

# Hvordan ruster NTNU seg til økende krav om samfunnsansvar og impact?

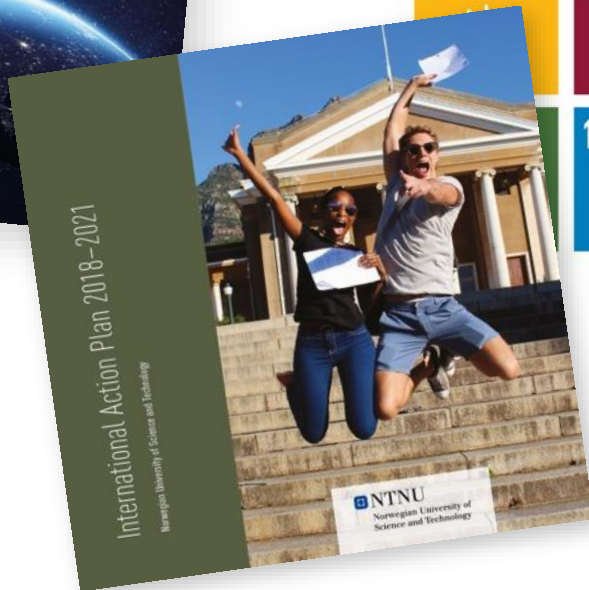
**NARMA 5 mars 2019**

Toril Nagelhus Hernes, prorektor nyskaping  
Siv ing fysikk, Professor medisinsk teknologi

# CHALLENGE INNOVATION

..from the universities...

Toril Nagelhus Hernes, prorektor nyskaping  
Siv ing fysikk, Professor medisinsk teknologi



# **SUSTAINABLE DEVELOPMENT GOALS**



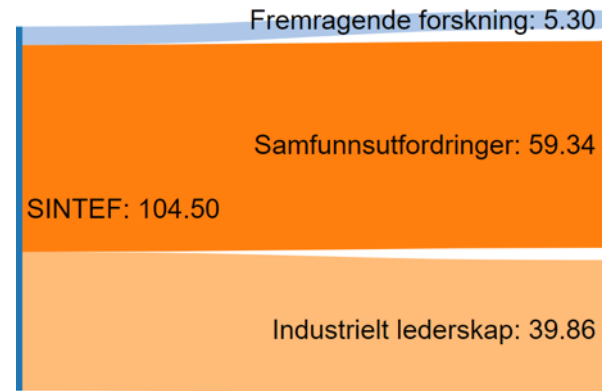
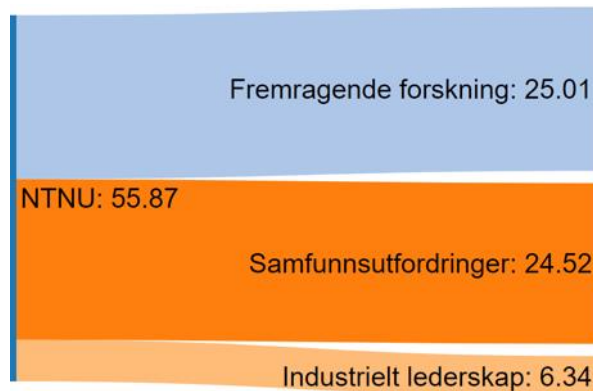
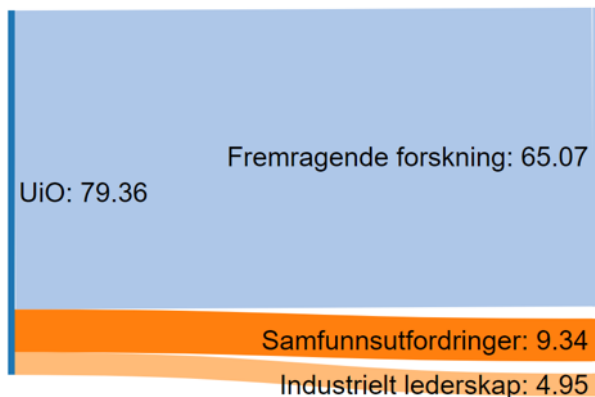
# NTNU, UiO og SINTEF har forskjellig programprofil i Horisont 2020



UiO



SINTEF



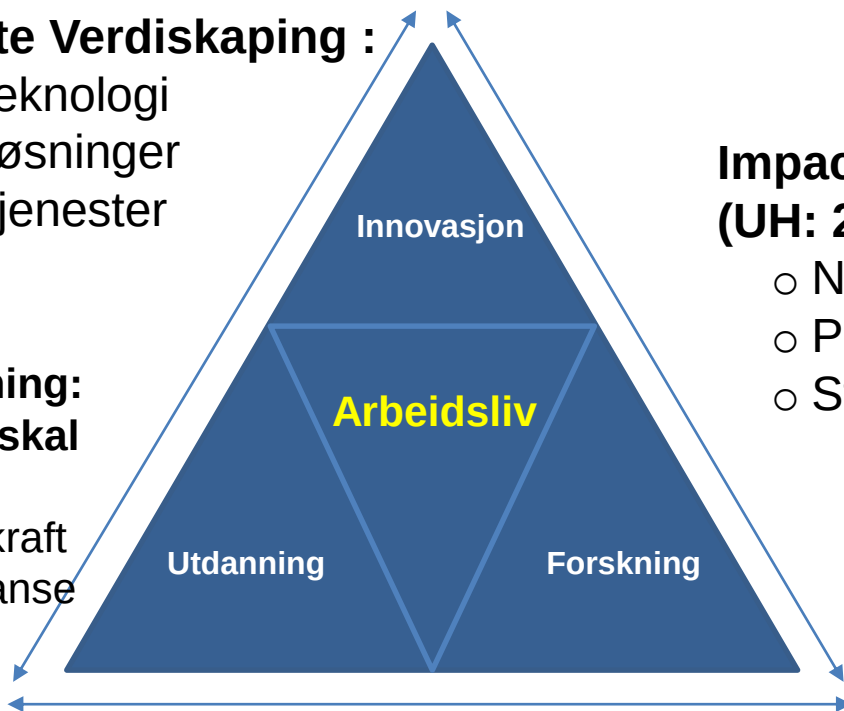
# Samfunnseffekter fra alle kjerneoppgavene

## Direkte Verdiskaping :

- Teknologi
- Løsninger
- Tjenester

## Impact gjennom utdanning: 300.000 studenter som skal ut i arbeidslivet:

- Fremtidens arbeidskraft
- Fremtidens kompetanse
- Lære hele livet



## Impact gjennom forskning: (UH: 23,2 mrd, 2017, NIFU):

- Ny kunnskap
- Plattform for innovasjon
- State of the art utdanning



# Universitetene er viktig for omstilling i eksisterende næringsliv

2005-2015: NTNU  
10 000 prosjekt,  
1 200 unike norske,  
760 internasjonale selskap

- ✓ 6,5-9% økning i sysselsetting (5 års periode)
- ✓ 18-29% økning i investeringer (3 års periode)
- ✓ 30-34% økning i omsetning (5 års periode)



# Effekter fra investering i FoU på miljøvennlig energi siden 2008

- 4 mrd. kr bevilget av Forskningsrådet til ca. 670 prosjekter (2008-2017).
- Realisert økonomisk effekt på **4 ganger** bevilgningene.

## 16 mrd. kr i realisert økonomisk effekt i Norge (2008-2017)

- Økte inntekter, reduserte kostnader.
- Reduserte og utsatte investeringer i infrastruktur.
- Realiserte investeringer i ny industriell virksomhet.

## 100 mrd. kr identifisert fremtidig økonomisk potensial (Norge/Europa)



Vannkraft



Industri



Energisystem



Energisystem



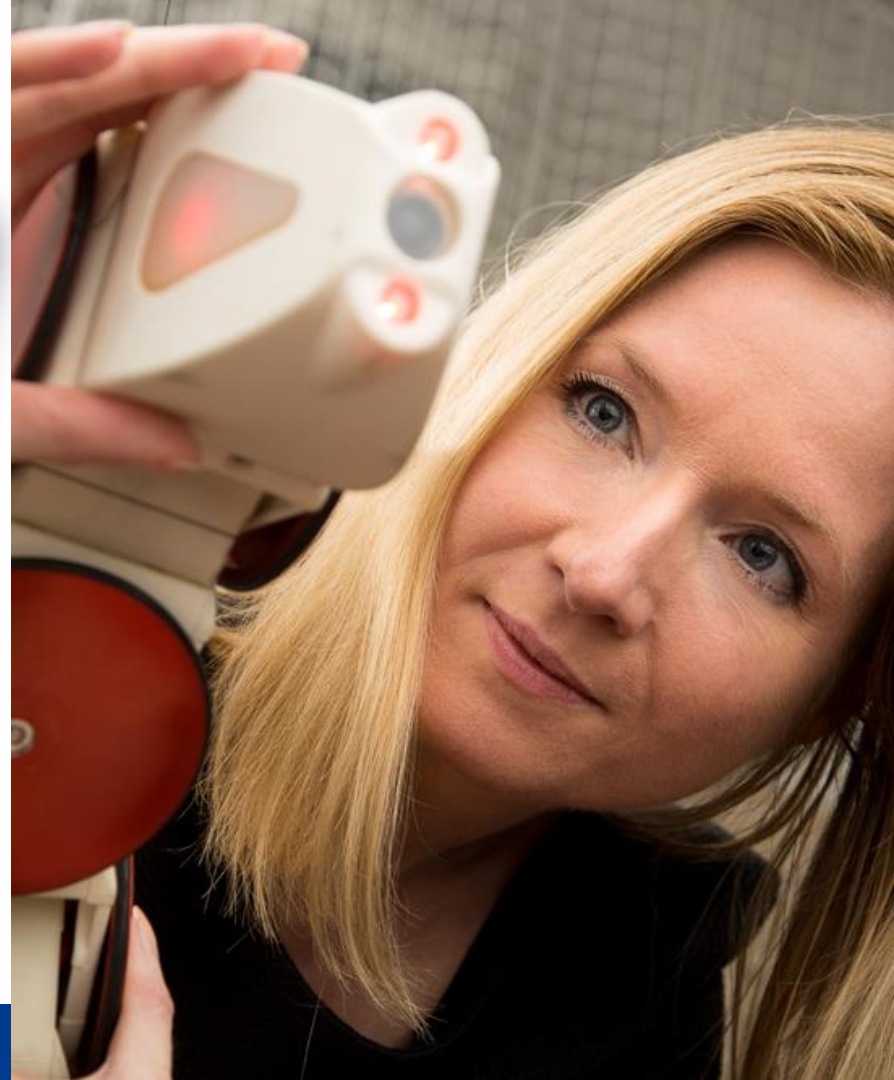
Solenergi



# innovasjon og nyskaping

NTNU bidrar til impact gjennom:

- styrke langsiktig samarbeid for å bedre arbeidslivets omstillingsevne
- øke antall innovasjoner, kommersialiseringer og nyetableringer
- innovasjonskompetanse i utdanningen





## Hovedstrukturen for universiteters bidrag til innovasjon

| Hovedkategorier                                                         | Dimensjoner og underdimensjoner                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A.<br/>Indirekte<br/>bidrag</b><br><br>(aktiviteter og<br>prosesser) | <b>1. Innovasjonskompetanse og innovasjonskultur</b> <ul style="list-style-type: none"><li>• Integrering av innovasjon i utdanning, forskerutdanning mv.</li><li>• Generering av nye ideer, fra studenter og ansatte</li><li>• Institusjonens tilrettelegging for innovasjon ved organisatoriske grep som (egne stillinger, TTO, inkubatorer, ulike incentiver for å fremme innovasjon mv.)</li></ul> <b>2. Samspill</b> <ul style="list-style-type: none"><li>• Samarbeid generelt (inkludert mobilitet)</li><li>• Næringslivssamarbeid spesielt (inkludert mobilitet)</li><li>• Samarbeid offentlig sektor (inkludert mobilitet)</li></ul> |
| <b>B.<br/>Direkte bidrag<br/>(endringer og<br/>resultater)</b>          | <b>3. Kommersialisering og næringsutvikling</b><br><br><b>4. Innovasjoner i offentlig sektor og samfunnet for øvrig</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Indikatorer for  
synliggjøring  
og måling av  
UH-sektorens  
bidrag til innovasjon**

# NTNU ruster seg til økende krav om impact ved samarbeid langs flere dimensjoner



*Arbeidslivet ønsker samarbeid:*

- Utdanning: Kompetanse
- Forskning: Kunnskap
- Behov: Bedre helsetjenester
- Tverrfaglig tilnærming
- Teknologi - løsninger
- Næringsutvikling: Kommersiell suksess (GE)

# NTNU ruster seg til økende krav om impact ved samarbeid med næringslivet



Norges forskningsråd

16 av 23 (vert: 7)



Norges forskningsråd

9 av 11 (vert: 3)



Norges forskningsråd

7 av 23 (vert: 6)



Senter for  
fremragende  
utdanning

4 av 8 (vert: 2)



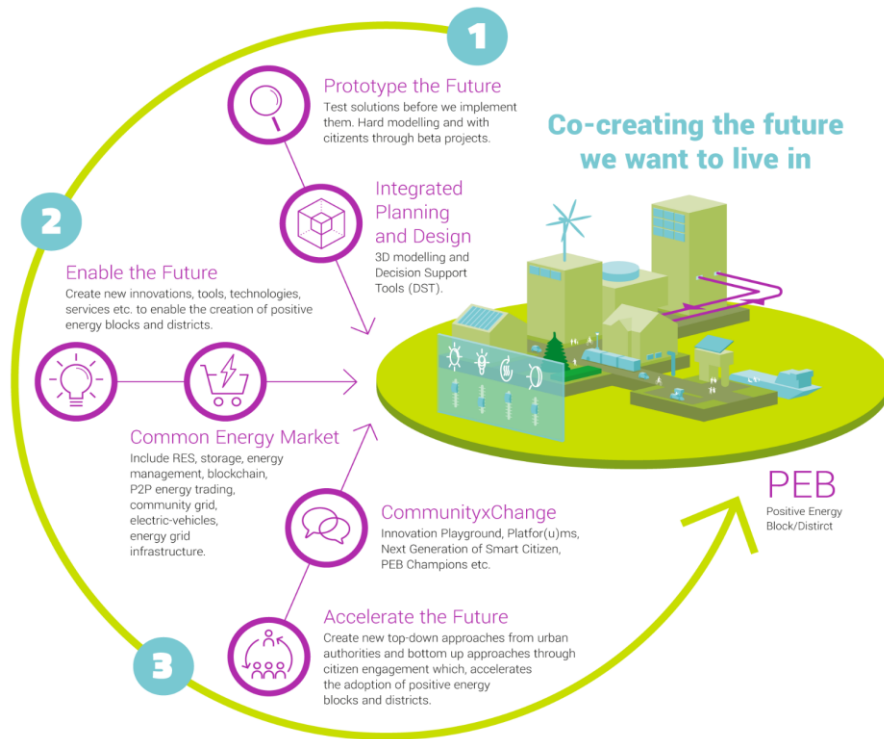
Blue Legasea



80 norske bedrifter skal få  
hjelp på Raufoss – bare i  
år

# NTNU ruster seg til økende krav om impact ved samarbeid med offentlig sektor

## +CITYXCHANGE



## Innovasjon i offentlig sektor

- Samarbeid offentlig sektor- næringsliv - akademia
- Fyrtårn EU prosjekt
- 190 mill NOK
- 32 Europeiske partnere
- 11demonstrasjonsprosjekt
- Piloter i Fyrtårn-byer
- Citiy Followers
- 2018-2021

**TRD3.0**



# NTNU ruster seg til økende krav om impact ved økt trykk på excellence- forskning og relevans i utdanning



7 av 23 (vert:6)



Senter for  
fremragende  
utdanning

4 av 8 (vert: 2)





- Struktur og ansvar
- Måling og synliggjøring
- Innovasjon i utdanningen
- Virkemidler for kommersialisering

## Creating value from research results and good ideas

**NTNU**  
The Royal Norwegian University of Science and Technology

**1776**  
RECEIVED IDEAS

**628**  
PATENT APPLICATIONS

**135**  
LICENSING AGREEMENTS

**140**  
START-UPS COMPANIES

NEW ASSIGNMENT

RESEARCHER TO BE UP

TECHNOLOGY EVALUATION

COMMERCIALISATION

NTNU Technology Transfer ASR was established in 2003 and is owned by the Norwegian University of Science and Technology (NTNU) and Central Norway Regional Health Authority (HMO).

We are our owner institutions' strategic tool to "create value from research" in the shape of new products and services, business and jobs.

At the most basic level our purpose is to spread technology and knowledge that benefits society.

Our core business is assessment of research- and knowledge based ideas, and developing these into socially beneficial products and services.

**NTNU**  
The Royal Norwegian University of Science and Technology



# NTNU

## Discovery

NTNU Discovery finances development, verification and quality assurance of commercialisable ideas results from NTNU and Helge Aha-Verge.



### 153

projects, in the period 2015-2020 projects have been awarded NOK 8 million in financial support.

### 41

companies established and a number of patents granted.

### 600

people involved in the projects, 40% of the projects have all increase with external R & D investments.

## These funds are essential to bring the technology to the next step.

Feedback from projects disclosed that the funding from NTNU Discovery covers a very critical stage in the transition from scientific to commercialised and business creation.

Discovery projects have triggered more than NOK 200 million in additional funding from Innovation Norway, Research Council of Norway, innovation and other funding programmes. The R & D projects are the support from Discovery, allows that in a substantial in the Discovery portfolio and that the projects have a high technical and innovative content. The high proportion of funding from Research Council of Norway (RCN), shows that many of the projects are still in the early stages when they have completed the Discovery period.

NTNU Discovery funds up to one million NOK in start-up projects and NOK 200 000 to pre-project.

[www.ntnudiscovery.no](http://www.ntnudiscovery.no)

# NTNU'S STRATEGIC PROGRAM FOR KNOWLEDGE-BASED INNOVATION (SKI)

## Why?

- It is an unmet need for innovation based on research from universities. Knowledge based on good potential for innovation **must** be followed.
- Transfer of innovation and knowledge from NTNU to our business partners and public sector must be increased
- NTNU wants to make innovation activities more visible and available for private, society, business and public sector

## How?

- NTNU and business partners will work close with our scientists to increase the number of small and medium transfer of knowledge from research to business
- Culture and competences within innovation in universities is supported by monthly interdisciplinary meetings and hands on co-working with relevant ideas and innovation projects
- Advanced training mechanisms are available for bringing ideas to the next step of scientific
- The gap between ideas and market is shortened by linking business and public sector into the program together with academics



## Field of study: examples

- Architecture and design, cross-environmental studies in smart cities
- Information Technologies and Electronics, artificial intelligence, big data and the ethics of things
- Information Technologies and Electronics, cybernetics and autonomous systems
- Engineering science, energy, hydro-power, technology
- Engineering, green energy in building sector
- Medicine and health studies, the elderly
- Food science, nutrition education
- Education, green change in the business sector
- Information Technologies and Electronics, energy and digitalization

<https://www.ntnu.no/skiping/kunnskapbasert-innovasjon>

 NTNU

# INNOVATION

The Norwegian University of Science and Technology (NTNU) views entrepreneurship as a central part of its education. The university has developed a number of initiatives to promote innovation and entrepreneurship among its students, faculty, and staff.

1. **Strengthen Entrepreneurship Education** with interdisciplinary business and technical education to improve the innovation capability.
2. **Encourage the student innovation, commercialization projects** and develop of start-ups and incubators.
3. **Include training in innovation in all students' education.**

NTNU's strategy clearly articulates that the university will offer an integrated approach to entrepreneurship and innovation during their studies. NTNU facilitates the creation of student start-ups that are in business-to-business market addressing other problems. This is a unique characteristic of the innovation ecosystem at NTNU.



## These are the most important actors in NTNU's student innovation ecosystem:

- 1. **ENIGADE** ([enigade.com](http://enigade.com)) is a center of excellence in entrepreneurship education. Enigade supports the students that they like to develop new opportunities, and the knowledge to deploy this resources and be needed to improve for the future. Second, Enigade functions as a **hub** for the students to the higher education.
- 2. **NTNU SCHOOL OF ENTREPRENEURSHIP** ([www.entrepreneurship.ntnu.no](http://www.entrepreneurship.ntnu.no)) is a business MSc program in entrepreneurship at NTNU where students choose to learn through their own initiative as part of their education. NTNU has a variety range of innovative education programs, one example is Entrepreneurship, Science and Technology (EST) at NTNU's largest research center, the Norwegian University of Science and Technology (NTNU). EST is a unique interdisciplinary program, where students develop their interdisciplinary business skills. EST provides an open course School of Innovation only to students at NTNU. Furthermore, EST facilitates the awareness and comparison in innovation and continues to increase innovation potential through research.
- 3. **SPARKS** NTNU ([sparks.ntnu.no](http://sparks.ntnu.no)) is a student-oriented entrepreneurship initiative introducing entrepreneurship and innovation to students by giving them a starting a better introduction to the entrepreneurship education at NTNU.
- 4. **START NTNU** ([www.startntnu.no](http://www.startntnu.no)) is a student-driven organization set up for promoting entrepreneurship in education. Start NTNU offers a wide range of innovative and creative student business ideas. This through its ongoing learning environment oriented sponsored by a number of stakeholders.
- 5. **FRAM NTNU** ([www.framntnu.no](http://www.framntnu.no)) is the students' shared hub for innovation and entrepreneurship at NTNU. FRAM offers a place to share events such as presentations and competitions, meeting and networking, and maintenance and a variety of other services.
- 6. **STARTUP-AMBAKK**, Space for student start-ups.

www.ntnu.no



# Norges campus for å øke omstillingstakten og impact



KONGBERG



equinor



TRONDHEIM  
KOMMUNE



telenor



- Arbeidsrelevant utdanning
- Ny kunnskap – forskning
- Ny teknologi og metoder
- Omsetter kunnskap til nytte
- innovasjonssenter
- Tverrfaglig kompetanse



Trøndelag fylkeskommune  
Tröndelagen fylhkentjelle



SINTEF



TrönderEnergi



GE Healthcare

SIEMENS

SpareBank  
BV 1

NTNU



**KUNNSKAP FOR EN BEDRE VERDEN**

