

## Smart Energy 2017, Halden, Feb 2017

# Industrial view - Smart Grid Security Centre

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## National initiative for a more secure future in IoT

## oTSec.no - Security for loT for Smart Grids



The IoTSec - Security in IoT for Smart Grids initiative was established in 2015 to promote the development of a safe and secure Internet-of-Things (IoT)-enabled smart power grid infrastructure. The Research Project received funding from the Research Council of Norway (RCN) to contribute to a safe information society.

IoTSec addresses the basic needs for a reliable and efficient, uninterrupted power network with dynamic configuration and security properties. It addresses in addition the needs of businesses and end users of additional IoT services by exploring use cases for value-added services with the intent to design the building blocks for future services that consider the necessary security and privacy preconditions of successfully deployed large-scale services. IoTSec will apply the research in the envisaged Security Centre for Smart Grids, co-located with the Norwegian Centre of Excellence (NCE Smart).

#### **About**

The IoTSec initiatives drives Research for secure IoT and Smart Grids



«Open World Approach» everything that is not

declared closed is open

Norway Gjøvik o-Kjeller Oslo Halden Smart Grid Security Centre



#### **Partners and Collaborations**

- UiO
- UNIK
- NR
- Simula
- NTNU

#### Academia

- Smart Innovation Østfold
- eSmart Systems
- Fredrikstad Energi
- EB Nett
- Movation Industry
- Smartgrid Centre
- Norw. Data Protection Auth.
- Forbrukerrådet Interest Org.
- EyeSaaS
- mnemonic
  Industry
- Mondragon Unibersitatea
- University of Victoria
- Universidad Carlos III
- La Sapienza
- COINS Research School
- Nimbeo International
- H2020 and ECSEL projects

## Handling of Confidential and security-critical material

## Retningslinjer på

## http://cwi\_unik\_no/wiki/loTSec:Secure\_and\_Confidential\_information

#### Confidential information [edit]

- Documents which are given to the project being confidential to the project shall be watermarked by IoTSec confidential, shall not be distributed outside of the project without consent"
- Deliverables being confidential shall be stored on the project server, e.g. owncloud.unik.no

### Security-critical information [edit]

Each project participant is asked to not publish security-critical information. If a participant regards information as potentially security-critical, he shall ask IoTSec's security officer for advice.

We have to follow the rules from NVE, outlining the rules and regulations, see Action Item to address NVE rules and regulations. The rules include a.o. a non-disclosure agreement for certain information.

Security critical information shall be watermarked "security-critical - do not distribute", and shall only be given to project partners on request. The distribution shall be noted to our COO

(Christian Johansen), who keeps a list of the documents and whom they have been distributed to.

 Next-generalist energy storage: the project at plane. World's population is increasing and with 4 the arreses of energy needed. Today's configence of challenges rapidly exceleing girbal energy demands and wide access to energy sources - demand inscentive way of florking to finge a pathway to a routestable energy future. According to rount projections,' in order to achieve climate charge targets of 90-90 percent reduction of the greenlesser gas carbon-dioxide from the power sector, Europe is atteing to increase to 90 % or more the penetration of renewable energy is 2050. With the current status of electricity distribution grid, the gaps scenario would regain a significant raturnissien liter addition (no called grid extension) in order \$6 liptog/ resources over large\_areas. This will have a strong impact on our landscape and will not note the 'Broblett of energy innegating ellipsomion from alteracing to direct current (ACDC). Beyond perangelings MAPs, the variable propriation weeks and dersed will impose increasing scientific challenges self-#7 Broade additional disching infrincingies stigh The last decades the scientific community flagged the developing Licitate-Phatteries for plantile and vehicular applications, due to their high aftergy and positir capabilities. (Mineting, Minetins attention over i evaluability facing a future demand div Nazeries Will requirements different from the portable electronics. or example for large scale applications such the fire electricity grid, Propolitheory the energy grid will require terrorise stess for energy storage gattings and fragin breakflooding fragerists discoveries

In the present propagal, I lingger than increase complete, of how the future glad could be, My vision is decentralising the energy principles, and directorian, where the electricity printiced (lighted) benewable sources by a single house, or neighborhous consuminess, whale M scored in a level complet of nationary between able to exchange electricity and information of the giff in an "spingers" major. Thus, the main ain of the current proposal is to develop Na-log billigh State-ries for allationary alterage device for integration of renewable energy in smart grid applications. On new Jude's will one inorganic unotables and person name-composites ti<sup>2</sup>ligite fit circrodes before in tight of energy capacity flam other existing barkeries. The choice of spelling, Bagesd of Misph jubbressa's, the availability and toxicity issues of the materials. Additionally, the new proposed starting device in Propries modelling the accountry and the exchange of information/Wellight/Erid along tile type of absentile energy used, the energy rapability of the network, and the glottle quago of the citiests. To achieve this, force main hypothetic, and put forth, it

Sodium can replace lithium in next-plineration energy storage/discretals for large scale applications 2) Nanocompostes artifactures in the electriples in the form of nanocomfried materials and inorganic nambles will enhance the mass diffusion and observe transfer increasing the accessibility of the action

 Future grid will allow a higher penerradies of renewables and empowering communes through energy storage units. A new communication system between the storage units/customers and the grid will allow an iscrease flexibility of the grid and protection of private information.

In the next pages I will explain how those hypothesis will be tested. But first I will describe shortly how StractStorage fits into the bigger picture of global energy demands.

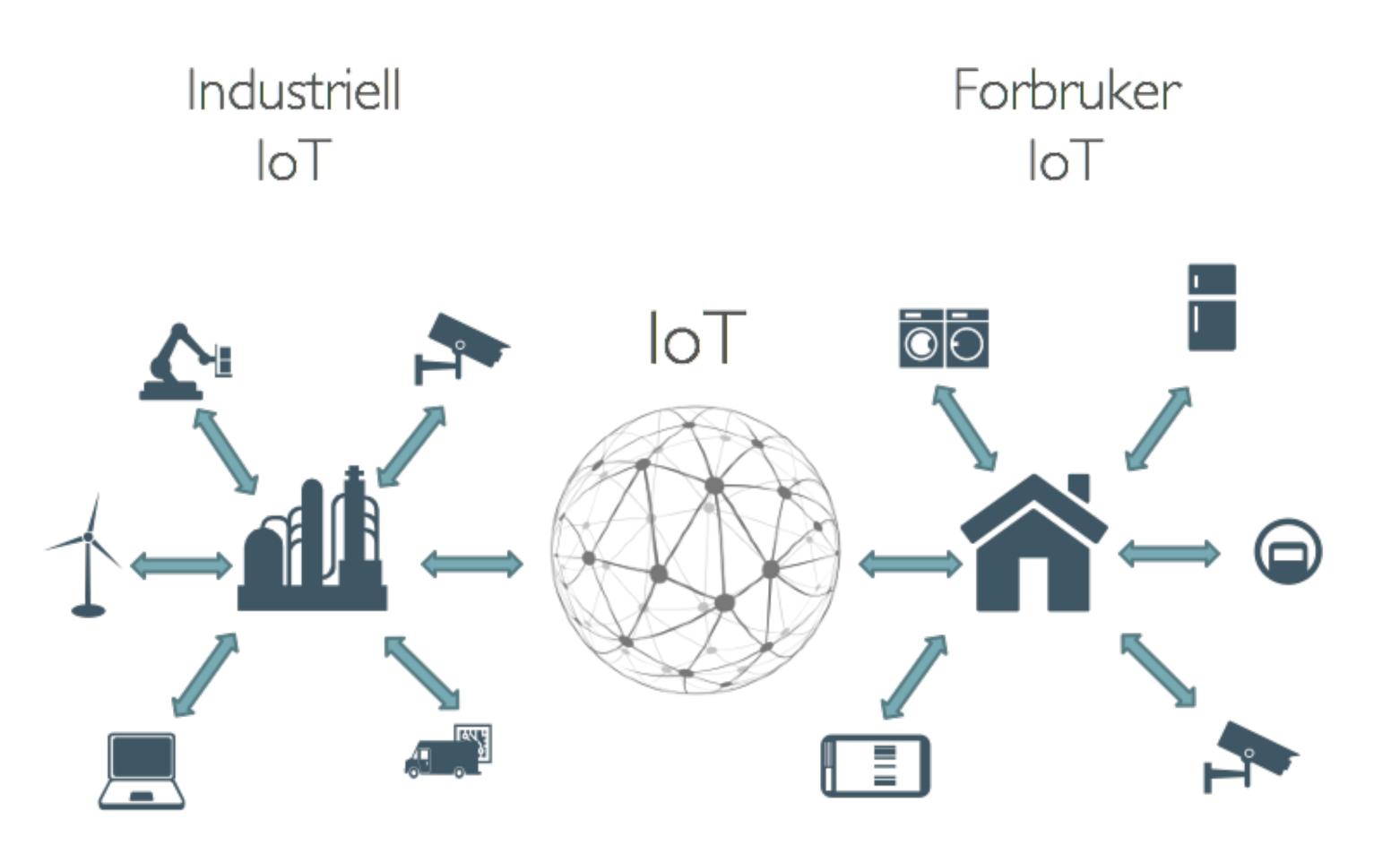
2. Future growth in domand of wind and volar photovoltain energy means growing mod of storage

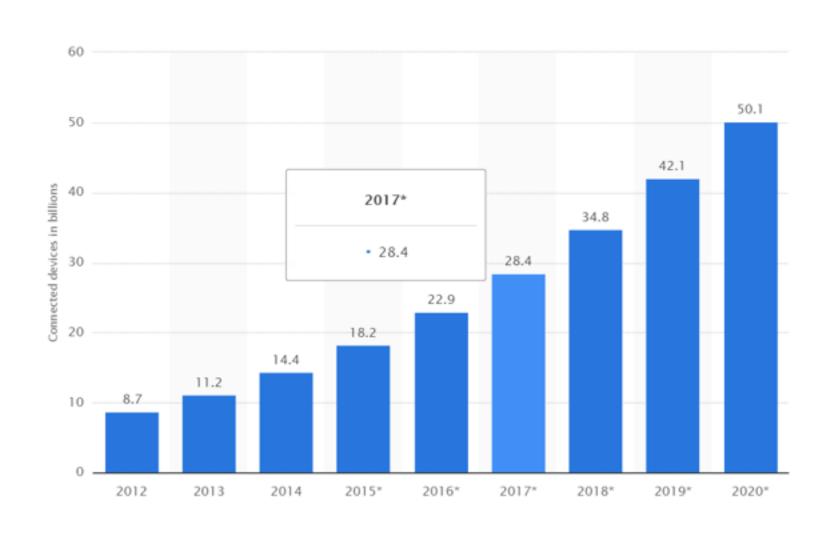
A fundamental challenge to significantly integrating renewaltie-groupsted govern courses - such as wind and sun - into the electric grid in their inhonest variability

This challenge makes electricity storage critical and, I believe, the next frontier in energy infractmentum.

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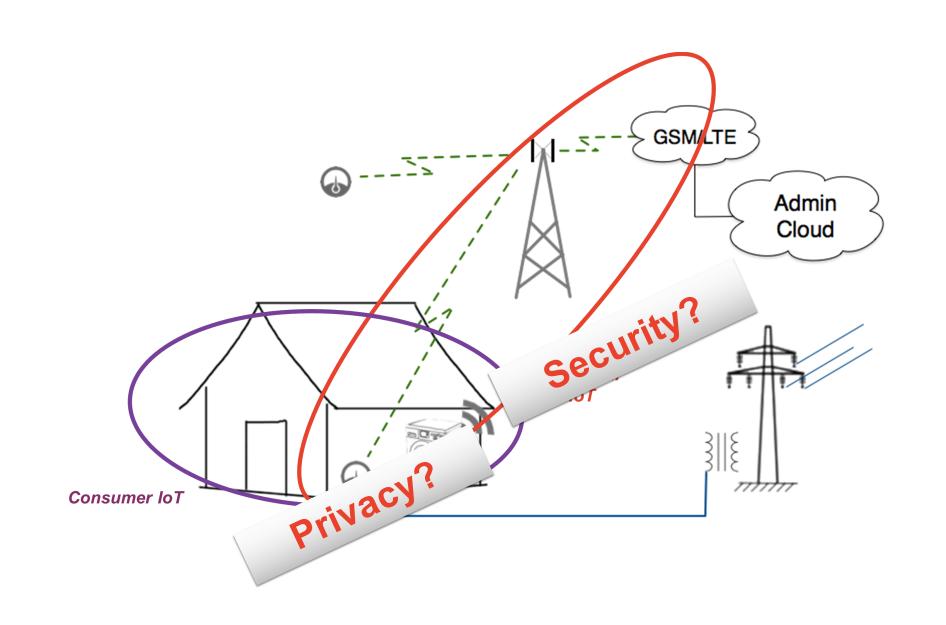
# Industrial view versus Consumer view







## The challenges - Smart Grid vs Smart Home



#### **Smart Grid**

- Limited public knowledge
- Security by design
- Security is the responsibility of supplier

#### **Smart Home**

- «Wild West» of devices
- «Plug and play»
- Limited user knowledge
- Limited security awareness



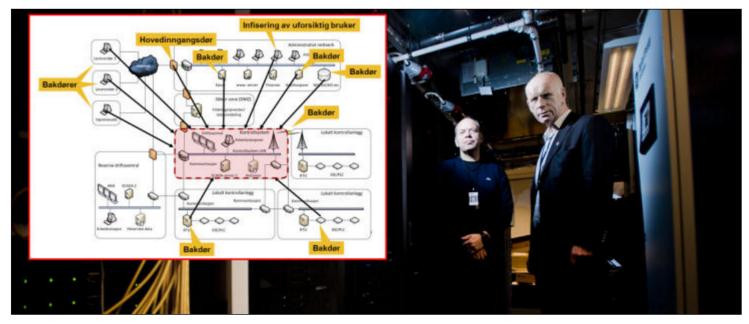
## Smart home services



[Source: https://www.samsungsds-nss.com/?p=en\_smarthome\_private



## Treaths



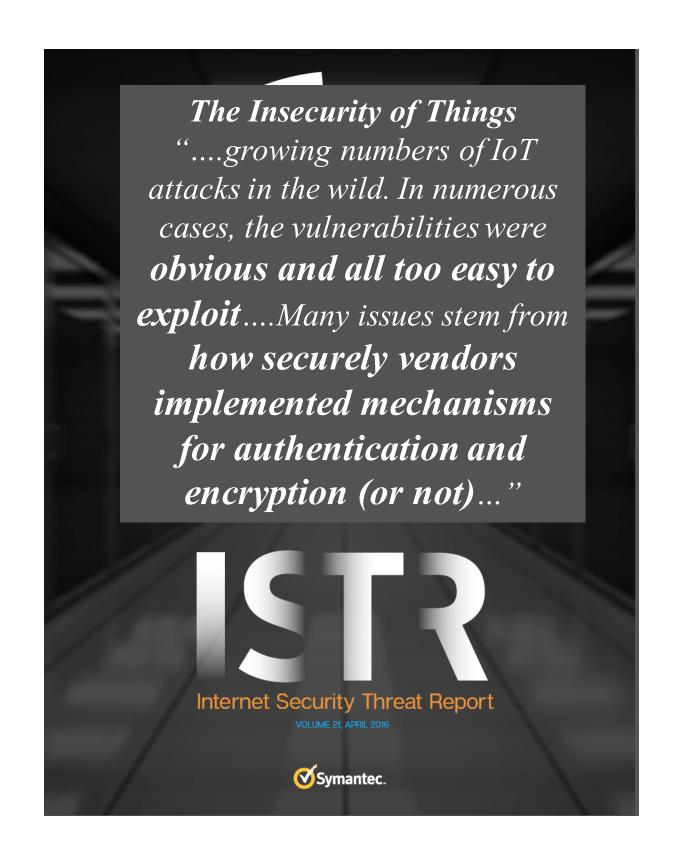
- Denne typen tiltak gjør oss mer sårbare for ondsinnede angrep

MVE advarer om nye trusler mot strømnettet. Les mer





# Trends in security





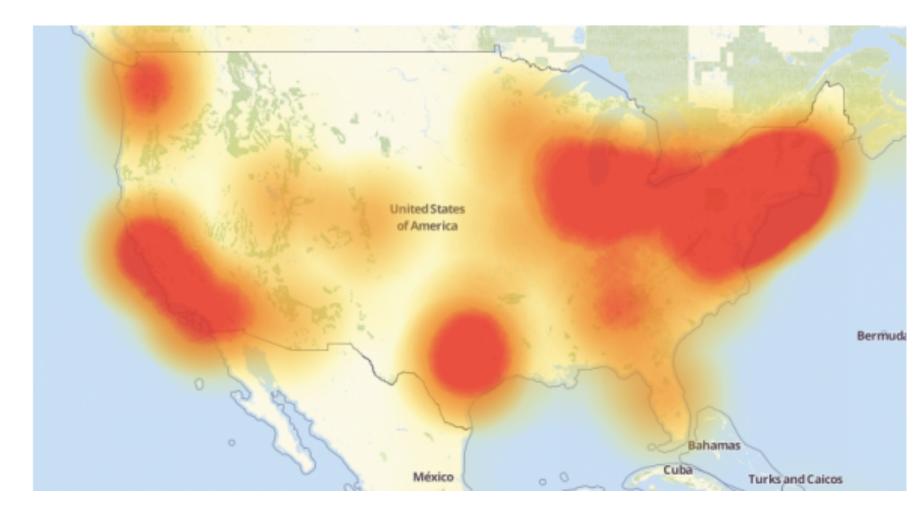


## Treath examples

# 21 Hacked Cameras, DVRs Powered Today's Massive Internet Outage

A massive and sustained Internet attack that has caused outages and network congestion today for a large number of Web sites was launched with the help of hacked "Internet of Things" (IoT) devices, such as CCTV video cameras and digital video recorders, new data suggests.

Earlier today cyber criminals began training their attack cannons on **Dyn**, an Internet infrastructure company that provides critical technology services to some of the Internet's top destinations. The attack began creating problems for Internet users reaching an array of sites, including Twitter, Amazon, Tumblr, Reddit, Spotify and Netflix.



[Source: https://krebsonsecurity.com/2016/10/hacked-cameras-dvrs-powered-todays-massive-internet-outage/]

#### **Computing**

# Ukraine's Power Grid Gets Hacked Again, a Worrying Sign for Infrastructure Attacks

Russian hackers may be behind attacks leveled at the nation's power grid and artillery. The West should take note.

by Jamie Condliffe December 22, 2016

[Source: https://www.technologyreview.com/s/603262/ukraines-power-grid-gets-hacked-again-a-worrying-sign-for-infrastructure-attacks/



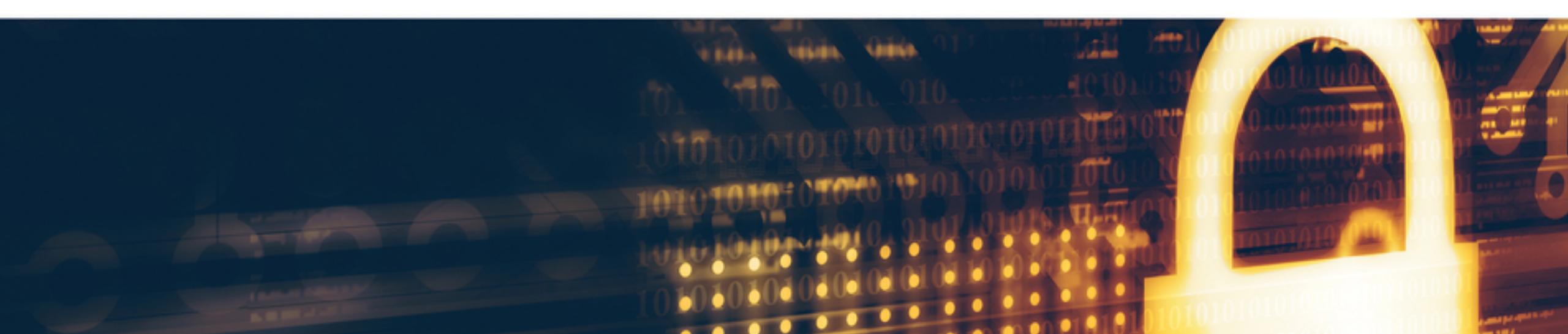
**IoTSec Movie** 

http://www.iotsec.no



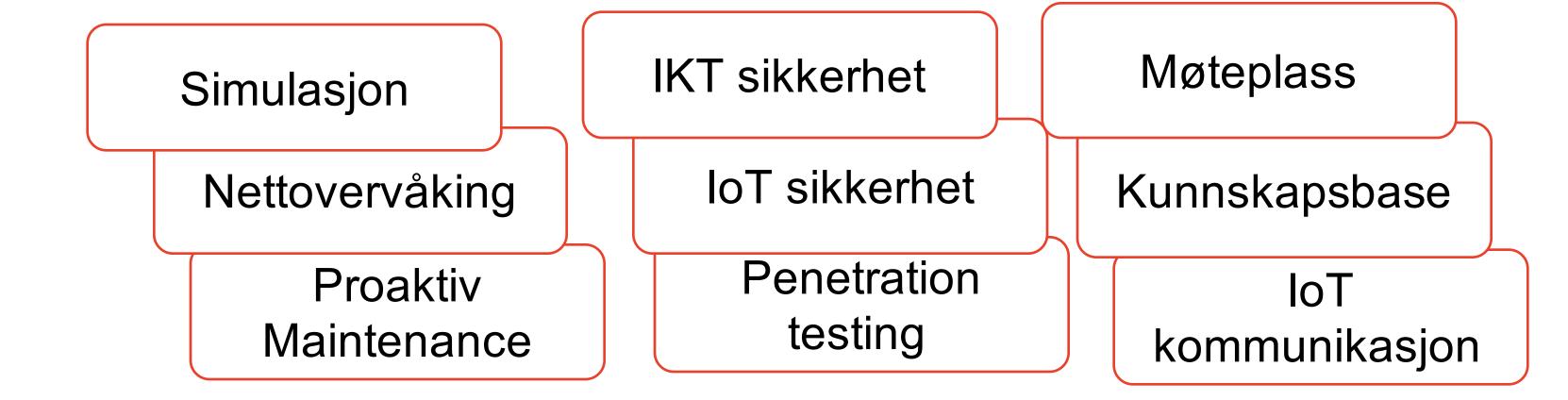


# SECURITY CENTER

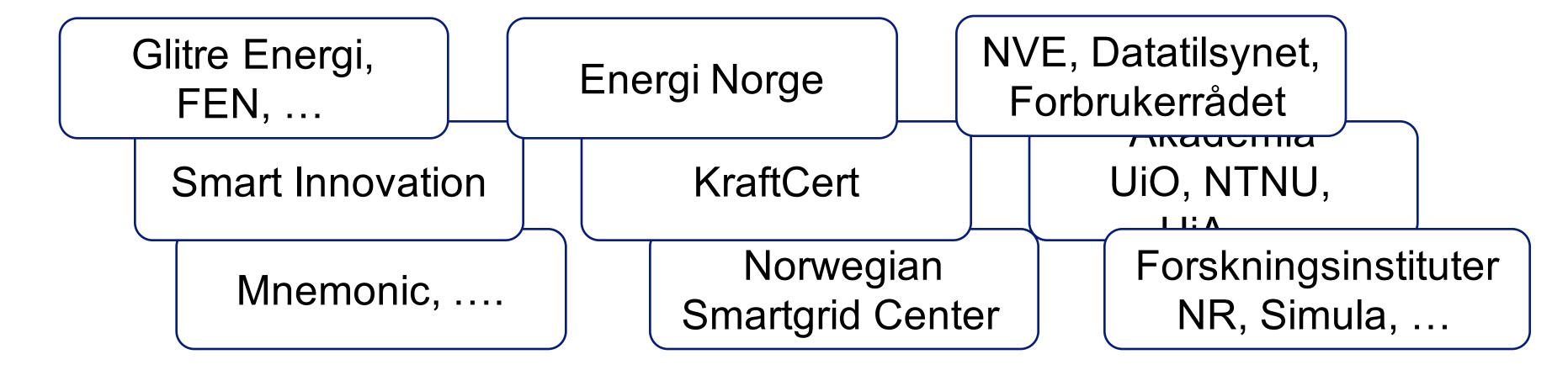


## Samarbeid basert på tillit

- Industriell perspektivet
- Samarbeid for å øke tillit
  - → blant aktører
  - → til forbrukeren
- Samarbeid for å øke sikkerhet
  - → samfunnssikerhet
  - → forsyningssikkerhet
- Utdannelse fra Akademia









## Mission Statement

We help the Utility Companies achieve their smart grid goals with higher resiliency and quicker response times against security threats.



