Turning wind R&D into sustainable industry

18 August 2021

FME NORTHWIND

Objective

research and innovation to reduce the cost of wind energy, facilitate its sustainable development, create jobs and grow exports

Total budget 2021-2029: 320 MNOK financed by Research Council of Norway, industry and research partners

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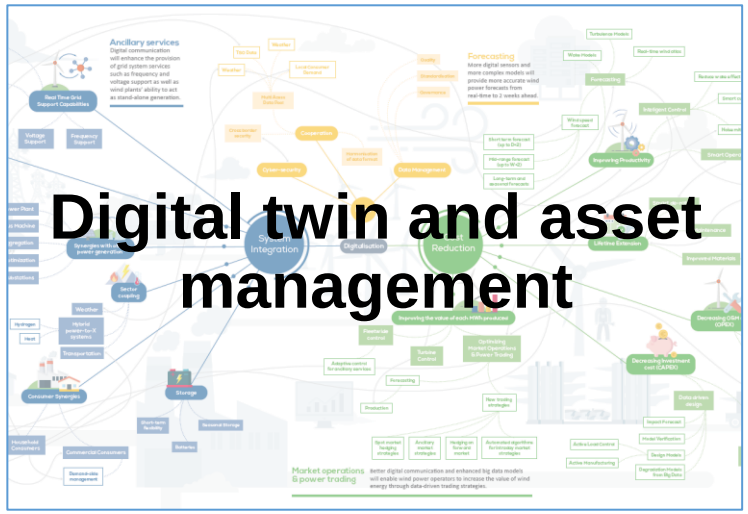
Research

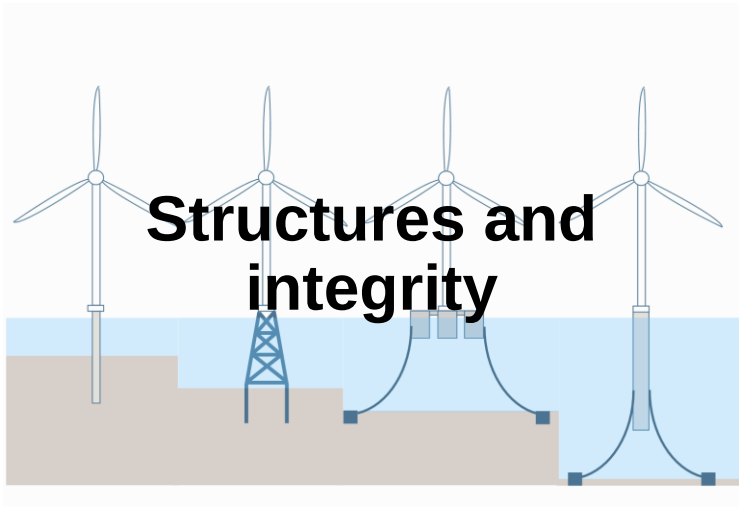
Industry

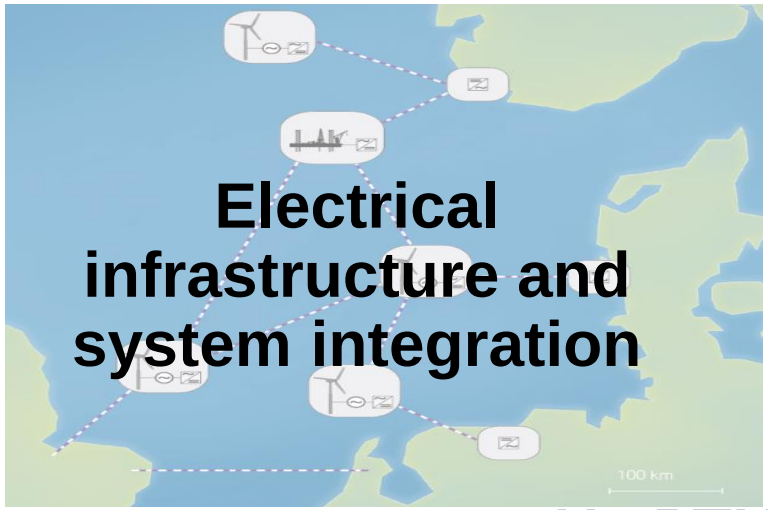
Associates

NORTH WIND

Research programme







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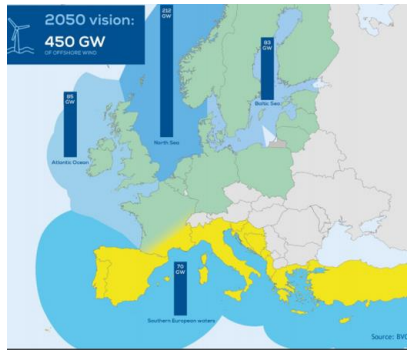
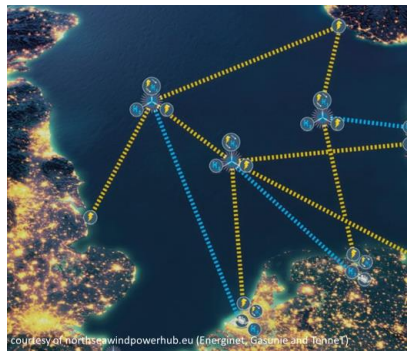
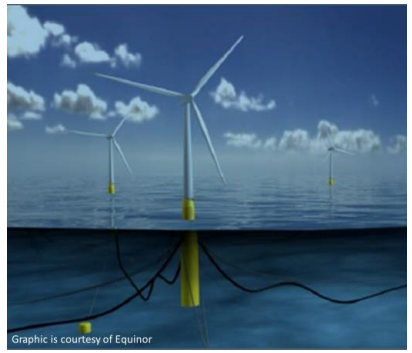
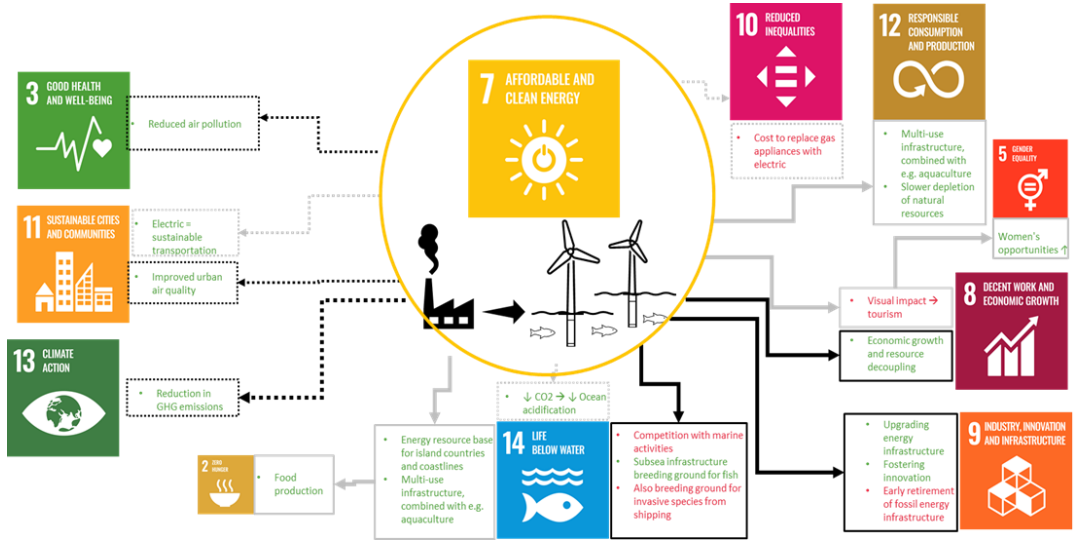
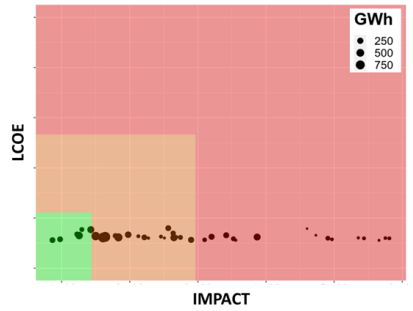
A giga opportunity with challenges





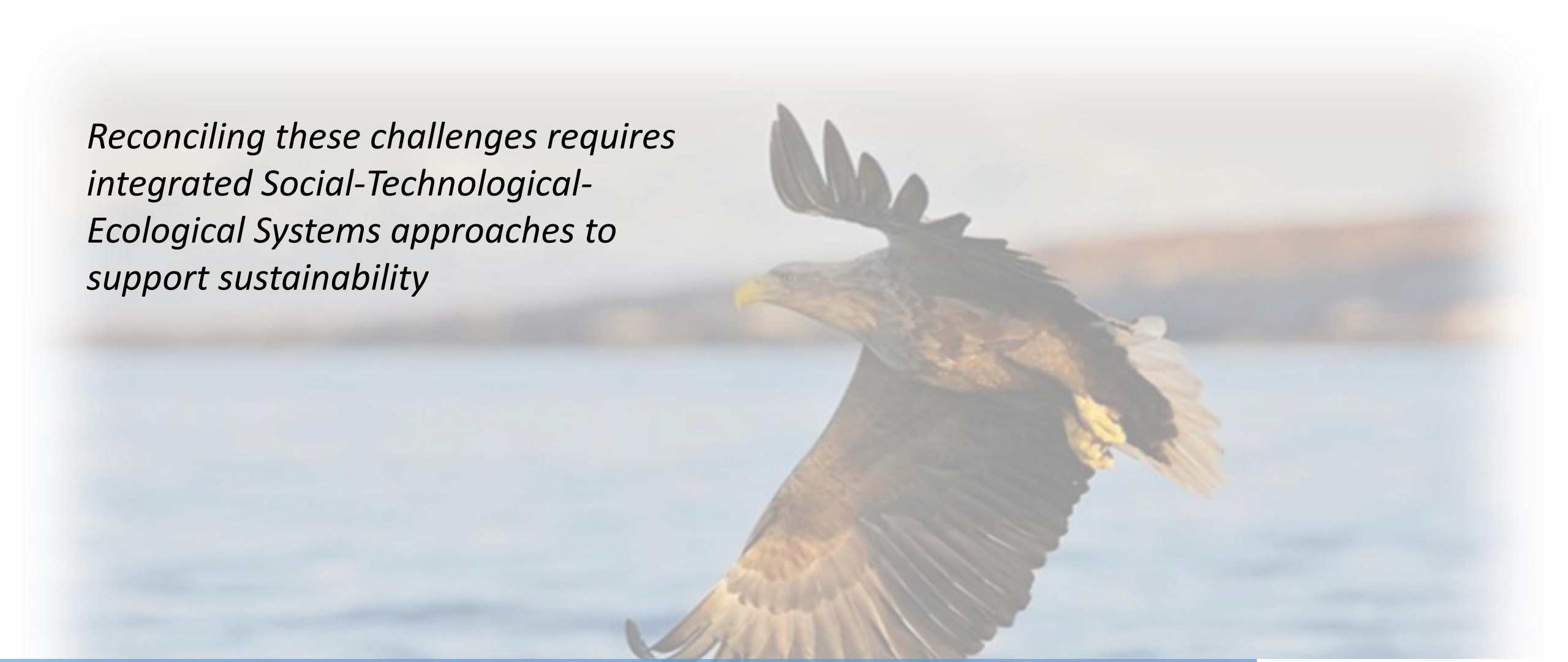






Technology ⟷ Society ⟷ Environment

Reconciling these challenges requires integrated Social-Technological-Ecological Systems approaches to support sustainability



WP5 Sustainable wind development

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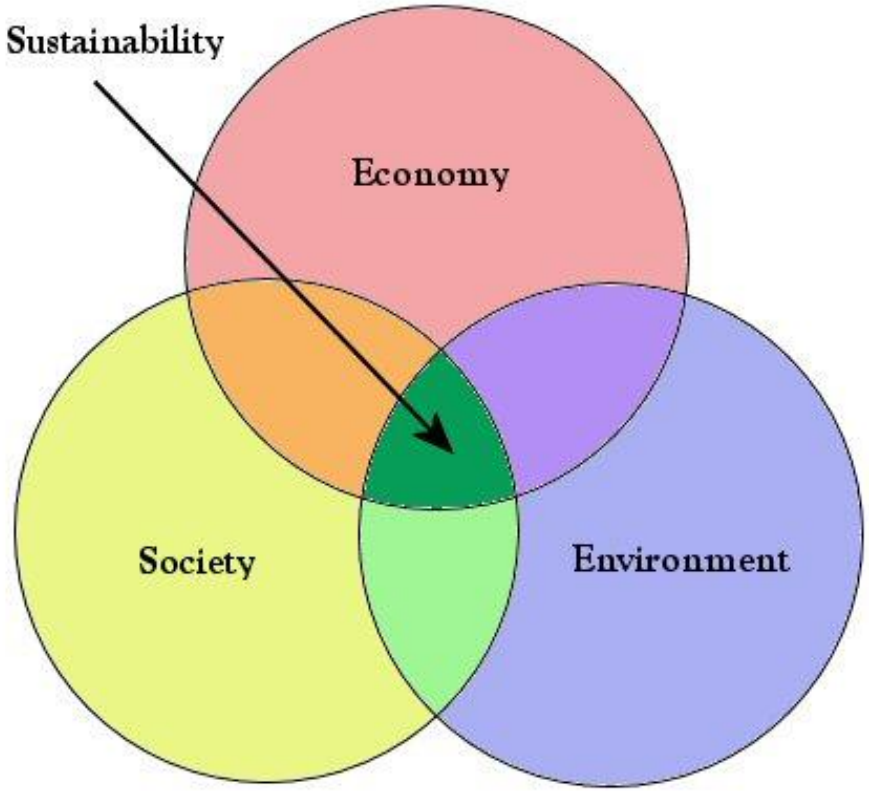
Motivation



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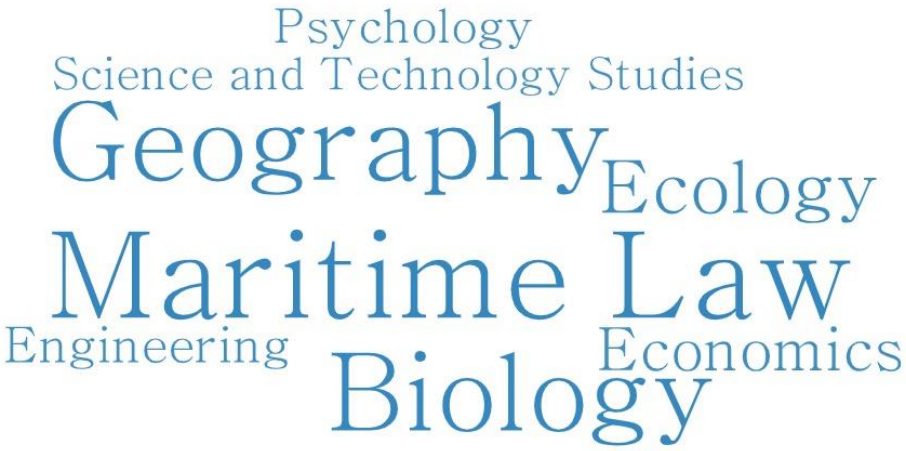
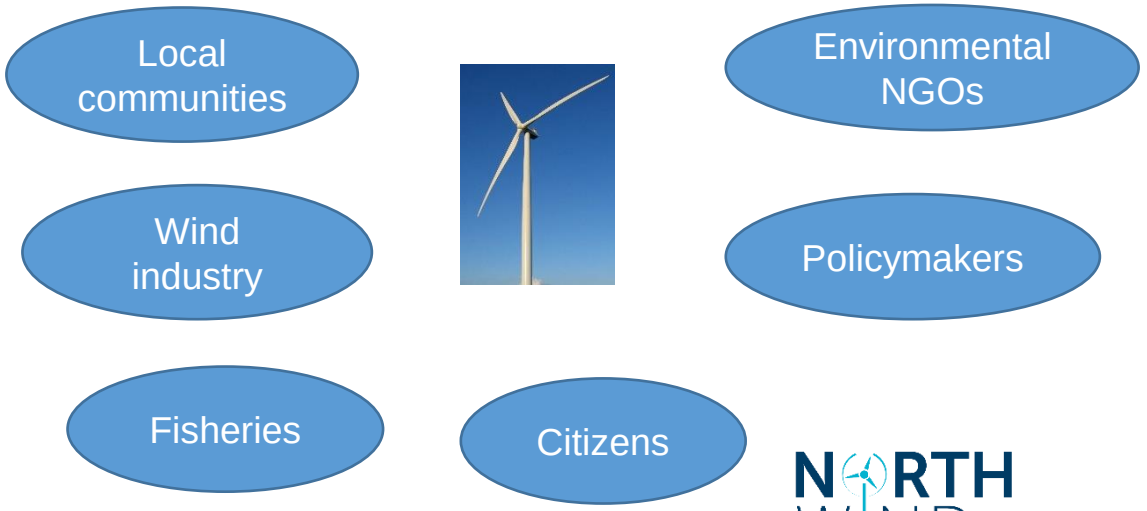
Objective

Develop tools and insights for sustainable development of wind energy to create a successful export industry, reduce cost and uncertainty, and resolve environmental and societal conflicts

Interdisciplinary collaboration

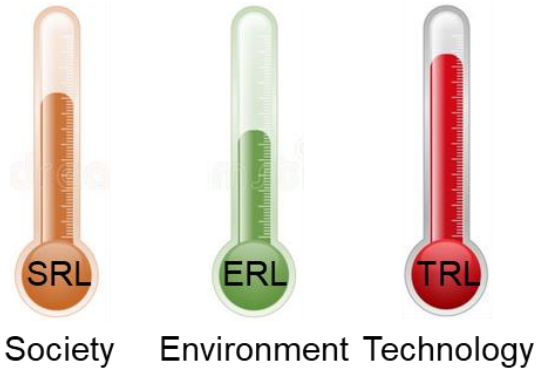


Transdisciplinary collaboration



Focal areas

- Task 5.1 – The role of (Norwegian) wind in the sustainable energy transition
- Task 5.2 – Environmental impacts and options for environmental design
- Task 5.3 – Public engagement, participation and controversy
- User cases – Sustainability Readiness Levels



Task 5.2 – Environmental impacts and options for environmental design

- ***Environmental impacts*** will assess multiple-stressor impacts of onshore and offshore operations on biodiversity using integrated monitoring and spatio-temporal modelling to support cumulative effect assessments and siting of wind energy facilities.
- ***Environmental design*** will develop tools and methodology to assess risks of impact caused by the ecological footprint of development and develop innovative technical solutions to mitigate impacts, including best practice guidelines for ecological restoration.
- ***Environmental assessment*** will develop best regulatory practices and tools for (strategic) Environmental Impact Assessments to enable cumulative effect assessments for sustainable licensing and siting.

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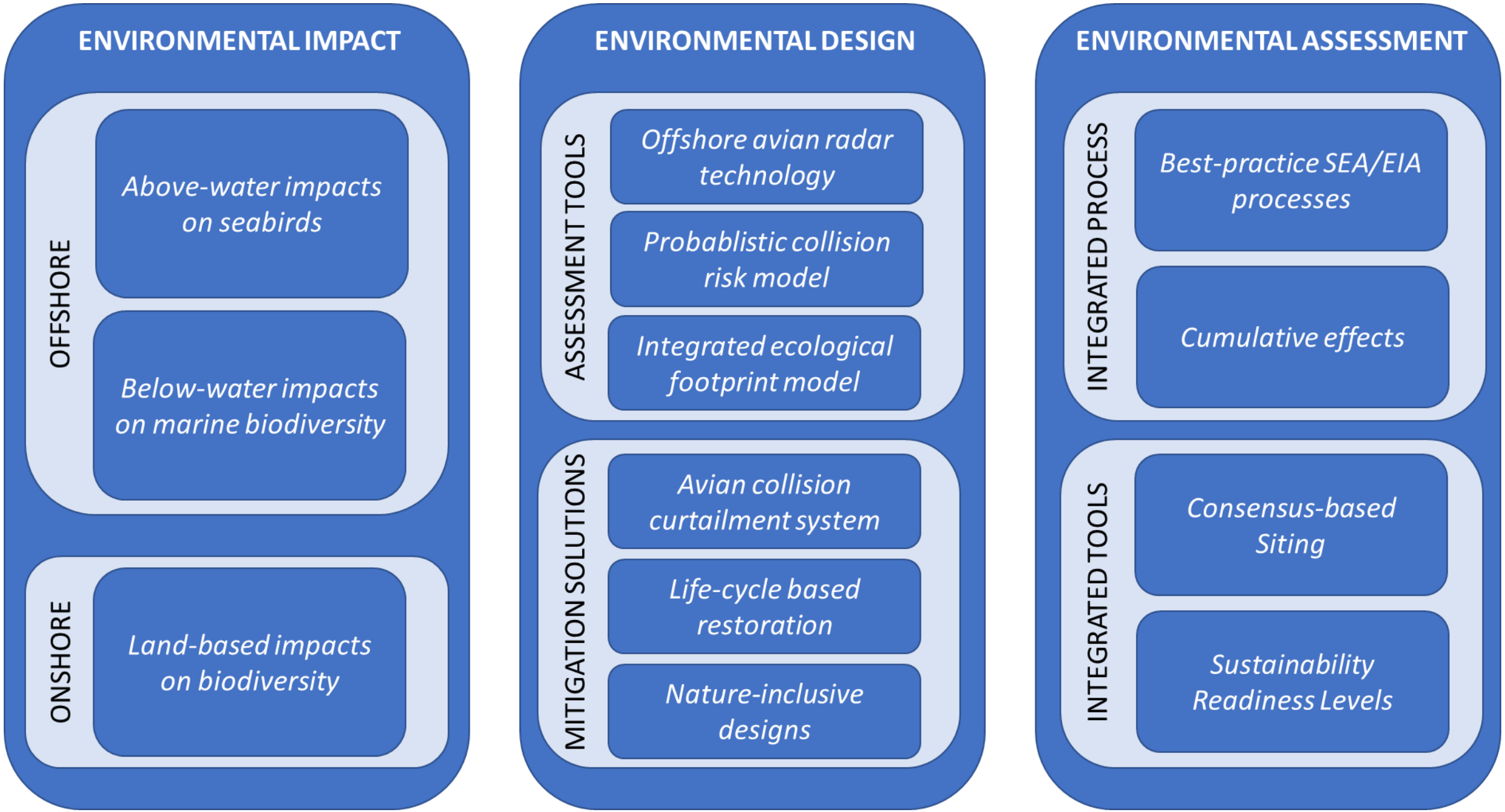
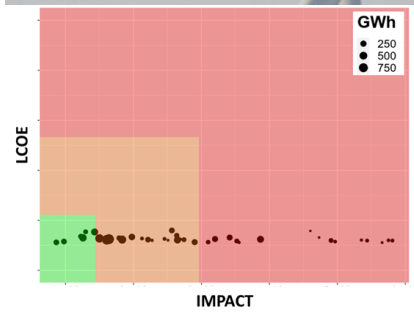

ENVIRONMENTAL IMPACT
OFFSHORE
Above-water impacts on seabirds
Below-water impacts on marine biodiversity
ONSHORE
Land-based impacts on biodiversity
ENVIRONMENTAL DESIGN
ASSESSMENT TOOLS
Offshore avian radar technology
Probablistic collision risk model
Integrated ecological footprint model
MITIGATION SOLUTIONS
Avian collision curtailment system
Life-cycle based restoration
Nature-inclusive designs
ENVIRONMENTAL ASSESSMENT
INTEGRATED PROCESS
Best-practice SEA/EIA processes
Cumulative effects
INTEGRATED TOOLS
Consensus-based Siting
Sustainability Readiness Levels

Activities 2021-2022



<u>Environmental impacts</u>

- Mapping of seabird life-cycle impacts
- Reviewing artificial reef effects in Scandinavia
- Online application for LCA impacts on onshore biodiversity

<u>Environmental design</u>

- Options for inclusion of environmental and societal risks in the Digital Twin concept
- Review of technology for bird detection and collision prevention
- Review of decommissioning and restoration practice at onshore wind farms

<u>Environmental assessment</u>

- Review of SEA, EIA and CEA requirements in the Norwegian permitting regime for onshore and offshore wind
- Mapping wind energy relevant ecosystem services for the integrated siting and planning tool ConSite

Mapping seabird impacts

Kronikk

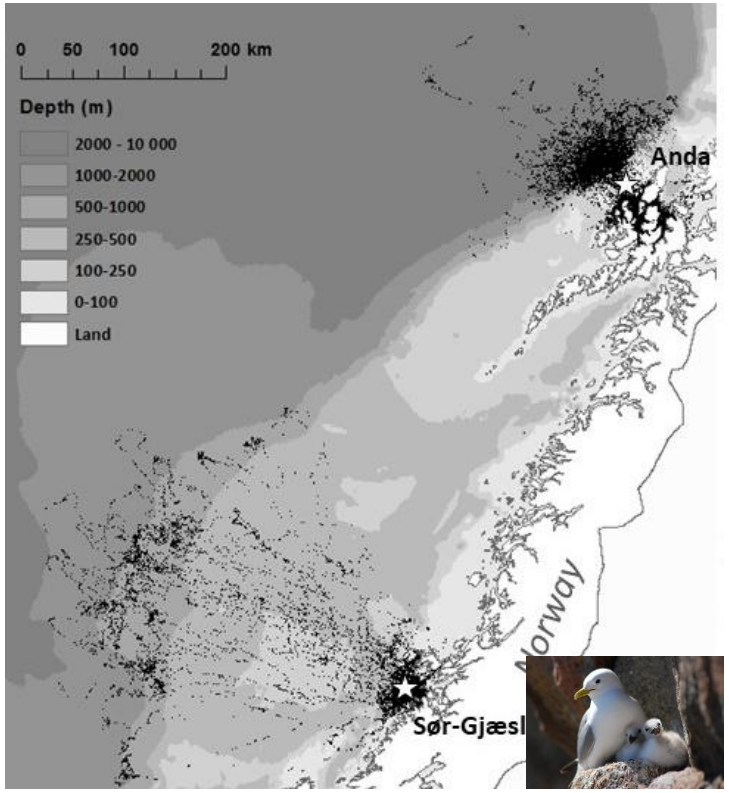
Dra til sjøs, for noen muligheter! Dette er vind-vinn

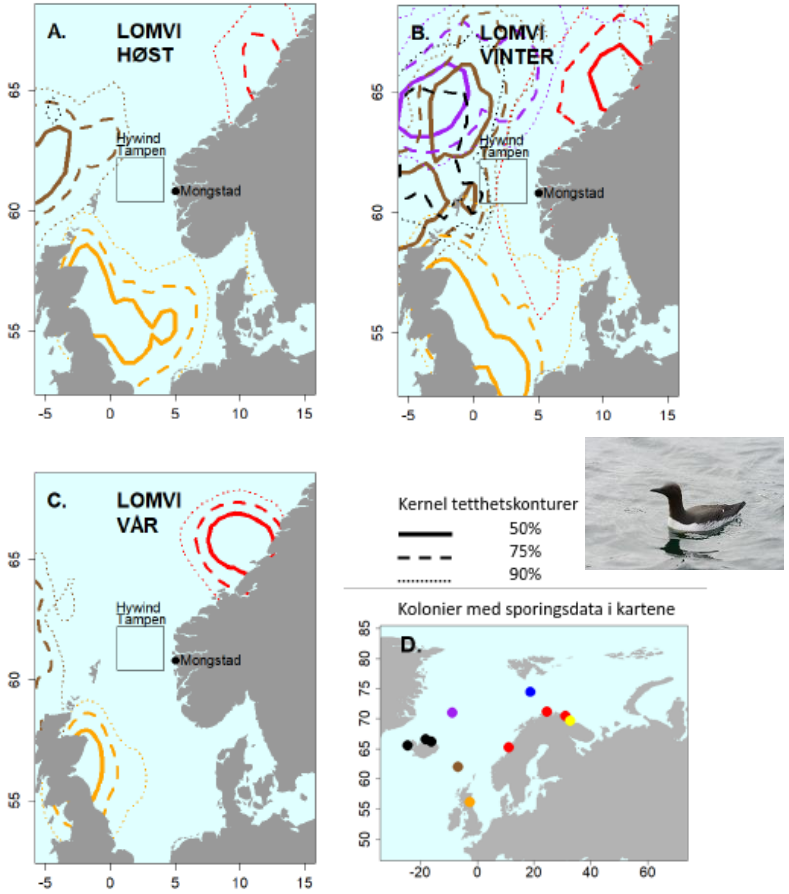
Glem
akku
erobr

Kronikk

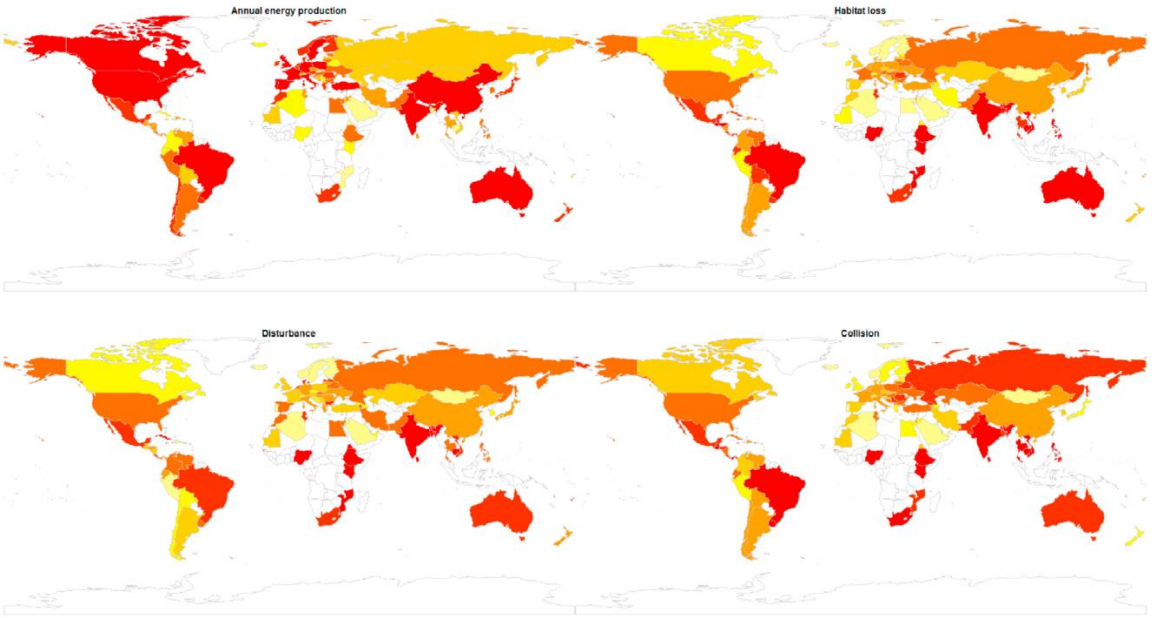
Havvind – ut av syne ut av sinn?

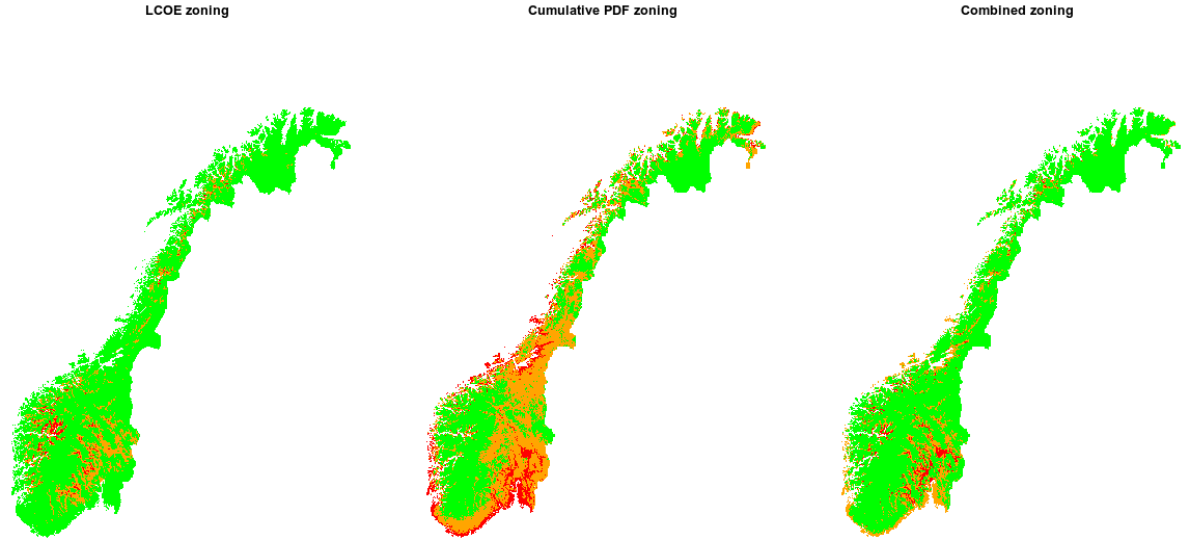
I takt med en økende kritikk mot de store naturinngrepene fra landbaserte vindkraftanlegg er det mange som ønsker at vindparkene skal flyttes til havs.



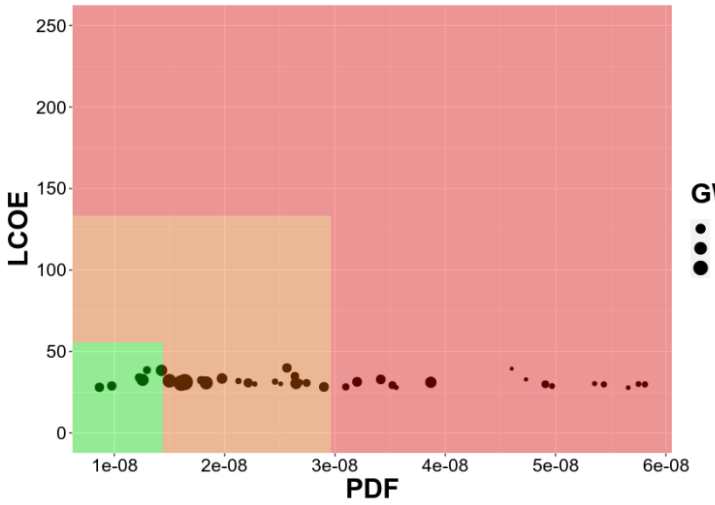


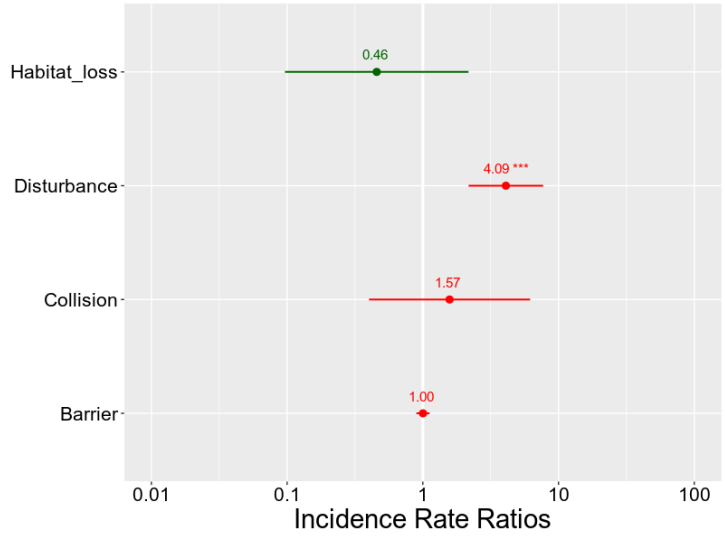
LCA for avian impacts of wind energy siting





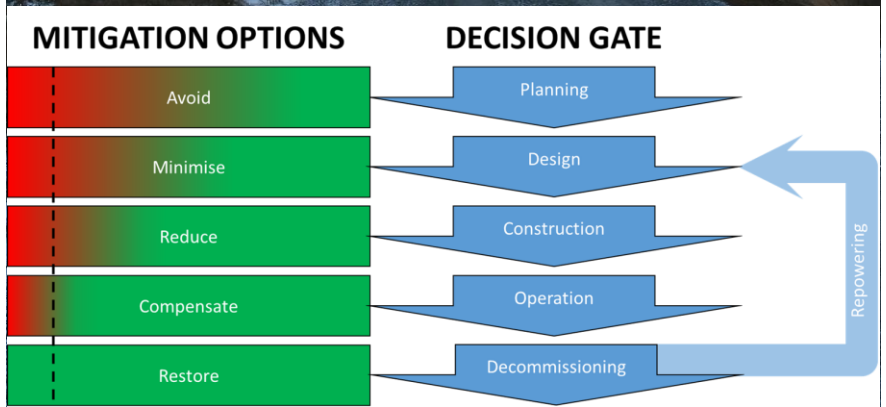
Covariate	Impact pathway			
	Habitat loss	Disturbance	Collision	Barrier
Turbine capacity (MW)	94.511***	9.857**	125.329***	5.465*
Number of turbines	66.151***	53.949***	77.239***	0.772
Interactive effect	−11.723**	−7.447*	−10.259**	6.466*
adjusted R^2	0.817	0.642	0.847	0.2034





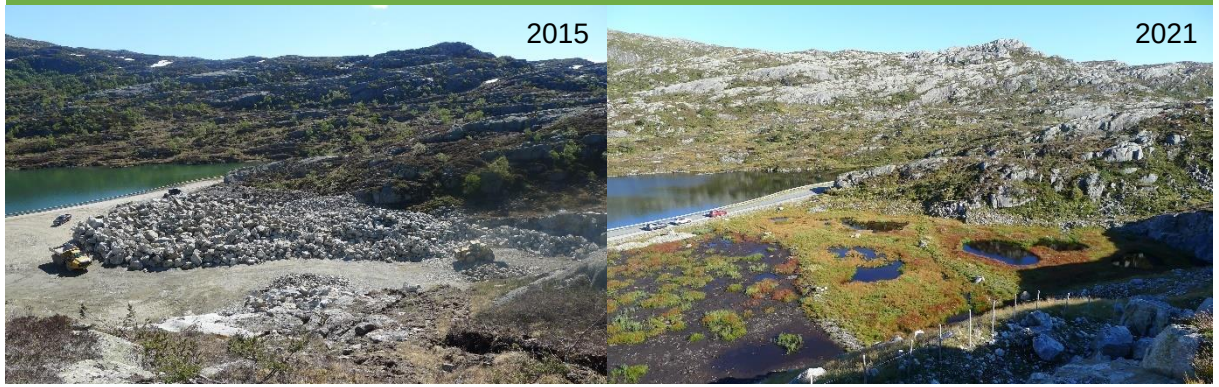
PhD on life-cycle restoration

Mitigate impacts from development of wind power



Footprint: Impact on ecosystems, vegetation and soil

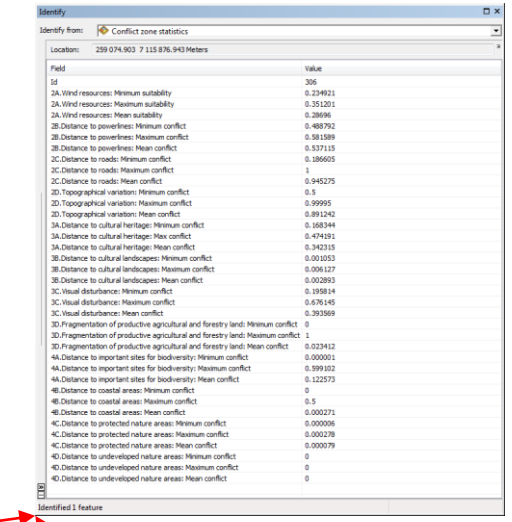
Restoration potential: Mitigate – restore - compensate

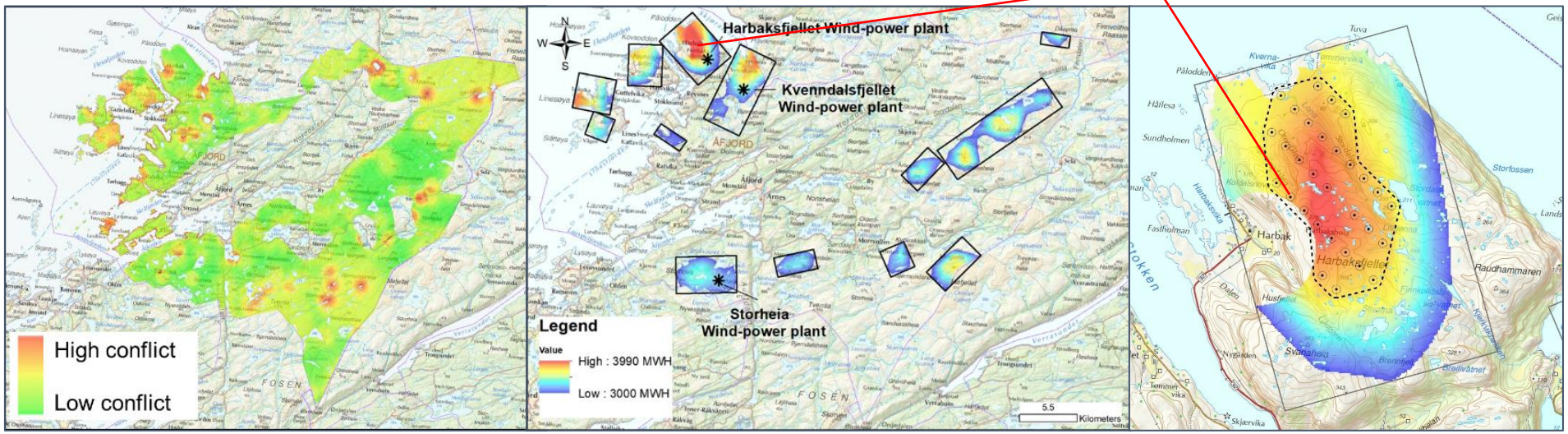


Relationship between biodiversity loss and carbon equivalents

Consensus-based siting of onshore wind (ConSite)

Spatial multi-criteria decision support tool for optimal siting of wind-power plants based on ecological, societal and technological criteria





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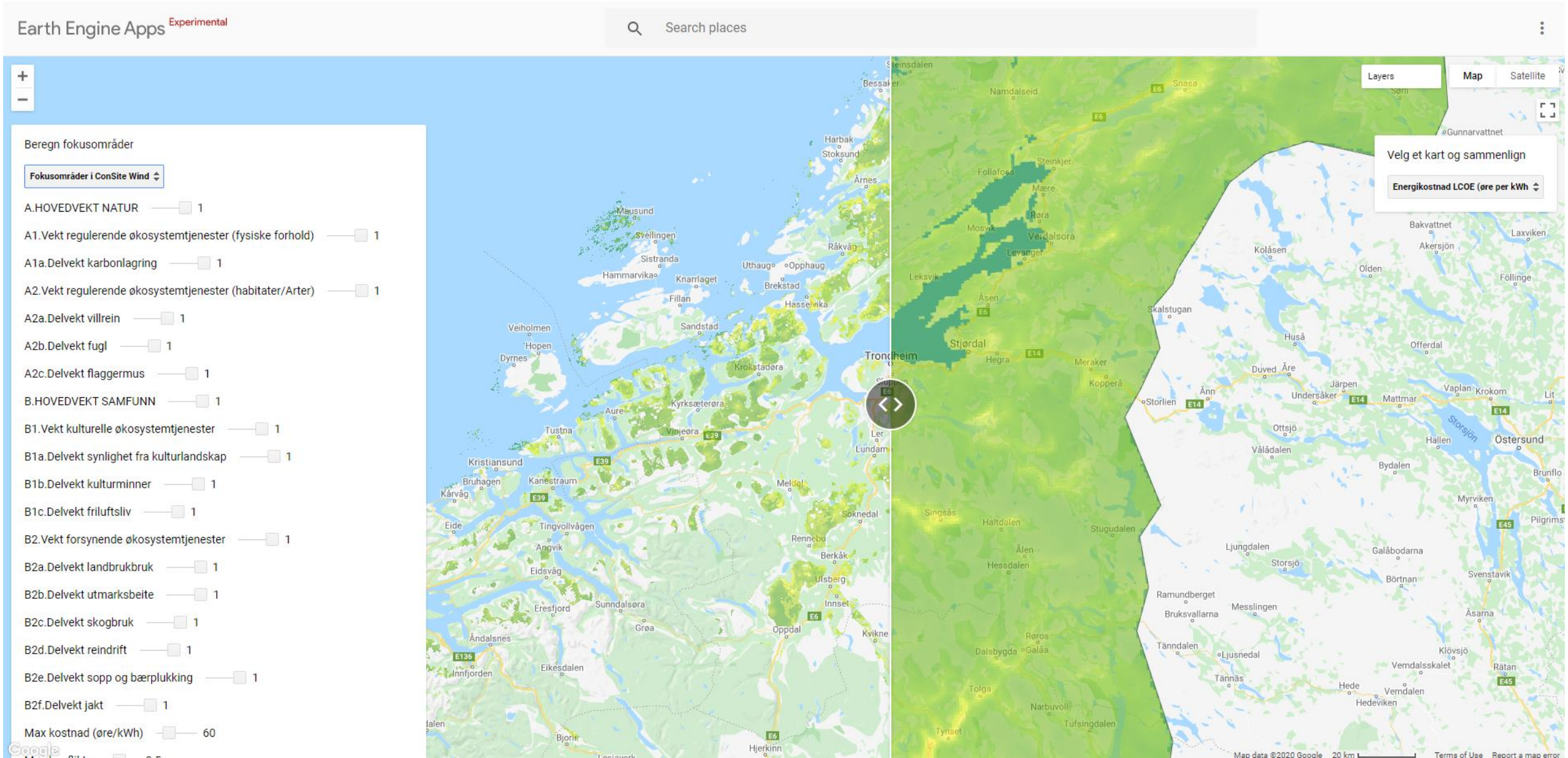

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