SMART
INNOVATION
NORWAY


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Research & Innovation - to boost business development and sustainability in an international context

SMART INNOVATION NORWAY

Established in 2003, non-profit

30+ employees

Research, innovation and business development

Areas of interest and commitment:
Smart energy, Smart Cities and Communities and Digitalization

In charge of the NCE Smart Energy Markets Business Cluster

NCE
Norwegian Centres of Expertise

Recieved then NCE – Norwegian Center of Expertice status - in 2009

One of 14 business clusters with the NCE-status in Norway

A project running for 10 years. The programme is owned by The Research Counsil of Norway, SIVA and Innovation Norway

70+ Cluster Members
250+ Research Partners

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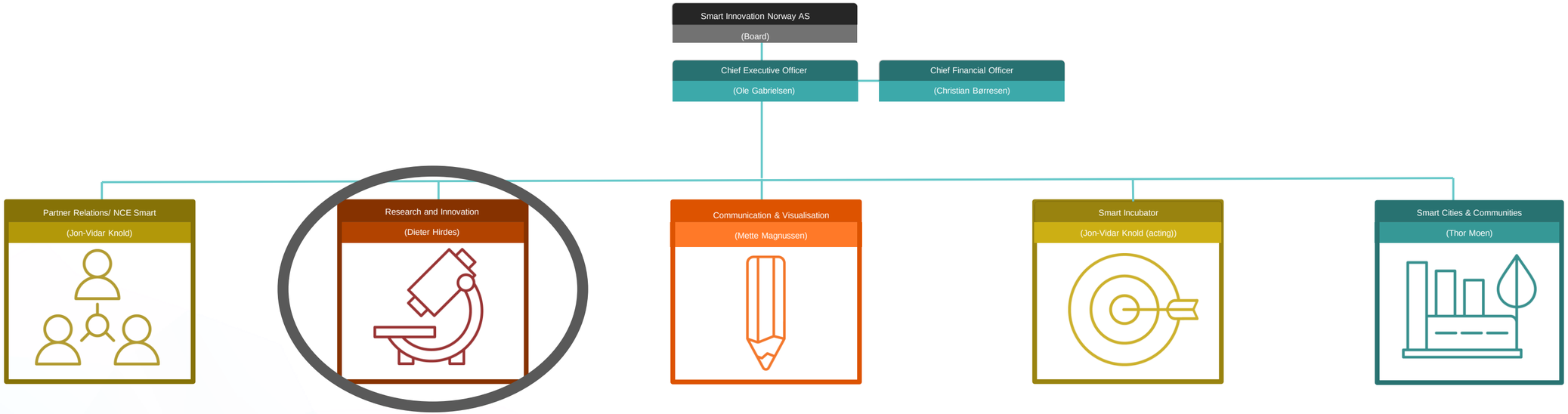


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# NCE SMART ENERGY MARKETS

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## PRIVATE ENTERPRICES AND INCUBATORS

Schneider Electric · STATSBYGG · Microsoft · COWI
WAGO · HALOGEN. · nxtech
Lyse · SAFETEC AN ABS GROUP COMPANY · VARDE Δ HARTMARK · KONGSBERG
ENERGEA AS · Norske Skog · Communicate · Fredrikstad energi
eSmart SYSTEMS · Norske Helsehus · ØSTFOLD ENERGI · BEE2BEE
zacco · VISAVI · kamstrup · OLA ROALD
MOSS HAVN · VIEW · MarkedsPartner · Borg Havn IKS
Vitir · COM4 · Tinymesh · E2U
EKERDESIGN · Capgemini CONSULTING.TECHNOLOGY.OUTSOURCING · ANERGY
POWunit · Flowit · NORD POOL · ONTOGENY GROUP
AS BATTERIRETUR · develop

## ACADEMIA

Høgskolen i Østfold · University of St.Gallen
NTNU Det skapende universitet · UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
UNIVERSITY OF OSLO · Østfoldforskning
UiT / NORGES ARKTISKE UNIVERSITET · IFE
NMBU Norwegian University of Life Sciences
Universitetet i Stavanger
FHE FACHHOCHSCHULE ERFURT UNIVERSITY OF APPLIED SCIENCES

## PUBLIC SECTOR

Østfold FYLKESKOMMUNE
Halden kommune
FREDRIKSTAD KOMMUNE
Sarpsborg kommune
HVALER KOMMUNE
Spydeberg kommune
Hurum kommune
BÆRUM KOMMUNE

## COOP PARTNERS

abelia
Innovasjon Norge
siva
Forskningsrådet
EV SUMMIT
NÆRINGSHAGEN MOSS
Connect Østlandet
MNU MOSSEREGIONENS NÆRINGSUTVIKLING
NORDIC EDGE EXPO 2016 · iKuben

250+ RESEARCH PARTNERS

## INKUBATOR

IPCO · Enmira as · SKEETTRACER SYSTEMS AS · CENATE · DataSET · Comlight · MAKEADRONE · RL SOLUTION
jodacare · FUNDSTEP · SOLAR VILLAGE · BOOMSAFE · TotalCtrl Consumer · GRAVITY TECHNOLOGY · Make it Shine · DROPBY - NORGE

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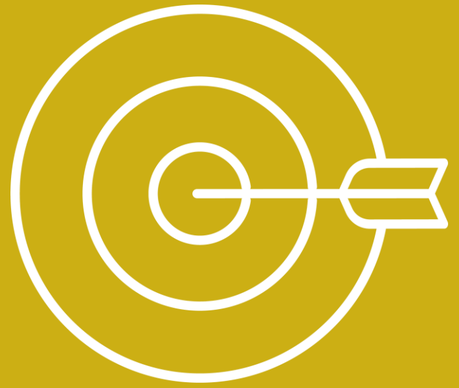

# SMART INCUBATOR

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# PANGSTART

Forretningsutvikling på rekordtid

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# COMMUNICATION & VISUALIZATION

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# SMART CITIES & COMMUNITIES

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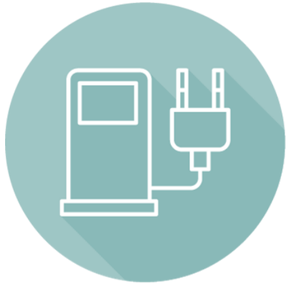
SMART ENERGY

SMART HEALTH

SMART WATER

SMART GOVERNANCE

SMART BUILDINGS AND HOMES



SMART MOBILITY

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# RESEARCH & INNOVATION

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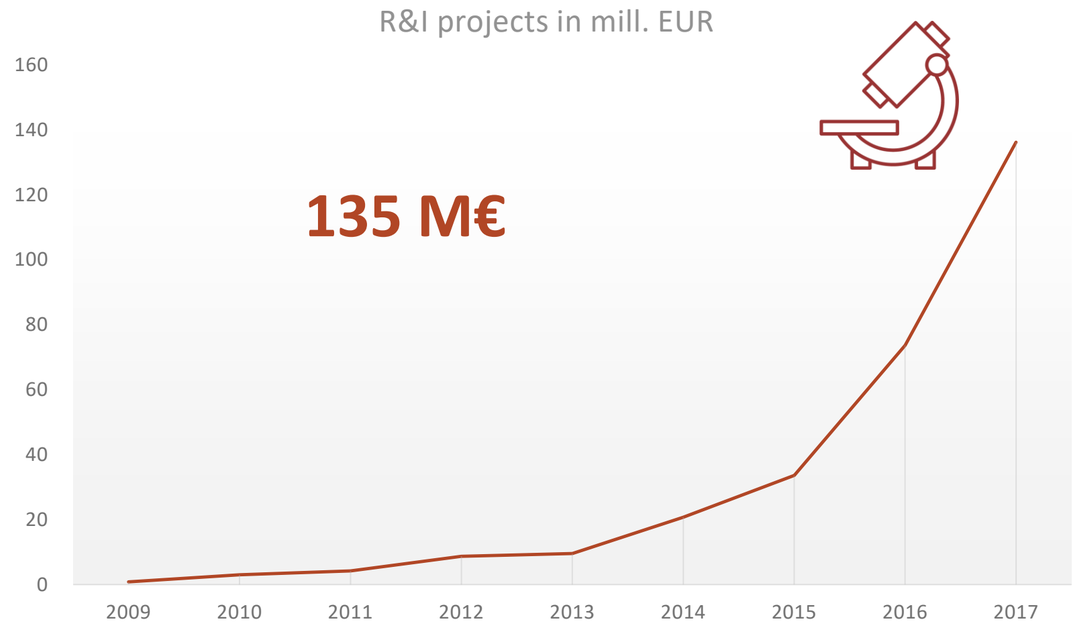
# RESEARCH AND INNOVATION PROJECTS 2009 - 2017

1) **Energy Trade and Environment 2020** (2009-2011) (RCN RENERGI)
2) **Manage Smart in SmartGrid** (2010-2012) (RCN RENERGI)
3) **IMPROSUME** (2010-2012) (EU ERA Net)
4) **DeVID** (2012-2014) (RCN ENERGIX)
5) **VRI-2 Østfold** (2011-2013) (RCN VRI)
6) **Smarter Remmen I** (2011-2013) (Statsbygg)
7) **Smart energy optimization of municipal buildings** (2013) (RCN Oslofjord fund)
8) **The future of smart energy prosumers** (2013) (RCN Oslofjord fund)
9) **Klimareg** (2013-2015) (RCN Oslofjord fund)
10) **VRI-3 Østfold** (2014-2016) (RCN VRI)
11) **Smarter Remmen II** (2014-2016) (Statsbygg)
12) **Smart Rural Grid** (2014-2016) (EU FP7)
13) **Smart Energy Hvaler** (2014-2016) (Hvaler kommune, Fredrikstad Energi, NCE Smart)
14) **National Smart Grid Laboratory** (2014-2018) (RCN RESEARCH INFRASTRUCTURE)
15) **ChargeFlex** (2015-2017) (RCN ENERGIX)
16) **EMPOWER** (2015-2017) (EU Horizon 2020)
17) **FlexNett** (2015-2017) (RCN IPN ENERGIX)
18) **IoTSec** (2015-2020) (RCN Forskerprosjekt IKTPLUSS)
19) **MATCH** (2016-2018) (ERA-Net)
20) **PERMIDES** (2016-2018) (EU Horizon 2020)
21) **INVADE** (2017 – 2019) (EU Horizon 2020)
22) **INJECT** (2016 – 2018) (Innovation Norway)
23) **CINELDI** (2016-2024) (RCN Centres for Environment-friendly Energy Research FME)
24) **SCOTT** (2017-2020) (JU ECSEL)
25) **E-REGIO** (2017-2019) (ERA-Net)
26) **RESOLVD** (2017 – 2020) (EU Horizon 2020)

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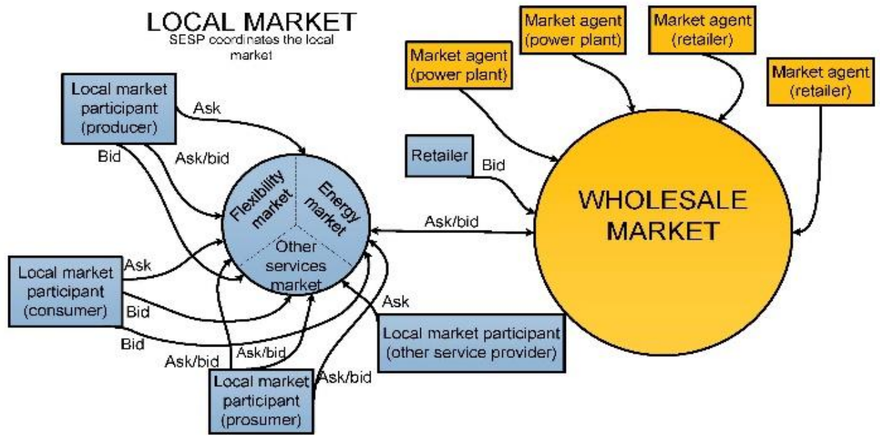
# EMPOWER 2015-2017 (H2020) http://empowerh2020.eu/

**EMPOWER is developing a complete new energy market where consumers can buy and sell «neighborhood energy» which is produced locally by solar panels, micro wind turbines and other de-central energy production**

- Relieve the central and regional grid, balance distribution grid locally
- Increase local electricity production and cheap renewable electricity to the customers
- Store electricity locally in battery stations and electrical vehicles




Partners

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Institut für Wirtschaft und Ökologie

Universität St.Gallen

eSmart SYSTEMS

Schneider Electric

UPC CITCEA

MIEMA
Malta Intelligent Energy Management Agency

NEWEN
ZUKUNFT AUS EINER HAND

Fredrikstad energi

EMPOWER

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# Hvaler Energy Park and Solar village

- Norway’s first and only full-scale microgrid
  - Hvaler Energy Park, an energy-producing recycling centre, was officially opened on September 5th, 2017
  - The Microgrid Power Router makes this the only microgrid facility in Norway that can go into ‘island mode’ if the local electricity grid goes down. It can run until the grid is back up again, at which point it will automatically switch back to grid-connected mode
- Solar village
  - ~70 solar panel installations in private homes and cottages

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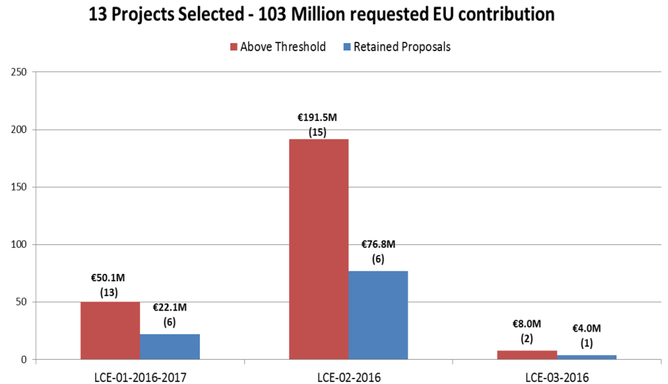
# INVADE 2016 - 2019 (H2020) http://h2020invade.eu/

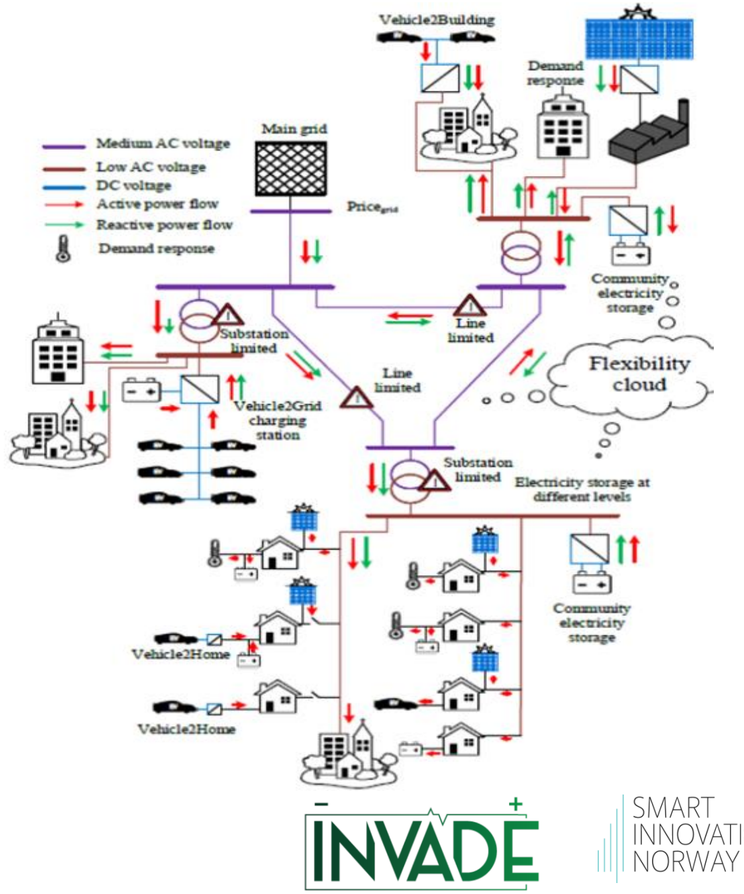
**INVADE will deliver a Cloud-based flexibility management system integrated with EVs and battery storages at mobile, distributed and centralized levels**

- Goal for the INVADE project is to change the way energy is used, stored and generated by utilizing renewable energy more effectively, optimizing the supply of electricity and making services more end-user-centric

Large scale pilots in 5 countries

12 partners from 6 countries – Bulgaria, Germany, Spain, Finland, the Netherlands and Norway




INVADE

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# INVADE – PILOTS

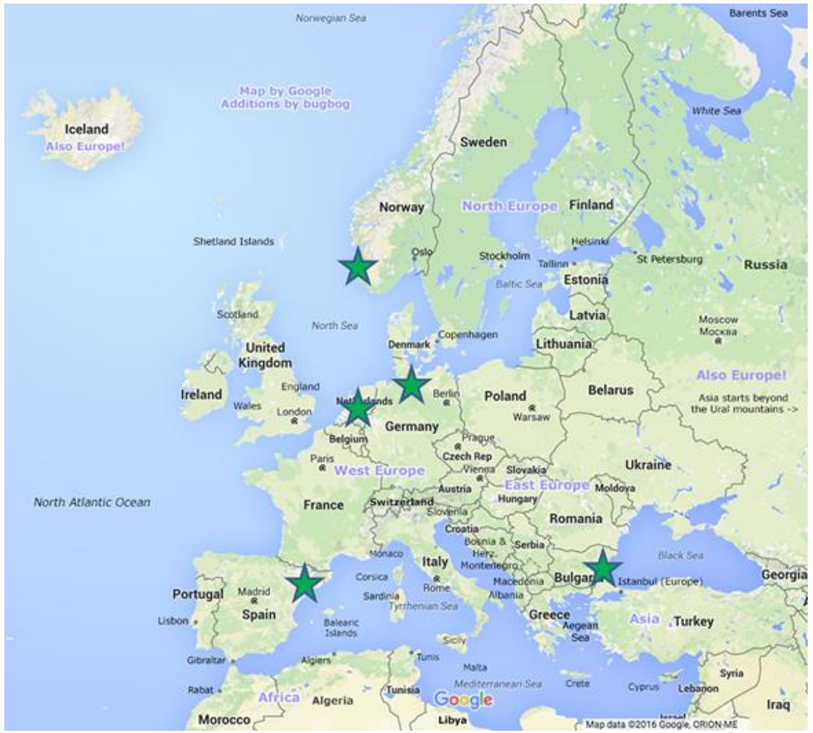
**Bulgaria (Albena)**
In Bulgaria, centralised electrical energy storage will be installed at a transformer substation that supplies two hotels, including restaurants, a spa centre and swimming pools.

**The Netherlands (Noord-Brabant)**
The Dutch pilot will cover three domains and two different approaches to charging electric vehicles on renewable energy.

**Spain (Granollers)**
The Spanish use case aims at demonstrating that a storage system shared with other users, is a safe, reliable and emission-free alternative, which will cover a gap of two hours without using a genset and thus no emissions.

**Germany (Dagebüll)**
In Germany, INVADE will integrate renewable energy sources (wind energy, PV plants, biomass), batteries at both community and household levels within the existing infrastructure, and ICT tools at the pilot site.

**Norway (Stavanger)**
Norwegian pilot will demonstrate how big data, machine learning and analytics parts of the INVADE platform can be integrated into the existing smart home solutions demonstrated in the Triangulum Smart City solutions in Stavanger with respect to V2H, batteries and boilers.




INVADE

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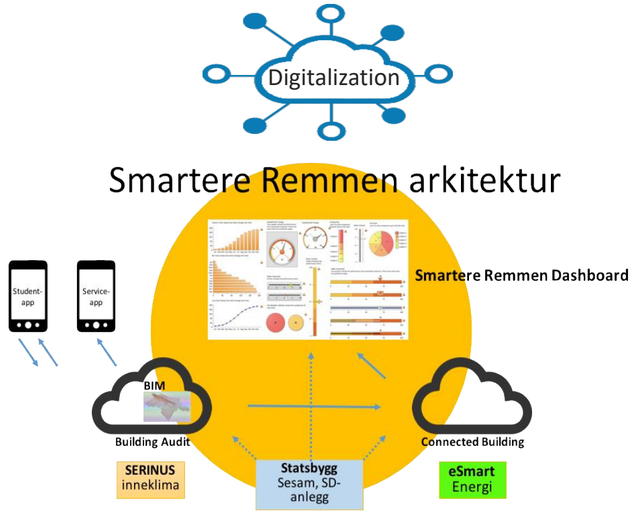
# Statsbygg Project

## Objectives

- Reduce energy and power consumption
- Improve work environment
- Find interplay between buildings and energy systems
- Develop a method for planning and optimal operation of buildings

## Pilot site

## How?




*Concept for Statsbygg project.*

## Project in details

### Phase 1
### 2014 - 2016

- Demo lab at HiØ
- Sensors and a mesh grid installation
- Mapping and analyzing the use of Remmen building
- Dashboard architecture and functionalities development
- Development of an user-app

### Phase 2
### 2017 - 2019

- Development and testing of full scale digital solution
- Smart operation and optimized land use
- Increased customer satisfaction
- Concept of solution for multiple buildings

## Partners:

STATSBYGG · IFE · eSmart Systems · Tinymesh · VIEW · Høgskolen i Østfold · REJLERS

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