



## **THE NORWEGIAN DEFENCE ESTATES AGENCY (NDEA)**

The property expert of  
the defence sector

### **SUSTAINABLE BUILDINGS**

- Zero-energy building
- Smart infrastructures

buildingSMART Norway conferrance 22.mar.2012

## Norway's largest property management enterprise

- We manage 13,410 buildings and facilities, totalling 4.4 million square metres
- We have 3.7 million square metres of buildings on lease
- We manage about 1,400 km<sup>2</sup> area of properties
- We have NOK 6,3 billion in annual revenues
- 1,375 employees (FTE)



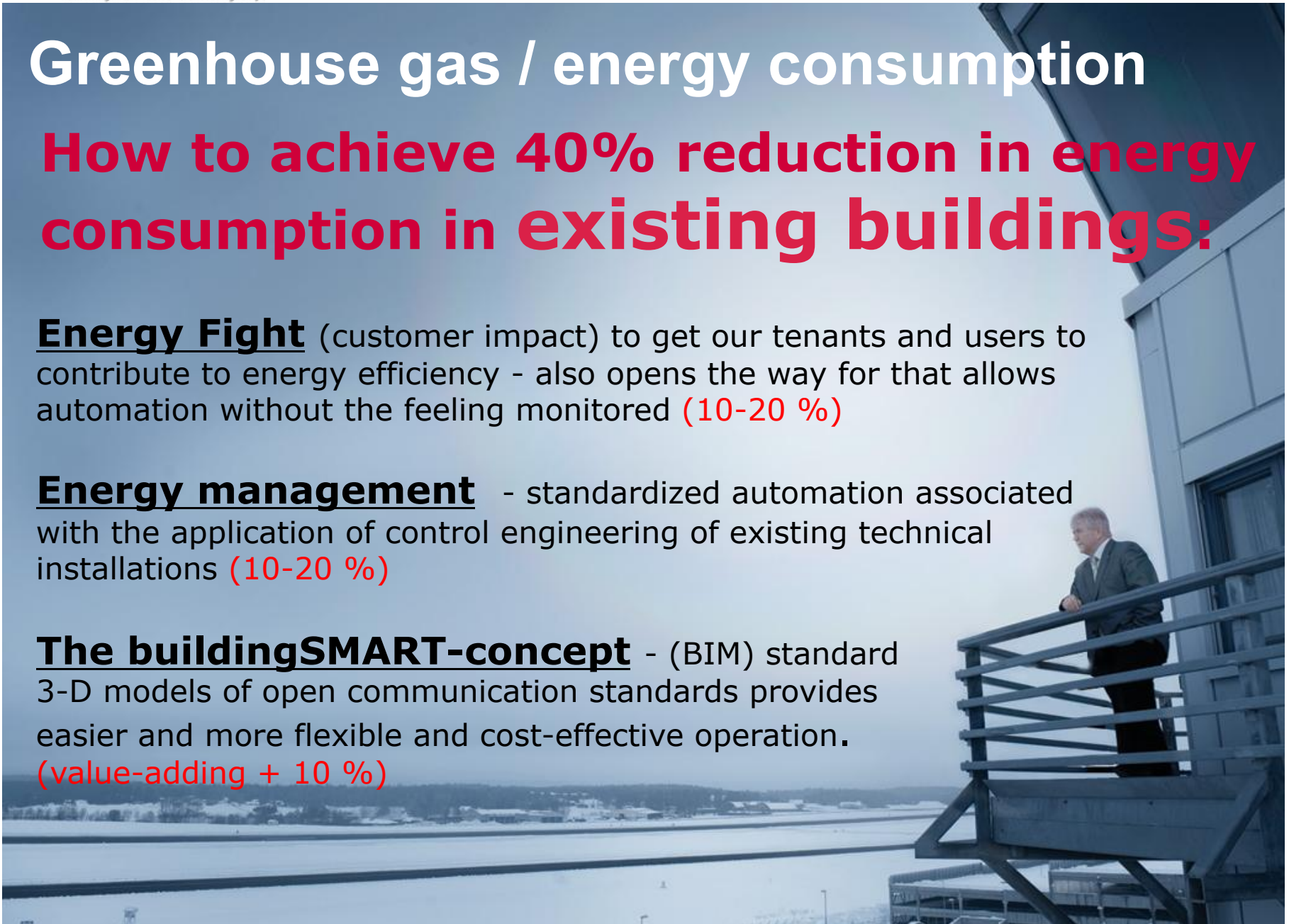
# Greenhouse gas / energy consumption

## How to achieve 40% reduction in energy consumption in existing buildings:

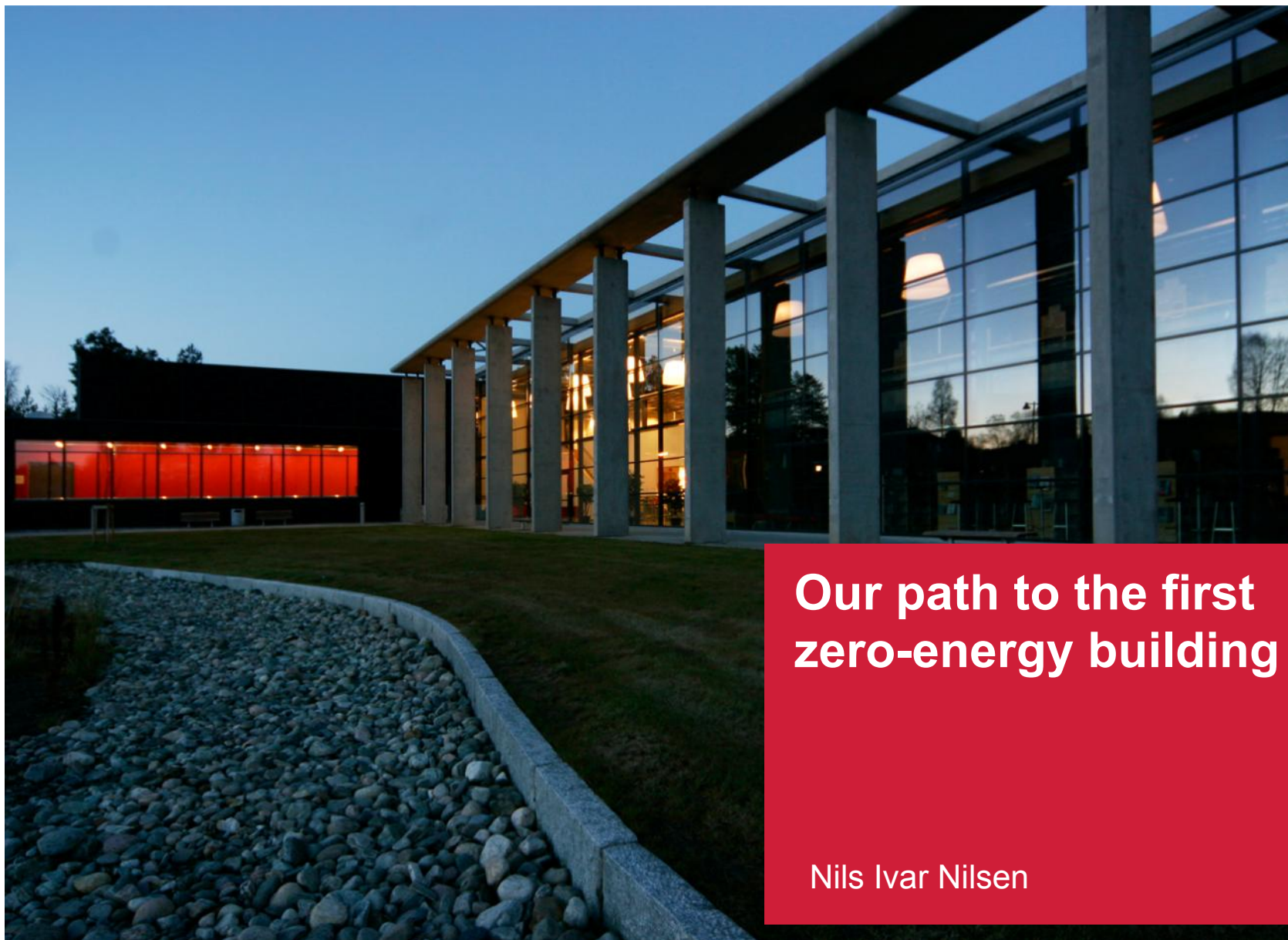
**Energy Fight** (customer impact) to get our tenants and users to contribute to energy efficiency - also opens the way for that allows automation without the feeling monitored (10-20 %)

**Energy management** - standardized automation associated with the application of control engineering of existing technical installations (10-20 %)

**The buildingSMART-concept** - (BIM) standard 3-D models of open communication standards provides easier and more flexible and cost-effective operation.  
(value-adding + 10 %)







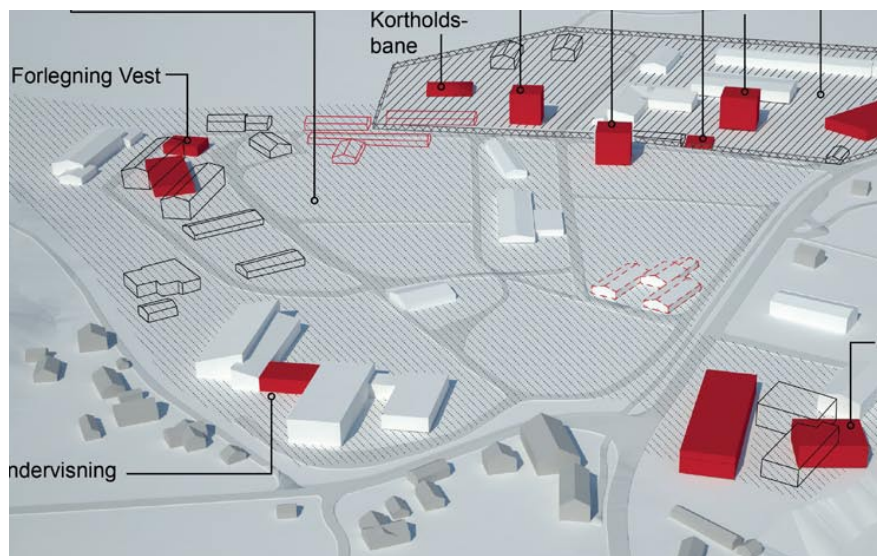
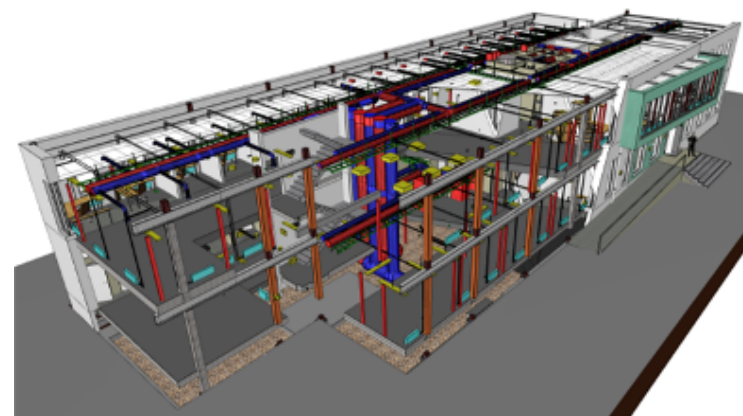
## Our path to the first zero-energy building

Nils Ivar Nilsen



# Forsvarsbygg and buildingSMART

16 running projects with bS.

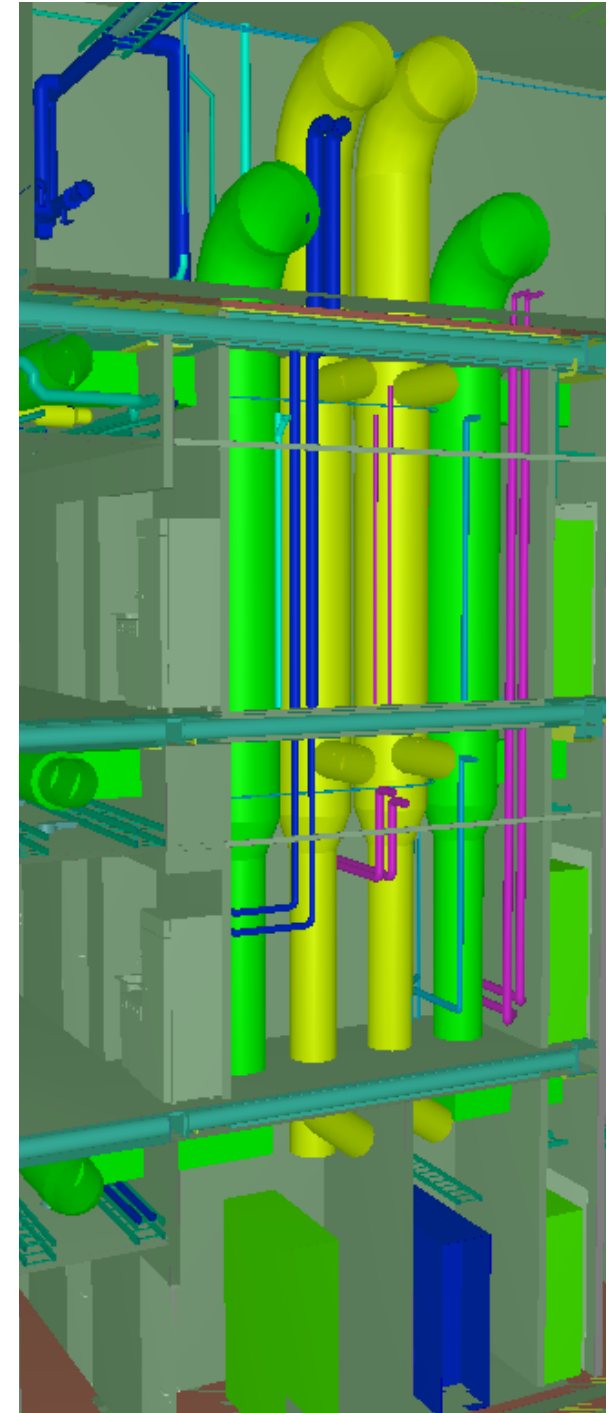
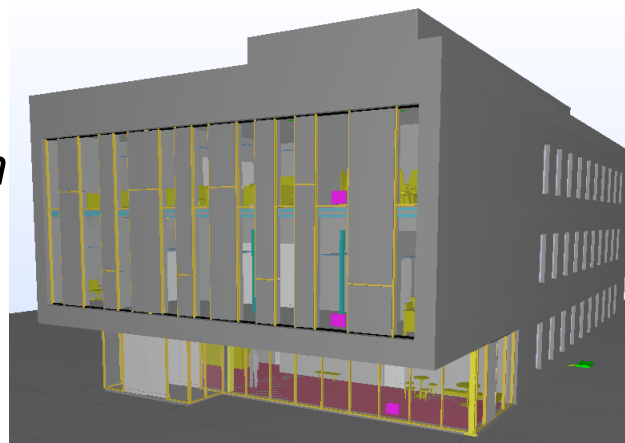
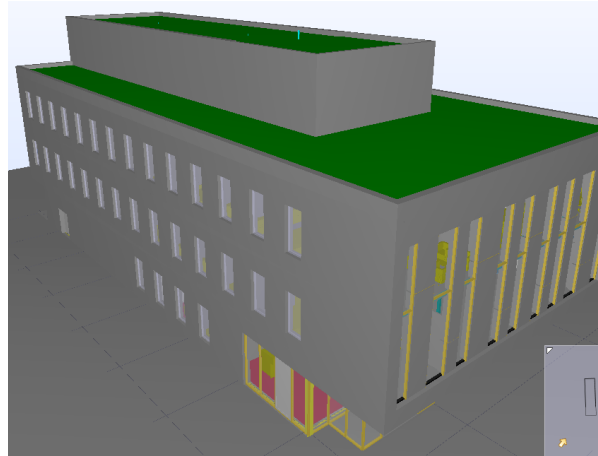


## How do we use buildingSMART

- *Adding details and enriching the model. Adding **information** to the BIM*

*Using the BIM as basis for contractors*

- *Compiled model with all subjects*
- *Separate model files from all subjects*



# Why going green?

- Environmental goals and policy 2009-2012:  
**Every new building from 1. Januar 2014 should be energyclass A**

**Norway: Energy class A is less than 84kWh/m<sup>2</sup> /year (office, Oslo climate)**

## Learning by doing

- Officers barrack Jørstadmoen (close to Lillehammer) – Energyclass B
  - Officers barrack Bardufoss Northern Norway – Energyclass A
  - Office for the Army, Bardufoss – Passivhouse (and energyclass A)
- 
- Office Haakonsvern Bergen – Goal: zero energy



# Under construction



**2010 Officers Barrac Jørstadmoen**

**– originally energyclass A**

# Under construction



**2011 Officers barrac  
Bardufoss  
– energyclass A**

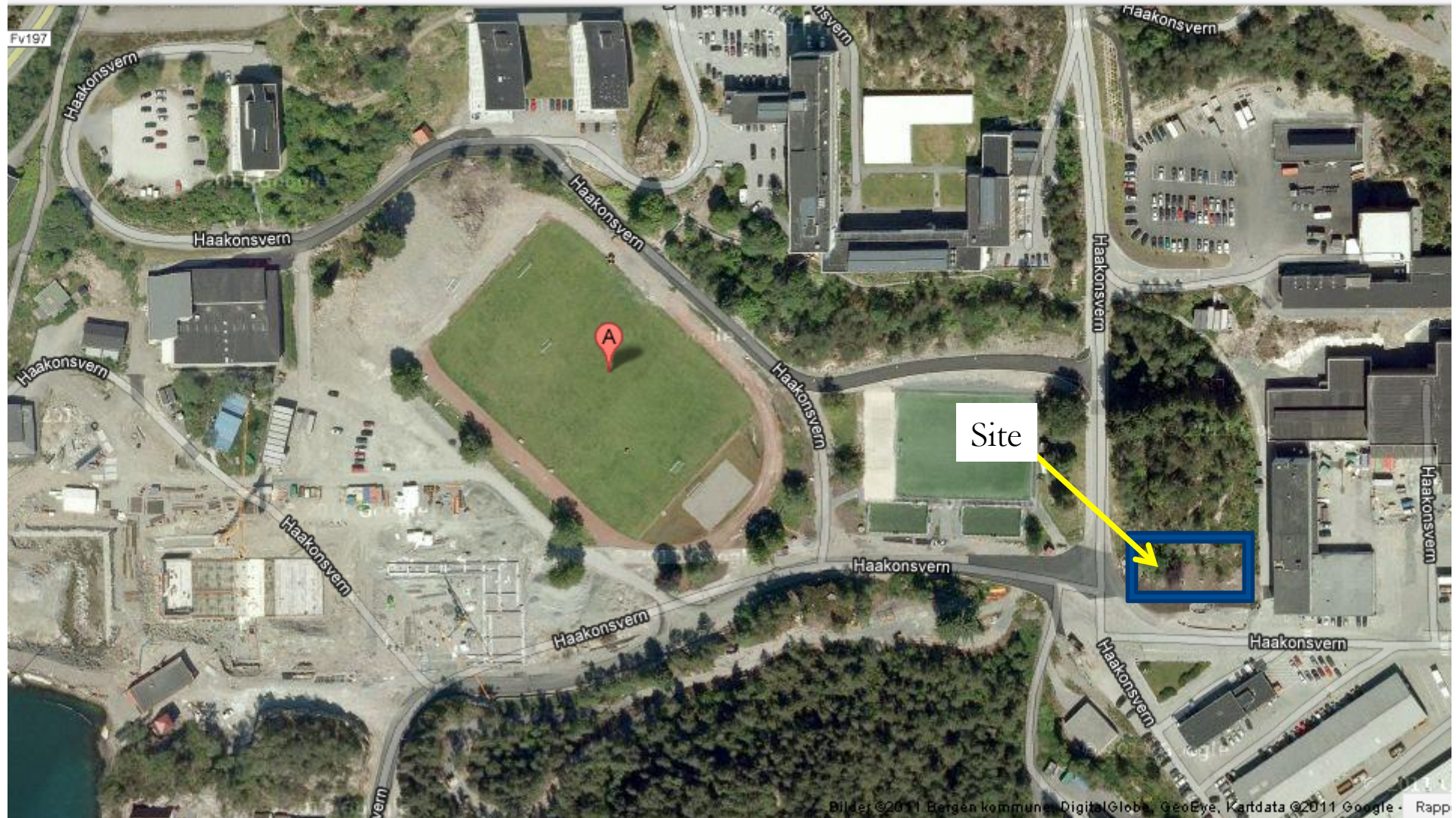
# Under construction



**2010 Office building, Bardufoss – passivhouse**

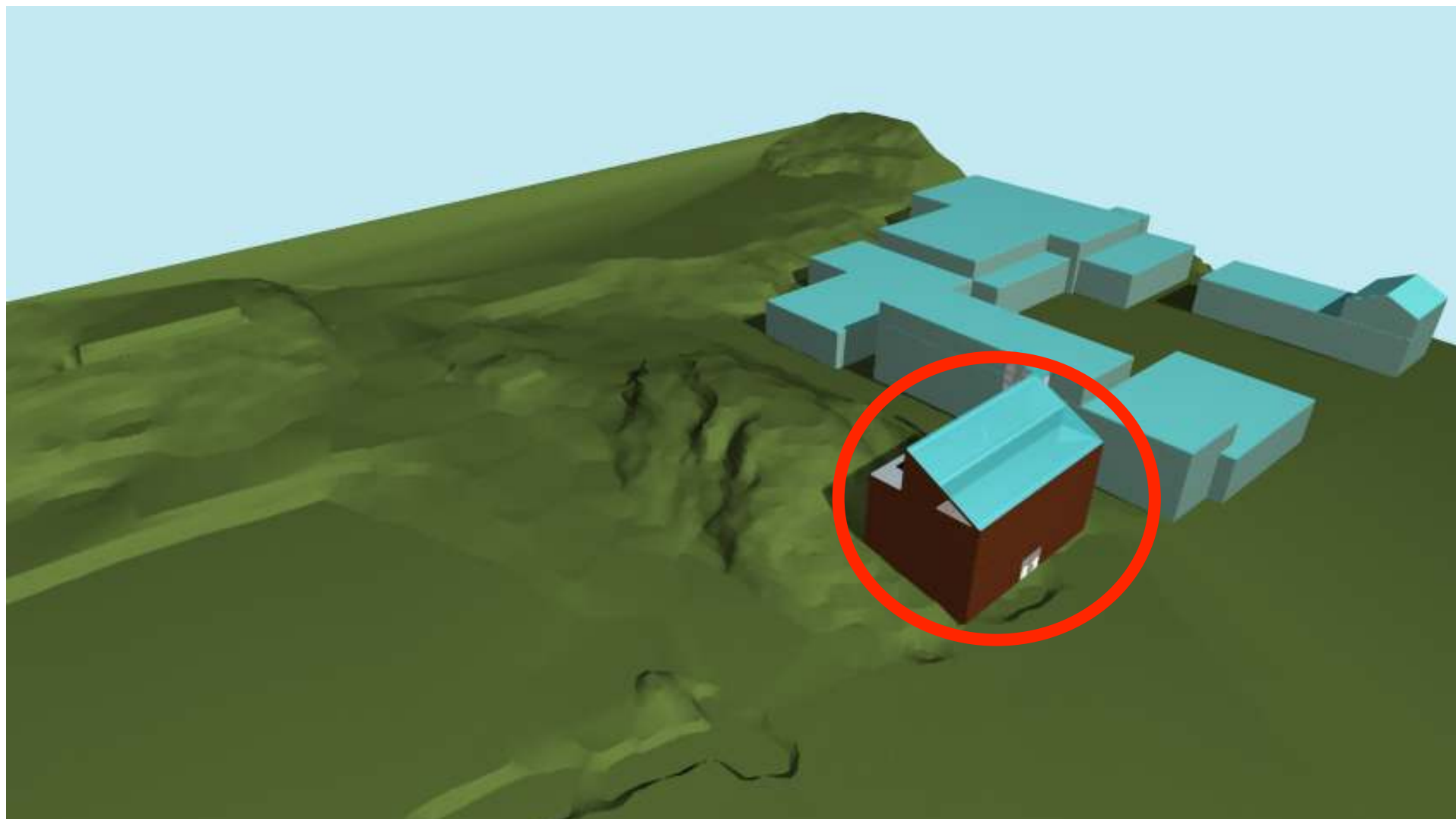


# Haakonsvern, Bergen, Norge



# Under Planning

**Zeroenergy office building, Haakonsvern Bergen**



## Zeroenergy

Definition: 0 kWh a year (user equipment not included)

The best conditions for a zeroenergy building in Norway?

- The local weather in Bergen (never warm, never cold!)
- The orientation of the building
- A compact building with a small surface area due to a small site
- Heating and cooling (local district heating run by Forsvarsbygg) close to the site
- Haakonsvern is in need for both heating and cooling 24/7 the whole year
- Green energy at Haakonsvern. 2 seawaterbased heatpumps provide heating and cooling



## Pilot project in [www.ZEB.no](http://www.ZEB.no)



- 2 workshops done, more to come
- 2012 September – concept with cost
- 2013 November – building starts
- 2015 first Q – opening ceremony

## Challenges for the owner – with regards to Energy and BIM

- Expertise (or lack of ):
  - In Forsvarsbygg (quality but not quantity)
  - The consultants
  - The builders (quality of the work and internal quality check!)
  
- RnD budget (or lack of )
  
- Limited national supportprogram, restricted economic support

## Where do we go?

### With regards to BIM and Zeroenergy ???

- LCC and the Ministry of Defence will decide if «Depotbygget» will be energyclass A or Zeroenergy
- We use buildingSMART  
and we intent to use it on all new buildingprojects  
where it give added value
- We will build new buildings which interact with local heat- and coolingsystems.

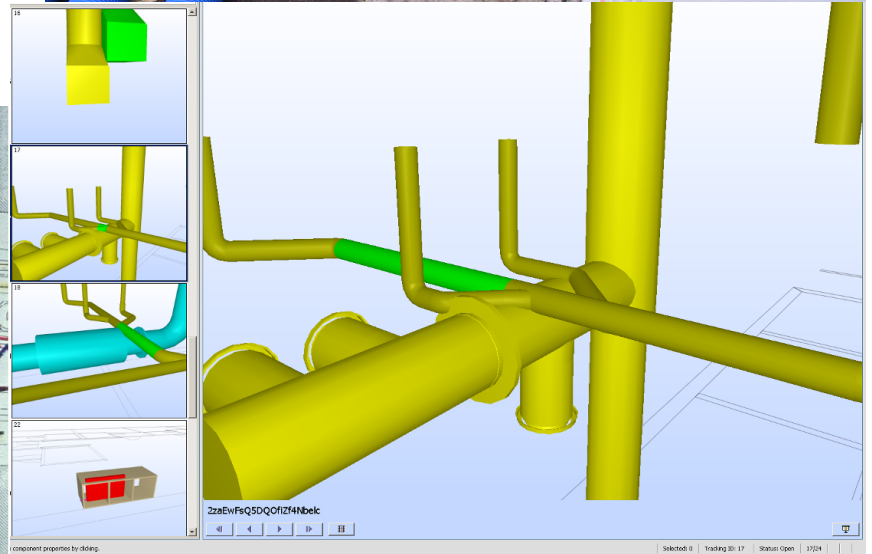
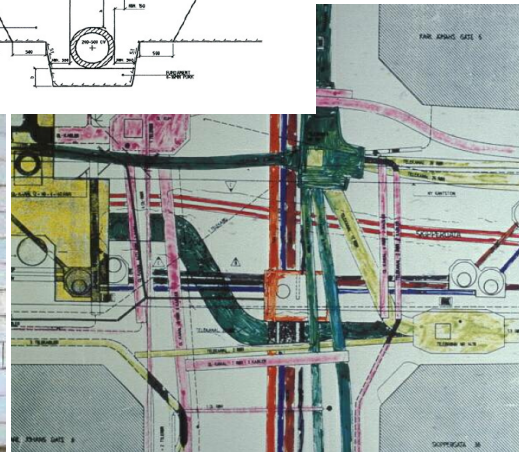
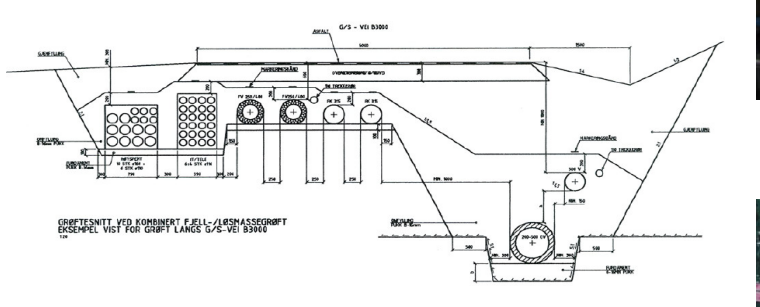
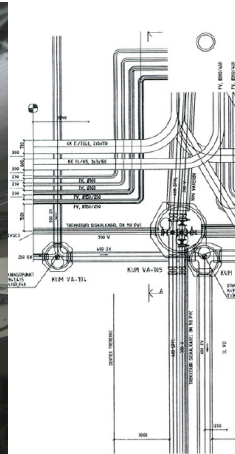


# Now it's your turn, Knud



# What is infrastructure?

Water and sewage systems, heating pipelines, cables of all kinds, roads and tunnels, etc.





# What is infrastructure, too?

Infrastructure on the management side can make SMART buildings everything from wireless transmitters in rooms of houses, which control parts of the city or larger areas

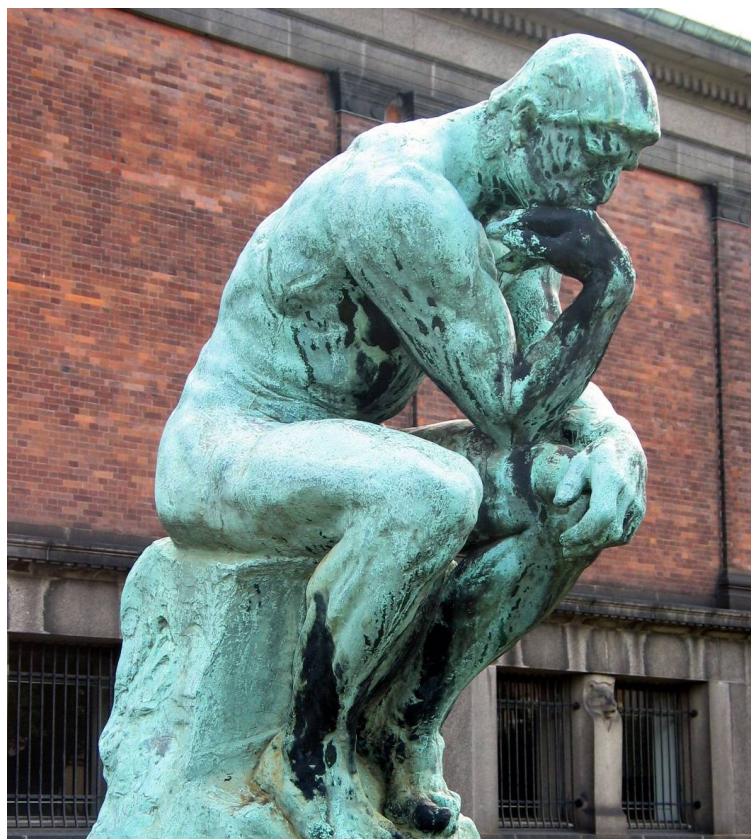
The collage illustrates infrastructure management through several key elements:

- Physical Infrastructure:** A photograph shows a worker in a trench handling a dense bundle of multi-colored cables, representing the physical layer of infrastructure.
- Web-Based Control Interface:** A screenshot of a Microsoft Internet Explorer browser displaying a control system for AHUS SD-Anlegg. The interface includes a tree view on the left listing systems like 'Behandlingsbygg', 'Arbeidssystem', and 'Varmesystem'. The main area shows a floor plan with room numbers (e.g., D344, F344, G351) and a control panel on the right for 'B1051342 Romkontroll', displaying room temperature (21.3 °C) and other parameters.
- 3D Architectural Model:** A 3D rendering of a building complex titled 'SENTRAL DRIFTSKONTROLL - NYE AHUS'. The model is annotated with labels for various parts of the facility, such as 'Pasienthotell', 'Forpassell', 'Sengufayene', 'Glassgata', 'Barnesenteret', 'Akuttmottak', 'Kapell', 'Behandlingsdelen', and 'Hovedinngang'.
- Operational Control:** A photograph shows a technician in a blue uniform interacting with a control panel and a laptop, representing the human management side of the infrastructure.

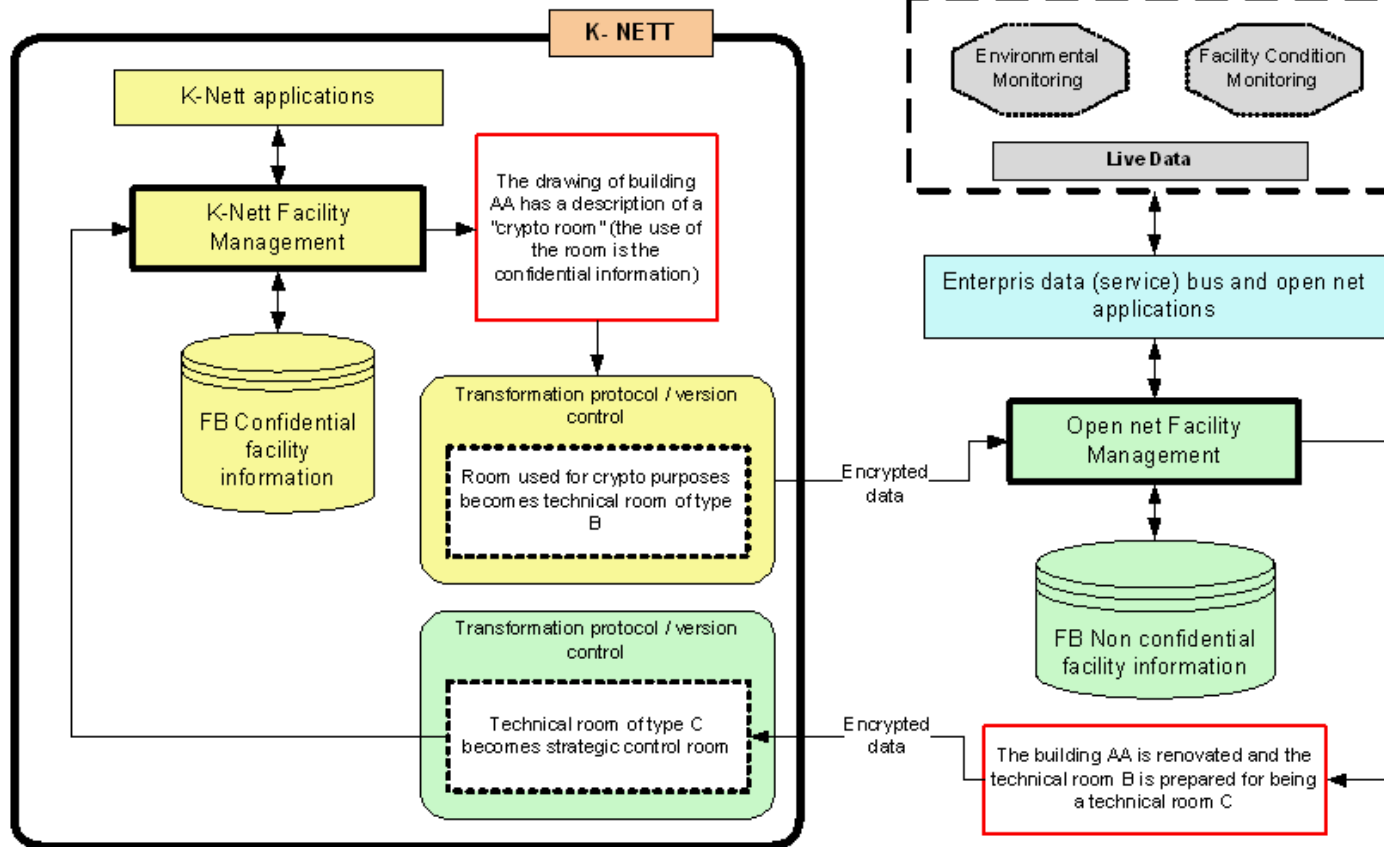


# Why infrastructure project?

Each year, broken pipes in the ground for about 3.5 billions kr, only in Norway



# Security top priority for infrastructure



**Example (for illustration only)**

# Norway is internationally leading

**The Norwegian research community is in world class, and divided into two main groups:**

- **Geographic information (GIS/SOSI)**
- **Engineering Related Information (buildingSMART/IFC)**

**Each group has ongoing ISO standardization work.**

**Norway is secretary in both**

**Infrastructure must all use both the standards sets for success**

**An infrastructure project, developed in Norway, therefore, hold an international potential.**



# Who is behind?

**The solutions must be based on the application of ICT on open standards**

## **Premises Donors**

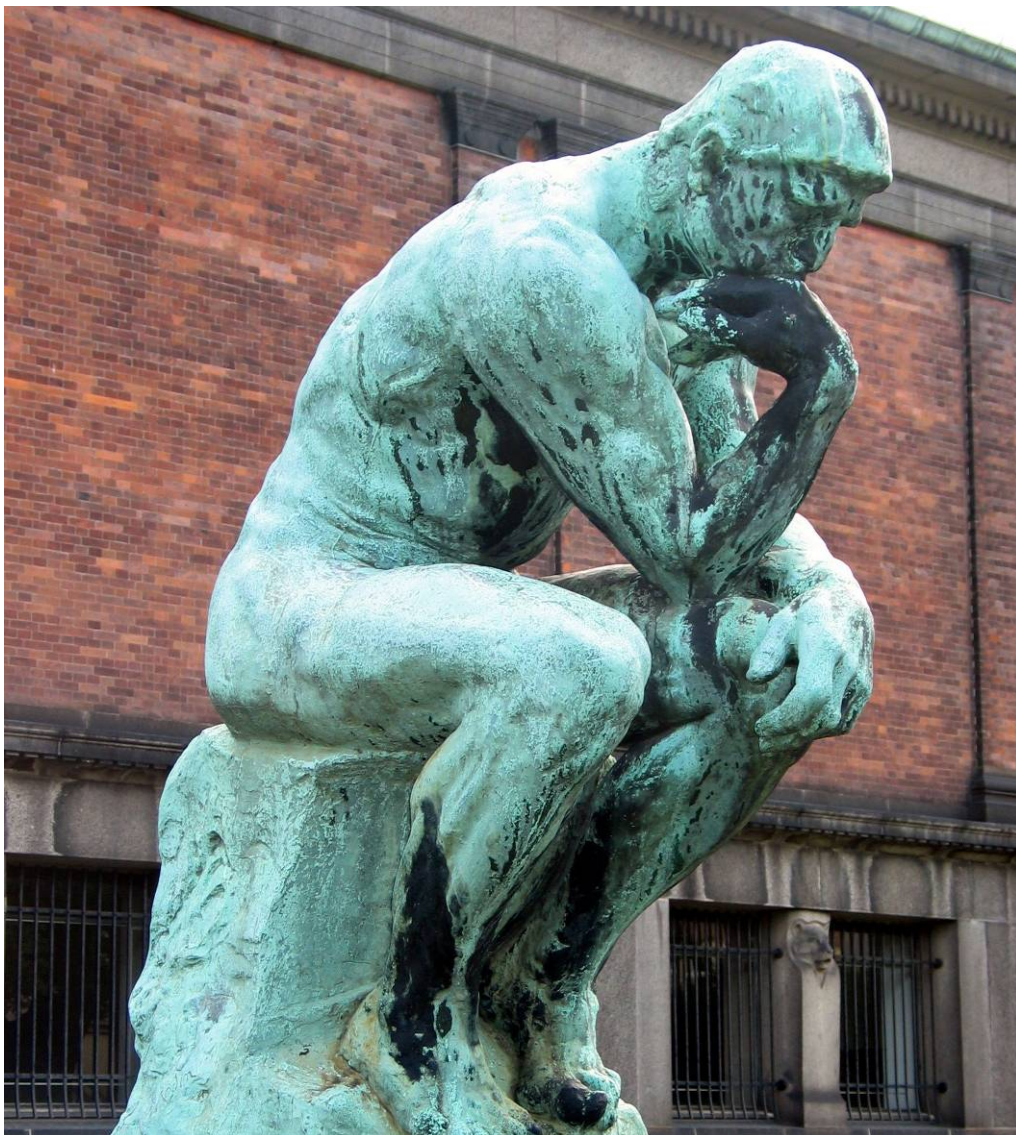
**The ministry of Environment, which may also rely on the professional Statens Kartverk and the Directorate of Construction Quality (DiBK).**

## **Problem solvers**

**NDEA and "Cities of the Future" at the start and municipalities (cities) and other public bodies for each industrial partners who have clout and power in the global market as IBM. IBM must also interact with Norwegian SME businesses, and help them succeed.**

## **Networks**

**buildingSMART, BA-nettverket and SOSI-ledning, that creates neutral meeting places where the needs and issues discussed**



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**Questions  
or  
comments!??**

