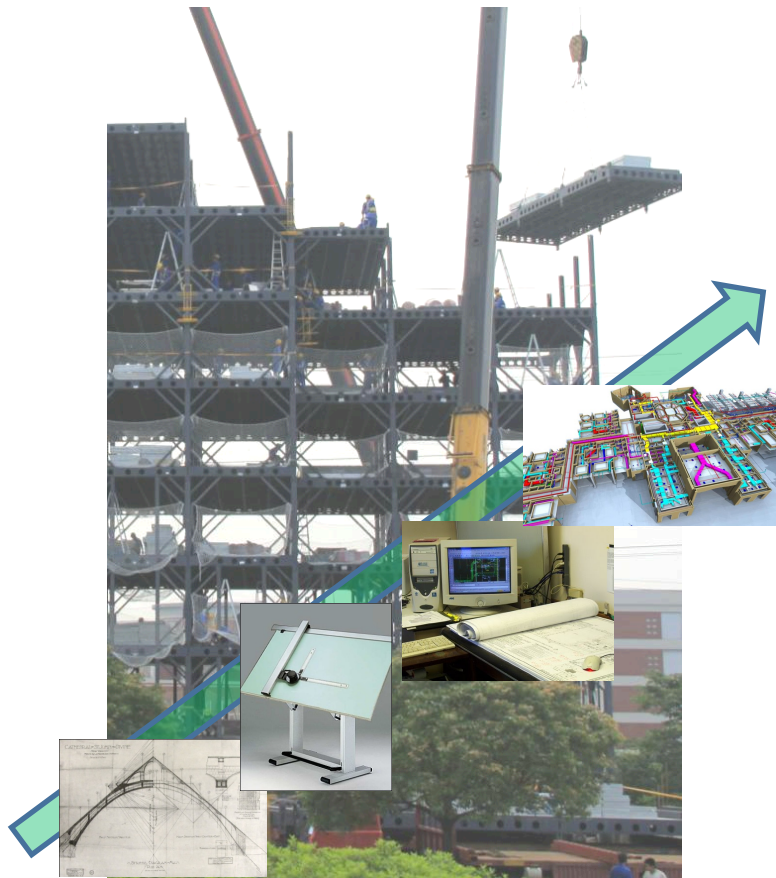


South-Eastern Norway Regional Health Authority
– Sustainable development according to our mission



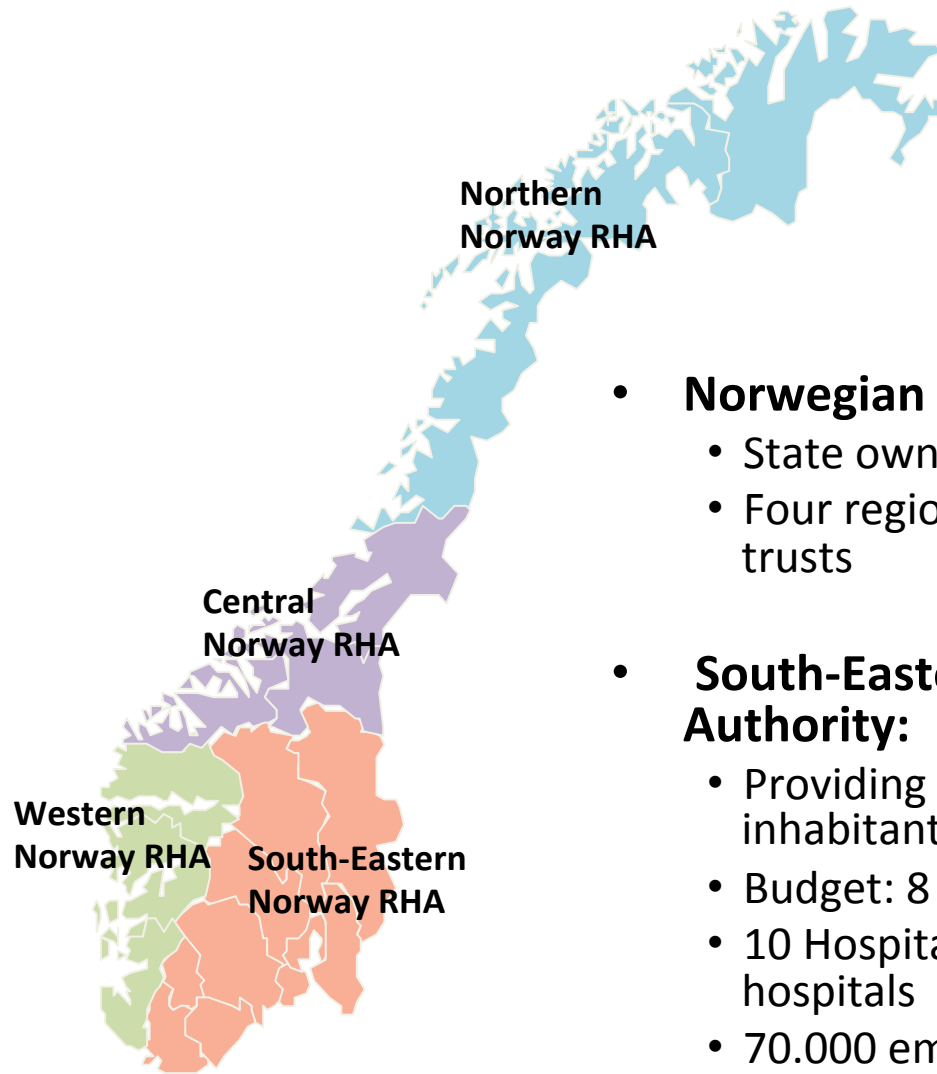
Moving the industry forward with openBIM strategy

22. March, 2012

Birger Stamsø

Head of project strategics

South-Eastern Norway Regional Health Authority



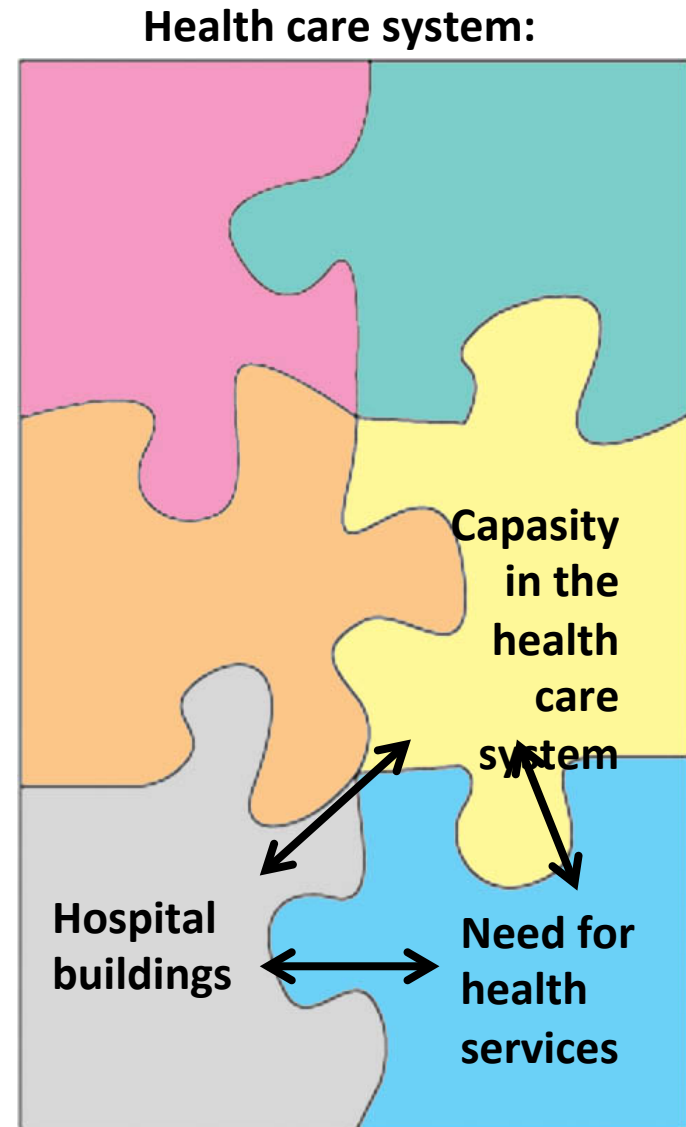
Our mission:

Provide high quality specialist healthcare services to all who need it, when they need it; irrespective of age, origin, ethnicity, gender or financial standing.

- **Norwegian secondary health services**
 - State owned public funded health trusts
 - Four regional health authorities controls 26 hospital trusts
- **South-Eastern Norway Regional Health Authority:**
 - Providing specialist health services for 2.8 Mill. inhabitants (56% of the Norwegian population)
 - Budget: 8 Billion EUR
 - 10 Hospital trusts, plus 5 private non commercial hospitals
 - 70.000 employees
 - 2,6 Mill. m2 floor area (excl. Private hospitals)

Hospital buildings – a strategic perspective

- Hospital buildings is one of several pieces in a health care system, where the overall objective is to get better health for the population.
- Hospital buildings is a strategic tool for the production of health services.
- The core business gives the premises for the construction and property management.

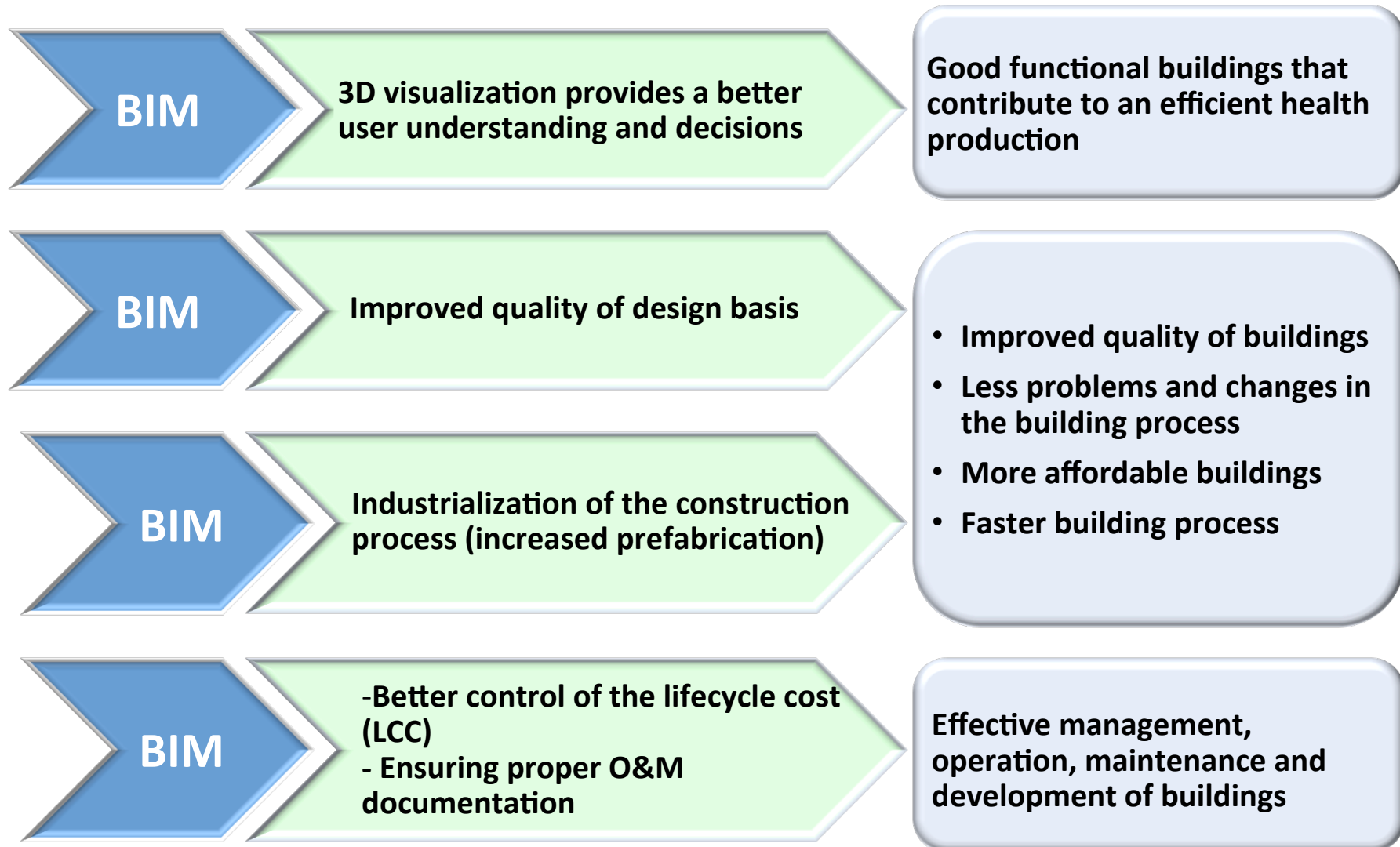


Our BIM vision

- Through BIM, achieving reduced cost and time spent on building projects, and at the same time getting better functional areas – with less faults.
- BIM is the concept and tool to reduce facility management and operations costs during the buildings lifespan.



How does openBIM help to reach the overall objectives for building projects

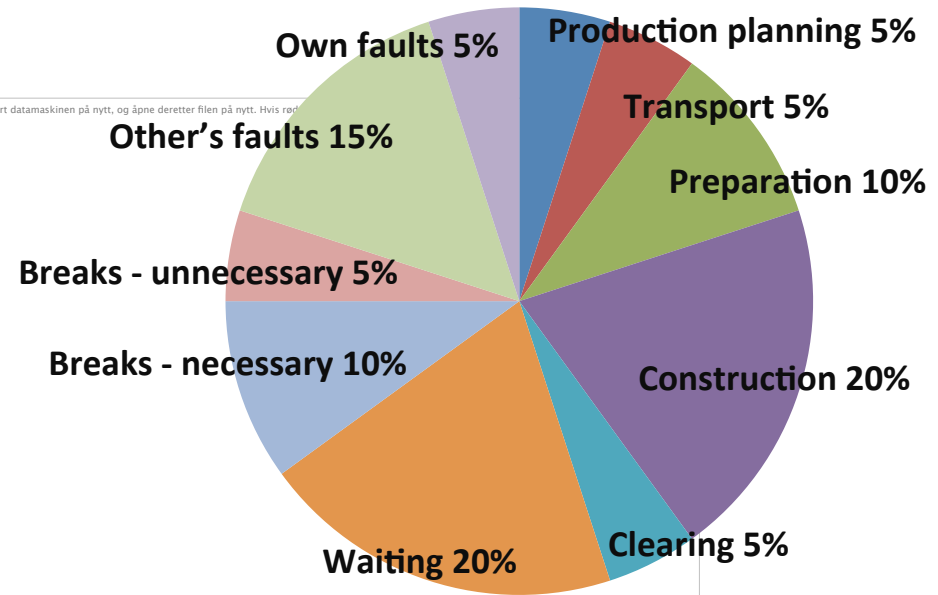


Need for improved productivity

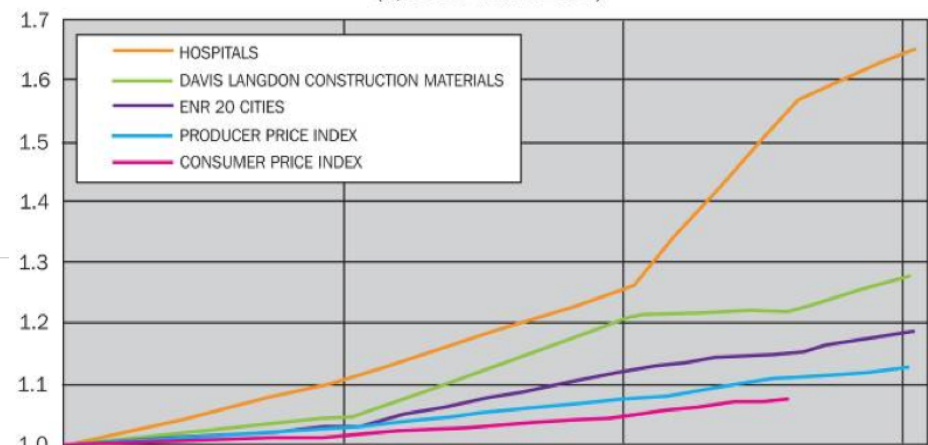
Potential: ~~✗~~ ~30 % cost reduction?

- **BIM:** ~10 % (DTU)
 - Direct effect
- **Organizing:** ~10 % (St. Olav – phase 2)
 - Improved interaction
 - Lean construction
- **Solutions and design:** ~10 % (est.)
 - Reuse of information and solutions
 - Standardization
- **Production:** ~10 % (Balfour Beatty)
 - Industrialization / modularization / prefabrication
- **BIM is not the solution – but a prerequisite**

Time spent at construction site – poorly coordinated interaction



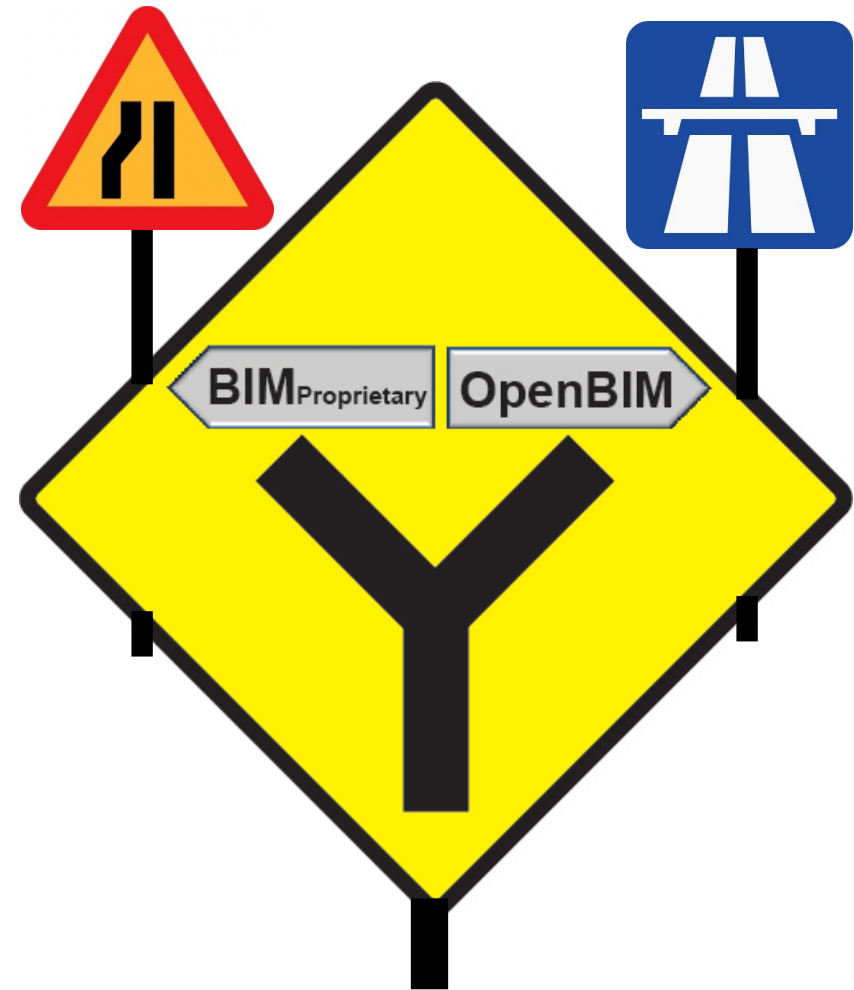
Source: Devoteam – daVinci



Development of US hospital building cost, related to other cost indexes.

Why establish an openBIM strategy?

- Give clear direction to the organization.
- Ensure proper focus from top-level management - throughout the organization.
- Focus on “business objectives” rather than technicalities.
- Give clear signals to the building industry, in relation to where South-Eastern Norway Regional Health Authority is moving.



Our overall openBIM strategy

- **All new projects in will demand openBIM.**
 - BIM is a strategically element in order to reach the prescribed quality, time and cost.
 - Contribute to a 10 % increase in efficiency within the property area (2010-2015).

- **Our commitment to BIM shall be based on openBIM and guidelines from buildingSMART**

URL – South-Eastern Norway Regional Health Authority BIM strategy:
http://www.sykehuset-vestfold.no/SiteCollectionDocuments/Utbygging/BIM-strategi%20for%20Helse%20Sor-Ost_Rev1-0-1_datert%2030-11-2011.pdf



*Akershus University Hospital Trust
Entrance building*



*Østfold Hospital Trust
81.000 m²*

Our overall openBIM strategy – cont.

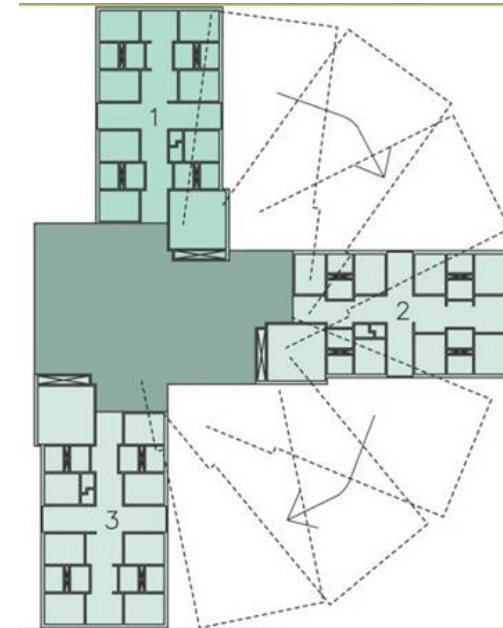
- **South-Eastern Norway Regional Health Authority will optimize the use of openBIM in the organization.**
 - Training and education
 - Focus on the transition between building phases (customer/supplier relationship).
 - Focus on Lifecycle Costs (LCC), rather than investment cost (**included health production cost!**).
 - Exploiting the potential of BIM requires ongoing assessment of the tools and methodologies that will contribute to this.
- **Focus on industrialization in building projects**
- **Securing the property rights**



Source: Fagskolen i Oslo

openBIM strategy: Industrialization

- Standardization of floor lay-out
- Standardization of technical solutions
- Adapting structural design of the building to an industrialized concept
- Cost efficient building process
- Low Lifecycle Cost (LCC)
- Advanced building logistics



*Vestfold Hospital Trust,
Building stage 7.1*

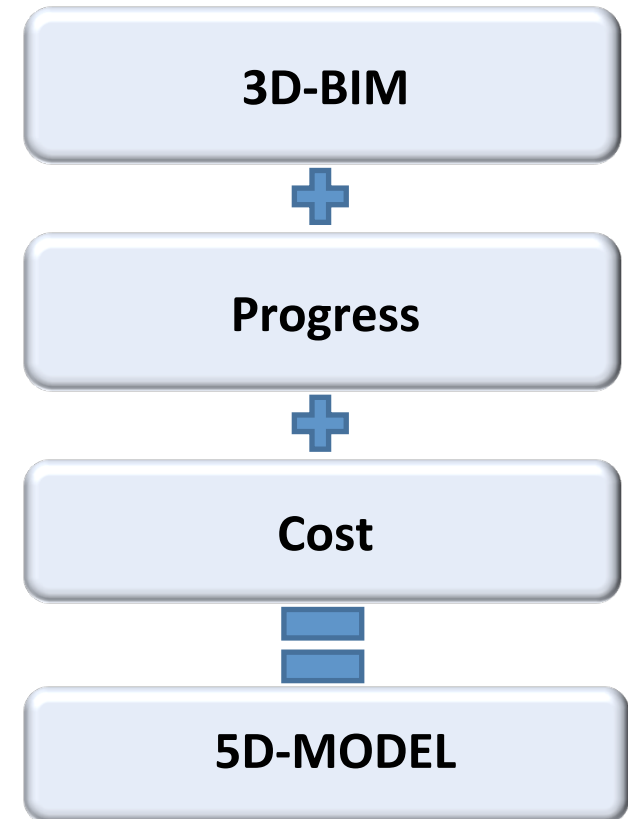
We consider BIM as an important element in industrialization of the building process.



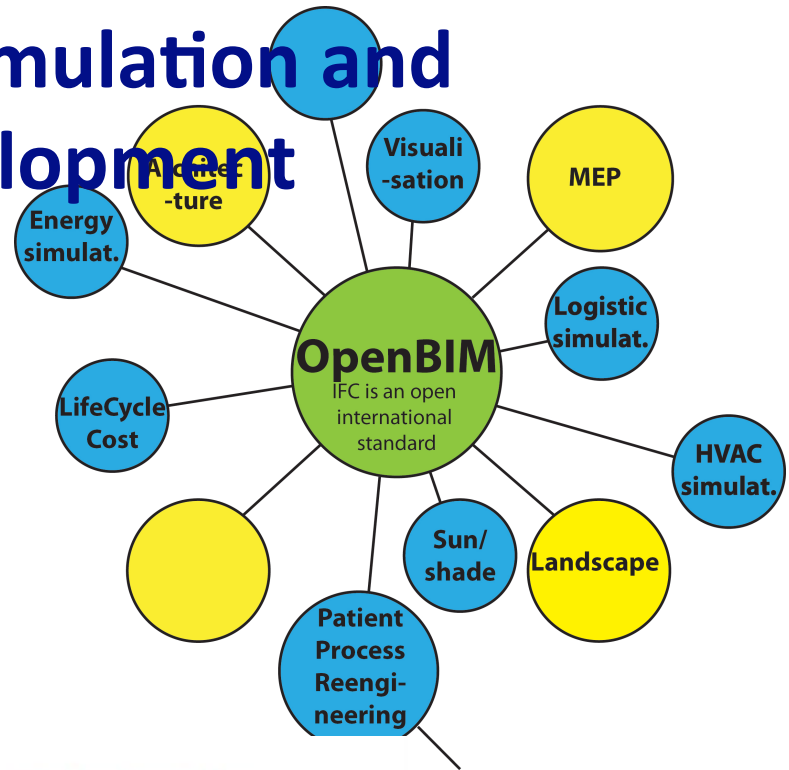
Picture source: Balfour Beatty

openBIM strategy: Improving Project Management

- **Progress in the Design and Engineering phase:**
 - Most of our projects have had problems with overdue delivery of drawings from the architects and consultants. BIM change this situation, by demanding better models at an early phase in the project.
- **Better project management in all project phases:**
 - Our objective is to use **5D-BIM** in all important projects, where the 3D-modell can be used in regard to monitoring progress and cost.



openBIM strategy: Simulation and sustainable development



Design and logistics simulation:

- Show different design solution and test them together with our users.

Life Cycle Cost (LCC) simulation:

- Simulate different design solutions in relation to LCC.
- Demand LCC-simulation in our projects.

Energy consumption:

- Simulate total energy consumption based on the properties of the building objects, sun screens, etc.

CO2-footprint:

- Simulate CO2-footprint with different designs.



Energy Balance Evaluation

Key Values

Project Name:	1.8b Result -Building Footprint -	Calculated thermal resistances:	
Project Location:	Hospital	Building shell average: R values [sq ft, h/Btu]	3.87
Activity Type:	9/23/09 9:03 PM	Roofs:	9.77 - 9.77
Evaluation Date:		External walls:	-
Tempered floor area:	48,177.56 sq ft	Basement walls:	12.40 - 12.40
Ventilated volume:	342,754.97 cu ft	Openings:	3.33 - 3.33
Outer heat capacity:	7061.76*10 ⁴ Btu/sq ft.F		

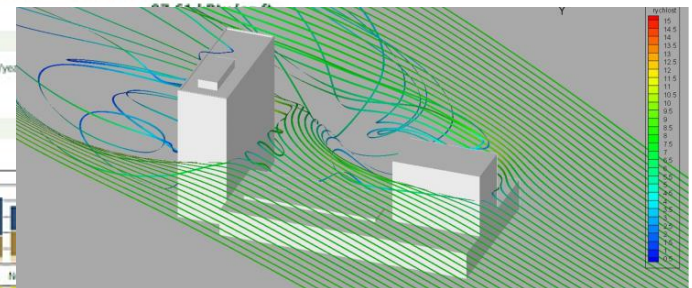
Energy Consumption

Source	Yearly total		Yearly specific		Total
	kBtu/year	USD/year	kBtu/sq ft,year	USD/sq ft,year	
14 % Natural gas	690231	6906950	14.33	143.42	4700671 kBtu
86 % Electricity	4010440	382300	83.27	5.86	
Total:	4700671	7189250	97.61	149.28	

Carbon Footprint

CO₂ emission as a result of operating this building is 722 tons CO₂/year.
This amount of CO₂ is absorbed in one year by 8.1 acres (roughly equivalent to 6 football fields) of tropical forest.

Monthly Energy Balance



openBIM strategy: Facility Management

Space planning and usage:

- 3D-BIM gives the possibility to plan the usage of the buildings better. Spaces can easily be connected to the functional hospital organization.
- It will be easier to check functional requirements with building attributes, when we are considering a change in the spaces.



Operations:

- Establish optimised Facility Management Systems, where the operating personnel (from the engineer to the plumber) have easy access to **all necessary information** in every operating situation.

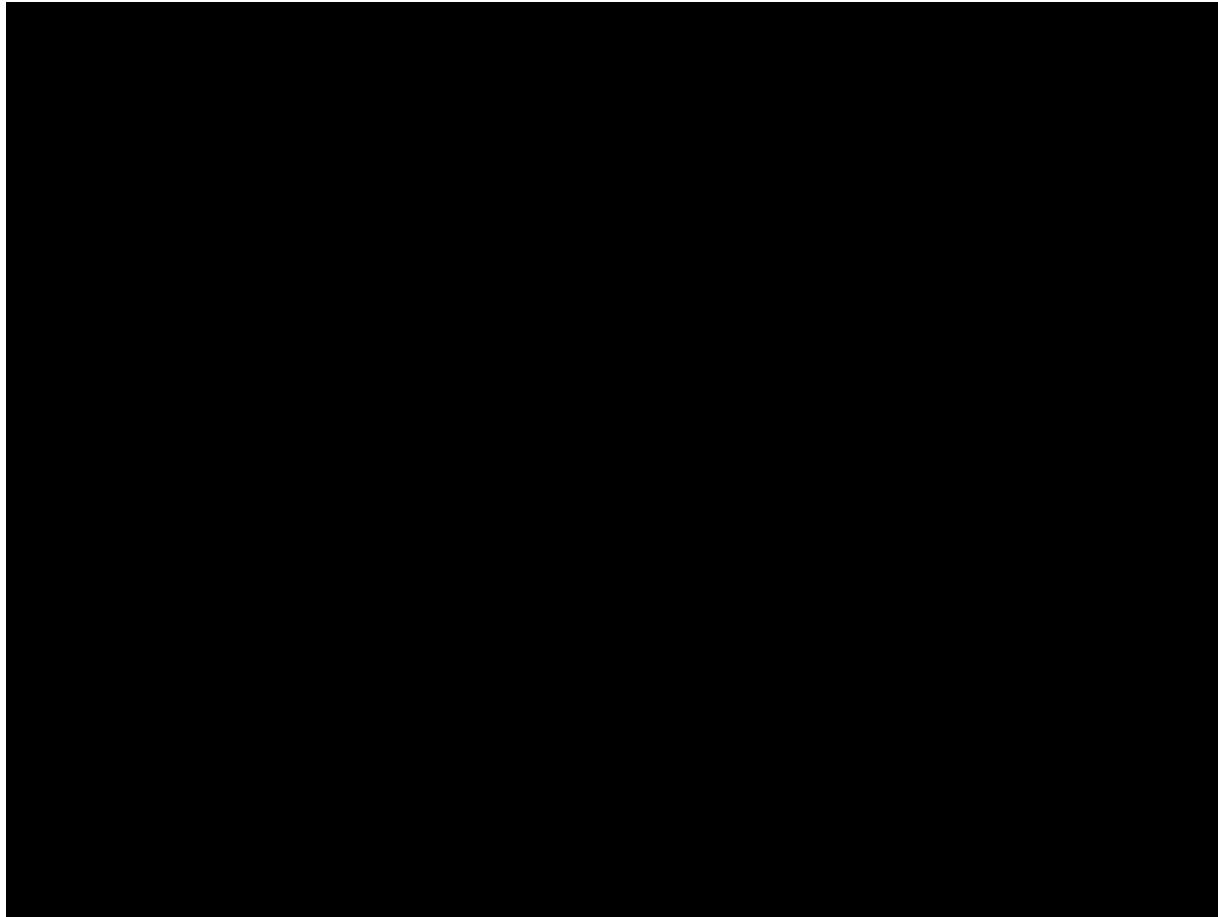


openBIM strategy: O&M documentation adapted to the users

Operation and maintenance documentation adapted to the user's needs, ex. with links in the BIM to maintenance movies.

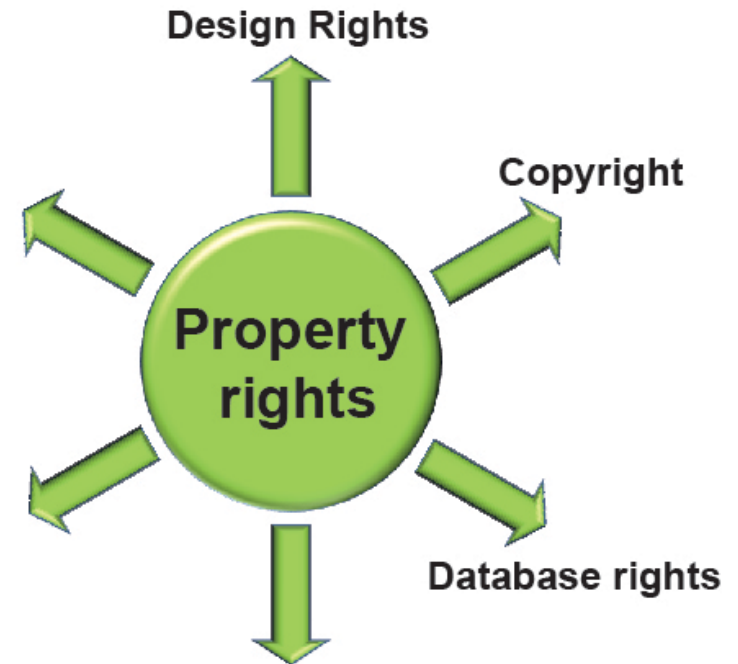
- Example of what we are looking for (from hospital equipment) – also in the maintenance of the building objects.

Source: www.youtube.com



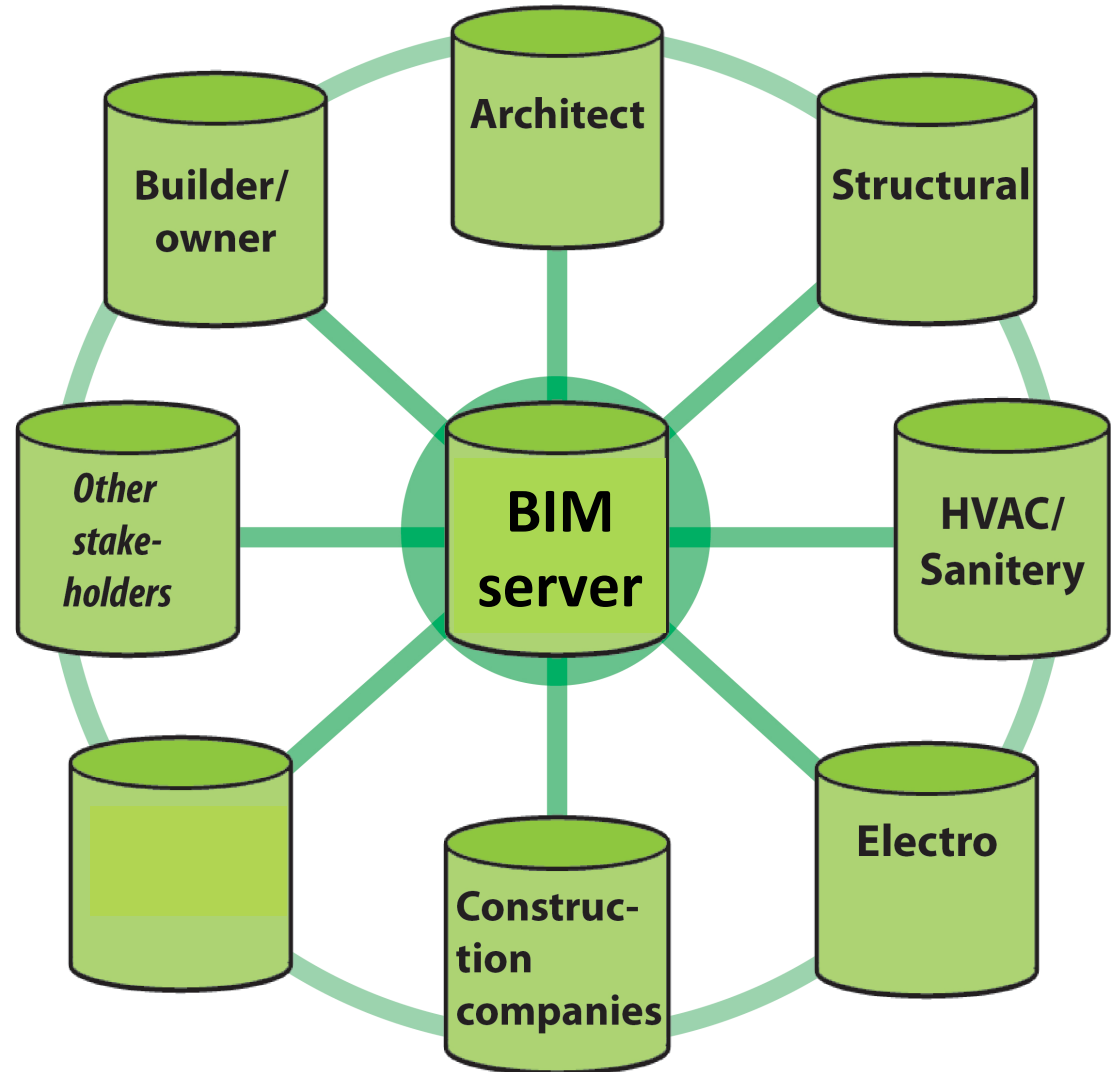
openBIM Strategy: Securing the property rights

- Securing all legal rights (including copyright) to the work done in all new BIM projects, in order to be able to reuse the functional and technical solutions in the organization and other regional health authorities.



openBIM Strategy: Implementation of BIM-server

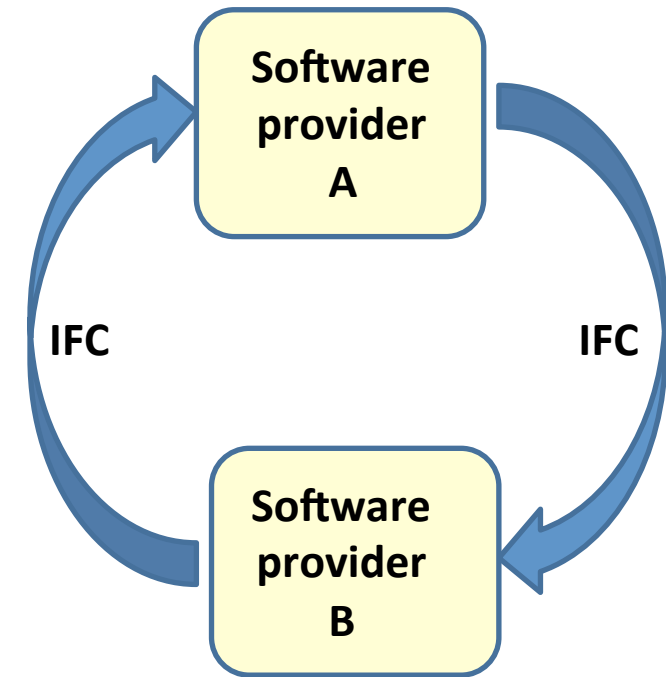
- BIM-server for both building projects and Facility Management



openBIM Strategy: Requirements to the models and storage formats

- All information in projects to be stored on open international formats (IFC – latest available version)
- Provide full isometrics, in order use the model directly in the industrialization process.
- The following text shall be included in our new BIM-contracts:

From 01.01.2014 the complete information produced by architects, consultants, contractors, etc., in their software applications, should be exported to openBIM (IFC). All information shall be stored on the latest publicly available version of the openBIM IFC format. Similarly, software applications should be able to import all the data stored in openBIM (IFC).



Complete Round-trip

openBIM strategy: Implementation

Our BIM Implementation strategy:

- Divided in eight parts with a list of actions in each part.

Step by step implementation:

- Started with the smaller projects and going further to the larger.
- Differentiated demands – based on the project size and anticipated difficulties.



BIM - Learning mode

- We acknowledge that we are not BIM experts, and have a focus on learning in these first BIM-projects.
- We try to create an open learning environment, where all participants shall be able to learn:
 - The builder's organizations
 - Users
 - Architects and consultants
 - Constructors
 - Others
- Using evaluation meetings to retrieve the experience from the different parts of the project.
- Learning together with other organizations, through buildingSMART events.



Overcoming traditional roles and attitudes in the design and engineering phase seems more demanding than handling the technical challenges.

Proactive to improvements

Jumping into BIM:

- Even though 3D-modelling and BIM has been a clear objective for many years, our approach has been like many others in the building industry in Norway:
 - **“we have jumped into it”**.
- We have had – and still have – a steep learning curve.

