

OSLO AND AKERSHUS  
UNIVERSITY COLLEGE  
OF APPLIED SCIENCES

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# Standards, Implementation and Potential in Norway



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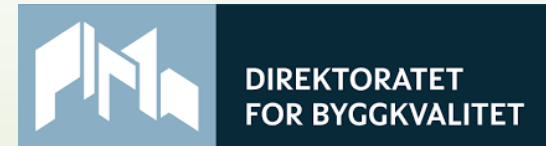
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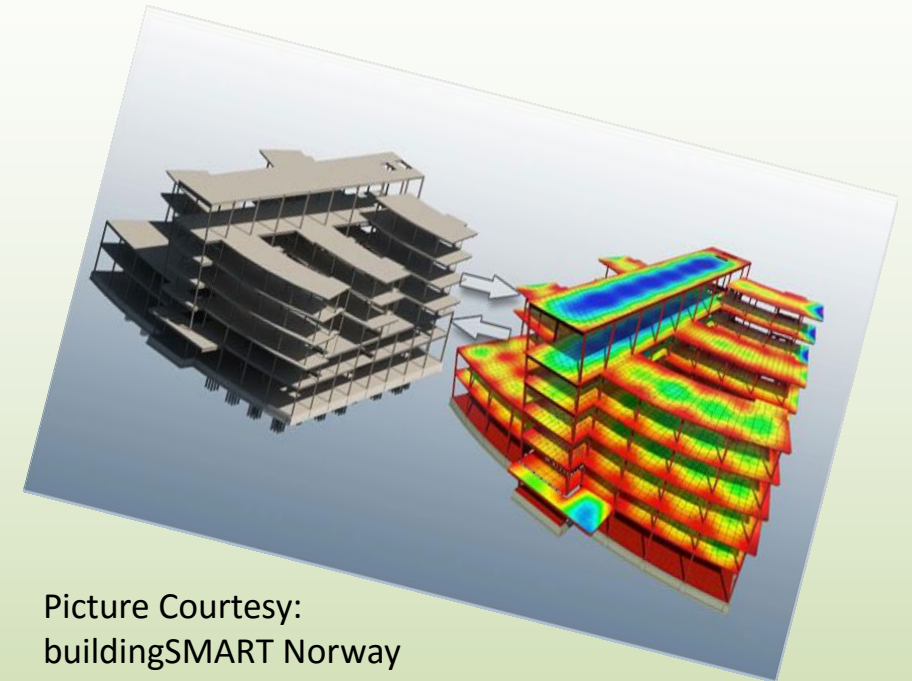
- Work experience from:
  - Standards Norway – working with BIM standardization
  - Norwegian Building Authority – working with digitalization
  - Selvaag Contractor and Property developer – working with development and implementation of digital solutions
- Associate Professor at Oslo and Akershus University College of Applied Sciences
- Adjunct professor, Norwegian University of Science and Technology, (NTNU)
- Competence advisor, buildingSMART Norway
  - Now - focus on research and education of the new generation of engineers
  - *believe this is where I have most impact...*



Picture Courtesy: topEngineer

# Why is digitalisation big in little Norway?

- Digitalisation is a megatrend
  - everyone try to do it – and some do it
- Norway is a leader in “digital government” \*)
- The Norwegian Tax Authority
  - Digital solution is default – and it works!
  - most is done online and automatic
- The AEC/FM industry
  - Paper is still default – but it does not work...
  - much can be done online, but manual
  - we want to follow Tax in digitalisation



Picture Courtesy:  
buildingSMART Norway

– \*) [https://www.accenture.com/us-en/~/\\_media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries\\_7/Accenture-Digital-Government-Pathways-to-Delivering-Public-Services-for-the-Future.pdf](https://www.accenture.com/us-en/~/_media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_7/Accenture-Digital-Government-Pathways-to-Delivering-Public-Services-for-the-Future.pdf)

# Why is BIM big in little Norway?

- We are a small country – with small AEC/FM industry – we have overview of what's is going on
  - transfer of knowledge
- The buildingSMART Norway is very small, but inclusive
  - However, it is relatively big and very active...
    - Figures from buildingSMART summit 2017 in Barcelona:
      - 18 attended from Norway, which in relation to population would be equal to 200 from UK, 300 from Germany, 1.115 from USA and 5.000 from China...



- The management of Standard Norway has for long time given priority to digitalization
  - Standardisation within the Architects, Engineers, Contractors / Facility Management industry (AEC/FM) industry have long traditions and strong support



- Standardisation stated with international experience

- GIS:
  - ISO/TC211, Norwegian secretariat, until 2017(coordination)
- BIM:
  - ISO/TC59/SC13, Norwegian secretariat (coordination)
  - CEN TC442, Norwegian secretariat (coordination)
    - Active Norwegian mirror committees
- International standards art transferred to official national standards: IFC is Norwegian standard -> NS/ISO 16739:2013



*Standardisation is an excellent "school" for learning GIS and BIM ;-)*



- ***BIM related:***

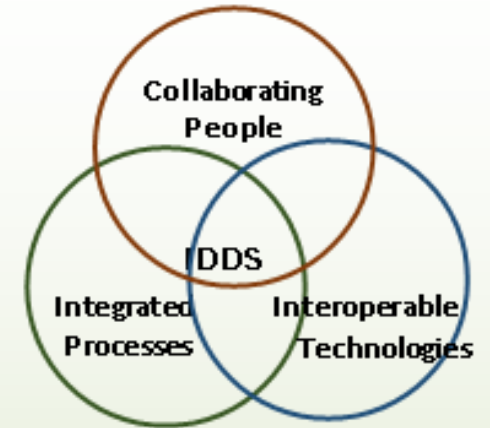
- NS 8360:2015 BIM objects - Naming, type encoding and properties for BIM objects and object libraries for construction works
- Guideline published in 2017
- SN/TS 3489:2010 Implementation of support for IFD Library in an IFC model

- ***General use – with digital implementation:***

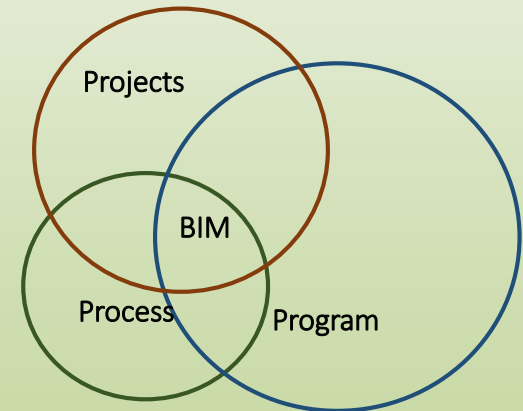
- NS 3420 Specification texts for building, construction and installations
  - Series of 32 standards – used by all, in various degree, for everything
  - Support digital exchange supported by
  - NS 3459:2012 Exchange of data for specifications, price information and settlements in building and civil engineering works

# Implementation - Perspectives

- BIM as practice in project
  - Advanced use of BIM in projects
  - Based on “Best practice” and enthusiasm
  - Try and learn – Just do it” attitude
- BIM as process
  - It is hard to identify formalised changes in processes, except VDC, Virtual Design and Construction
- BIM in program (software)
  - High focus on openBIM = ifc file exchange
  - Support - try out - Norwegian software



IDDS (2013). Integrated Design and Delivery Solutions, Research Roadmap, CIB Publication 370,



Presenters perspective of Norwegian priority

# Implementations

## Akershus University hospital - The first large scale openBIM project in 2008

Norwegian approach:  
Learning from projects  
What is best possible process  
and technology  
– preference for openBIM



Courtesy: Ahus



However, it was only this part  
that was designed by open BIM

Head of project Bjørn Sund:  
*Open BIM looks promising  
– and even if half of the benefits  
can be archived – this is more  
than enough to go for openBIM!*



# Implementations

## Statsbygg: 2010: Open international Architectural competition National Museum Demand open BIM deliverables (no physical models)

German architects Kleihues +  
Schuwerk Gesellschaft von  
Architekten was winner with  
«Forum Artis»

To be finalized in 2020

Web-cam:

<http://www.statsbygg.no/Prosjekter-og-eiendommer/Byggeprosjekter/Nasjonalmuseum/webkamera/>

Statsbygg is the Norwegian  
government property developer  
Managing 3 mill. m2 of buildings



Picture Courtesy:  
Statsbygg







## AF Gruppen: Addressing Future



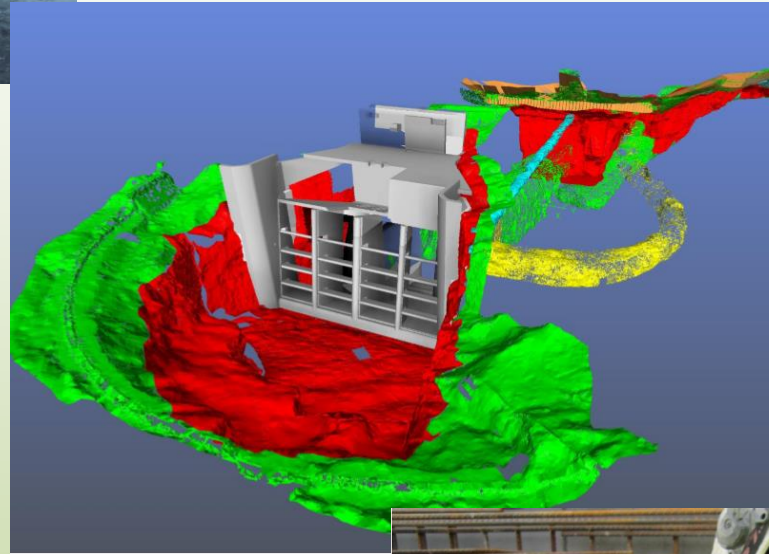
The “Vamma Hydro power plant” built by contractor AF Gruppen in 2016 – without paper drawings!

### *Objective:*

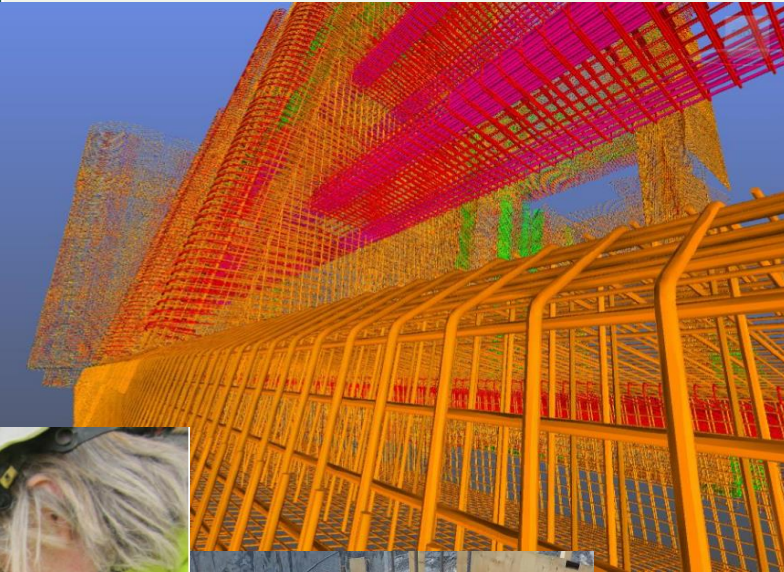
The power plant built without paper drawings - the entire project is digitally designed and built

### *Experience:*

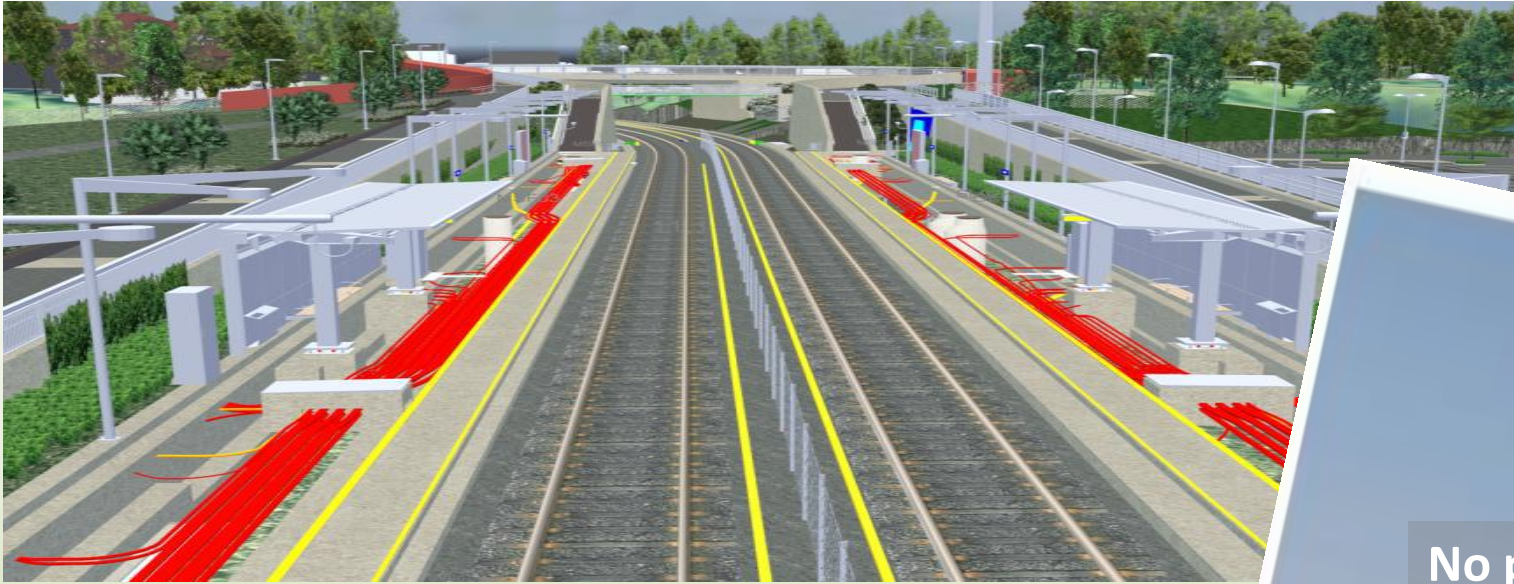
This could not have been built by drawing – the quality and the accuracy is not good enough!  
Digital models in design and construction are default



Picture Courtesy: AF Gruppen, Norway







## Digibbygg

No papers at all, digital processing,  
transfer and presentation of information  
– for everything  
– in the entire life-cycle!

### ***Statsbygg: DigiBygg***

Pervasive digital design and construction project

Use of best possible digital solutions  
for the entire life-cycle of the project

- Combination of openBIM, GIS, VR, RFID

Picture Courtesy:  
Statsbygg

<http://www.statsbygg.no/Nytt-fra-Statsbygg/Nyheter/2017/Digibbygg-forste-prosjekt-er-klart/>

## Data Design System (DDS)

<http://www.dds-cad.net/>

Product suite: DDS-CAD Mechanical / Electrical / Plumbing / Building / PV



## Vianova – now: Trimble

<http://www.novapoint.no/>

*Novapoint*: A design toolset for infrastructure BIM projects.

*Quadri*: A cloud-based model collaboration platform for infrastructure BIM projects



## dRofus

<http://www.drofus.no/no/>

A planning and data management tool for the global building industry



## coBuilder

<http://cobuilder.co.uk/>



Product suite: Multiple solution for digital product data

Strategic contributor to major international standardisation bodies such as ISO, buildingSMART, CEN and CENELEC

Market leader in the domestic market, providing the only centralised system for EHS documentation & product data management in Norway

Developing solutions integrated with Revit, Navisworks and ArchiCad



## **Rendra** <https://rendra.io/en/>

Rendra focuses on MOBILE FIRST and gives you access to your drawings, your documents and your BIM model whenever you need it wherever you need it!



## **Catenda** <http://catenda.no/>

bimsync® by Catenda makes it easy to collaborate between all stakeholders in construction projects, powerful visualizations, issue management and secure digital data management.



## **areo** <http://areo.io/>

SMART Facilities Management: Asset management, handover management, defect tracking, work order management



## **Viscenario** <http://viscenario.com/>

Mobile platform for Collaboration in projects, Hand Over and Maintenance



- *if it is good in a Norwegian project*
- *– it should be good enough for the rest of the world ;-)*

# Potential

- We are in front today – but we have to keep up the pace!
- Digital exchange of information focus too much on transport of product data (ifc) and not on transformation of processes
- Understanding of BIM is high, but
- understanding of digitalisation is limited
- Implement the “Digital Road map” for digitalization of the entire AEC/FM industry – included public authorities!

Today)

Short term  
(2017 – 2018)

Mid term  
(2019-20-21)

Long term  
(2022-23-24-25)

Constraints

Goal

Vision

Digital, competitive,  
sustainable  
AEC/FM industry in  
2025

25%  
lower cost

50%  
faster

50%  
less GHG

50%  
more export

Digital  
site

Digital  
twin

Digital plattform

Standards and Codes

Competency

Benefits realization

**IMPACT**  
ÅRLIG EFFEKT (Y %)  
INVESTERING  
-x mill  
**INVESTMENT**  
INVESTERING  
-x mill  
ÅRLIG EFFEKT (Y %)  
INVESTERING  
-x mill

# Road map for digitalisation

– developed as a joint project in the AEC/FM industry

- *Thank you very much for your attention!*
- Norway – many good cases for BIM research  
Please contact me if you want information about Norwegian BIM projects
- More research is needed to document, assess and compare progress in BIM implementation  
Collaboration is welcome!



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