

Ekitaldi:

Birmanufaktura bikaina metalezko osagaietan eta ekipoetan.

Produktuaren balioa hobeto atxikitzeko metodoa.

Oscar Lopez

HSE Manager Gamesa Gearbox

Jornada:

Remanufactura excelente en componentes de metal y equipos.

Método para mejorar la retención de valor del producto.



**EUSKO JAURLARITZA
GOBIERNO VASCO**

INDUSTRIA, TRANTSIZIO
ENERGETIKO ETA
JASANGARRITASUN SAILA

DEPARTAMENTO DE INDUSTRIA,
TRANSICIÓN ENERGÉTICA Y
SOSTENIBILIDAD

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Rentabilidad, Excelencia y Confianza del negocio de la Remanufactura

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HSE Manager Gamesa Gearbox



Gearbo^X | Future
by Gamesa | proof

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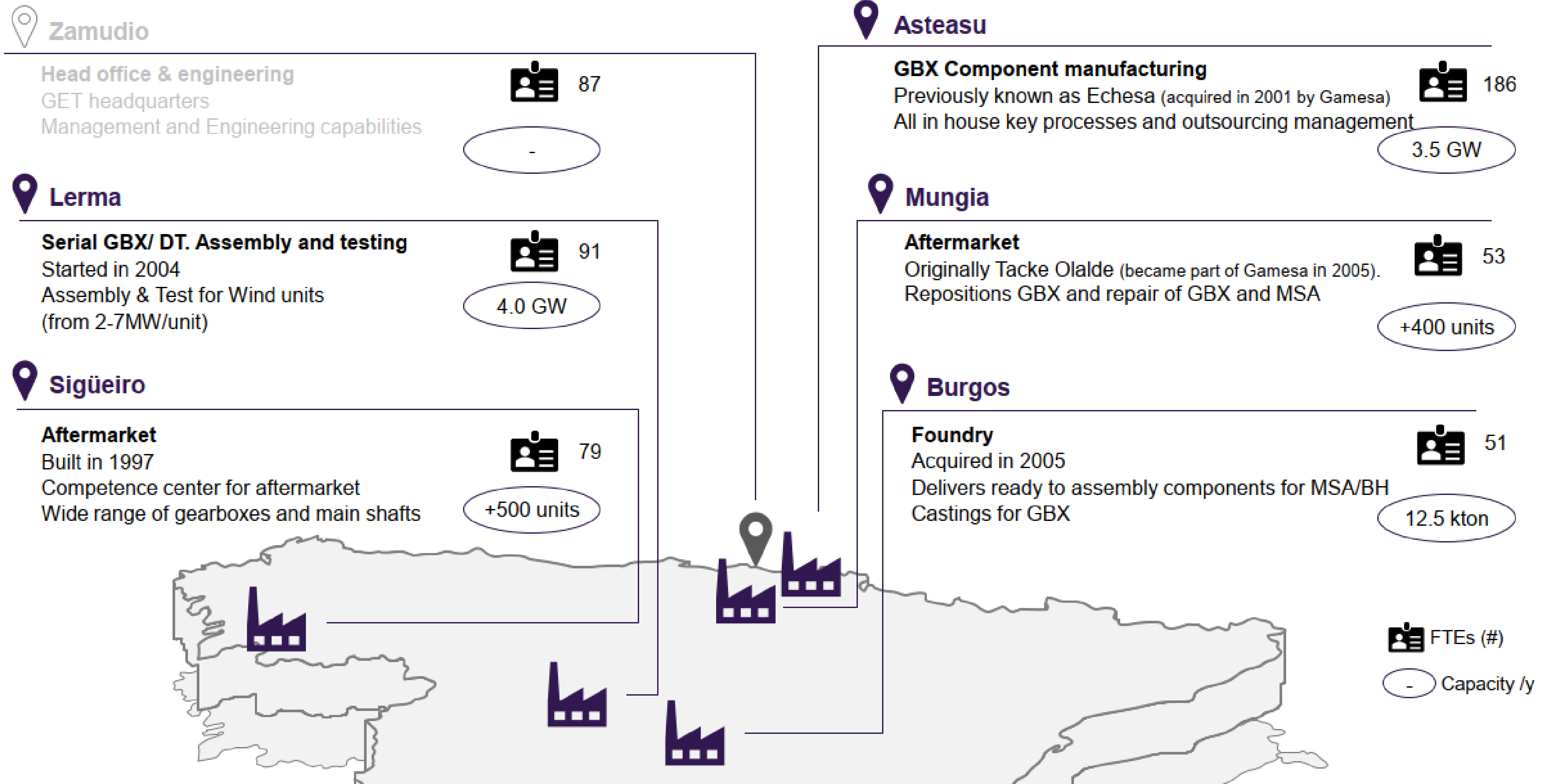
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Gearbox WW Player – Gamesa Gearbox
Top 3+1 Gbx manufactures leaders



GET capabilities in Spain developed through 5 plants specialized in each stage of the value chain



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Extensive AFTM catalogue of GBX & MS. **Multibrand** Re-engineering approach

SIEMENS Gamesa
(MADE / BONUS / GAMESA / SIEMENS ENERGY)

MULTITECH



SENVION
SUZLON



**Wind
GBX**

Reposition (New / Swap)

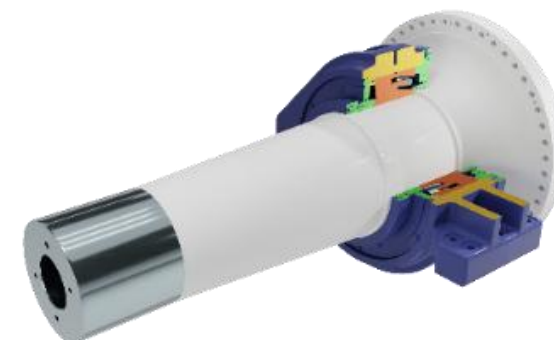
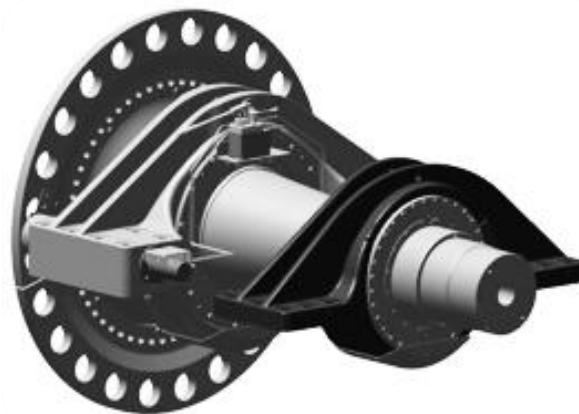


Remanufacturing



8,000 units
delivered during the
last **12 years**

**Wind
MS**



130 repair product
portfolio

**Industrial
units**



Tacke Olalde and Echesa brands, with over **50 years** experience and more than **4,000 gearboxes** delivered

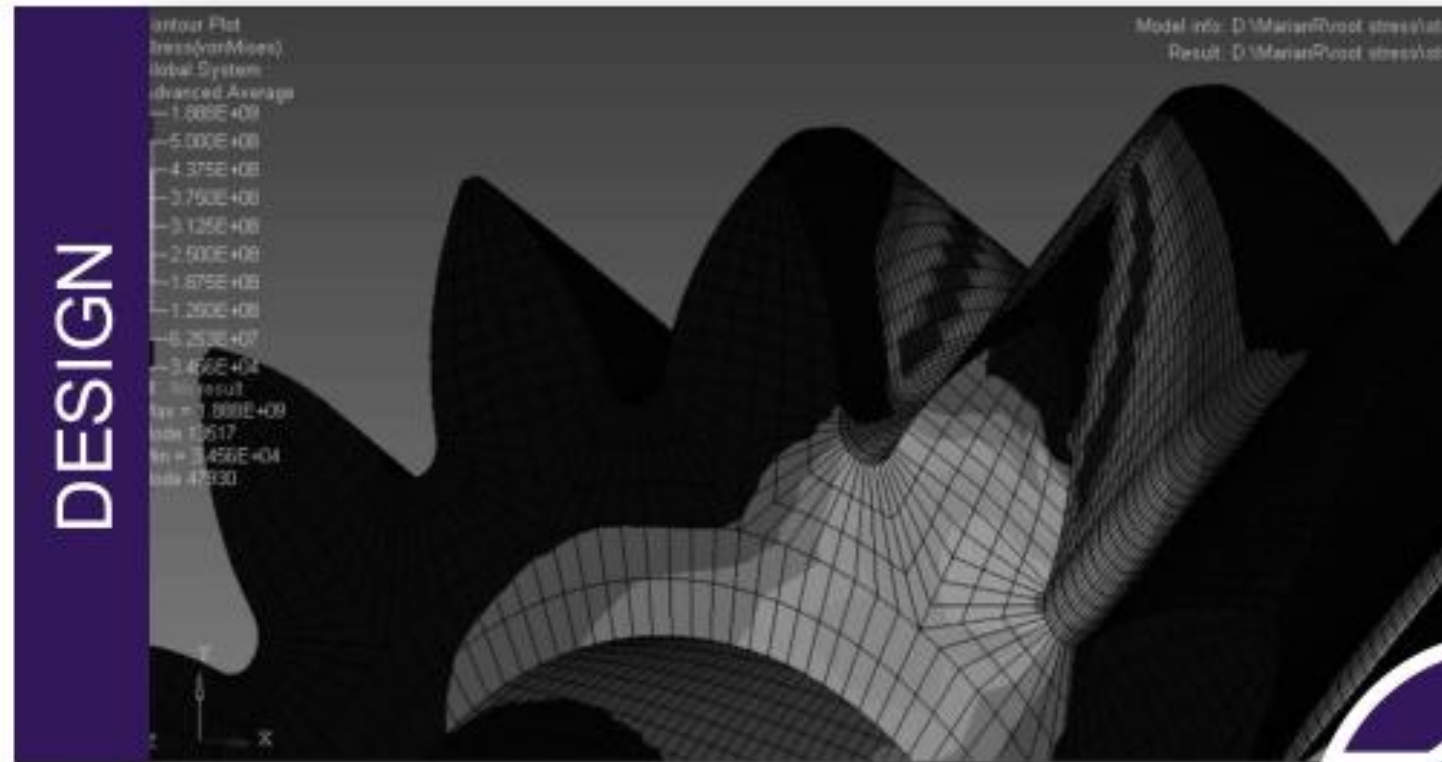
Customer portfolio and technical information available allow a non promoted busines with high margins

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Aftermarket privileged position



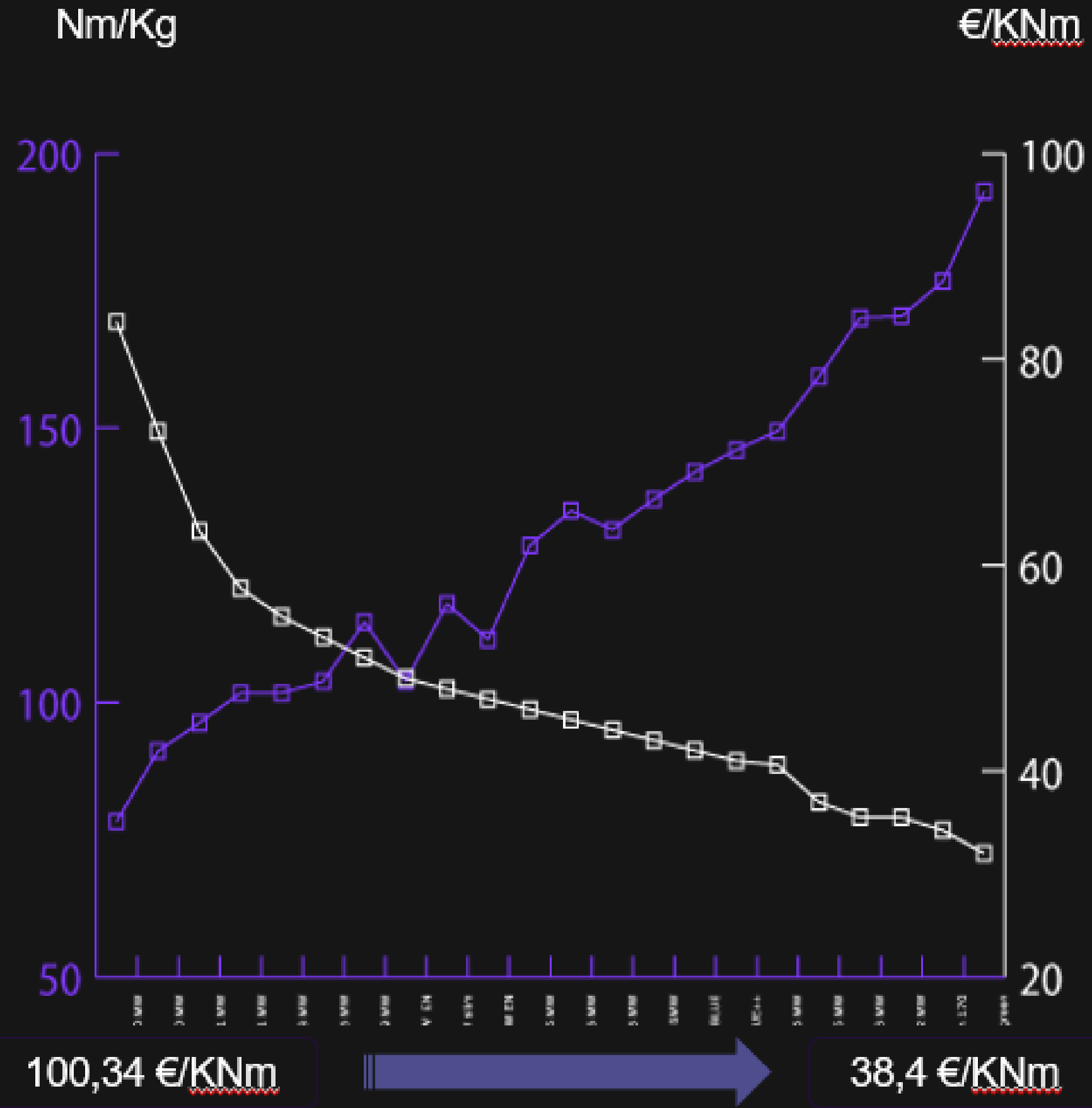
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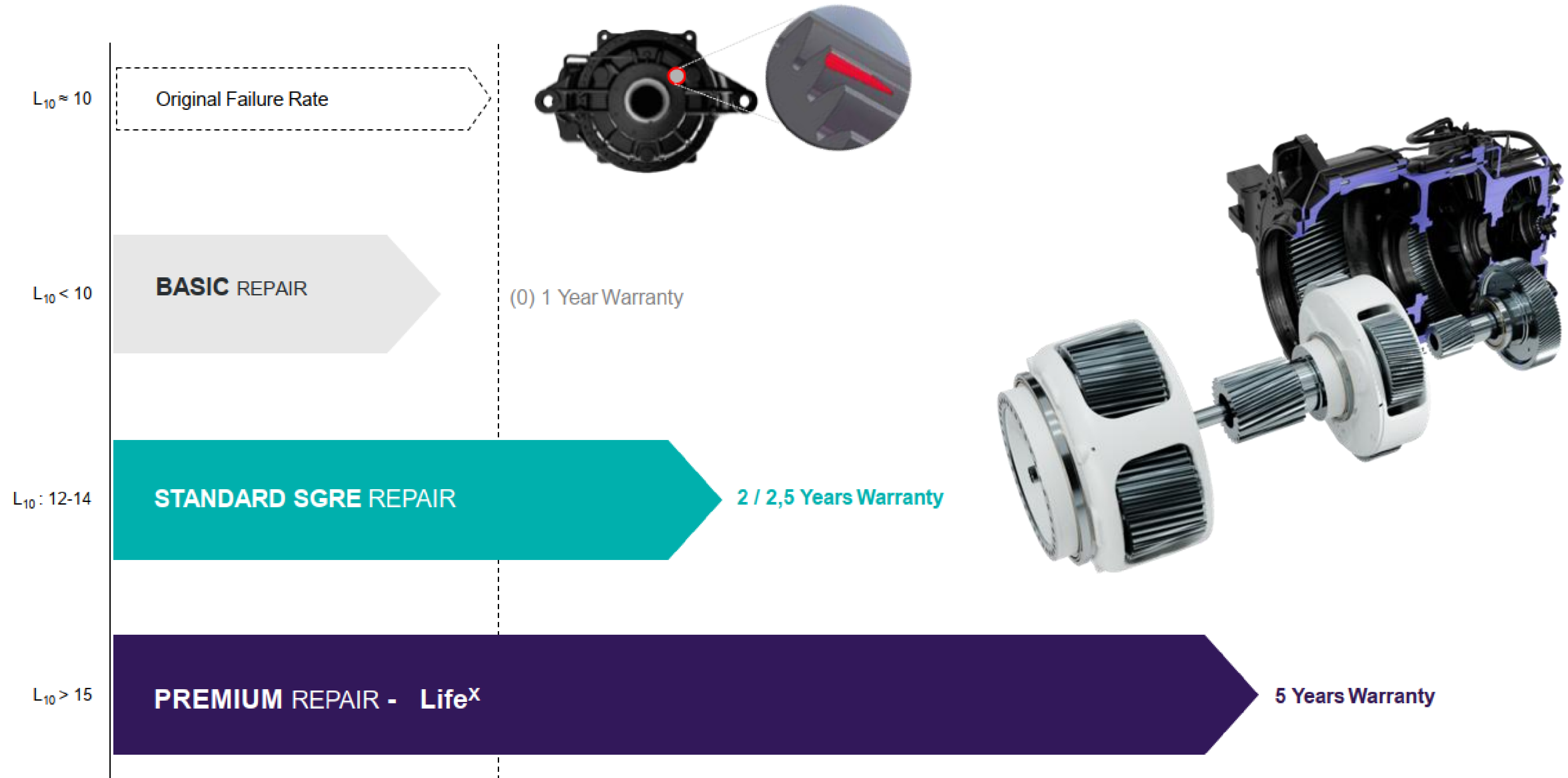
INNOVATION EVOLUTION

GBX dimensions & weight need to be reduced to optimize costs



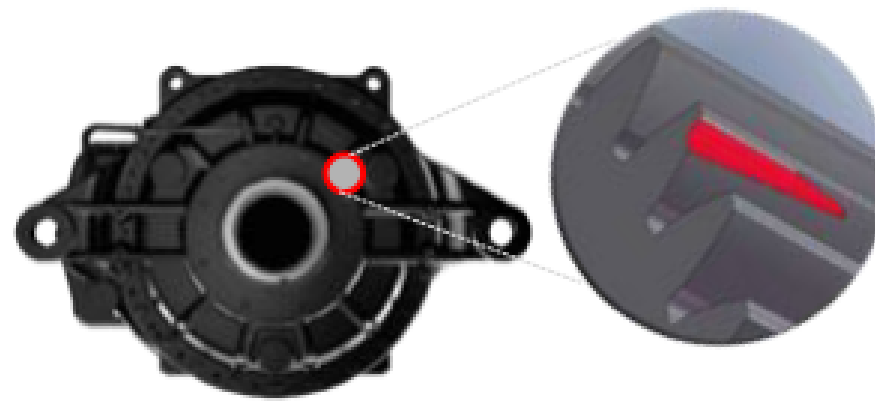
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Extended
Gbx Lifetime

Gearbox Failure

BASIC REPAIR

Gearbox Failure

STANDARD SGRE REPAIR

Gearbox Failure

PREMIUM REPAIR - Life^X

REMANUFACTURING

$$\text{IGS}^{\text{®}} = \text{SP} + \text{SF}$$

Shot Peening



Shot Peening

IGS is the combination of 2 non-conventional surface treatments that let us increase significantly gear capacities and performance.

IMPROVED
GEAR
SURFACE

Super Finishing



Super Finishing

The combination of shot peening followed by a superfinishing technique let us increase significantly gears fatigue performance, reducing also wear, and power losses.

METAL SPRAY SHAFT RECOVERY

GearboX by Gamesa



Thermal spray and laser cladding significantly improve wear and operational bending fatigue resistance compared to the baseline main shaft material. (Courtesy: Gamesa Gearbox)

WINDSYSTEMSMAG.COM



Performance Enhancement in Wind Turbine Main Shafts Using Surface Coating Techniques

Dr. Rubén Carranza, Ainhoa Okariz, Miguel Martínez

Abstract

Failures in wind turbine main shaft assemblies (MSA) are an increasing concern in the industry, both for their frequency and the downtime they cause [1], [2]. The rising power density of turbines, driven by competitiveness, has led to higher MSA failure rates and the appearance of defect types not seen in smaller units. This trend is prompting a reconsideration of MSA design and calculation methodologies [3], [4].

Conventional repairs that restore MSAs to their original design may not be sufficient to extend service life. Surface coating techniques, increasingly applied in recent years, offer a viable alternative by enabling shaft restoration and avoiding scrapping. Compared with full shaft replacement, these methods can provide cost savings and shorter lead times, while also creating opportunities to improve shaft performance and reduce MSA failure rates.

Main Shaft Failures and Repair Strategies

Wind turbine main shaft failures (MSA) are increasingly common. Causes include inadequate bearing design, manufacturing or assembly issues, insufficient maintenance, shaft cracking [5], or current-induced failures [6]. Low rotational speeds complicate early detection through standard temperature or vibration monitoring [7].

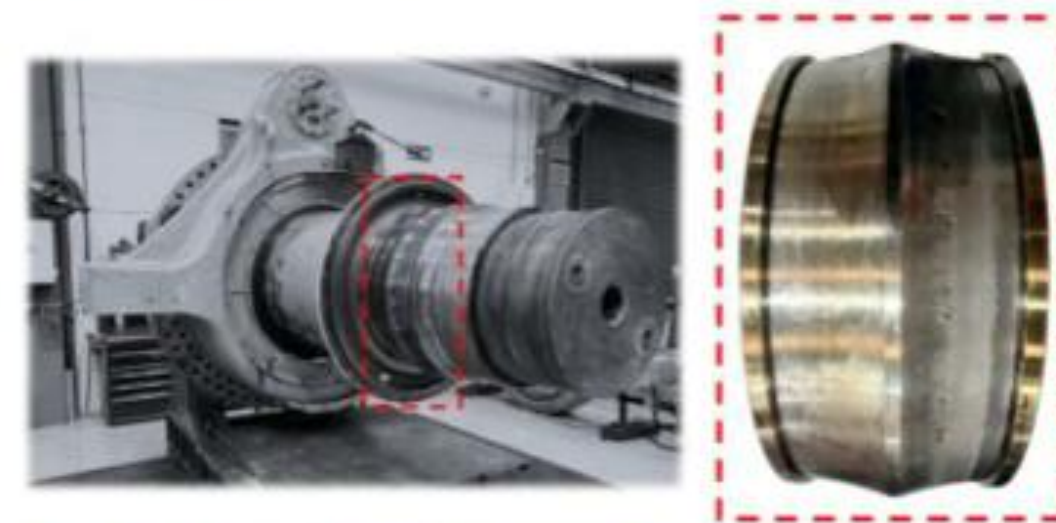
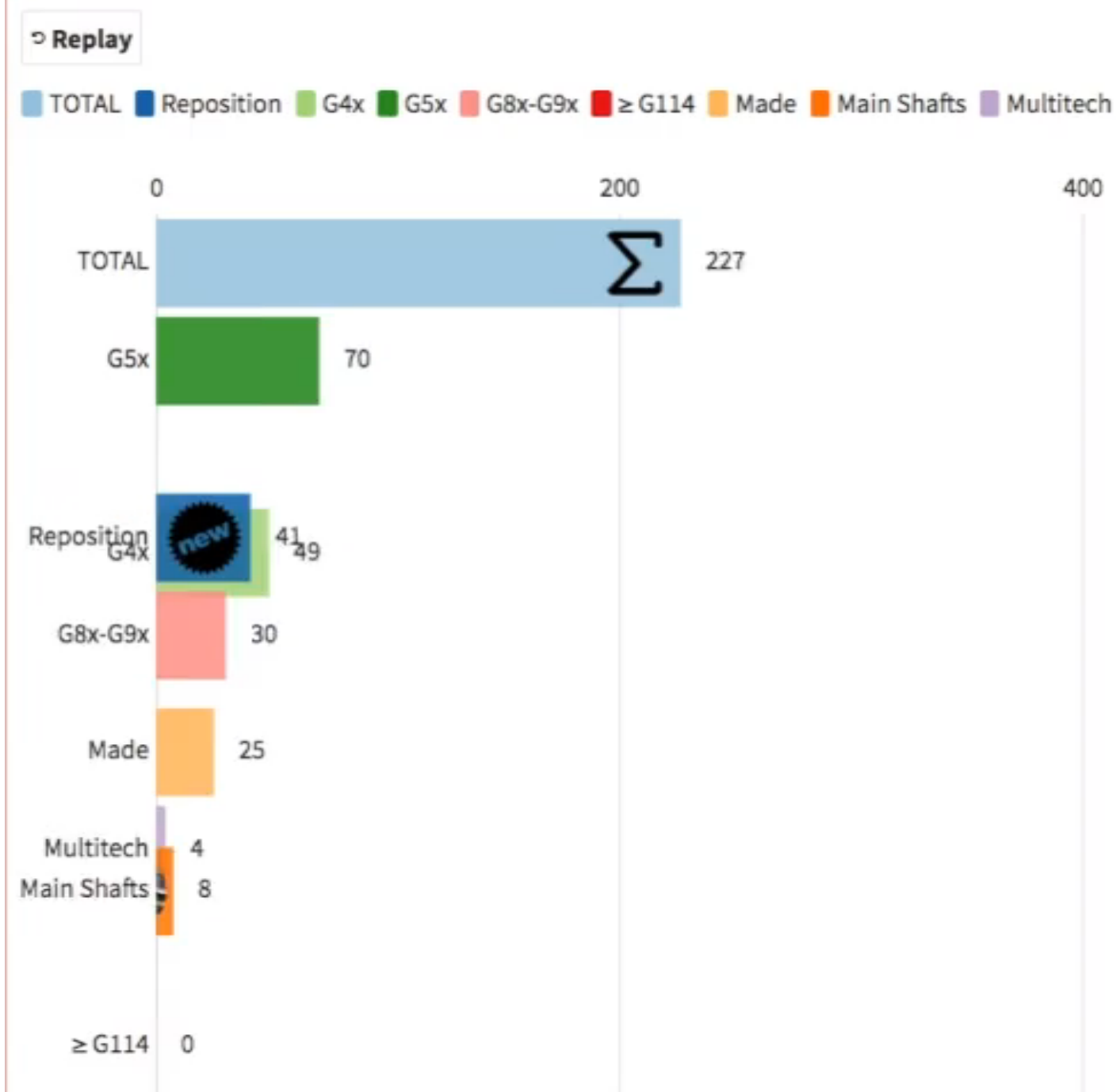


Fig. 1 - Typical spalling failure [2] in MSA bearing, the most common failure type.

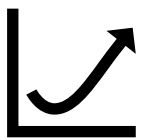
Aftermarket growing experience and know-how Strong AFTM position, and future potentialities

IC GBX REFURBISHMENT ACTIVITY / Platforms



2012

Exponential growth since 2010,
 with fully dedicated
 refurbishment centers and team.
 Currently **~800 units/year**



Potential growth in other
 regions, using **licensing**
 agreements and **SWAP** options



Refmanufacturing activity is an
 excellent source of knowledge
 and know-how



~ 8,000 AFTM units delivered 2012-2025

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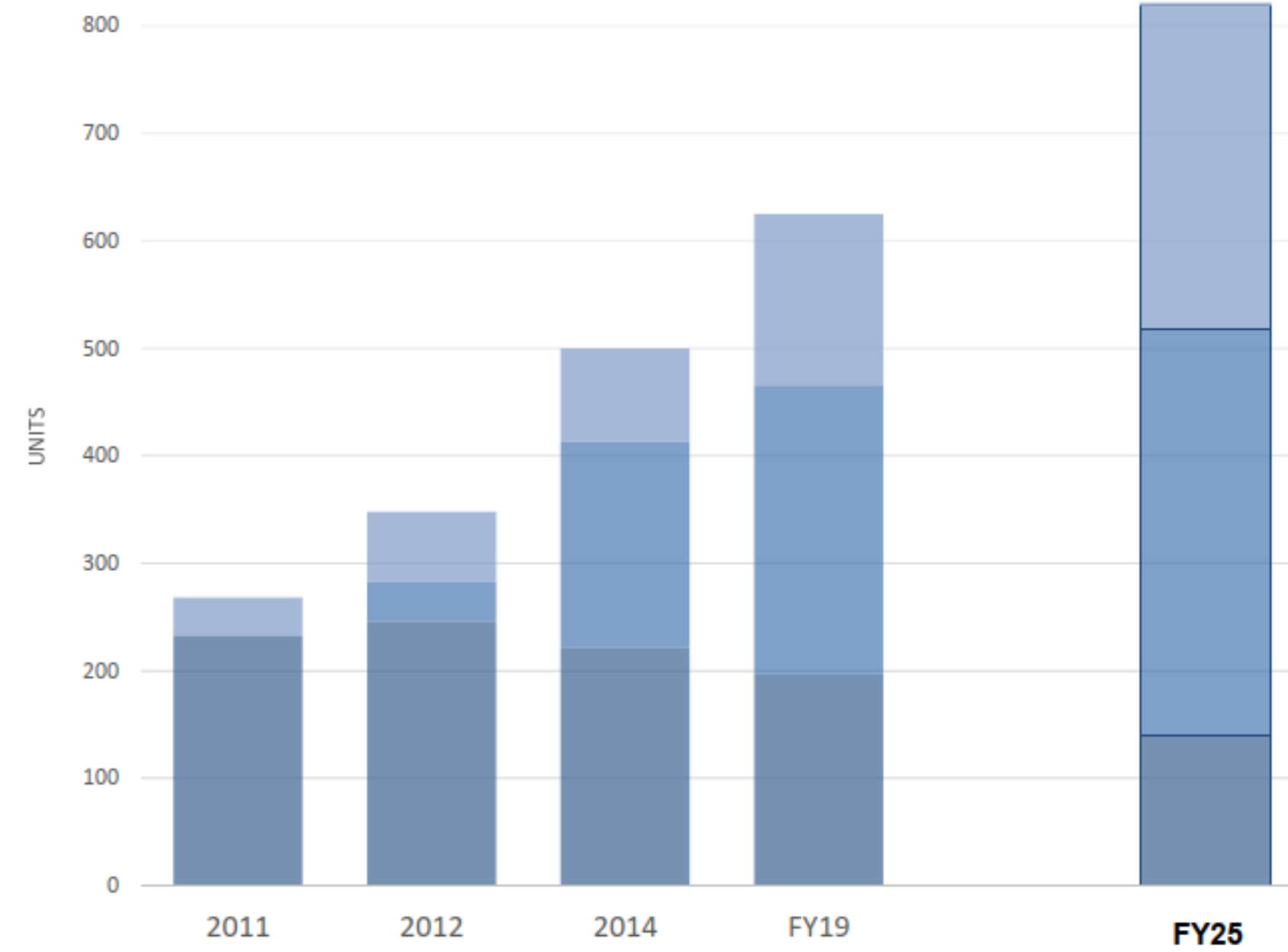
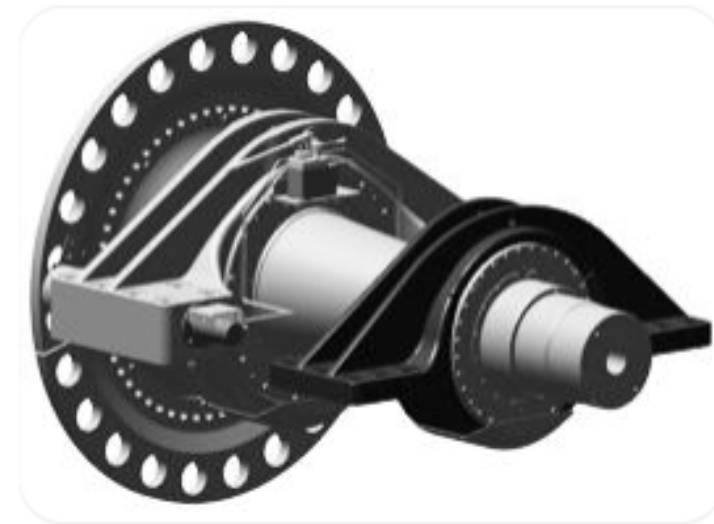
GAMESA GEARBOX

Gbx & MS REFURBISHMENT

70%



30%

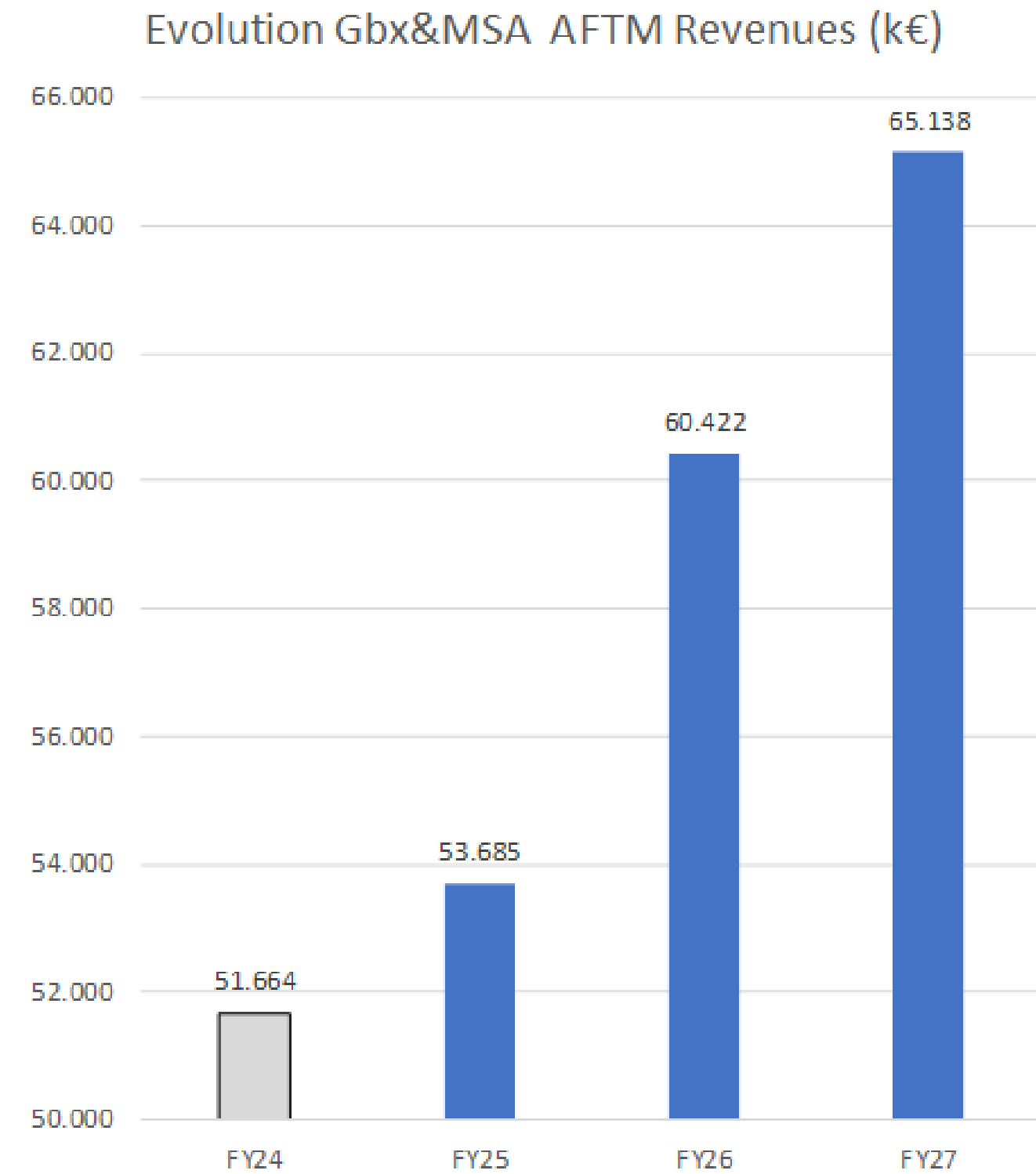


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Drivers	FY24	FY25	FY26	FY27	Δ
0. Expand AFTM Offer (Components & MSA)					
1. Empower Regions (≠SEA)	35.223	35.666	37.144	38.178	2.955 8%
2. MULTITECH	11.741	11.741	11.741	18.734	6.993 60%
3. MULTIMEGAWATT	4.700	4.700	4.700	8.225	3.525 75%
Total	51.664	53.685	60.422	65.138	13.474



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Norma CEN TC 473 WG 2

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Supporting watever you are

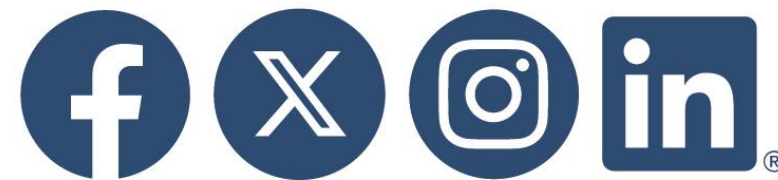
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