

# MOORING SYSTEMS ADVANCEMENTS FOR FLOATING OFFSHORE WIND

**KIVI OFFSHORE TECHNOLOGY**

**January 19th 2023**

This document and the Information contained herein is Confidential, Privileged, Property of Vicinay Marine. It can not be reproduced, disclosed, copied, re-distributed or made public in any manner without written authorization from Vicinay Marine.





# Contents

- **COMPANY INTRO**
- **EXPERIENCE**
- **CASE STUDY**
- **THE FUTURE OF FLOATING WIND**

**VICINAY**marine®





# Linking a history of more than 250 years

Vicinay is a family-owned organization which has been in business since the mid 17th century.



**VICINAY**marine®







# VICINAYmarine®

World Class Mooring  
Spain | Brazil | China | Sweden



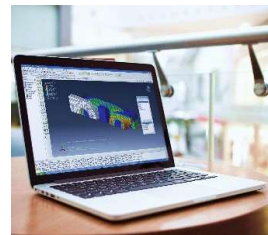
VICINAY  
SESTAO®



VICINAYmooring  
connectors®



INGEMOOR  
by VICINAYmarine®



VICINAYmarine  
innovación



BRASILAMARRAS



FMAC  
Fishes Marine Anchor Chain



Rennet  
2000



ENGINEERING

VICINAYmarine®



MANUFACTURING AND  
SUPPLY

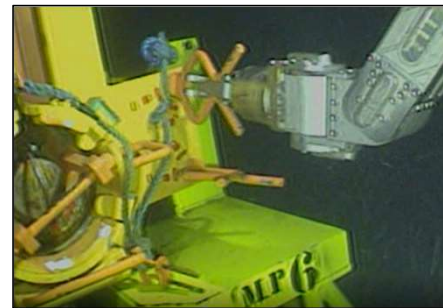
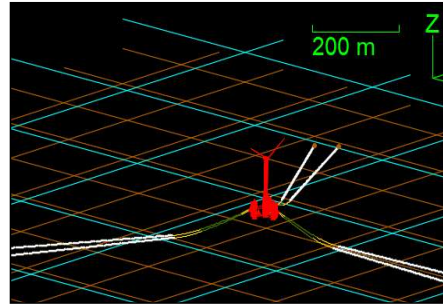


SERVICES



# Providing global mooring solutions

**ENGINEERING**



- Mooring analysis
- Structural analysis
  
- Detailed equipment design
- Special studies
  
- Subsea solutions
- Installation methods

**VICINAYmarine®**



# Providing global mooring solutions

MANUFACTURING AND  
SUPPLY



- Taylor made connectors
- Tensioning systems
- Subsea solutions
  
- Any offshore grade from R3 to R6
- Other mooring equipment
  
- Chains from 50 m up to 220 mm in diameter

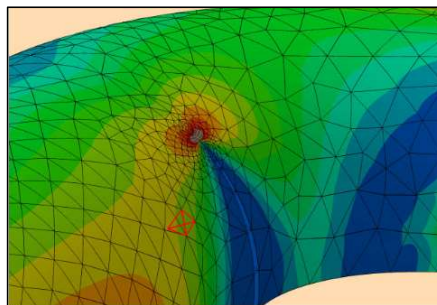
VICINAYmarine®





# Providing global mooring solutions

## SERVICES



- Offshore and onshore inspections
- Corrosion/condition monitoring
- NDE/3D scanning
  
- Full scale testing
  
- Remaining life assessments
- Engineering criticality assessments (ECA)



# Learning from the experience



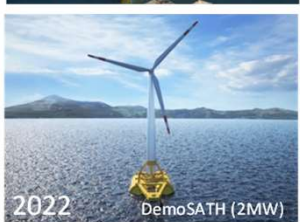
VICINAYmarine®





# Learning from the experience

## Prototypes



## Pre-Commercial Projects

2016  
HYWIND  
SCOTLAND

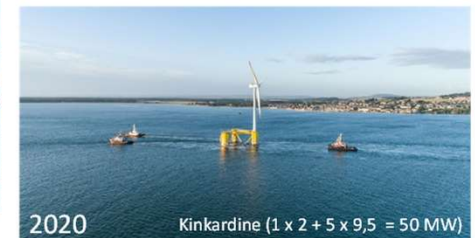
2018  
WINDFLOAT  
ATLANTIC

2020  
KINCARDINE

2021  
GOTO

2022  
HYWIND  
TAMPEN

2023  
PGL





# Learning form the experience HYWIND TAMPEN



Location: NORTH SEA  
Unit: SPAR  
No. FOWTs: 11 x 8 MW  
Installation: 2022-2023



Hywind Tampen  
88 MW





# Ready for the future



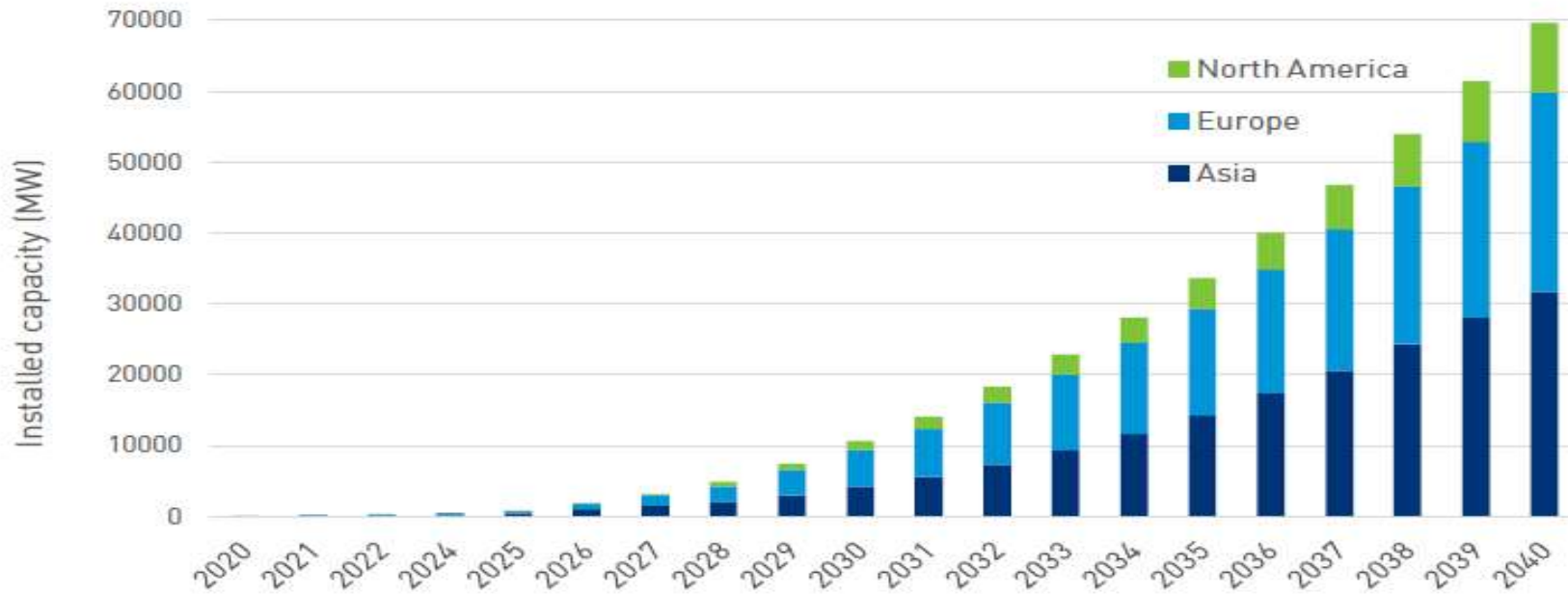
**VICINAY**marine®





# Ready for the future

Figure 2: Global floating wind deployment





# Ready for the future



**RELIABILITY**



**SUSTAINABILITY**

**VICINAYmarine®**



# Ready for the future

**RELIABILITY**



- **ENSURE CAPACITY**
- **MOORING INTEGRITY MANAGEMENT**

**VICINAYmarine<sup>®</sup>**





# Ready for the future

RELIABILITY

## UPGRADE SMART FACTORY



- Increase capacity
- New automatized NDE techniques
- Self regulated welding process
- Automatized dimensional control

VICINAYmarine®



# Ready for the future

**RELIABILITY**



## **MOORING INTEGRITY MANAGEMENT**

- Mooring integrity based on digital twin
- Remote monitoring of mooring behavior



**VICINAY**marine®



# Ready for the future

- **LOW CARBON FOOTPRINT PRODUCTS**
- **EFFICIENT PROCESS**



**SUSTAINABILITY** TY”

**VICINAY**marine®





# Ready for the future

## LOW CARBON FOOTPRINT PRODUCTS

**EPD®**

### CLIMATE DECLARATION FOR MOORING CHAIN R3 R3S R4 R4S R5 QUALITY STEEL FOR OFFSHORE INDUSTRY

Declared unit 1000 kg of finished product

ISO 14025  
ISO 14040  
PCR

Data collection

LCA calculation

External verification

Publication




**SUSTAINABILITY SAFETY**



# Ready for the future

## EFFICIENT PROCESS



### CERTIFICATE OF APPROVAL

This is to certify that the Energy Management System of:

**VICINAY CADENAS, S.A. (GALDAMES)**  
**Pol. Ind. La Aceña, nº3, Pabellón 1**  
**48191 Galdames, Vizcaya**  
**Spain**

has been approved by Lloyd's Register Quality Assurance to the following Energy Management System Standards:

**ISO 50001:2011**

The Energy Management System is applicable to:

**Manufacturing of forged products for mooring line oriented to offshore industry.**

Approval Certificate No: SGI 6046245  
 Original Approval: 22 December 2016  
 Current Certificate: 22 December 2016  
 Certificate Expiry: 21 December 2019

Issued by: LRQA España, S.L.  
 For and on behalf of: Lloyd's Register Quality Assurance Limited



C/ Princesa, 29 - 1<sup>o</sup> - 28008 Madrid, España  
 For and on behalf of: 1 Trinity Park, Bickenhill Lane, Birmingham B37 7YJ, United Kingdom  
This approval is limited and is not a guarantee of the product or service. It is subject to the terms and conditions of the certificate and the applicable standards. The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number only.

CATEGORIAS DE IMPACTO	R3	R3S	R	R4S	R5	TOTAL
Global W	3	32E+00	32E+00	40	62E+00	5 E 3
Global W	3	2 E 00	2 4E+00	3 8E+00	3 2E+00	3 E 00
Global W	3	3 8E+00	3 40	3 2E+00	3 2 40	3 2 E 00
Global W	5 E 0	5 4E	5 E 0	5E 0	62E+00	55E 3
Global W	3 2E+00	3 40	40	5E+00	40	5 3E 00
Global W	3 6E+00	3 4E 00	6E+00	5 4E+00	6 3E+00	3 E 00
Global W	40	40	5 2E+00	6E+00	5E+00	E 00
Global W	3 8E	5		2 8E	2 3 E	E
Global W	2 2E+00	2 40	2 4E+00	2 4E+00	3,2E+00	E
Global W	2 E 0	4E 0	40	2 3E 0	2 8E	E
Global W	4E 0	22E 0	3 0E	3 4E 0	40	2 E



**SUSTAINABILITY**

**VICINAY CADENAS**



**THANK YOU**

This document and the Information contained herein is Confidential, Privileged, Property of Vicinay Marine. It can not be reproduced, disclosed, copied, re-distributed or made public in any manner without written authorization from Vicinay Marine.