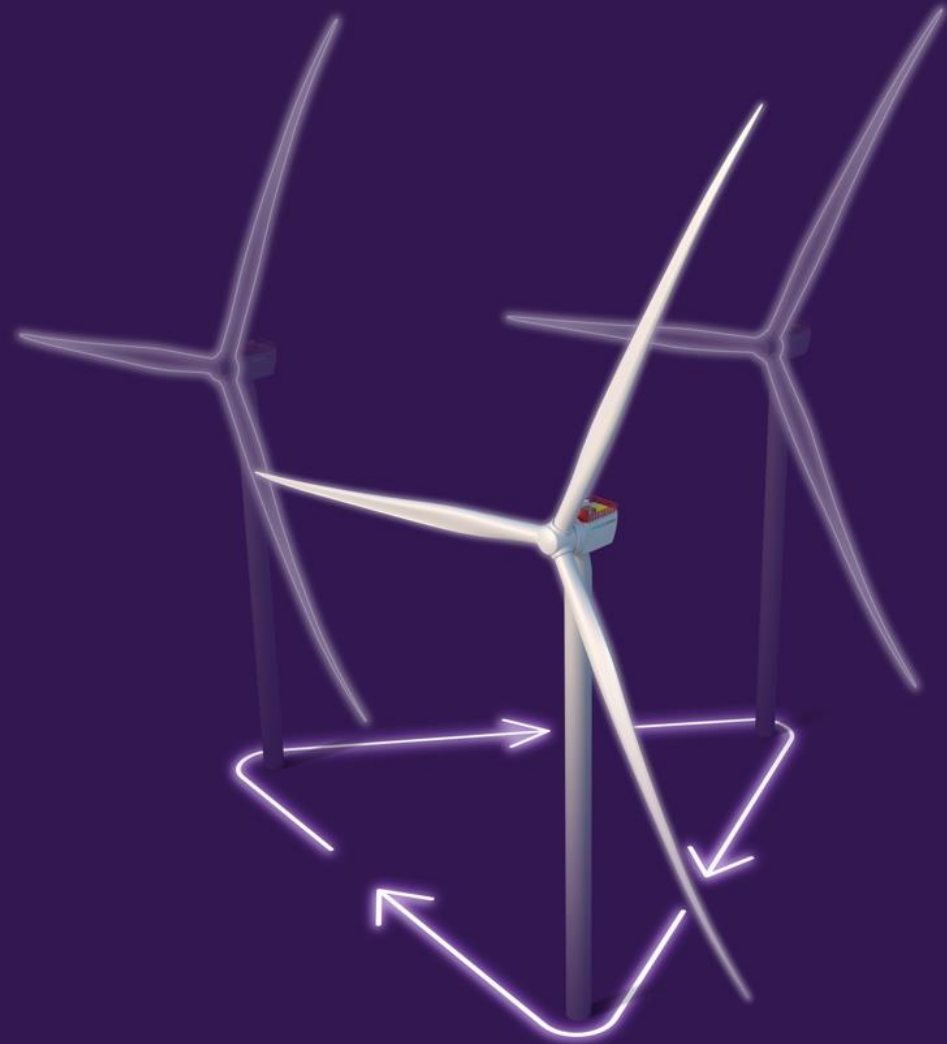
Pyrolysis

Examples of secondary outcomes

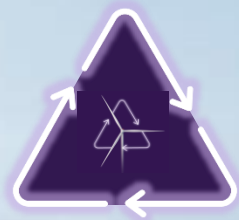


RecyclableBlade

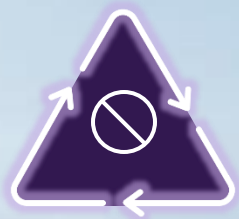
Taking responsibility.
Blade by blade.



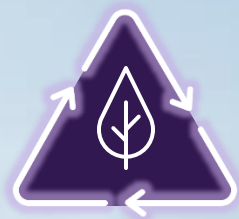
Ambitious target for fully recyclable blades and turbines



Siemens Gamesa has set a target to have fully recyclable blades by 2030 and fully recyclable turbines by 2040



Siemens Gamesa is working with WindEurope and other major players in the industry on a call for action to have a Europe-wide landfill ban and to support the road towards full recyclability.



Siemens Gamesa is part of the DecomBlades project with other major players, to find joint solutions to tackle the decommissioning and recycling of already installed blades.

Increasing demand, focus and opportunities



Societal and regulatory focus on circular economy ie.:

- Landfill bans in a range of countries including the Netherlands, Germany and other European countries
- Specific circularity legislation in France.
- Increasing auction focus on sustainability



Selling the recycled materials instead of paying to get rid of them could turn part of the decommissioning cost into revenues.



The energy transition in progress, means that Offshore wind power is expected to grow to nearly 1000 GW total installed capacity by 2050 .

Same means same, but recyclable



The RecyclableBlade utilizes the same IntegralBlade design criteria as previous, and the only change is the recyclable resin.



The recyclable resin is structurally comparable to current resin systems, with the added benefit that it has the ability to be dissolved again after decommissioning.



Using the RecyclableBlade in a wind power plant is no different from any other SGRE blade.



The RecyclableBlade process from initial idea to full scale production



Initial idea

- The initial idea behind the RecyclableBlade concept was developed in 2018 in cooperation with a sub-supplier who had already performed initial resin and recyclability testing.



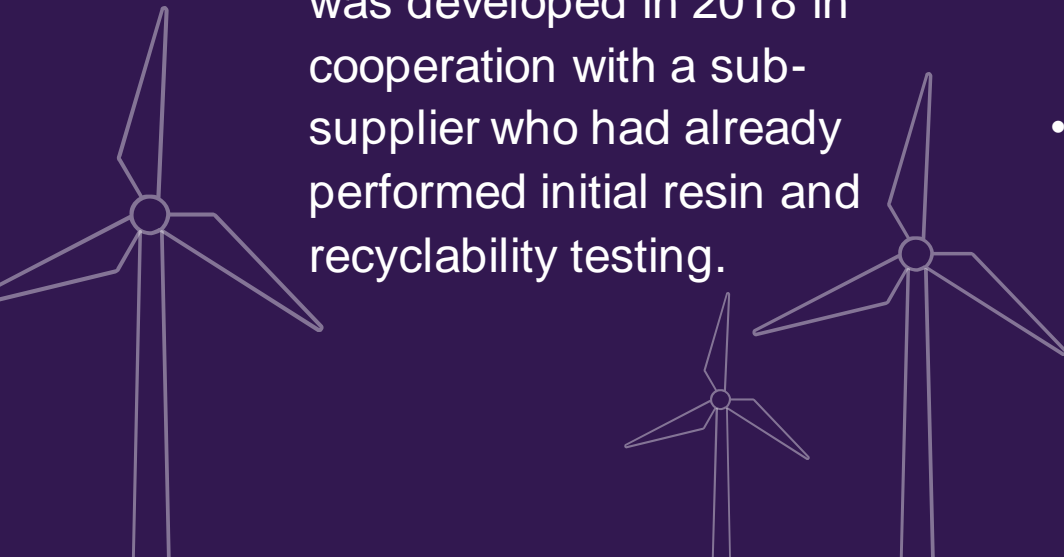
Qualification process

- A standard and detailed qualification process was undertaken, and the resin was fully validated.
- The RecyclableBlade product has been successfully tested on a number of B81 blades during 2021.

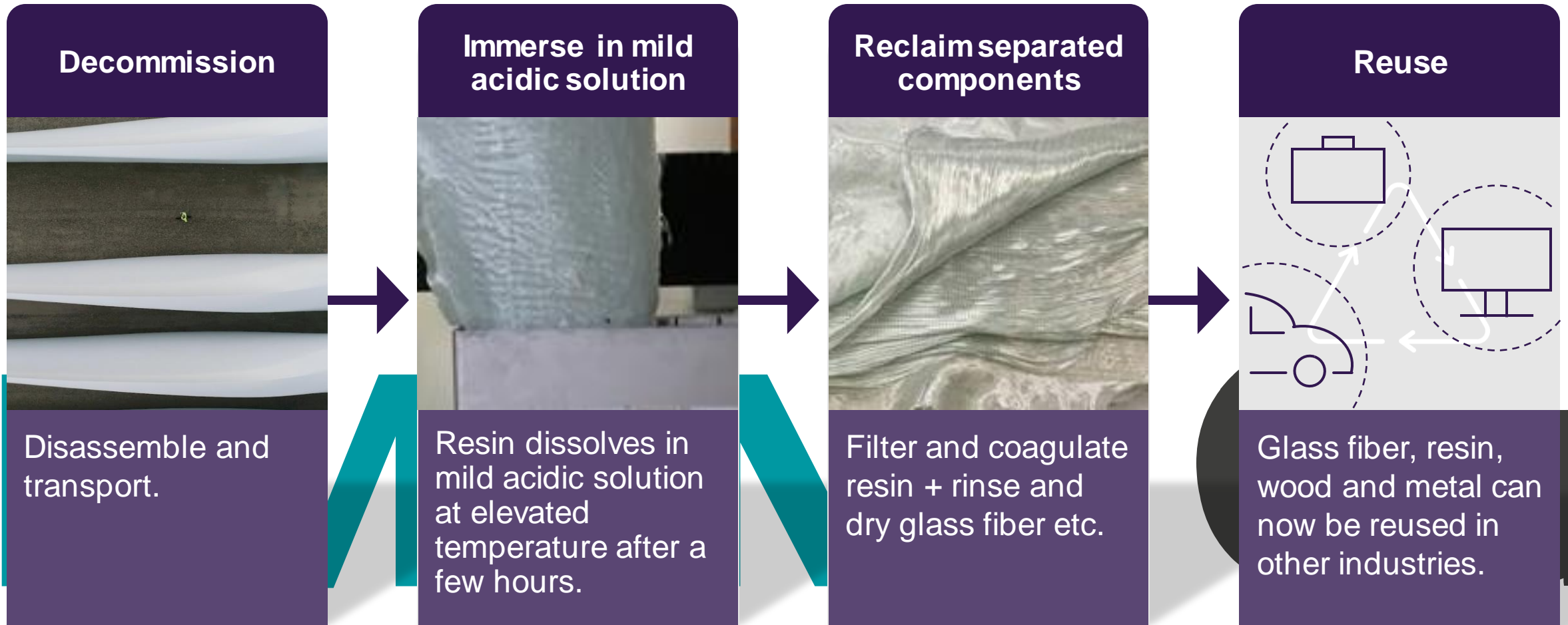


Full scale

- Industrialized setup for manufacturing is expected to be completed in the course of 2022.



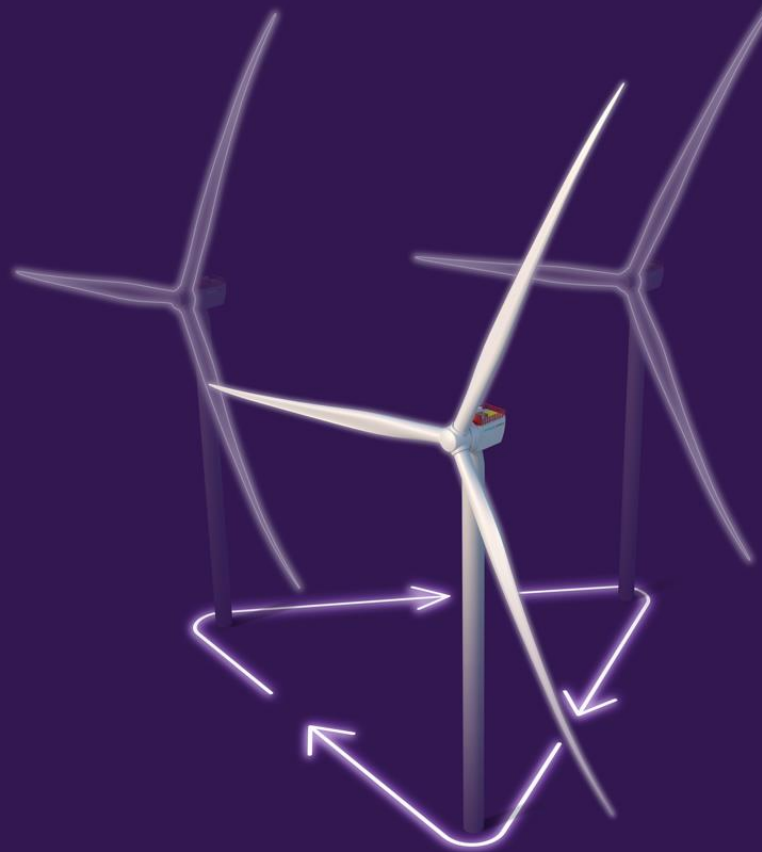
The recycling process for our RecyclableBlade is simple and fast



Siemens Gamesa has taken a big step towards our 2030 goal – already now.

The RecyclableBlade is one big step closer to our vision of a fully recyclable blade – already ready for the market today.

The recycled materials can be resources for new products after having produced clean energy for many years.



Increased recyclability with simple processing lowers end-of-life costs.

Environmental impact assessment shows an improvement due to the recycling of the materials and use of these in new applications.

Og nu er det tid til jeres spørgsmål

