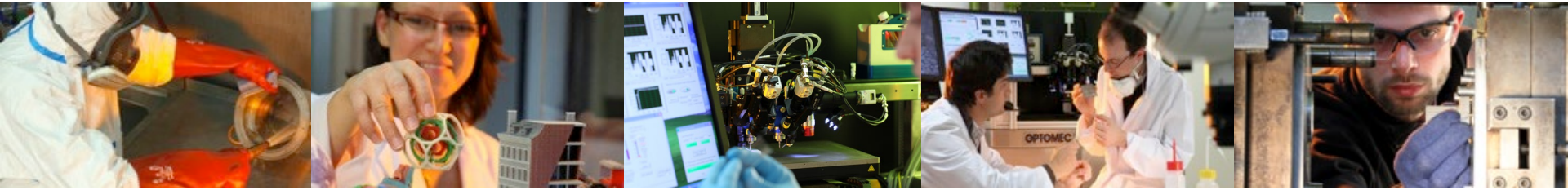
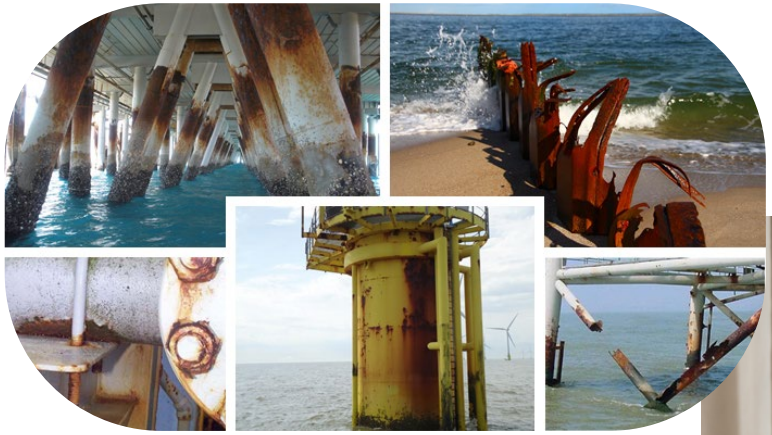


CIG on Corrosion Monitoring

Case study of an OPIN-led CIG

Interreg North-West Europe OPIN
EUROPEAN UNION
European Regional Development Fund

sirris
driving industry by technology



Steps leading up to the CIG

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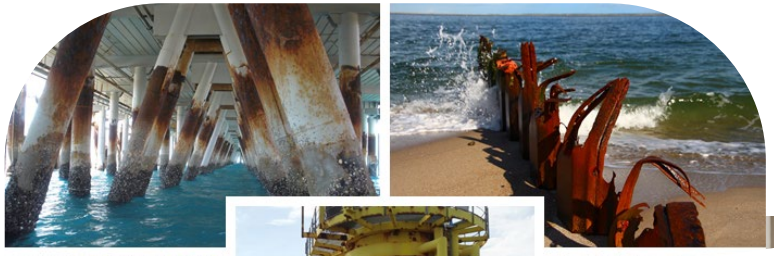
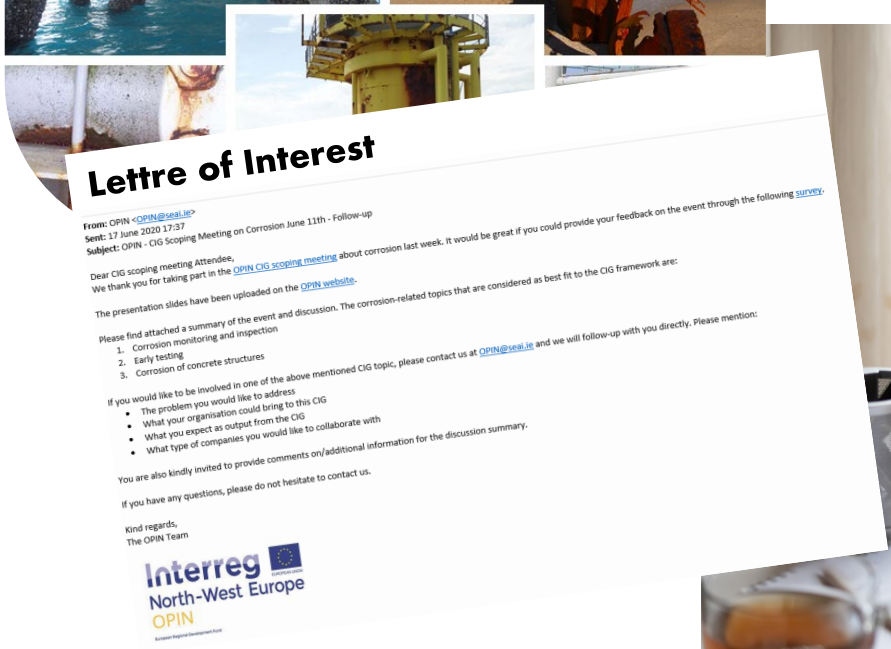




Lettre of Interest

From: OPIN <OPIN@seai.ie>
Sent: 17 June 2020 17:37
Subject: OPIN - CIG Scoping Meeting on Corrosion June 11th - Follow-up

Dear CIG scoping meeting Attendee,
We thank you for taking part in the OPIN CIG scoping meeting about corrosion last week. It would be great if you could provide your feedback on the event through the following survey.

The presentation slides have been uploaded on the OPIN website.

Please find attached a summary of the event and discussion. The corrosion-related topics that are considered as best fit to the CIG framework are:

1. Corrosion monitoring and inspection
2. Early testing
3. Corrosion of concrete structures

If you would like to be involved in one of the above mentioned CIG topic, please contact us at OPIN@seai.ie and we will follow-up with you directly. Please mention:

- The problem you would like to address
- What your organisation could bring to this CIG
- What you expect as output from the CIG
- What type of companies you would like to collaborate with

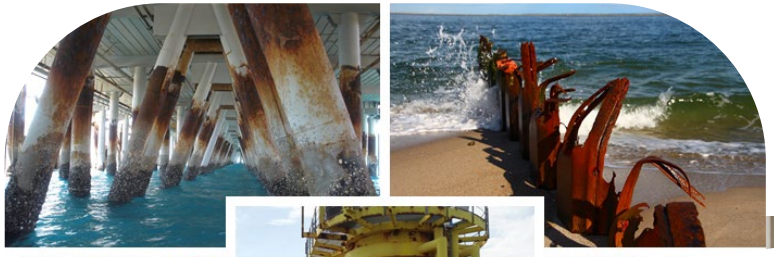
You are also kindly invited to provide comments on/additional information for the discussion summary.

If you have any questions, please do not hesitate to contact us.

Kind regards,
The OPIN Team

Interreg North-West Europe OPIN

Steps leading up to the CIG



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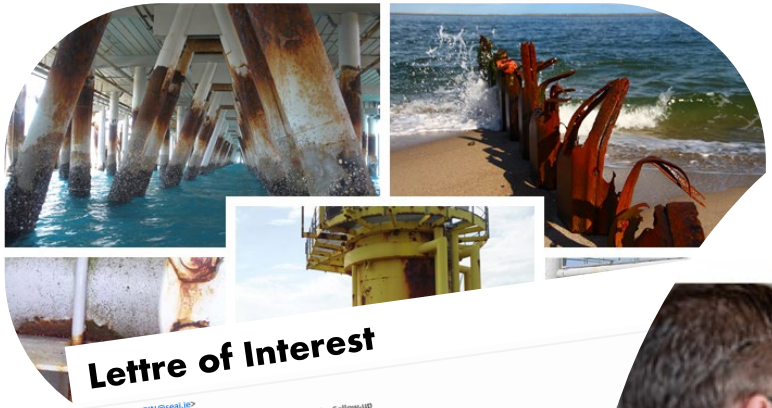

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The OPIN Team

Interreg North-West Europe OPIN

Corrosion monitoring

Bring people together

Bring people together

Interreg North-West Europe OPIN

Expression of Interest

Name of organisation: C-Cube International
Name of contact point within organisation: Tjewei Hu
Role of contact point within organisation: Business Development Manager
Email of contact point within organisation: th@ccube.nl
Date: 18/09/2020
Organisation type (please tick as appropriate):

- ☒ Consultancy or engineering company
- ☐ Offshore renewable energy technology or project developer
- ☐ Public sector organisation
- ☐ Research performing organisation or academic institute
- ☐ Supply chain company
- ☒ Other – Please specify: Corrosion Monitoring

Is your organisation an SME (Y/N): Y

Please provide a brief description of your organisation (200 words max):

C-Cube International specialises in corrosion and wear and has developed technologies to measure and predict corrosion very precisely. We operate globally covering a wide range of industries such as infrastructure, shipping and process industries, insurance companies or research organisations, offshore applications, dredging, hydraulics and coating applications.

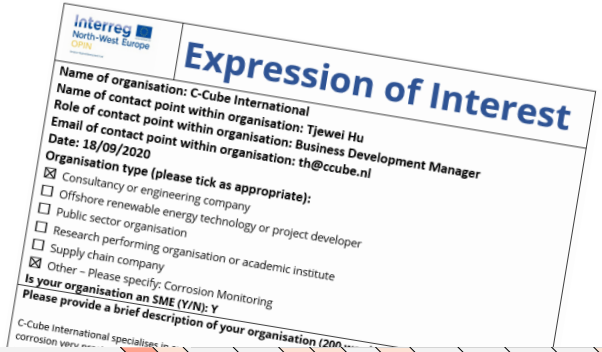
Our technologies detect corrosion in an early stage and coating degradation. Based on our measurements the protective properties of coatings can be quantified, the lifetime of the coating can be predicted, and **predictive maintenance** is enabled.

This method of maintaining assets prevents failure and downtime by repairing corroded area's before the structural integrity is at risk, which **saves up to 40% of maintenance costs.**

Please list the CIG activitie(s) your organisation would like to contribute to (Section 3):

- Make an overview of **existing sensor technology** that could be suitable for offshore corrosion monitoring, with benefits, drawbacks and limitations (desktop research);
- Define challenges related to **sensors integration** in a remote, offshore device, including installation, maintenance and data collection and transfer (in discussion with device owners and the corrosion monitoring value chain);
- Identify remaining **technology gaps** that are barriers to implementation of corrosion monitoring;
- Build consortium to tackle potential technology gaps and search for opportunities to start a **demonstration project** (including potential funding).

Bring people together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C-Cube International specialises in
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	Naval Energies	C-Cube	Technological Centre CT C	Dublin City University	PU3 Technologies	Bisca	BlueWiseMarine	Tidal Flyer Ltd.	Université Gustave Eiffel	Université de Nantes	University College Dublin	IDMEC	ENGIE Laborelec
SME? (Y/N)	N	Y	N	N	Y	Y	Y	Y	N	N	N	N	N
Country	F	NL	ES	IR	BE	UK	IR	IR	FR	FR	IR	UK	BE
Organisation roles													
WEC, TEC and floating wind device owners or developers	x							x			x	x	x
Developers of corrosion or environmental sensor technology		x		(x)		(x)				x	x		
Companies providing solutions for data transmission				x						x	x		
Activities in corrosion management, corrosion modelling and/or data analysis		x	x	x	x				x	x	x	x	
Test sites	x		x	x		x	x			x	x	x	x
Participation to activities													
Identify **needs and expectations** of TEC, WEC and floating wind developers/owners	x						x	x				x	x
State-of-the-art report on current practice in fixed offshore wind				(x)								(x)	x
Make an overview of ***existing sensor technology***		x	(x)	(x)	x	(x)	x		x	x	x	(x)	
Define challenges related to ***sensors integration***	x	x	x	x	x		x		x	x	x	x	x
Identify potential ***economic benefits*** of corrosion monitoring	x				x		(x)			x		x	
Identify remaining ***technology gaps***	x	x	x	(x)		(x)	(x)		x		x	x	
Search for opportunities to start a ***demonstration project***	x	x	x	x	x	x	x			x		x	x
Interest in outputs													
Report with requirements, needs and expectations for corrosion monitoring	x		x		x	x	x	x		x		x	
State-of-the-art report	x		x		x		x	x	x	x	x	x	
Guidelines/information on sensor integration	x	x	x	x	x		x	x	x	x	x	x	
Identification of potential economic/technological benefits	x		x	x	x		x	x	x	x	x	x	x
Insights in methods, technologies and strategies most effective for corrosion monitoring	x		x	x	x	x	x	x	x	x	x	x	x
Preparation for a case specific demonstration project	x	x	x	x	x	x	x	x	x	x	(x)	x	x
Additional activities/outputs proposed													
Demonstration platform (use-case testing setup)		o					x						
Also consider corrosion under insulation		o							x				
A better approach for edge analytics, storing only useful insights				o									
Corrosion modelling for making decisions to install sensors at strategic locations					o		x						
Identification of funding mechanism for demonstration project							x						
Develop new strategies of joint monitoring (e.g.: corrosion + stress, corrosion + biofouling)							o		x		o		
Investigation of sensor-fusion												o	
Investigation of harmonizing information from sensor and SHM with traditional operations												o	
Neuromorphic computing for SHM												o	
State-of-the-art: sensors long-term reliability, stability and calibration needs													o
Use of sensors: practical aspects to be considered during design, manufacturing, installation and operation													o

Bring people together

Investigation of harmonizing information from sensor and SHM with traditional operations												o	
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Use of sensors: practical aspects to be considered during design, manufacturing, installation and operation													o

Bring people together

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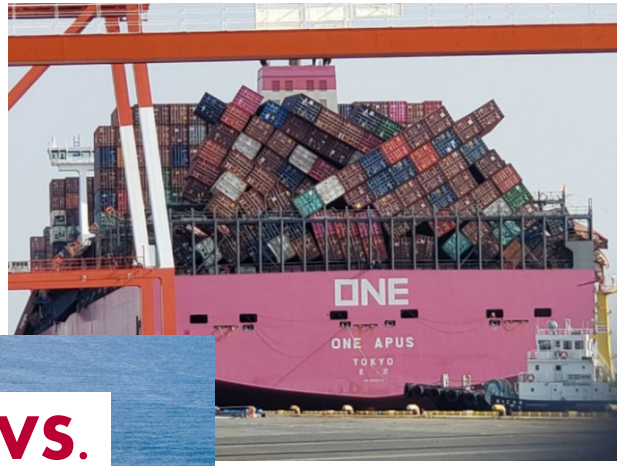
Get to work


Interreg
North-West Europe
OPIN
Action Plan
OCEAN POWER INNOVATION NETWORK
Action Plan for Collaborative Innovation Group (CIG)
DELIVERABLE: WP T2 CIGs
VERSION: 1.0
DATE: 17.08.2020

Get to work



Get to work

(1) Identify needs and expectations of TEC, WEC and floating wind developers/owners

(2) Review the state-of-the-art on current practice in fixed offshore wind

(3) Make an overview of existing sensor technology

(4) Define challenges related to sensor integration, data analysis and monitoring strategy

(5) Identify potential (economic) benefits of corrosion monitoring

(6) Identify remaining technology gaps

(7) Search for opportunities to start a demonstration project

Get to work

- Kick-off meeting/workshop
- Interviews
- Public Survey
- Written input
- Collate into a coherent report

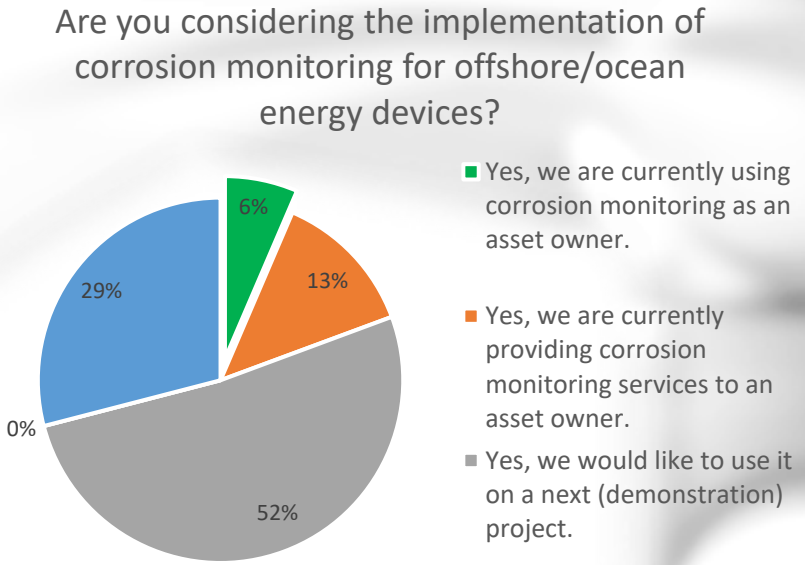
The Reward: Valuable market Insight

Interreg North-West Europe OPIN
EUROPEAN UNION
European Regional Development Fund

Ocean Power Innovation Network

(https://www.nweurope.eu/projects/project-search/opin-ocean-power-innovation-network/)
FREE to join

Collaborative Innovation Group (CIG)
on Corrosion Monitoring



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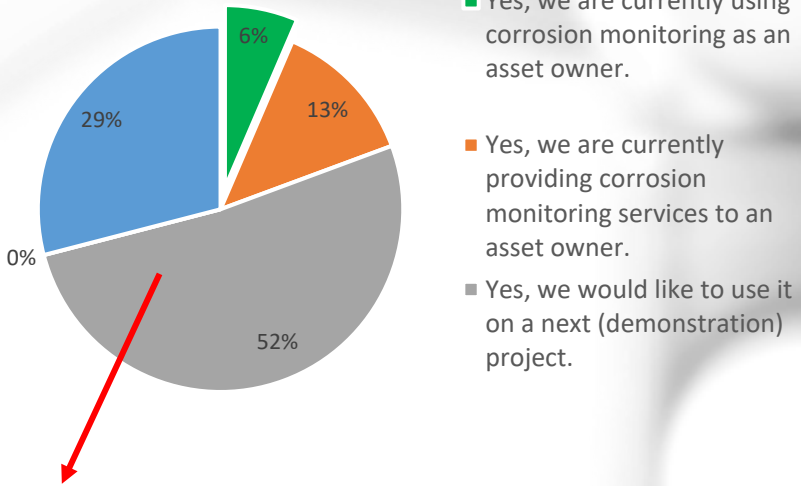
Collaborative Innovation Group (CIG) on Corrosion Monitoring

Are you considering the implementation of corrosion monitoring for offshore/ocean energy devices?



Large (expected) potential,

The Reward: Valuable market Insight

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EUROPEAN UNION
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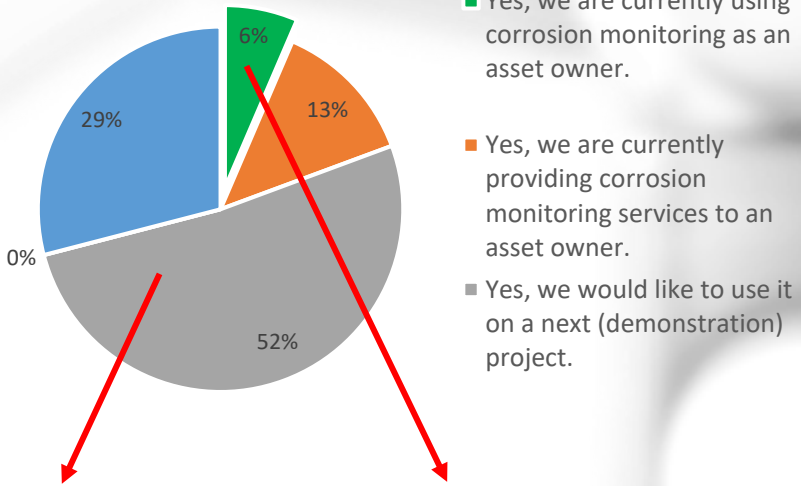
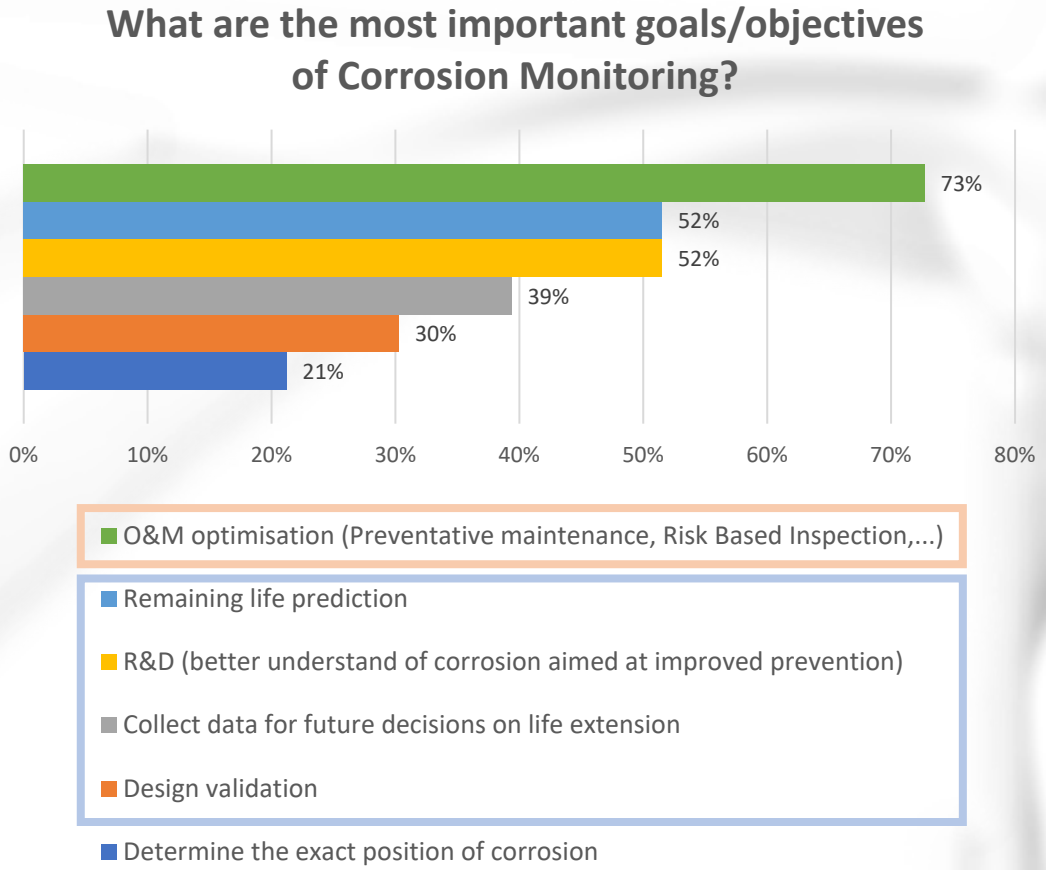


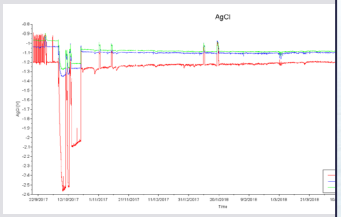
Large (expected) potential, limited use!

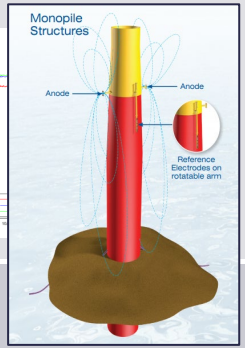
The Reward: Valuable market Insight



The Reward: Technology Insight

Cathodic Protection





Corrosion Rate

Coating Degradation

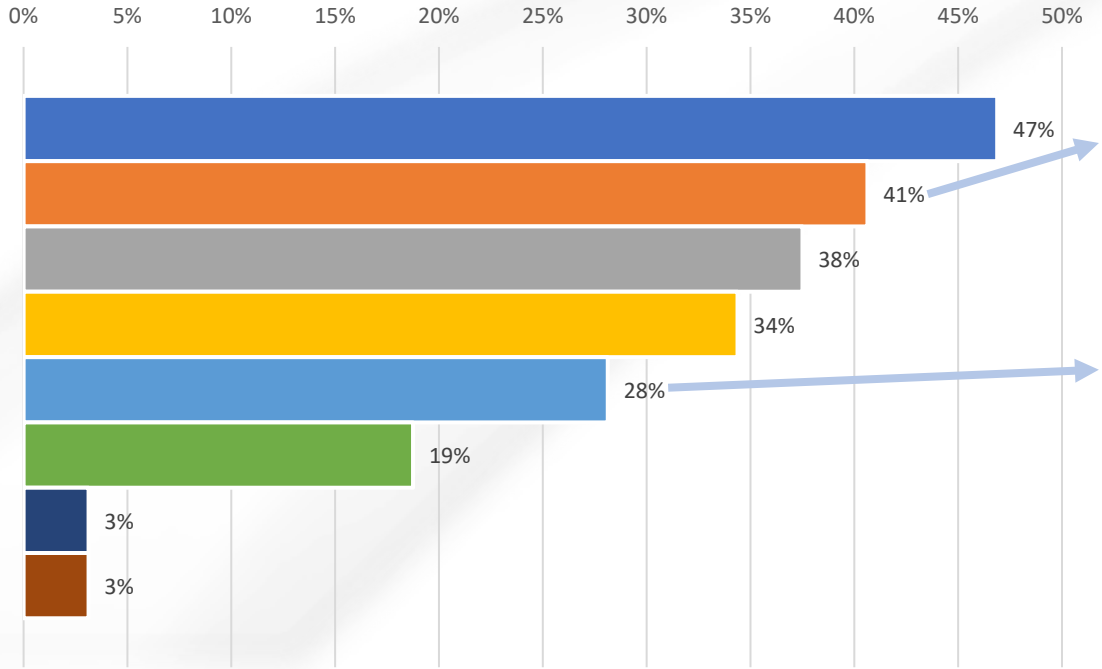
Environment

The Reward: Barriers and Opportunities

Corrosion Monitoring has a **LARGE POTENTIAL**,

However, today we know of only one asset owner in Europe applying it on a large scale.

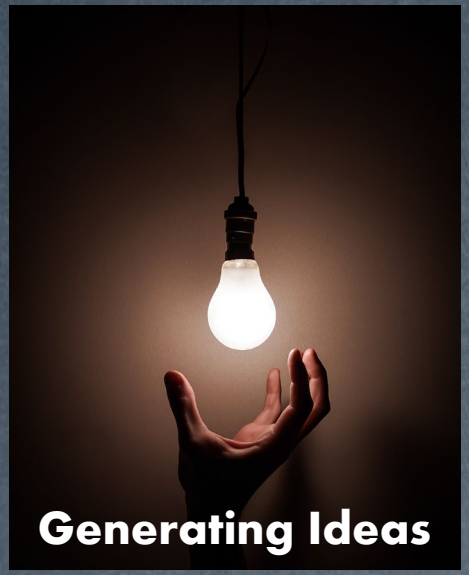
What are the barriers to implementation of corrosion monitoring?



- *Unclear what sensors to use (in a maritime environment)*
- *The cost of corrosion and therefore added value of monitoring for our project is unclear*
- *Unclear what parameters to measure and how to interpret the data*
- *Insufficient lifetime/reliability of sensors*
- *Benefits of corrosion monitoring on the long term are unclear*
- *Lack of skilled personnel or service provider*
- *CAPEX driven design, O&M is not sufficiently considered at design stage*
- *At present our project view is too high-level to focus on these details*

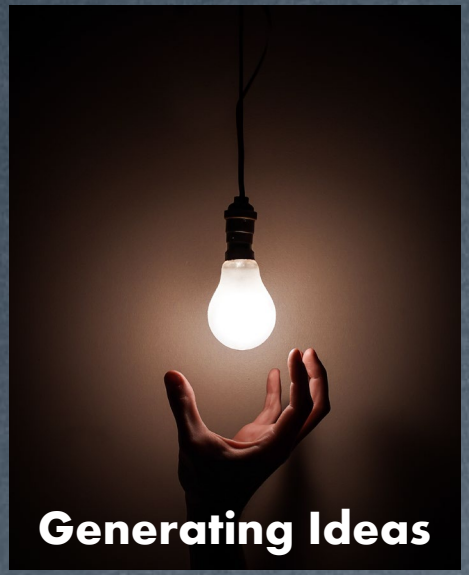
The Reward: Project ideation

The Reward: Project ideation



Building a Network

The Reward: Project ideation



Building a Network

New project concepts

Somebody needs to pull the rope

OPIN ➡ **Public results**

SME ➡ **'Behind closed doors'**

driving industry by technology

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+32 493 31 06 44

sirris

driving industry by technology

http://www.sirris.be

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