Funding opportunities for R&D

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Agenda for this presentation

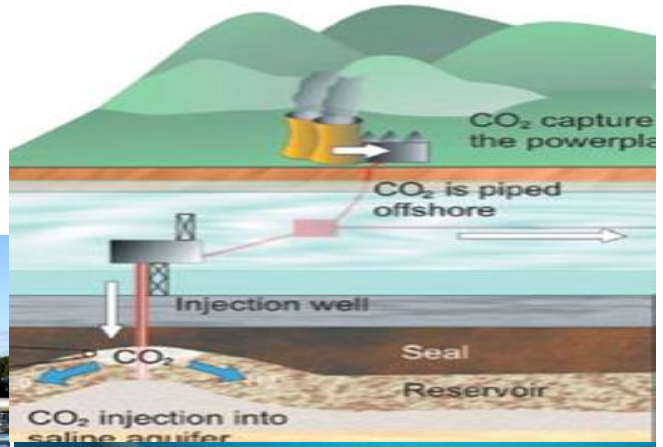
- ENERGIX
- NANO2021
- Other national research funding
- EU calls

Energy at The Research Council

- **ENERGIX** (program)

  Renewable energy and energy efficiency
- **CLIMIT** (program)

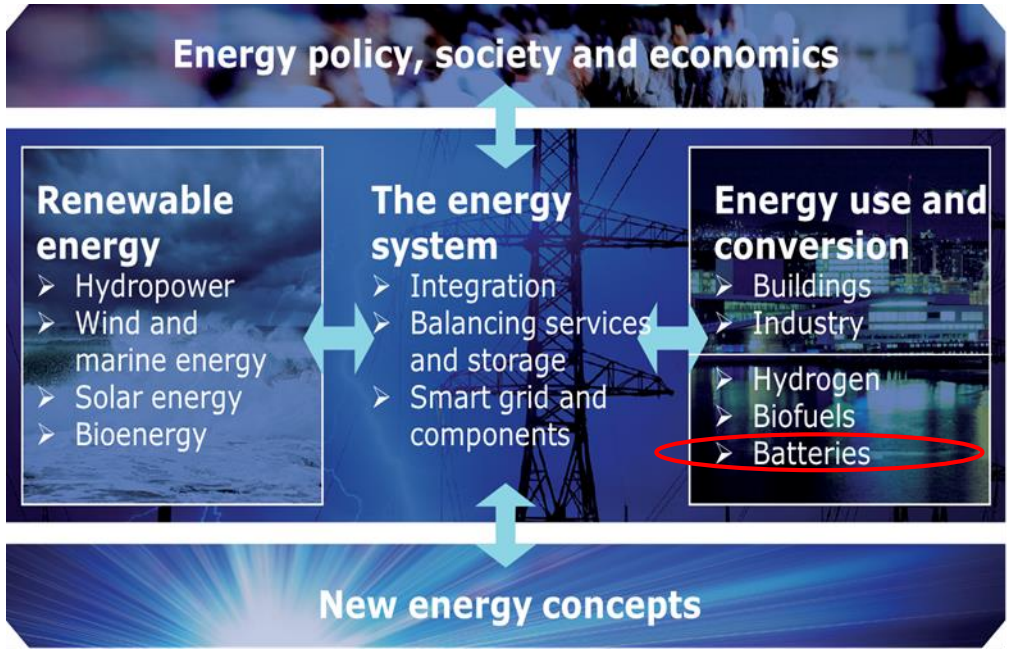
  Carbon capture and storage
- **FME** (research centres)
  Centres on environment-friendly energy
- **Energi21** (national energy strategy)



ENERGIX

Objective: support a long term and sustainable development of the energy system, promoting Norwegian competitive industries and contributing in the transition to the low-carbon society

- **Secondary objectives** for the program is to develop knowledge and solutions for:
  - sustainable utilisation and use of renewable energy sources
  - reduction of Norwegian and global GHG emissions
  - enforced national security of supply
  - more innovation in private and governmental sector
  - further development of Norwegian research and education



PILOT-E
Raskere fra idé til marked

Running projects on batteries research in ENERGIX

Project n.	Titel	Application type	Period
296413	Aluminium bus bars for marine battery systems	Annen støtte	2019 - 2022
281804	30t utslippsfri gravemaskin - zero emission digger	Annen støtte	2018 - 2020
287890	Next generation oxide electrolytes for solid-state batteries	Forskerprosjekt	2019 - 2022
280910	High energy cathodes for Li ion batteries	Forskerprosjekt	2018 - 2022
280885	Silicon alloys for improved lithium-ion batteries	Forskerprosjekt	2018 - 2020
255441	Solid Electrolytes for Li and Na-ion Batteries	Forskerprosjekt	2016 - 2019
255108	Advanced Materials for Magnesium-Ion Rechargeable Batteries (ADMIRE)	Forskerprosjekt	2016 - 2019
296595	High Energy Lithium Sulfur Battery	Innovasjonsprosjekt i næringslivet	2019 - 2021
296272	"Silicon-based anodes towards market penetration"	Innovasjonsprosjekt i næringslivet	2019 - 2022
282328	LIBRES - Lithium ion Battery Recycling	Innovasjonsprosjekt i næringslivet	2018 - 2022
282313	DOVRE Den Optimale Veien til Robuste Elektroder	Innovasjonsprosjekt i næringslivet	2018 - 2019
269490	New Energy Storage System	Innovasjonsprosjekt i næringslivet	2017 - 2020
269462	Joint Industry Development of Maritime Battery Safety	Innovasjonsprosjekt i næringslivet	2017 - 2019
281005	Safety and modelling of aged Li-ion Batteries	Kompetanseprosjekt for næringslivet	2018 - 2021
280985	Silicon on the road - how to make silicon-based anodes for Li-ion batteries	Kompetanseprosjekt for næringslivet	2018 - 2021
255195	Silicon anodes for Li-ion batteries - influence of binder, electrolyte and cathode	Kompetanseprosjekt for næringslivet	2016 - 2019

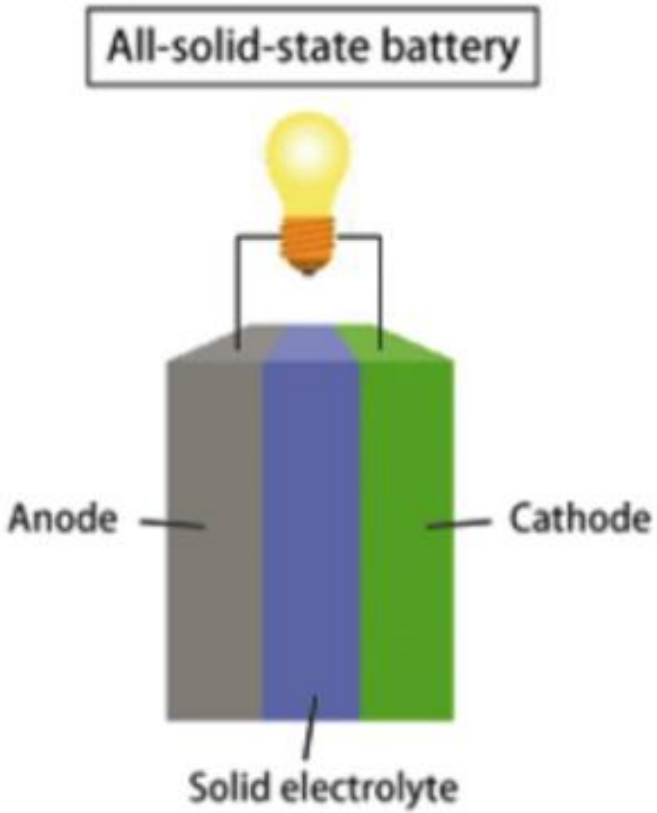
Solid Electrolytes for Li and Na-ion Batteries

Background:

Regular Li-ion batteries require relatively stringent safety precautions, making production and operation at large scales rather complex and expensive. The application of solid electrolytes is limited because they attain practically useful conductivities only at elevated temperatures.

This project:

- Simulations/theoretical prediction of new or improved solid electrolytes for Li-/Na-ion batteries
- Synthesis of such compounds based on recommendations from simulations (oxides, sulfides, hydrides, fluorides and nitrides)
- Electrochemical and structural characterization of the solid state electrolytes
- Studies of ionic conductivity/diffusion.



Type: Researcher project

Duration: 4 years

Responsible organisation: UiO

Other participants: SINTEF and institutes abroad

Disciplines: Chemistry, physics, materials science, energy

RCN funding: 13,7 mill. NOK – 100 percent of total budget

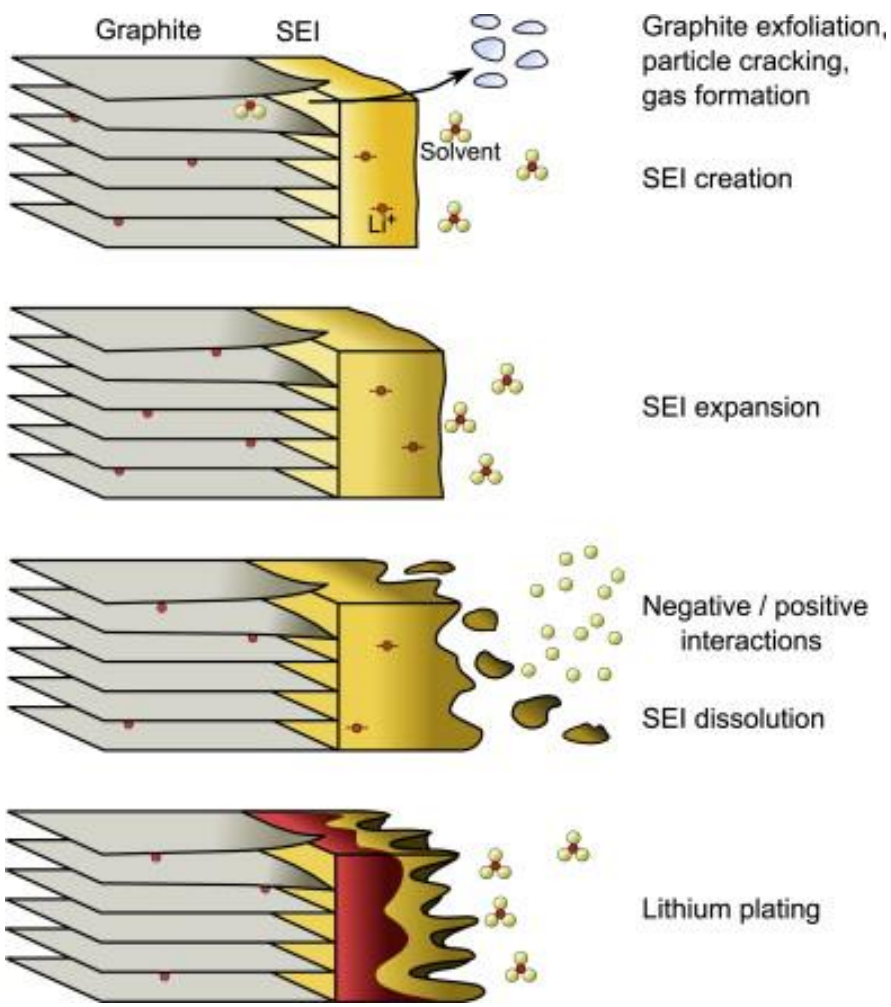
Safety and modelling of aged Li-ion Batteries

Background:

The consequences of a fire in a large maritime battery system could be catastrophic. Maritime batteries require long cycle- and calendar life, and the degradation and ageing of Li-ion batteries will in many cases contribute to reduced thermal stability. Knowledge of safety aspects on aged Li-ion cells is scarce.

This project:

- Building in-depth knowledge for safety aspects of new and aged Li-ion batteries.
- Investigate fire properties of both cells and modules
- Freezing and high temperatures



Type: Competence-building project

Duration: 4 years

Responsible organisation: IFE

Other participants: Other research institutes and a group of private companies engaged in maritime electrification

Disciplines: Li-ion batteries

RCN funding: 13 mill. NOK

Cenate – silicon powder to replace grafite in the anode of Li-ion batteries

Background:

Today, the anodes in Li-ion batteries primarily consist of carbon in the form of graphite. By adding socalled nanostructured silicon, energy density can be increased by up to 30 percent.

Project:

- Objective: Develop a sufficiently cost-effective production process
- Utilizing a unique sentrifuge reactor, originally developed for PV silicon
- God progress towareds project targets
- In process of finding a battery cell manufacturer willing to start using the new product

Type: Innovation project, **Duration:** 2 years

Responsible organisation: Cenate AS

Other participants: Dynatec Engineering, IFE, SINTEF

Discipline: Materialvitenskap

Governmental funding: 14 mill. NOK – 50 % of total budget

Prosjektnummer: 282313

Electric solutions enabling zero emission vessel

Objective

- develop a scaleable electric propulsion system, including energy storage, power management and charging, with lower cost, higher efficiency, improved reliability, smaller dimensions and more feasible integrations with existing systems

Results by winter 2019

- finished container solution where batteries and power electronics is installed in separate rooms, isolated with fire resistance in class A-60
- Signed a contract with Golden Energy on delivering a battery system of 896 kWh for each of the two sister vessels «NS Orla» and «NS Fraya» for hybrid propulsion. In addition more than 40 requests for hybridisation of existing offshore vessels and many newbuilds

Responsible organisation: Rolls-Royce Marine AS

Partners: Norwegian shipowners, classification societies, international research institutes

Project period: 2017 - 2018

Type: Innovation project

Governmental funding: 5,9 mill. NOK (40 % of total budget)

Project number: 269136

Photo: Golden Energy Offshore

LIBRES - Lithium ion Battery Recycling

Background:

- Norway is the world leader on electrification of cars
- The number of EVs will increase strongly the coming 7-10 years
- Norway has a competent metallurgical industry and an efficient scheeme for collection of batteries

Objective:

Become a world pioneer on sustainable, energy- and cost-efficient processes for recycling of valuable materials from EV batteries: lithium, cobalt, nickel, copper, aluminium, graphite and special fluoride salts.

Responsible organisation: Hydro Aluminium AS

Participants: Elkem Technology, IME RWTH i Aachen (Tyskland), MIMI Tech (Tyskland), Universitetet i Agder (Grimstad) og NTNU, Universitetet i Agder, Glencore Nikkelverk AS, Batteriretur AS og Keliber OY MIMITech GmbH

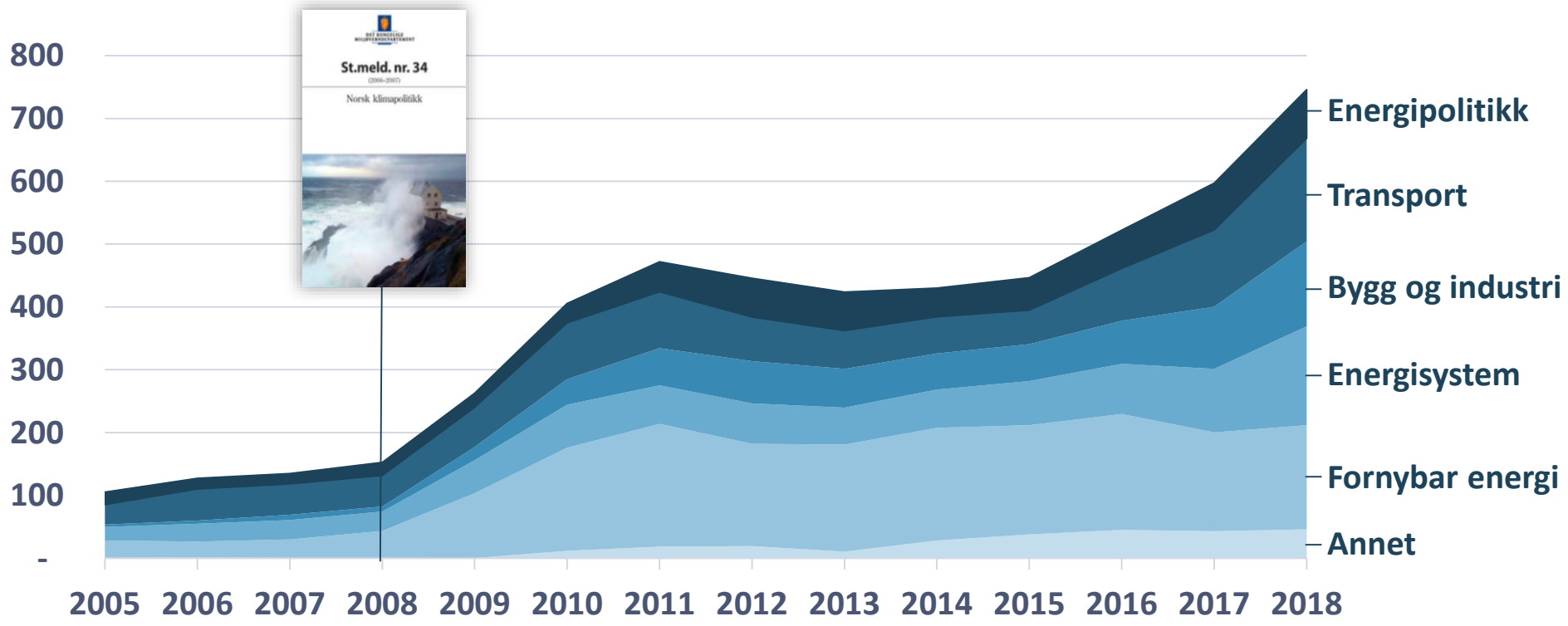
Duration: 2018 - 2022

Type: Innovation project

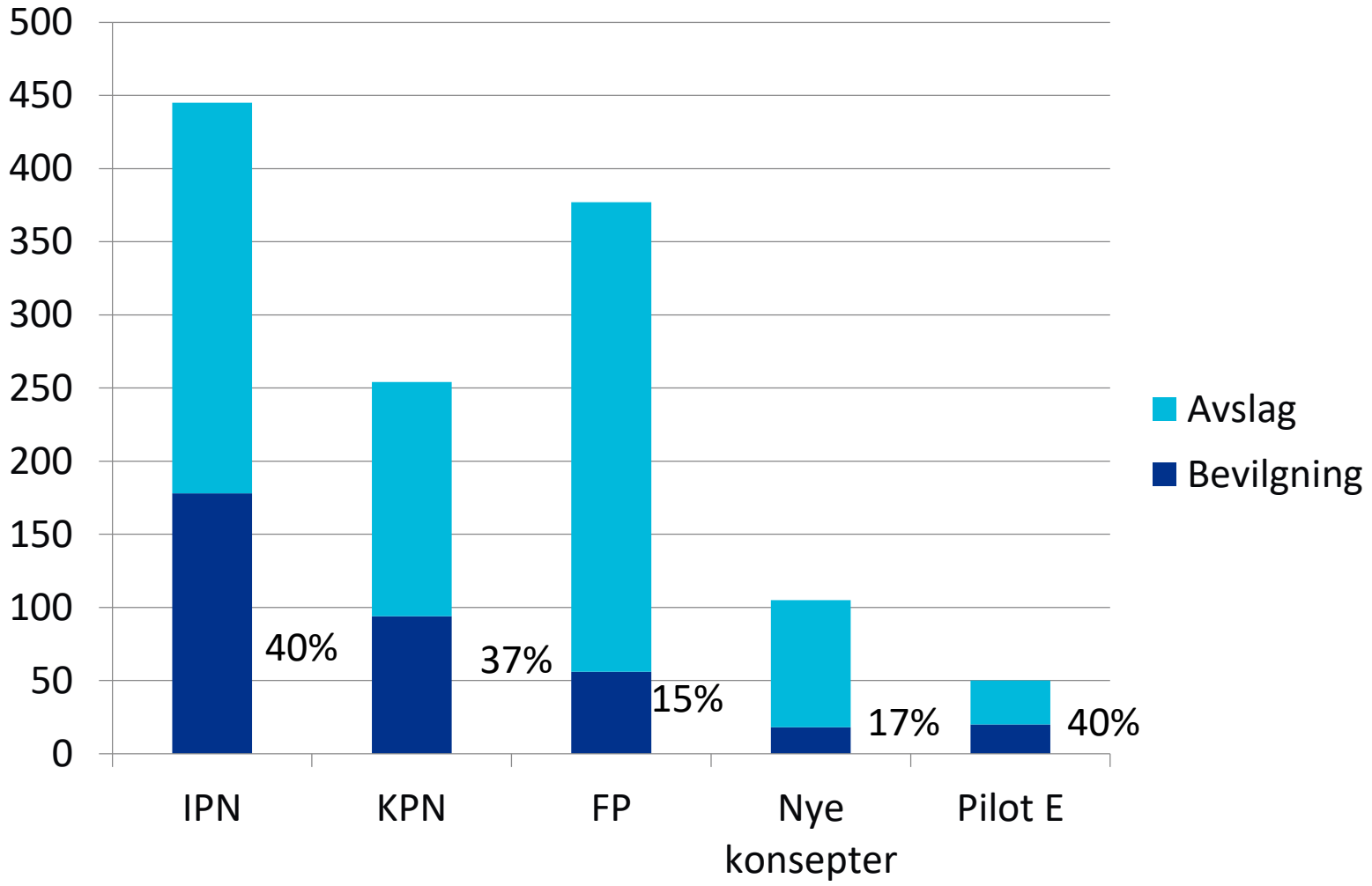
Governmental funding: 6,6 mill. NOK (30 %)

Project number: 282328

Porteføljе RENERGI/ENERGIX og FME (mill. NOK)



ENERGIX – applications received 2012 to 2018 – specified per application type – refusals and grants



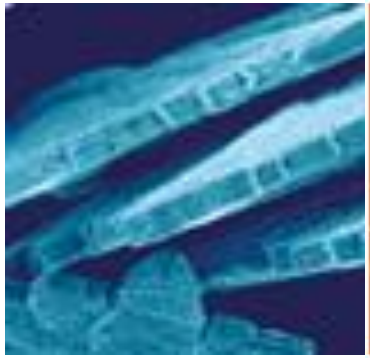
Calls 2019

- Innovation projects, 170 mill. kroner:
  - We invite applications on **all topics** covered by the ENERGIX program plan
  - Application deadline 25.09 2019
  - More info: Webinar IPN, webinar IPO
- Competence-building projects, 160 mill. kroner:
  - We invite applications on **all topics** covered by the ENERGIX program plan
  - Application deadline 04.09 2019
- Researcher projects, 20 mill. kroner, social science projects requiring independence, deadline 10.04.2019

- **Note! New templates for project descriptions and new sets of evaluation criteria**

Søknadstype	Utlysning	Ramme
IPN	170 mill. kroner	150-190
KPN	160 mill. kroner	140-180
FP	20 mill. kroner	20-40
Pilot E	50 mill. kroner	30-60
MVO, Kina og gjesteforsker/utenlandsstipend	40 mill. kroner	
Totalt	**440 mill. kroner**	

NANO2021
Nanotechnology, microtechnology and advanced materials



Goal:
Build excellent knowledge and sustainable innovations based on nanotechnology, microtechnology and advanced materials

Target groups: Researchers and industry

Budget: 136 mill. NOK annually

Major thematic priorities:

Renewable energy

The environment

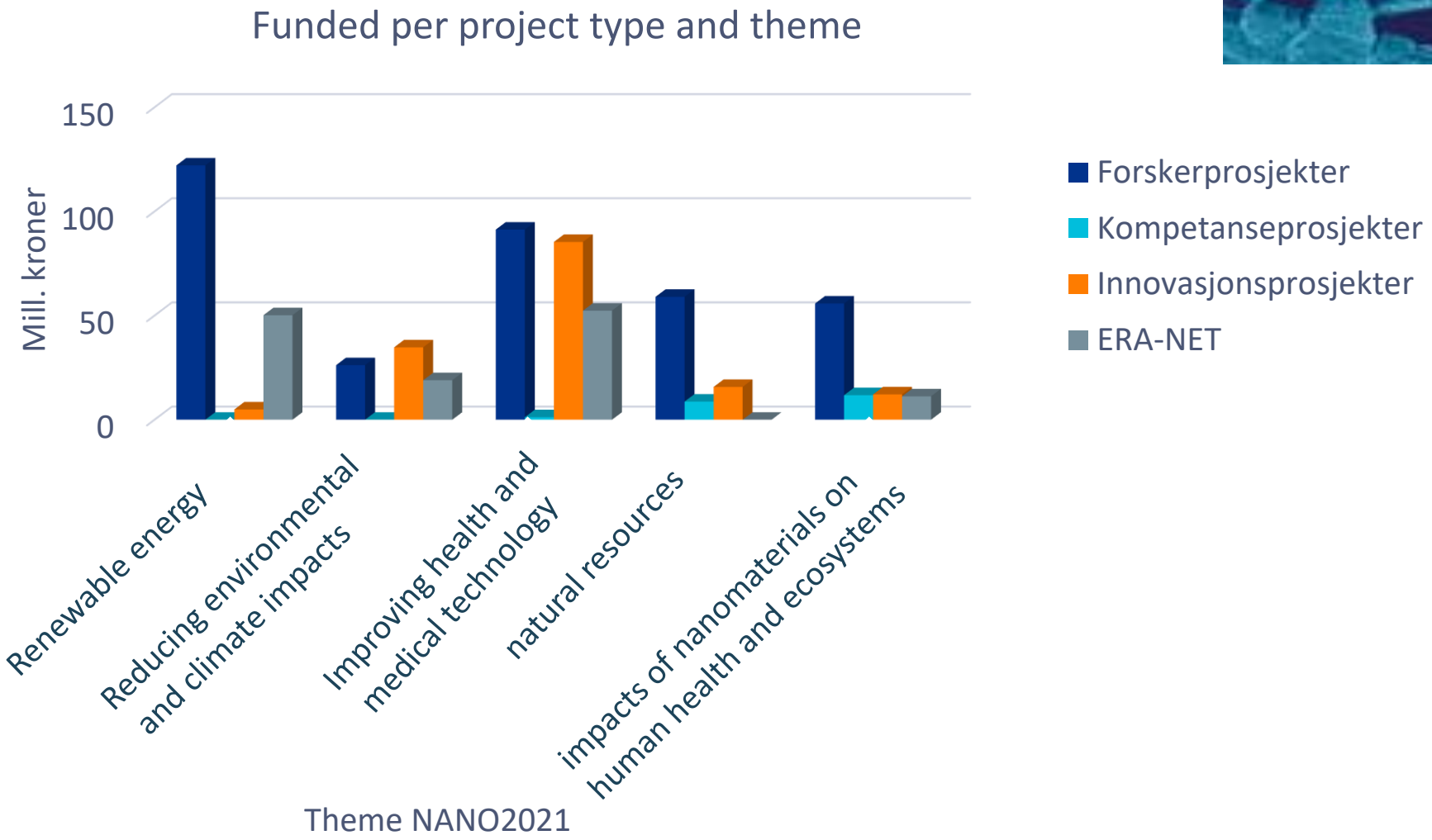
Health

Utilize natural resources

Responsible technology development incl. effect nanoparticles on the environment and health

Responsibility vs. synchrotron and neutron research with special emphasis on method development.

NANO2021 Project Portfolio (2018)

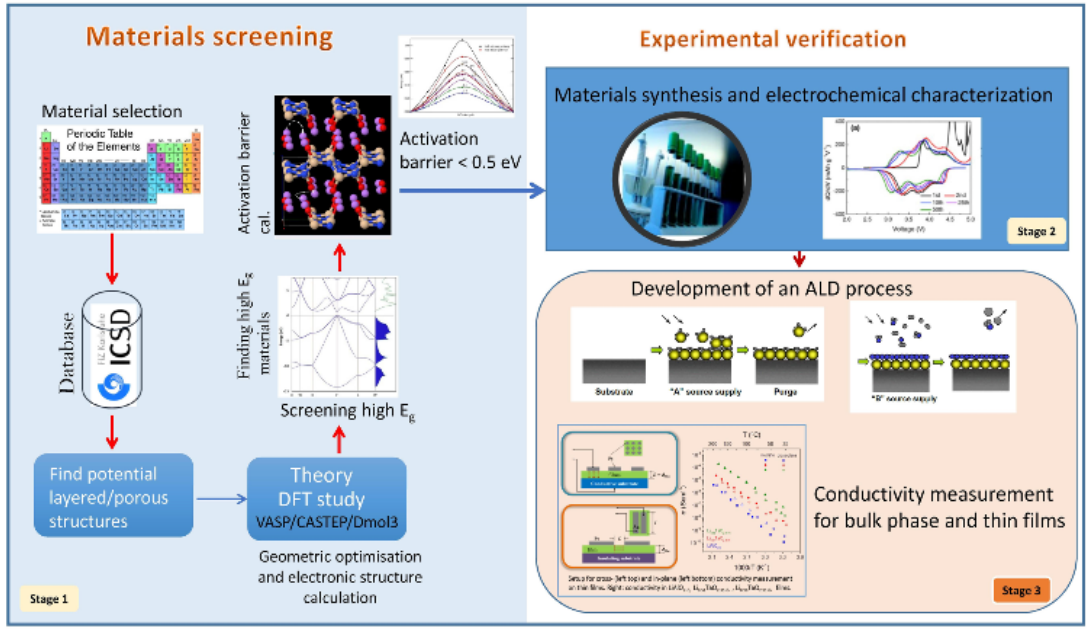


Running projects on batteries research in NANO2021 (2019)

P.nummer	Fra	Til	Tittel	Prosjekttype	Adm. ansvarlig institusjon	Prosjektleder
272806	03.04.2017	03.04.2020	Hybrid materials for Si surface passivation and battery applications	M-ERA.NET	INSTITUTT FOR ENERGITEKNIKK	Erik Stensrud Marstein
262387	01.01.2017	31.12.2020	Solid state electrolytes for all-solid thin film Li-ion batteries	Forskerprosjekt	UNIVERSITETET I OSLO	Ola Nilsen
262399	03.04.2017	31.12.2020	Carbon Nanomaterial-IL Hybrids for Ultrahigh Energy Supercapacitors	Forskerprosjekt	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	De Chen
274969	01.05.2018	31.10.2020	Bio-degradable Li-ion battery anodes	Forskerprosjekt	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	Fride Vullum-Bruer
287480	01.06.2019	01.09.2022	NanoName: Improving sodium ion battery perfomance with nanostructured metallate anodes	Forskerprosjekt	Senter for materialvitenskap og nanoteknologi, UNIVERSITETET I OSLO	Helmer Fjellvåg

Solid state electrolytes for all-solid thin film Li-ion batteries

- Development of a new classes of solid-state electrolytes for micro batteries as energy storage media.
- Atomic layer deposition (ALD) and molecular layer deposition (MLD) technique uses to design conduction pathways in amorphous electrolytes to open for high transport rates.
- Interaction with Norwegian and international R&D related to battery technology via the proposed FME on Mobility Zero Emission Energy Systems.
- The Project heavily uses national infrastructure (RECX, NORFAB).

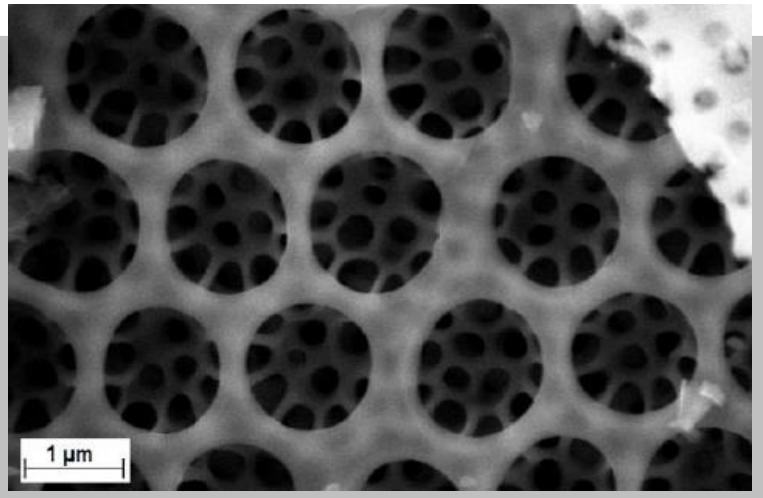


https://www.mn.uio.no/smn/english/research/projects/chemistry/selinab/index.html

Prosjektleder:	Professor Ola Nilsen
Prosjektnummer:	262387
Søknadstype:	Forskerprosjekt
Prosjektperiode:	2016 - 2021
Tildelt:	9,0 mill.. kr
Midlene er mottatt fra:	NANO2021 — Nanoteknologi og nye materiale
Organisasjon:	UoH-sektor > Universiteter > UNIVERSITETET I OSLO > DET MATEMATISK-NATURVITENSKAPELIGE FAKULTET > Senter for materialvitenskap og nanoteknologi
Geografi:	Oslo / Oslo

Bio-degradable Li-ion battery anodes

- Development of a Li-ion battery (LIB) solution where SiO2 can be used as anode material combined with water soluble alginate binders.
- Morphology and composition of the silica anode are key parameters to achieve high and stable electrochemical performance.
- Various pre-treatmens and conductive coatings are investigated to provide higher conductivity.
- The project works toward commercialization (verification at ETH in Zurich)



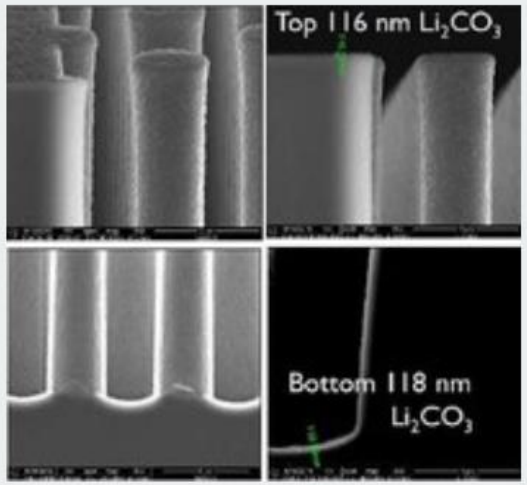
Microscope image of the three dimensional nanostructure of a *Coscinodiscus* diatom.

Prosjektleder:	Professor Ann Mari Svensson
Prosjektnummer:	274969
Søknadstype:	Forskerprosjekt
Prosjektperiode:	2018 - 2021
Tildelt:	8,5 mill.. kr
Midlene er mottatt fra:	NANO2021 — Nanoteknologi og nye materiale
Organisasjon:	UoH-sektor > Universiteter > NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU > NTNU FAKULTET FOR NATURVITENSKAP > Institutt for materialteknologi
Geografi:	Sør-Trøndelag / Trondheim

Success Stories M-era.net

Project: LaminaLion - Conformal Layer-by-layer growth of hybrid polymer/inorganic nanolaminates for Li-ion batteries

- Manufacture functional all-solid state 3D thin-film micro-batteries by atomic layer deposition.
- Conformal coating processes and solid electrolytes as well as cathode and anode materials for batteries.
- New solid-state electrolytes combining organic- and inorganic materials were made, showing promising potential.



A patent : “Methods for forming lithium manganese oxide layers” Nouha Labyedh, Marina Yurievna Timmermans, Philippe Vereecken, US 15339577 A1, Pub. Date: May 04, 2017.

PROJECT DETAILS

Publication date	2018/02/20
Call Topic	Materials for Sustainable and Affordable Low Carbon Energy Technologies (Call 2012)
Duration in months	36
Partners	• imec, Belgium (Coordinator) • UiO, Norway (Partner) • Picosun, Finland (Partner) • UGent, Belgium (Partner)
Funded by	• Belgium Flanders • Finland • Norway
Total project cost	€ 945,587

Relevant calls in 2019

NANO2021

Innovation projects

- 60 mill. kroner
- Application on all topics covered by the NANO2021 program plan
- Application deadline **25.09 2019**

Pre-projects SMEs

- Up to NOK 200 000 per pre-project.
- For small and medium-sized Norwegian enterprises
- Application on all topics covered by the NANO2021 program plan
- Application deadline **– open ended, call opens 01.10 2019**

Other national research funding

- SkatteFUNN
- Regional research funds
- Pre-projects for unexperienced companies
- PILOT-E
- Innovation Norway

EU calls

Horizon 2020 – Smart, Clean and Efficient Energy (WP 2018-2020)

1. Energy Efficiency

- Upgrading buildings' energy performance and smartness
- Energy efficient industry and services
- Energy efficiency is an investment
- Energy efficiency is an energy source
- Support for policy-driven innovations

3. Smart and clean energy for Consumers

4. Smart citizen-centred Energy System

5. Smart Cities and Communities

2. Global leadership in Renewables

- Next Renewable energy solutions
- Renewable energy solutions for implementation at consumer scale
- Renewable energy solutions for energy system level implementation
- Renewable Fuels for transport
- Market Uptake Support

6. Enabling Near-Zero CO2 Emissions

from fossil fuel power plants & carbon intensive industries

7. Next-Generation Batteries

H2020 Cross-cutting issues

- Strong commitment on battery from different DGs
- Objective:
  - Build-up of battery cell manufacturing in Europe
  - Compensate for possible job losses in European car manufacturing, due to electrification
  - Catch up with South-East Asia
- Calls from WPs on transport, energy and technologies (FET) bundled in “Cross-cutting issues”
- Project types:
  - Research and innovation actions: RIA (TRL 3-6)
  - Innovation actions: IA (TRL 5-8)
  - Coordination and support action: CSA
- Available funding: 2-20 mill euros per project

Upcoming call (preliminary)

Topic	Type/TRL	Funding (euros)	Deadline
Novel methodologies for autonomous discovery of advanced battery chemistries	RIA	1 x 20 mill.	16.01.2020
Sensing functionalities for smart battery cell chemistries	RIA	2-5 x 2-4 mill.	16.01.2020
Self-healing functionalities for long lasting battery cell chemistries	RIA	5 x 2-4 mill.	16.01.2020
Coordinate and support the large scale research initiative on Future Battery Technologies	CSA	1 x 2 mill.	16.01.2020
Next-generation batteries for stationary energy storage	RIA	3 x 6-8 mill.	21.04.2020
Hybridisation of battery systems for stationary energy storage	RIA	2-3 x 3-4 mill.	21.04.2020
Next generation and realisation of battery packs for BEV and PHEV	IA	4-5 x 8-10 mill.	21.04.2020
Reducing the cost of large batteries for waterborne transport	RIA	2 x 8-12 mill.	21.04.2020

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NCP H2020
Energy

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NCP H2020
New materials

Want to apply?
Please contact us for help

- Finne og tolke utlysningstekster
- Økonomisk støtte til å skrive søknad
- Økonomisk støtte til reiser i Europa
- Eksperthjelp til gjennomgang av søknadsutkast

Battery team among advisers and NCPs at RCN:

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- FET Flagships Board of Funders
- National research Infrastructure

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