



# Life Extensions of Offshore Assets



Life Extensions  
of Offshore  
Assets

Centre for Research-  
based Innovations  
(SFI LEO)

**Seeking partners within  
the offshore industries,**  
oil & gas, renewable energy, aquaculture,  
maritime and others.  
**Deadline-first phase: 18-September-2024**

Develop innovative solutions for holistic improvements of offshore asset operation and lifecycle.  
Achieve best profitability, longevity, and safety of personnel, environment, and assets through:

**Intelligent  
monitoring**

**Autonomous  
operations**

**Data analytics**

**Digital decision tools**

 **Key research avenues**

Empower the offshore industries with research and competence in:

- Asset lifecycle economy
- Asset integrity management
- Overall Equipment Effectiveness
- Remaining Useful Life extension
- Risk minimisation

 **Outcomes**

Foster greater collaboration and seamless technology transfer across offshore industries.

Deliver cutting-edge solutions for critical offshore assets leading to:

- Increased asset uptime and availability
- Significant reduction in O&M costs
- Improved operational service windows within safe boundaries
- Informed decisions about life extension minimizing risk and costs

**Sustainability**



- Reduce total emissions and climate impact through optimised operations from construction to removal
- Improve components longevity, circularity and reuse
- Effective utilisation to alleviate terrestrial pressure
- Safer operations to minimise risk

**Partners**

**Potential international research partners:** TU Delft, RWTH Aachen, Aalborg University, University of Leiden.

**Potential industrial collaborations:** Members of GCE NODE, GCE Ocean Technology, GCE Blue Maritime, CIAM and others.

# WELCOME - VELKOMMEN

## Invitation to Centre for Research-based Innovations

Call from RCN – The Research Council of Norway

Description of the Centre

**Kjell G. Robbersmyr & Geir Grasmo**  
University of Agder, Grimstad

**Rune Schlanbusch**  
NORCE - DARWIN, Grimstad

**Jan Frick**  
University of Stavanger, CIAM

**Hans Petter Hildre**  
NTNU, Ålesund



# Agenda

- Presentation – Who we are
- SFI description
- Motivation for SFI LEO
- Centre research and innovation topics
- Centre description
- Partnership
- Application Process and next steps
- Questions and Remarks

# Who we are



# The Research Partners

## Scientific



Kjell G. Robbersmyr, Prof. UiA,  
Director UiA TRC-Mechatronics



Rune Schlanbusch, PhD, Chief Sci.,  
NORCE – DARWIN



Hans Petter Hildre, Prof. NTNU,  
HOD Mar.Ops & Construction,  
SFI MOVE (finished 2023)



Jan Frick, Prof. UiS,  
CIAM



Geir Grasmø, Prof. UiA,  
SFI Offshore Mechatronics (finished 2023)  
UiA Offshore Wind

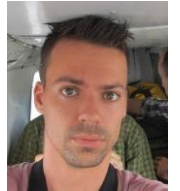
## Administrative

Siren M. Neset, NORCE,  
Business Development E&T,  
former RCN advisor Agder

Peter Zahl Marki, PhD, UiA  
sen.advisor R&I , HEU – NRC

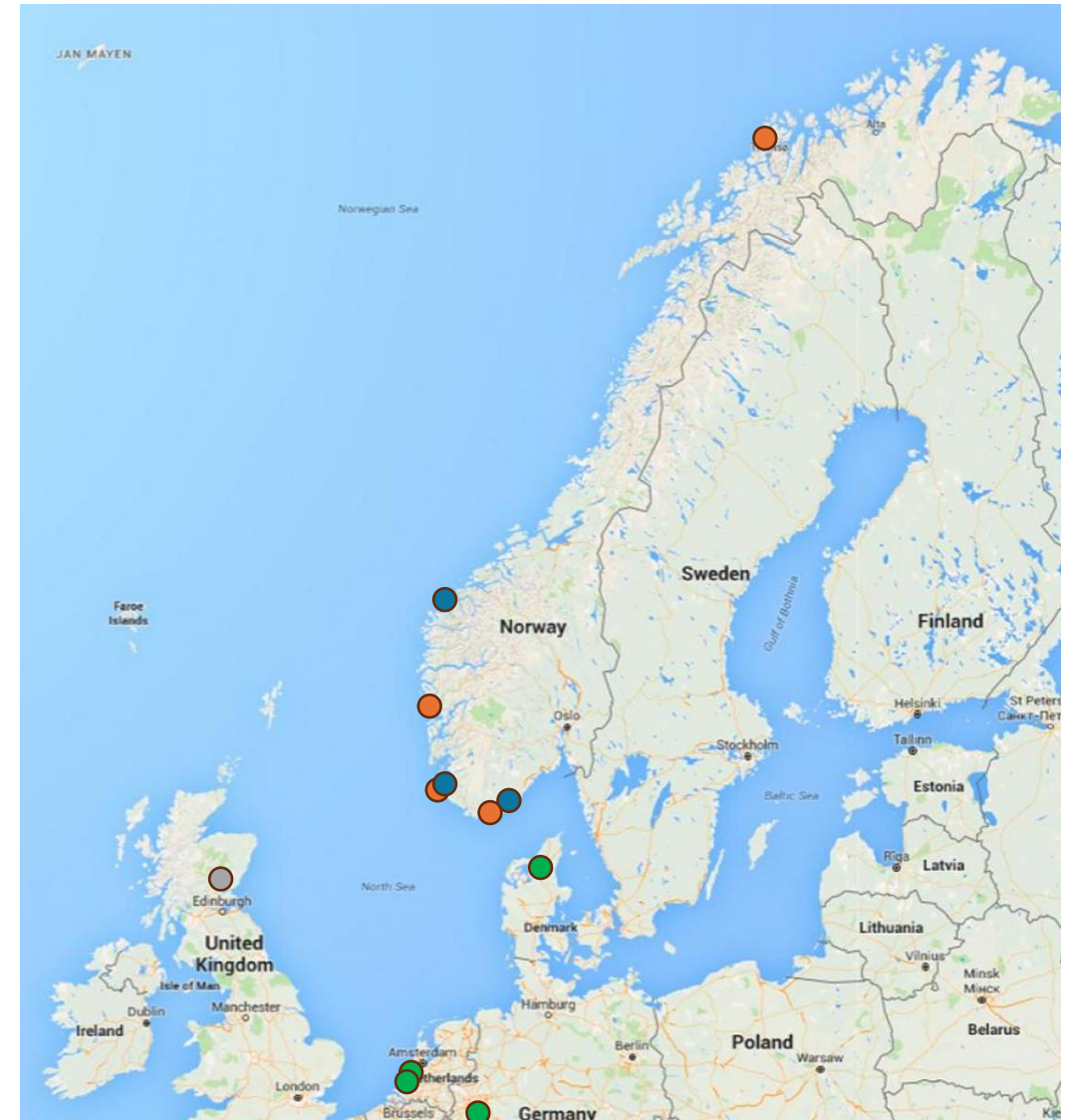
Odd Terje Høie, UiS  
CIAM Project Coordinator

Anne Solvang Salvesen, UiA  
R&I admin advisor, communication



# Centre satellites

- **NORCE**
- **NTNU**
- **University of Stavanger**
- **University of Agder**
- **Aalborg University (DK)**
- **Leiden University (NL)**
- **TU Delft (NL)**
- **RWTH Aachen (DE)**
- **Open (UK)**



# Collaborations



## National research partners:

- University of Agder (UiA)
- University of Stavanger (UiS)
- NTNU Ålesund
- NORCE

## Research collaborations:

- SFI Smart Ocean

## Potential international research partners:

- TU Delft
- Leiden University
- RWTH Aachen
- Aalborg University

## Industry cluster collaborations:

- CIAM
- GCE Blue Maritime
- GCE NODE
- GCE Ocean Technology
- Open



# The Norwegian Research Council call for SFI

Main features and requirements for the fifth generation SFI (V)

# The Centres for Research-based Innovation scheme



- Develop expertise that is important for innovation and value creation
- Strengthen the business sector's innovation capacity
- Strengthen technology transfer, internationalisation and researcher training
- Long-term research in close cooperation between R&D-active companies and prominent research groups
- Address the long-term needs and challenges facing the business sector
- Help to resolve key challenges to develop solutions for a sustainable society
- <https://www.forskningsradet.no/utlysninger/2024/senter-for-forskningsdrevet-innovasjon-trinn-1/>

## • Timeline

- Runs 8 years
- Starts 2025-Q4 / 2026-Q1
- Deadline for Prequalification application (5 pages): **18th September 2024**

## • Budgets

- ≤ 67% of the costs are funded by the RCN
  - ≤ 12 MNOK/year, Total 50 - 96 MNOK
- ≥ 33% funding cash and/or in-kind from industry
- ≠ No funding to industry from [RCN](#)

# SFI LEO research and innovation topics

Develop innovative solutions for holistic improvements of offshore asset operation and lifecycle. Achieve best profitability, longevity, and safety of personnel, environment, and assets through:

**Intelligent  
monitoring**

**Autonomous  
operations**

**Data analytics**

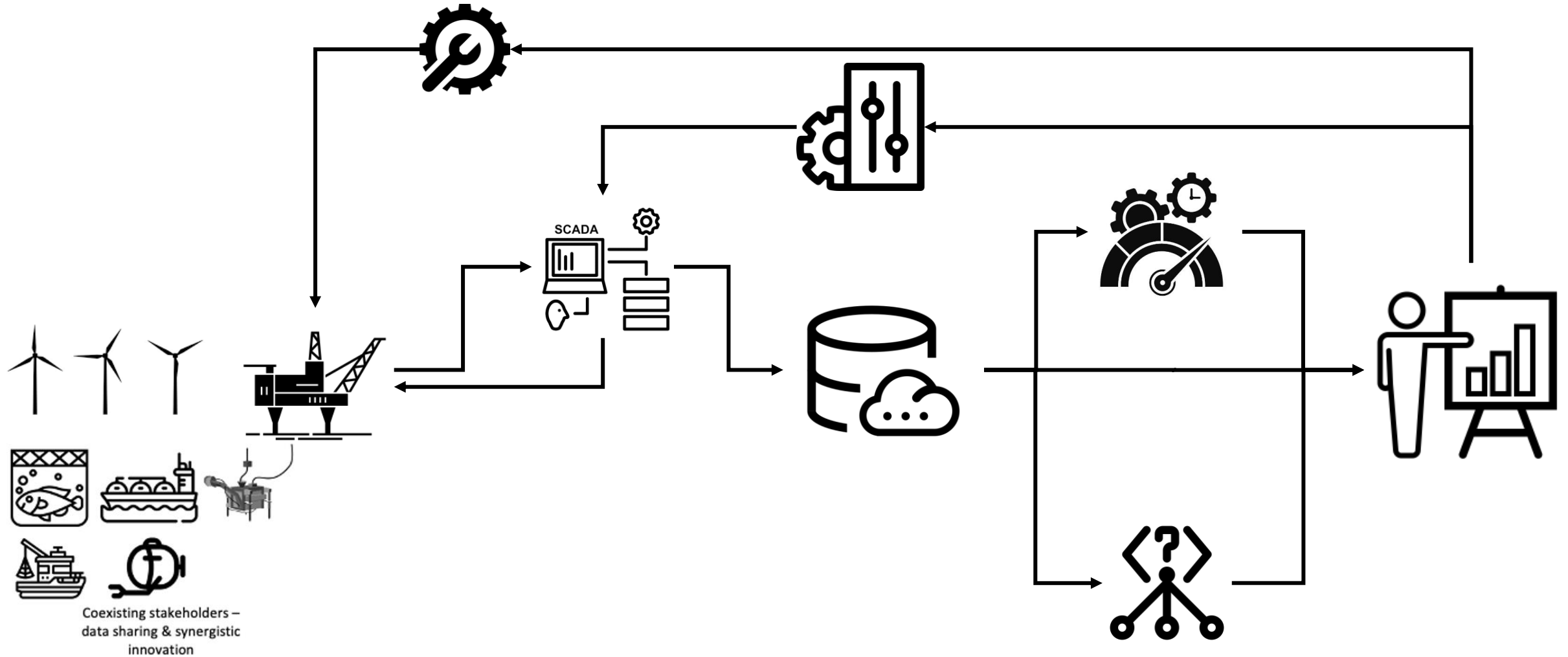
**Digital decision tools**

## Outcomes

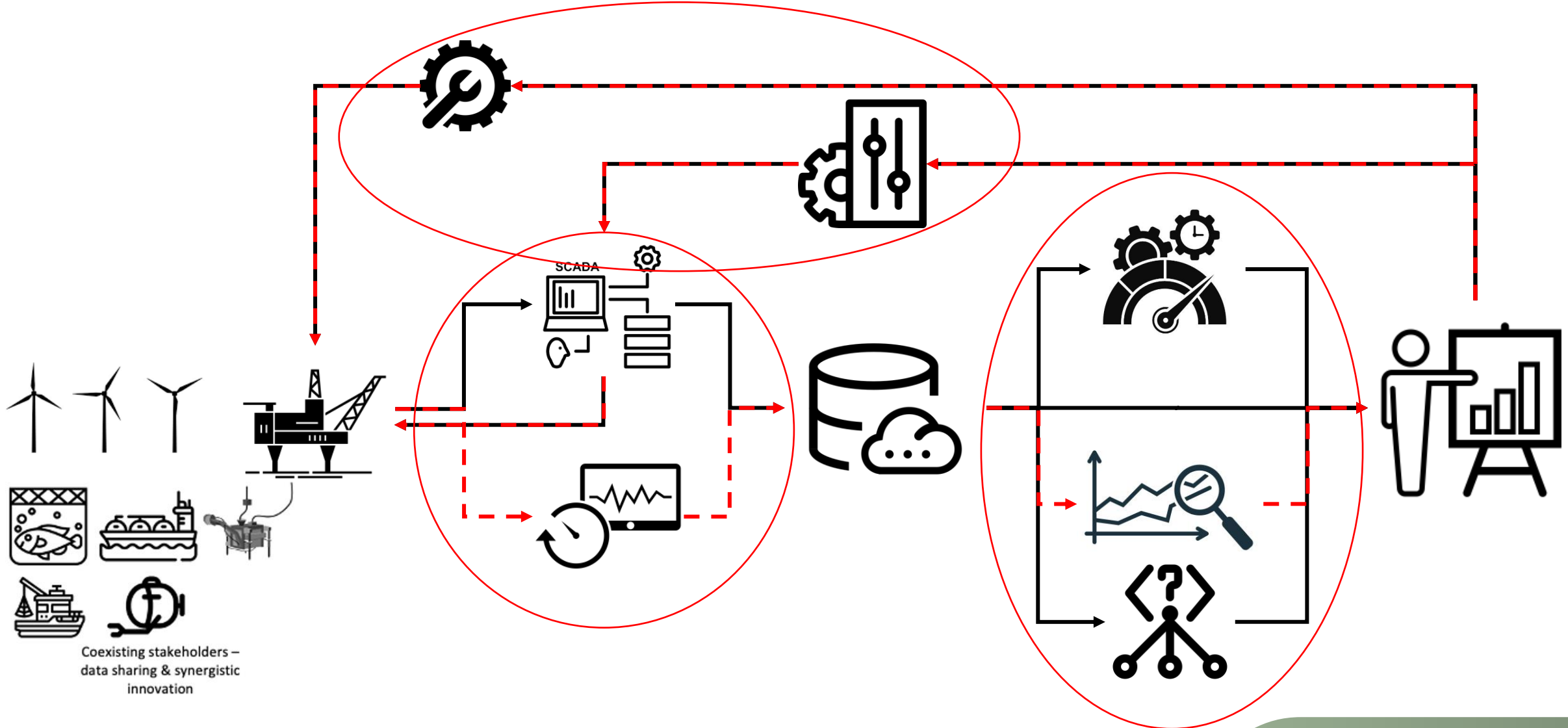
Foster greater collaboration and seamless technology transfer across offshore industries. Deliver cutting-edge solutions for critical offshore assets leading to:

- Increased asset uptime and availability
- Significant reduction in O&M costs
- Improved operational service windows within safe boundaries
- Informed decisions about life extension minimizing risk and costs

# Current

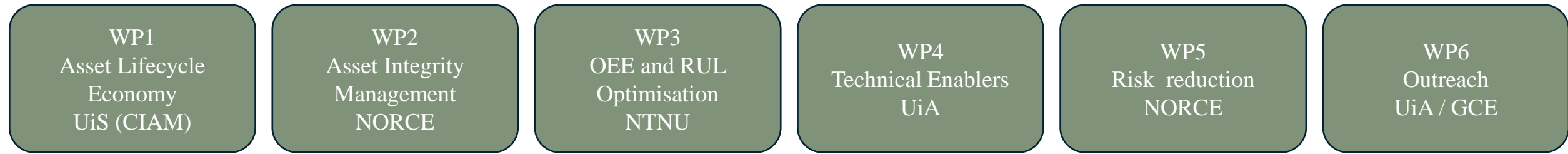


# The digital approach



Coexisting stakeholders –  
data sharing & synergistic  
innovation

# PROPOSAL, OPEN FOR DISCUSSION:



Asset economy

Intelligent sensing

O&M effectiveness  
management

EPCI  
optimisation

Personnel safety

Interdisciplinary  
collaboration

Cost engineering

Structural integrity

Intelligent control

Autonomous  
systems

Marine  
surveillance &  
Environment

Publicity

Digital thread

Power trains  
integrity

Operational  
sceneries

Mechatronics

Cyber security  
Data safety

Training

Decision support  
system

Machinery

Analytics

Robotics

Physical  
protection

Clusters

Business models

Systems and RUL  
monotoring

Drones

Decommissioning

Servitisation

Digital thread, quality in data transfer and communication, AI/ML

# What is new and unique?

- Combine Intelligent Condition Monitoring with AI Analytics for online prognostics
- Remaining Useful Life recording
- Digital twins for control and digital decision support
- Sensor system developments for critical key components and systems
- Autonomous maintenance solutions





# Objectives

- Establish framework for asset economy and cost engineering.
- Simplify the data management process of data acquisition, transfer, contextualization, analysis, presentation, utilization and sharing. This includes interfacing environmental monitoring.
- Design digital twin architecture for assets performance assessment of key components.
- Optimize performance, cost and risk by balancing productivity, environmental impact and asset lifetime, through combining asset monitoring, data analysis and control.
- Design and enhance digital decision support system (DCSS) including transfer learning from O&G to other offshore sectors.
- Develop modular design strategies of assets for simplified replacements offshore and for enabling remanufacturing of system components.
- Develop autonomous inspection, maintenance and component replacement systems.
- Cross sectorial knowledge building and knowledge sharing in close interaction with user partners.

# Motivation for SFI LEO



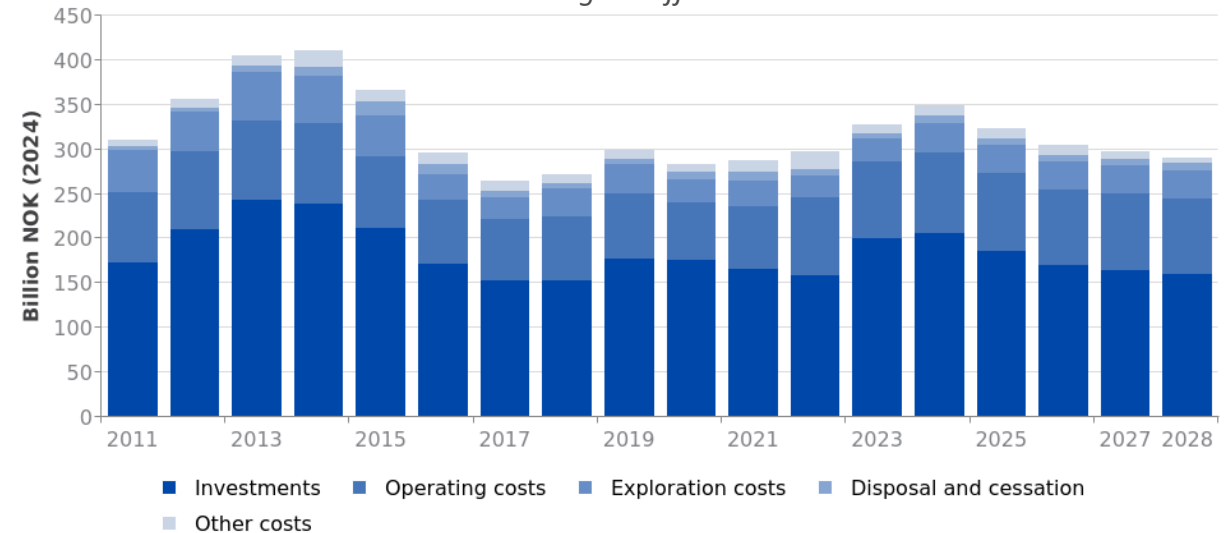
# Value creation

- CAPEX<sub>O&G</sub> > 150 BNoK /y
- OPEX<sub>O&G</sub> > 80 BNoK /y
- CAPEX<sub>OW</sub> > 50 BNoK /y from 2030
- OPEX<sub>OW</sub> > 30 BNoK /y from 2030

## Impact on ROA:

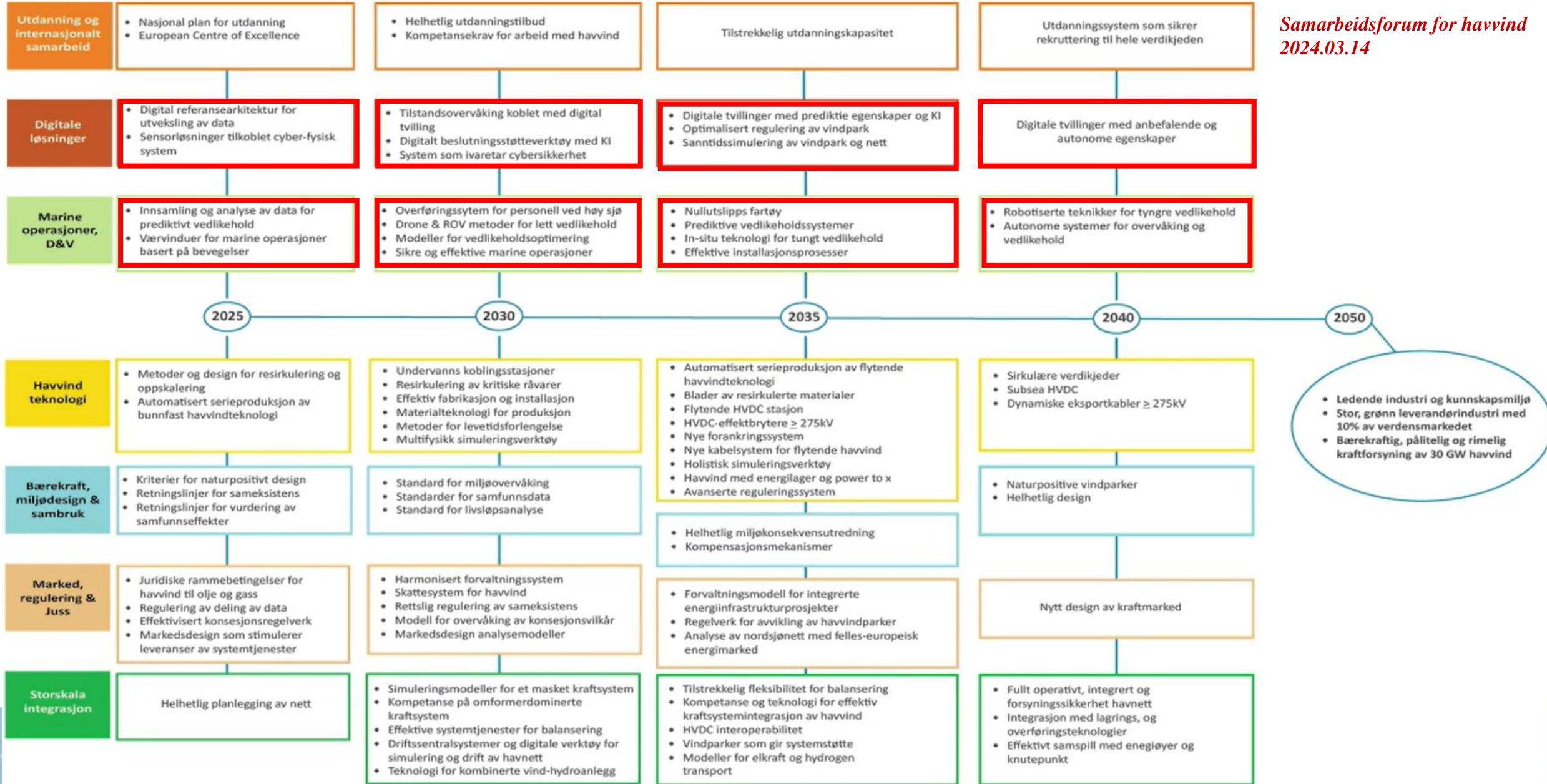
- 1 year RUL Extension = 5 BNoK/y
- 1% OEE improvement = 1 BNoK/y

**Overall costs by category O&G**  
Updated: 11.01.2024  
Historical figures for 2011-2022 and forecast for 2023-2028  
Source: Norwegian Offshore Directorate

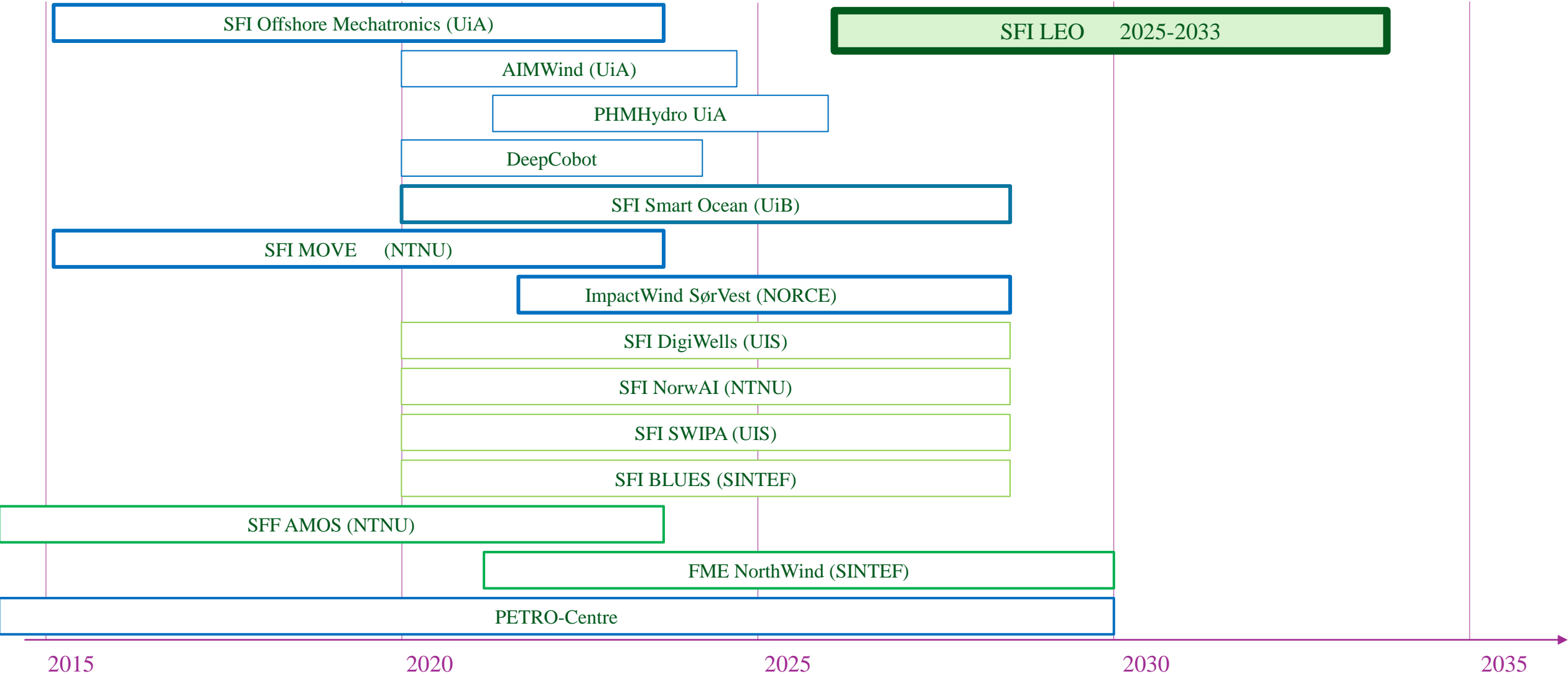


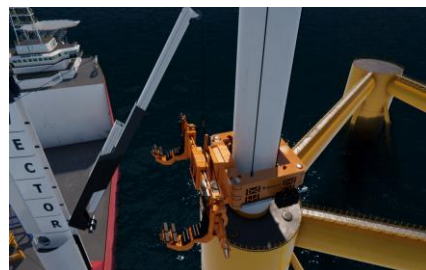
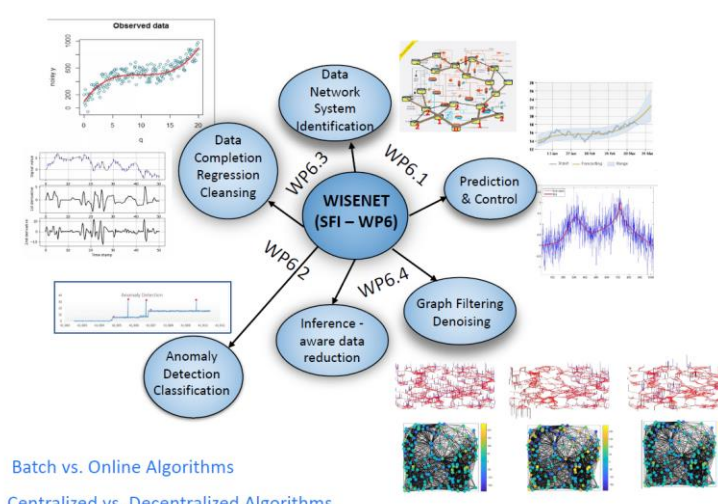
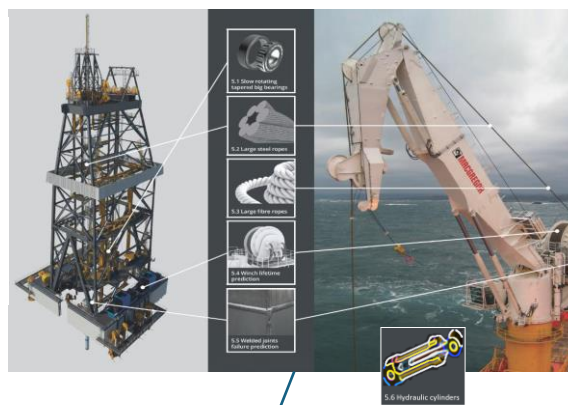
# Veikart for forskning, innovasjon og utdanning

*Samarbeidsforum for havvind  
2024.03.14*



# Our position and intension





**PHMHydro**  
Performance and Health Monitoring of Hydro electric power plants

# CIAM – Cluster on Industrial Asset Management

# Success criteria for SFI's:

Long-term, significant funding from all partners

Attracting international researchers

**Technology transfer**

**Long-term research**

Gender aspects

**Value creation**

Industry-oriented education

Institutional support

**Researcher training**

**Internationalisation**

New partners

Visibility, identity and cooperation

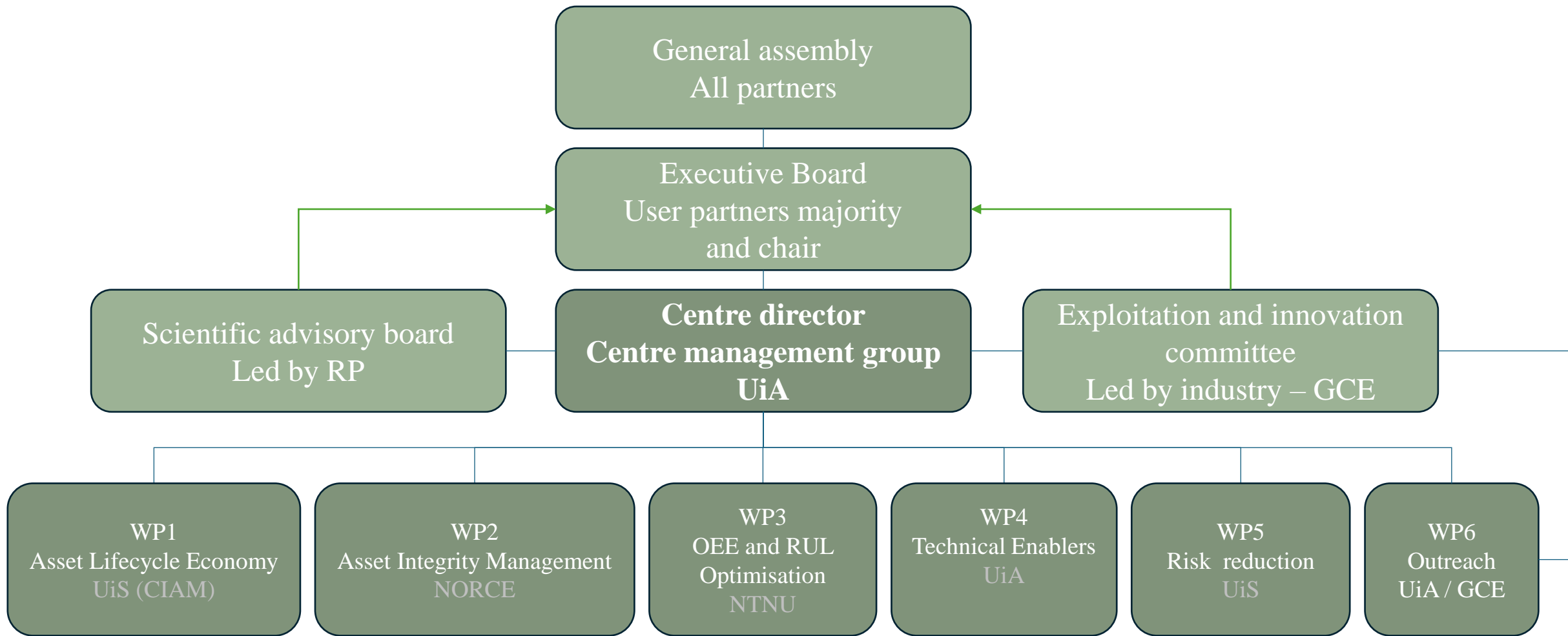
Management

Spin-off projects

Commitment and support from the host institution

# Structure of the Centre SFI LEO





# Centre management

## Centre Administration

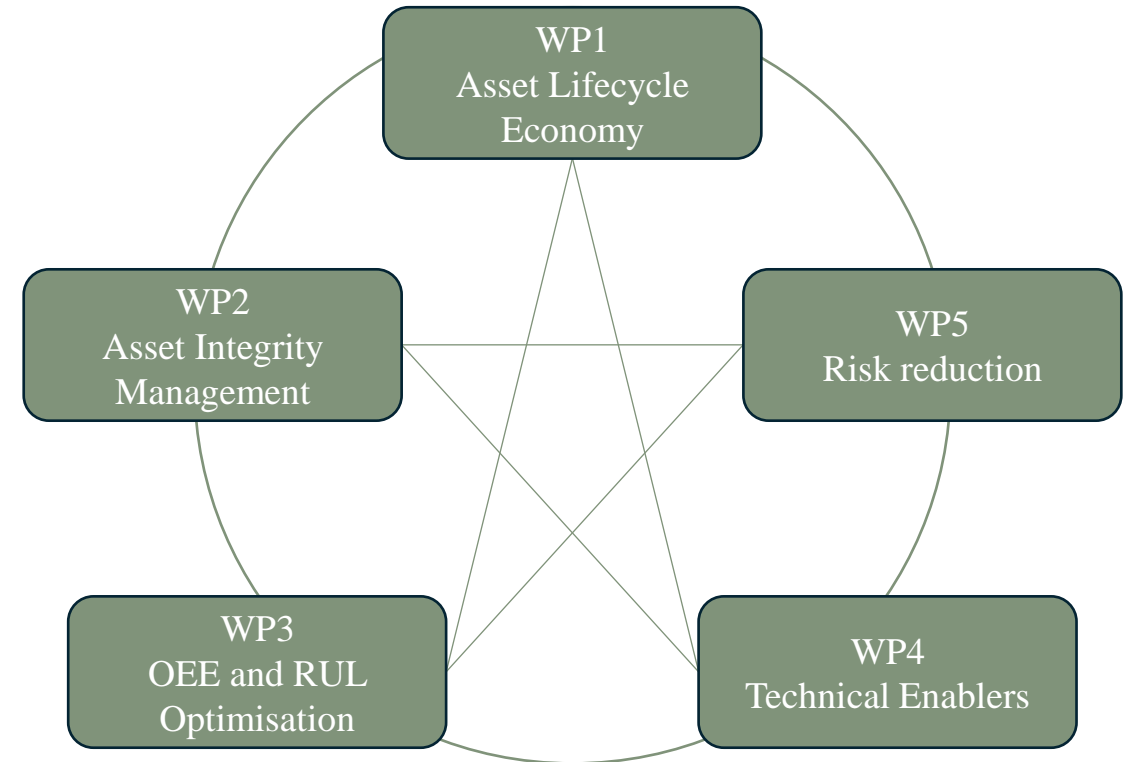
- Centre Director, UiA
  - Prof. Kjell G. Robbersmyr
- Centre Co-director / CTO, NORCE
  - Chief Researcher Rune Schlanbusch , PhD
- Centre Administrative Mng, UiA
  - NN
- Innovation officer
- Satellite Managers
  - Prof. Jan Frick, UiS-CIAM
  - Prof. Hans-Petter Hildre, NTNU

## Centre Management Group

- Centre Administration
- WP Leaders
- Controller (Host)
  - Even Skretting, UiA
- Communication-exploitation officer
  - Anne Solvang Salvesen
- Education officer
  - PhD, Training, Research Schools,
  - MA, BA, Continuing Education
- HR / Recruitment officer / Gender Bal.

# Research and exploitation characteristics

- Annual Conference
- Regular Presentations / Training
- WP Activities
  - Reference group meetings 4X/y
  - Work shops
  - Bilateral sessions/visits
- Cross-activities via active WP-managers
- Exchange / Co-location



# SFI LEO Partnership



# Organisation and funding

## Time-bound research centre

- 8 years (5 years, *mid-term evaluation* + 3 years )

## Funding

- |  |   |         |
|--|---|---------|
| • RCN funds up to 12 MNoK per year, total                              | ≤ | 50 - 96 |
| • User partners (i.e. industry) contributes minimum 50% of RCN funding | ≥ | 25 - 48 |
| • no in-kind requirement for research orgs.                            | ≥ | 0       |
| • Total  | ≥ | 75 -144 |
| • Ambition:  | ≥ | 200     |

≤ 67% of the costs are funded by the RCN,  
max 96 MNOK  
≥ 33% funding cash and/or in-kind from industry

## No state aid

- Require industry participation
- Require actual real collaboration
- No funding of industrial partners, industry partners cover own costs

For details, see:

<https://www.forskningsradet.no/utlysninger/2024/senter-for-forskningsdrevet-innovasjon-trinn-1/>



# Partnership categories

Prelimar expectations on funding from user partners

Company size (EU - SME definition)		Large	Medium	Small	Micro
Cash and/or in-kind	/ kNoK p.a.	1 500	500	250	125
Cash and/or in-kind Total 8 years	/ MNOK	12	4	2	1

# Application process

# Two-stage proposal evaluation

## Phase 1: Prequalification 2024

- Open for research institutions and partners
- Short application «5 pages» (+ attachments)
- Expert evaluation
- Screening of applications based on quality and relevance to the call
- Thematic delineation (FME, FSP/Petrosentre, SFI-IV)
- Contribution to sustainability
- Remaining applications will receive notification of rejection after ca. 5 months

## Phase 2: Complete application on invitation

- Ca. 30 will be invited
- Full proposal (20 pages + attachments)
- Expert evaluation
- Recommendation for funding based on quality and assessment criteria
- Interviews of best applicants





# Our Application Process and Timeline



# Template **Letter of Intent** for user partners participating in the Centre for Research-based Innovation - SFI <project title>

## Please note:

- The Letter of Intent should be maximum 1 page.
- Keep the page format of this template (A4, 2 cm margins, single spacing, font 11, Calibri).
- **Motivation for participation in the centre**  
Describe why the company or organisation wants to participate in the centre and what the expected outcomes and effects of the participation are, including future innovations and value creation.
- **Description of the participation**  
Describe the contribution from the company or organisation regarding knowledge, expertise, infrastructure etc. that the user partner plans to make available in the centre.
- **Intended contribution**  
Describe the type and amount of financing the company or organisation intends to contribute with  
- separated in cash (NOK 1000) and in-kind (NOK 1000) during the eight-year lifetime of the centre.

# Next steps

## 1. Work shops April-May 2024

- |                |      |             |                         |
|----------------|------|-------------|-------------------------|
| • Ålesund      | 25/4 | 10:00-13:00 | ÅKP / GCE-Blue Maritime |
| • Kristiansand | 26/4 | 13:00-16:00 | UiA Campus Kristiansand |
| • Bergen       |      |             | NORCE                   |
| • Stavanger    | 2/5  |             | UiS                     |
| • Oslo         |      |             |                         |

## 2. Registration for SFI LEO: email

[anne.s.salvesen@uia.no](mailto:anne.s.salvesen@uia.no)

## 3. Questions, email

[geir.grasmo@uia.no](mailto:geir.grasmo@uia.no)

## 4. LOI - Letter of Intent

- We will make examples
- We will establish a help desk
- Internal dead line is **01-09-2024**  
(we need time for final description and budgeting)

[Template from Forskningsrådet](#)

Registration of interest:



# Questions and remarks

Please raise your digital hand or  
put question in the chat



# Appendix

# About RCN SFI-V call

# Vision

The aim of the SFI scheme is to **promote innovation** by support of **long-term research** through close cooperation between R&D-intensive enterprises and prominent research institutions.

SFI shall strengthen the innovative capacity of Norwegian business and industry through research that responds to long-term needs, **challenges** and **future value creation** opportunities.

The research must take place in a binding and long-term manner with **collaboration** between research organizations and companies, preferably also in collaboration with the public sector.

The research must be at a **high international level** and **provide a basis for innovations and increased value creation in Norwegian industry.**

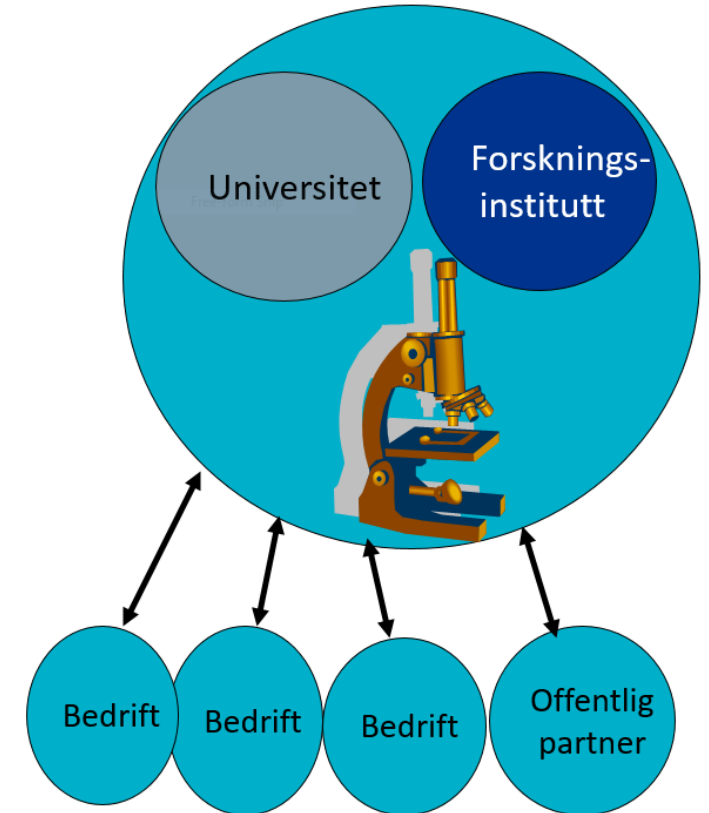
# Objectives

The results of the research shall provide a **basis for innovations** and increase **value creation** in Norwegian business and/or increased efficiency and good services in Norwegian public sector.

Business shall through **collaboration** with leading research institutions, and access to high-quality research, achieve **increased competitiveness** nationally and internationally.

The center shall increase the internationalization of Norwegian business and industry research institutions, i.a. through strong national and **international research networks** and **value chains**.

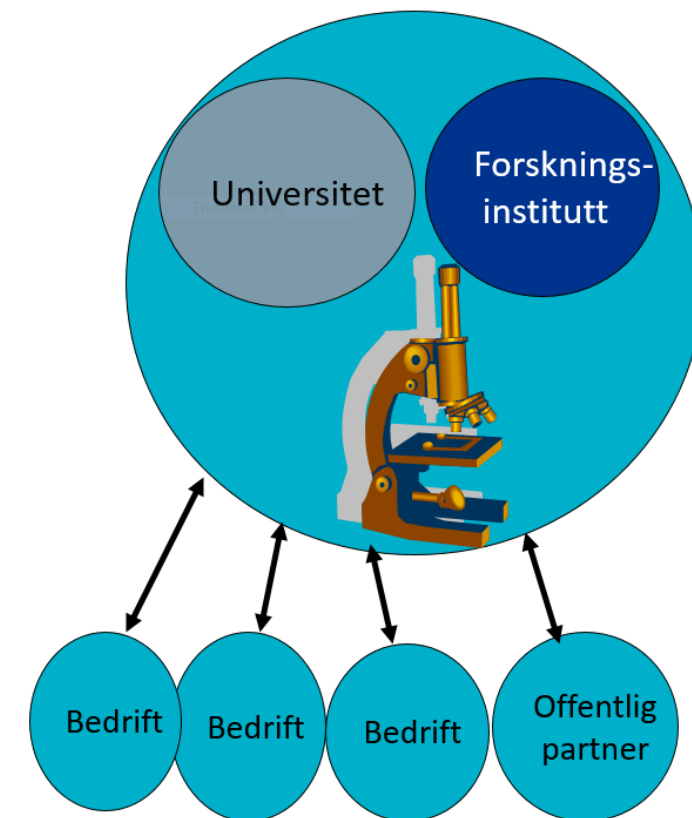
The centers must contribute to master's and research **education** in order to meet competence needs in business and the public sector.





# Expectations

- To make it easier for business and the public sector to **adopt research results to innovations**,
  - a large degree and **real involvement** of partners in the center
  - the center has **expertise in innovation**.
- Innovations based on research results from the centers are expected to be followed up of the centre's partners in separate activities, initiatives and projects.



# RCN SFI (V) Application Process and Timeline

5. April 2024  
Call Announcement

18. September 2023  
Deadline Application (5 page)  
Step 1 Prequalification

May 2025  
Deadline Application  
Step 2 (20 page)

November  
2025  
Kick-off



22. April 2024  
Application  
seminar  
(Research partners)

7. August 2024  
Application  
Opening

December 2024  
Step 1  
approval / rejection

September 2025  
Step 2  
Approval / rejection

# About SFI LEO organisation

# General Assembly

- Annual meeting
- Weighted voting share  
(cash & in-kind for industrial partners)
- Election of Executive Board
- Approval of annual plans
- Approval av budgets
- Approval of  
Centre Director and Co-Director

# Executive Board

- 9 members
  - 1 Chair by industry, cluster representative
  - 4 from user partners
    - Minimum 1 from SME partners
  - 4 from national research partners, 1 each
  - 4 deputy representatives (meeting)
    - 2 user partners including industry clusters
    - 1 from host institution
    - 1 from research partners
- Centre Director, Co-director and Administrative Manager are obliged to attend .



# Scientific advisory board

- 5 internationally recognised active researchers/professors
- Covers the scope of the centre
- Reports on the scientific progress and performance
- Mandatory requirement from RCN
- Led by one of the Research Partners, prefer independent representative.
- Reports to the Executive Board



# Exploitation and innovation committee

- Lead by one of the industry / clusters
- 4 – 6 members from the user partners
- One member of each research partner (4 in total)
- Planning and execution of innovation promoting activities
- All partners should have access to bi-annual sessions