

# **openBIM Facility Management**

**Presentation of background and a new project proposal**

By

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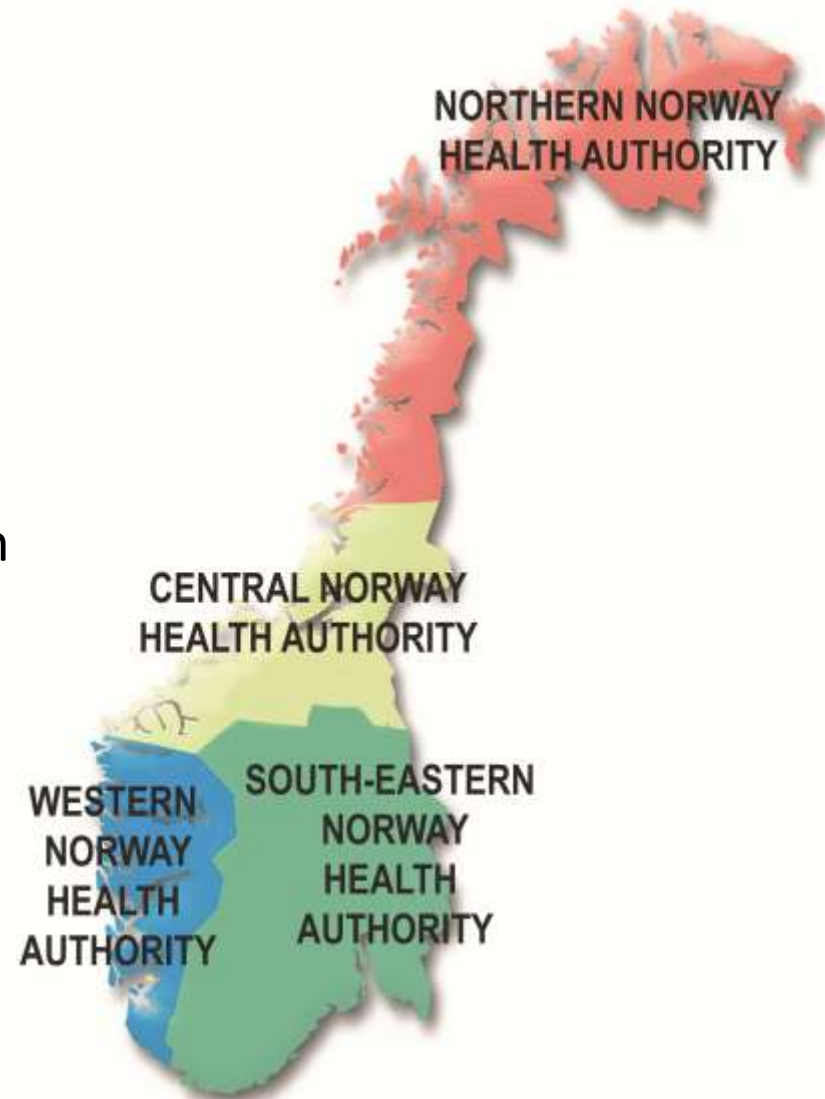
Brynjulf Skjulsvik, Senior Consultant, Norconsult

Alexander Olsen, Consultant/developer, Norconsult

Oslo, 19.03.2012

# South-Eastern Norway Regional Health Authority

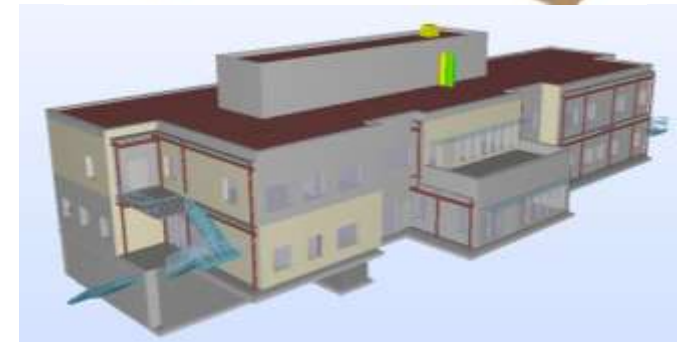
- **South-Eastern Norway Regional Health Authority:**
  - Providing specialist health services for 2.8 Mill. inhabitants (56% of the Norwegian population)
  - Budget: 8 Billion EUR
  - 10 Hospital trusts, plus 5 private non commercial hospitals
  - 70.000 employees
  - 2,6 Mill. m2 floor area (excl.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



# Background

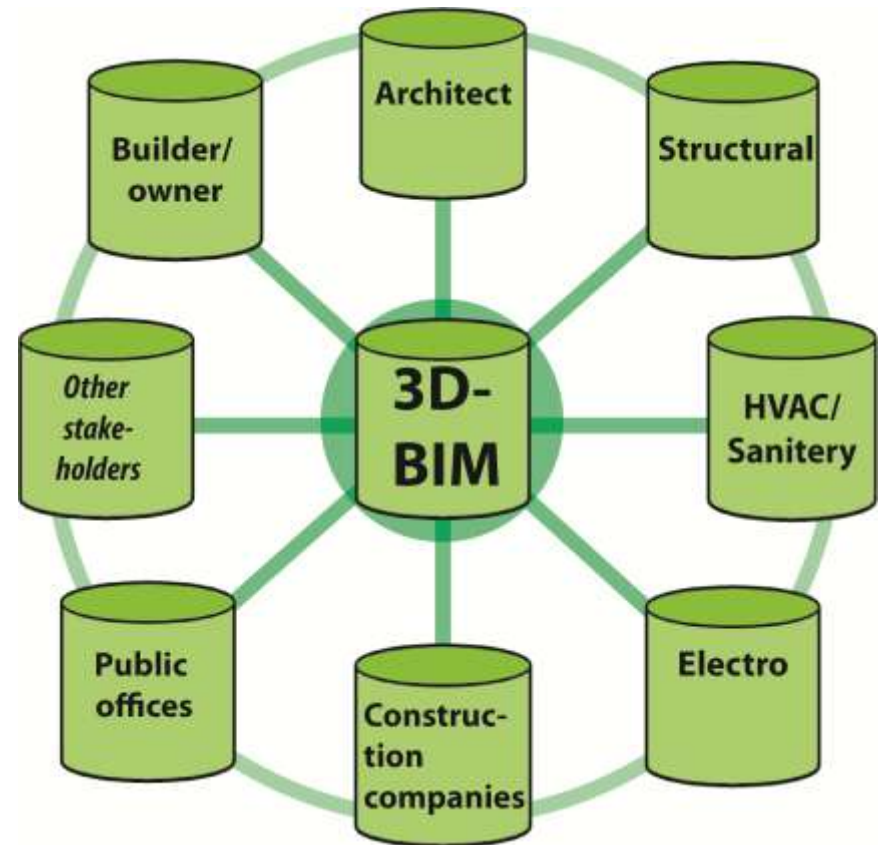
Vestfold Hospital Trust is a part of South-East Norway Regional Health Authority, which has several openBIM projects both in progress and in pipeline.

In 2010 we started to search out the best way to establish the Facility Management documentation, where we considered both national systems and COBie2.



# Background – The challenge

- How to get all the relevant information into the 3D-BIM in order to get a complete FM documentation in BIM?
- How to ensure that FM documentation is a natural part of the ongoing delivery to the project?



# Existing FM document collection

- We considered COBie as one of the potential systems for collecting FM documentation.
- We saw that existing systems and procedures didn't give us the level of detail information on the object level – which we was looking for.
- Different software providers had different solutions and it was not a standardized set of information.

Rom	Space
Navn	Name
OpprettetAv	CreatedBy
OpprettetTid	CreatedOn
Kategori	Category
EtasjeNavn	FloorName
Beskrivelse	Description
EksternSystem	ExtSystem
EksternObjekt	ExtObject
EksternIdentifikator	ExtIdentifier
RomMerke	RoomTag
BruksHøyde	UsableHeight
BruttoAreal	GrossArea
NettoAreal	NetArea
<i>RFIDtagNr</i>	
<i>Romfunksjonsnummer</i>	
<i>Geografisk nummer</i>	
<i>Romnummer</i>	
<i>RomType</i>	
<i>Kallenavn</i>	
<i>BRA</i>	
<i>OBRA</i>	
<i>REA</i>	
<i>VEA, Vektet areal</i>	
<i>Volum</i>	

COBie2

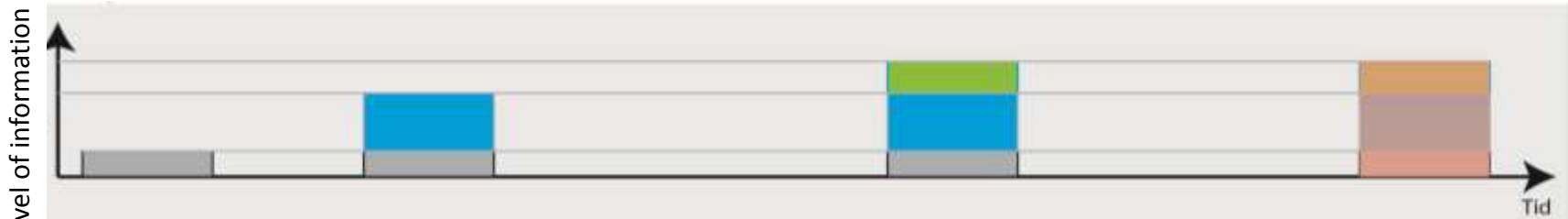
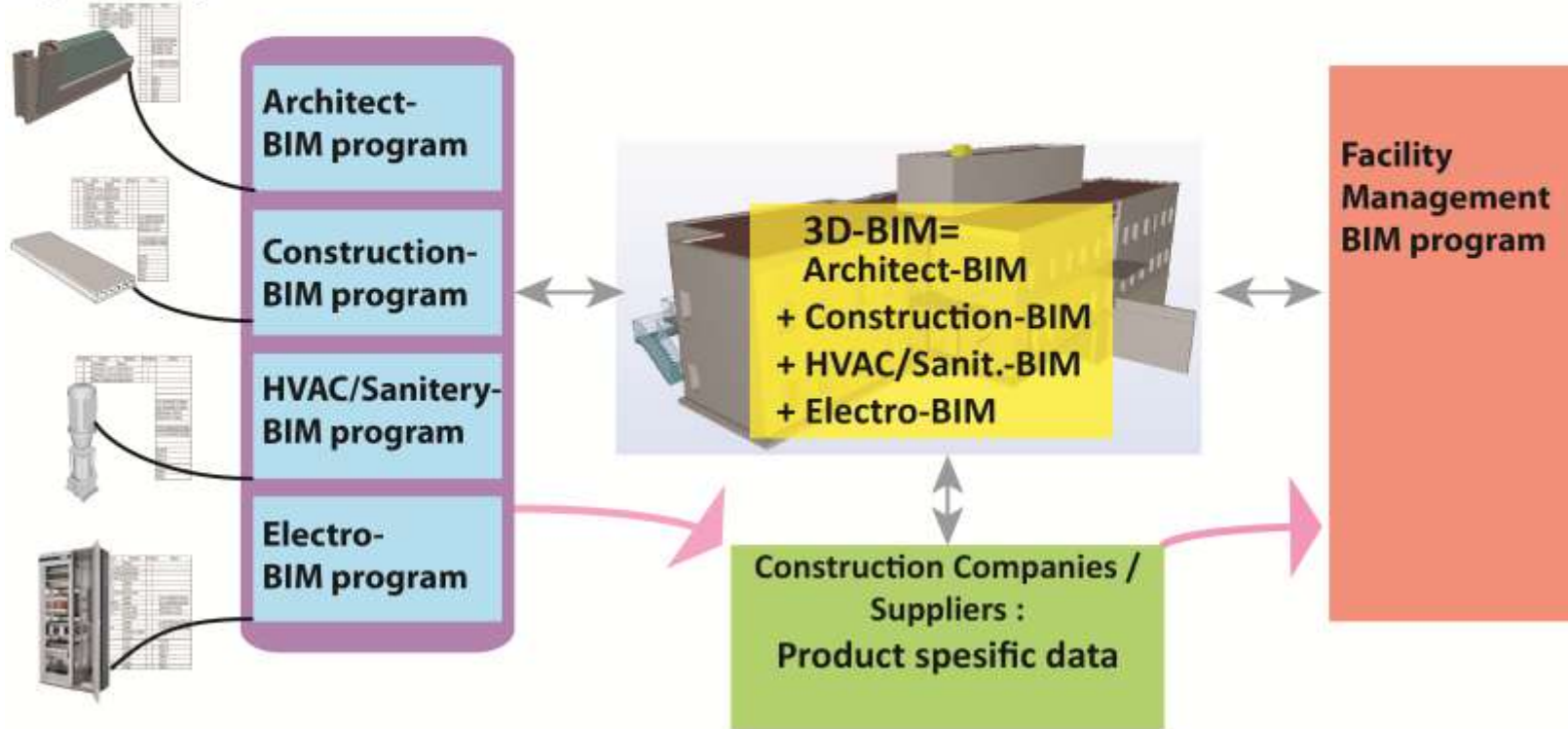
# Facility Management - documentation

Design and Engineering

Construction

Operation

Generic object library



# Scope - new proposal : openBIM FM

## Scope of work:

- Within the context of the operation based Norwegian Classification System TFM, and from a Facility Management perspective, we want to identify and map relevant IFC4 Property Sets, Quantity Sets and Properties.
- Identify the minimum level of information for Facility Management, in relations to property sets and property names, of a representative selection of building objects.
- Enrich the openBIM standard by producing and delivering a list of proposed new Property names and Property Sets which is necessary from a Facility Management perspective.

## **Other effects:**

- Ease the process of identification and registration of new properties (property names) necessary for Facility Management.
- Show the link between functional products (based on Norwegian TFM Context) and the building objects, Property Sets and Property names.

# Scope - new proposal : openBIM FM

## **Out of Scope of work:**

- Identifying all properties of all building objects or Entities.
- *(Decide final hierarchical location within IFC4. (To be discussed).)*



# **Business need – new proposal : openBIM FM**

- As a builder / owner - from a Facility Management perspective, we considered the information available in the existing systems as insufficient, especially in relation to the different phases of a building project
- A clear and unique property definition is also crucial for the different software vendors, in order to let different software easily communicate on the same model without having to map different contexts together.
- In order to open up for third parties software developers and Apps developers, we need more standardization of the property fields and property sets.

# Business need – new proposal : openBIM FM

## Other benefits:

- Gives BuildingSMART the possibility to have a minimum level of property sets and property names to be included in the IFC export and import – in order to develop IDM (PM, ER and MVD) for efficient workflow and IFC4 certification of software.
- Manufacturers get information about what type of information the customers / end users need in order to operate the products.
- The FMie-web application gives a better overview and accessibility of product properties. This can be achieved by exporting data directly from the web-application.
- All parties can easily get access to the system through this database contribute in creating the necessary Properties.

# New proposal : openBIM FM, what do we want to achieve?

- (We have focus on the “I” in BIM, not geometry)
- Establish standardized building object information on property field level based on the need from Facility Management, which is not already in IFC4.
- Build upon the existing Psets and property fields within IFC4.
- Establishing Psets and Property fields for a representative selection of building objects.
- Allowing information to have different values in different building phases
- Contribute to solve the problems with complete round-trip between software vendors. The information gets the same name in all software (avoiding “spam” sets).
- *Side effects: A web-tool to get easy access to the property sets and property fields already established in IFC4, which could be used by others also.*

# Project Goals

- Map the context of the operation based Norwegian Classification System (TFM) to relevant IFC4 properties (Property Sets, Quantity Sets, Properties) for selected TFM products and from a Facility Management perspective.
- Enrich the openBIM standard by producing and supplying a list of proposed new property names and property groups necessary from a Facility Management perspective.
- Ease the process of identifying and registering new property names necessary for Facility Management.
- Show the mapped relation between TFM and IFC4.

# FMie - database

- Unique user sign-in, customizable role access and easy participant invitation for selected roles.
- TFM context overview and editing
- TFM product properties overview
- Different users and roles (suppliers, contractors, vendors etc.)
- Show relations between selected TFM products and mapped IFC4 properties.
- Give an overview over existing and needed properties for a TFM product. Easy search within mapped IFC properties and proposed properties for each TFM product.
- Registration of proposed property grouping
- Registration of proposed properties for a TFM product
- Exports and report templates for TFM product property overview with proposed properties and mapped IFC4 properties

URL: <http://193.71.49.220/fmie/>

# User sign-in

## Welcome to FMie

Facility Management Information Exchange (FMie) is a web based application for collecting and organizing required or missing properties for product- and systemcodes related to Facility Management (FM).

User name

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Password

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 Sign in     Forgot Password

Video-assistent: Hvordan logge på / glemt passord ([video](#))

# Project information

The screenshot shows a web application interface for project information. At the top, there is a blue header with the 'buildingSMART' logo on the left, the text 'FMie: 01 National FM-BIM Workshop' in the center, and a 'Logg ut' button with a red 'x' icon on the right. Below the header is a navigation bar with icons and labels for 'Project', 'My Profile', 'Properties', 'Reports', and 'Help'. The main content area has a breadcrumb trail: '01 NATIONAL FM-BIM WORKSHOP > PROJECT > PROJECT OVERVIEW'. A blue callout box labeled 'Top-menu navigation' points to the 'Properties' menu item. Below the breadcrumb, there is an information icon and the text 'The following is a brief overview of selected'. Two buttons are visible: 'List of participants' and 'Invite participants'. A second blue callout box labeled 'Easy participant invitation' points to the 'Invite participants' button. The main content is divided into two columns. The left column is titled '01 - National FM-BIM Workshop' and contains a 'Project Information' table. The right column is titled 'Changes' and contains a table of change logs. At the bottom right, there is an image of rolled-up blueprints.

**buildingSMART** FMie: 01 National FM-BIM Workshop Logg ut

Project My Profile Properties Reports Help

01 NATIONAL FM-BIM WORKSHOP > PROJECT > PROJECT OVERVIEW

The following is a brief overview of selected

List of participants Invite participants

01 - National FM-BIM Workshop

Project Information	
Owner	Helse Sør-Øst
Number	01
Name	National FM-BIM Workshop
Description	National FM-BIM Workshop contains an overview over proposed Property Sets and properties spesific for Facility Management.
Comment	

Changes	
Created	09.09.2011
Created By	tojon@norconsult.no
Changed	09.09.2011
Changed By	tojon@norconsult.no

# Registrating new proposed properties

New Property
New Custom Type
Edit

Property Overview  Show only open items  Show all items  Show only items with properties  Show only items without properties

**Create new proposed property**

**TFM Information**

List View  Hierarchical view

**TFM Custom Types**

English	Norsk	English	Norsk
Axial	Aksial	Fans	Vifter
Condenser	Kondensator		
Cooling tower	Kjøletårn		
Diffusion	Innblåsing		
Evaporator	Fordamper		
Exhaust	Fraluft		
Recirculated air	Omluft		
Supply air	Tilluft		

**TFM Code**

English	Norsk	English	Norsk
JV	JV	Fans	Vifter

**TFM Description**

English	Norsk
Supply air fan (-40), Diffusion Fan (-40), exhaust air fan (-50), Extract air Fan (-50), circulation fan (-60), axial fan, Cooling tower fan, evaporator fan, condenser fan	Tilluftsvifte(-40), Innblåsningsvifte(-40), Fraluftsvifte(-50), Avtrekksvifte(-50), Omluftsvifte(-60), Aksialvifte, Kjøletårnsvifte, Fordampervifte, Kondensatorvifte
Ulike typer grupperes etter løpenummer gruppe. JV4 shall be used for supply air fans and JV5 for exhaust fans.	Ulike typer grupperes etter løpenummer gruppe. Det skal benyttes JV4_ for tilluftsvifter og JV5_ for fraluftsvifter.

**Search in proposed and mapped properties**

**Proposed property**

Group	Name	Description	Comment	n/a
Electric	Speed control			
Electric	Termistor			
Pset_Condition	AssessmentCondition	The overall condition of a product ba...		🔒
Pset_Condition	AssessmentDate	Date on which the overall condition i...		🔒
Pset_Condition	AssessmentDate	Quantitative		🔒

**Existing IFC4 property (mapped to JV - Fans)**



# Registrating new proposed properties

The screenshot displays the BIM Workshop interface for property registration. A blue callout bubble points to the 'Select Group' dropdown in the 'SELECT EXISTING OR CREATE NEW PROPERTY' dialog, with the text 'Select property group'. A second blue callout bubble points to the 'Top 10 Existing Properties' list, with the text 'Displaying existing when creating new property'. The 'Top 10 Existing Properties' list includes:

Name	Group	Unit
Pre_Surprise	Pipe_PumpPriority	
Surface temperature	Energy	

The main dialog also shows the 'Name' field with 'sur' entered in the English column, and the 'Description' field with 'Surface temperature' entered in the English column. The 'Select Unit' dropdown is currently empty.

# TFM Product properties

- ⊕ C - Kompletterende / Utspringende
- ⊕ D - Åpnende
- ⊕ E - Bekledende
- ⊕ F - Innredende Veggfast
- ⊕ G - Møblerende / Utstyr / Inventar
- ⊕ H - Hjelpende (Mobil)
- ⊕ I - Produserende
- ⊖ J - Forsterkende
  - JF - Forsterker
  - JK - Kompressor
  - JP - Pumper
  - JQ - Pumper i VA-installasjoner
  - JV - Vifter**
  - JW - Spesialvifter
- ⊕ K - Overførende / Transporterende
- ⊕ L - Omformende / Vekslede
- ⊕ M - Filtrerende / Rensende
- ⊕ N - Lagrende
- ⊕ O - Prosesserende
- ⊕ Q - Vernende / Dempde
- ⊕ R - Registrerende
- ⊕ S - Stengende / Regulerende
- ⊕ U - Uttakende
- ⊕ V - Utvendig
- ⊕ X - El. produkter
- ⊕ TFM - Systems

English	Norsk	English	Norsk
JV	JV	Fans	Vifter

## TFM Description

English

Supply air fan (-40), Diffusion Fan (-40), exhaust air fan (-50), Extract air Fan (-50), circulation fan (-60), axial fan, Cooling tower fan, evaporator fan, condenser fan

Norsk

Tilluftsvifte(-40), Innblåsningsvifte(-40), Fraluftsvifte(-50), Avtrekksvifte(-50), Omluftsvifte(-60), Aksialvifte, Kjøletårnsvifte, Fordampervifte, Kondensatorvifte

## TFM Examples

English

Different types are grouped by serial number group. JV4 shall be used for supply air fans and JV5 for exhaust fans.

Norsk

Ulike typer grupperes etter løpenummer gruppe. Det skal benyttes JV4\_ for tilluftsvifter og JV5\_ for fraluftsvifter.

English	Norsk
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Axial	Aksial	🗑️
Condenser	Kondensator	🗑️
Cooling tower	Kjøletårn	🗑️
Diffusion	Innblåsing	🗑️
Evaporator	Fordamper	🗑️
Exhaust	Fraluft	🗑️
Recirculated air	Omluft	🗑️
Supply air	Tilluft	🗑️


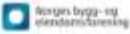

- ⊖ JV - Vifter
  - ⊕ Electric
    - Speed control
    - Termistor
  - ⊖ Pset\_Condition
    - AssessmentCondition
    - AssessmentDate
    - AssessmentDescription
  - ⊕ Pset\_ElectricalDeviceCommon
  - ⊕ Pset\_EnvironmentalImpactIndicators
  - ⊕ Pset\_FanCentrifugal
  - ⊕ Pset\_FanOccurrence
  - ⊕ Pset\_FanPHistory

Proposed property

IFC4 property






# Reports

## Product- and systemcodes with connected entities

This report provides a list of product- and systemcodes with connected entities, property sets and proposed custom properties. Printed: 19.03.2012 kl 10:05:14

Entity	Property set
JP - Pumps	ItcPump
	Qto_PumpBaseQuantities
JQ - Pumps in VA installations	ItcPump
	Pset_Condition
	Pset_ElectricalDeviceCommon
	Pset_EnvironmentalImpactIndicators
	Pset_ManufacturerOccurrence
	ItcPump
	ItcPump
	ItcPump
	ItcPump
	ItcPump
	ItcPump
	ItcPump
JV - Fans	Custom defined/Not IFC4
	ItcFan
	ItcFan
	ItcFan
	ItcFan
	ItcFan
	ItcFan

## Product and systemcodes with proposed custom properties

This report provides a list of product- and systemcodes with existing and proposed custom properties for each product- or systemcode. Printed: 19.03.2012 kl 10:07:10

Group	Property	Unit	Description	Comment
<b>JP - Pumps</b> Description: Pumps for all media, Circulation pump (-40); Ice water Pump (-47); Recycling pump (-50); pressure booster pump; Fire Pump; Pressure Pump; Freshwater Pumps; Circulation Pump; Manual pump. Examples: Different types are grouped by serial number group. The various pumps used in various systems so that breakdown is satisfactory. Out = JPA, In = JPB.				
Energy	Surface temperature	°C		
Pset_Condition	AssessmentCondition		The overall condition of a product based on an assessment of the contributions to the overall condition made by the various criteria considered. The meanings given to the values of assessed condition should be agreed and documented by local agreements. For instance, is overall condition measured on a scale of 1 - 10 or by assigning names such as Good, OK, Poor.	
Pset_Condition	AssessmentDate		Date on which the overall condition is assessed	
Pset_Condition	AssessmentDescription		Qualitative description of the condition	
Pset_ElectricalDeviceCommon	Current		The current that a device is designed to handle	
Pset_ElectricalDeviceCommon	Frequency		The frequency that a device is designed to handle	
Pset_ElectricalDeviceCommon	HasProtectiveEarth		Indicates whether the electrical device has a protective earth connection (=TRUE) or not (=FALSE)	
Pset_ElectricalDeviceCommon	InsulationStandardClass		Insulation standard classes provides basic protection information against electric shock. Defines levels of insulation required in terms of constructional requirements (creepage and clearance distances) and electrical requirements (compliance with electric strength tests). Basic insulation is considered to be shunted under single fault conditions. The actual values required depend on the working voltage to which the insulation is subjected, as well as other factors. Also indicates whether the electrical device has a protective-earth connection.	
Pset_ElectricalDeviceCommon	IP_Code		IEC 60529 (1989) Classification of degrees of protection provided by enclosures (IP Code).	
Pset_ElectricalDeviceCommon	NumberOfPoles		The number of live lines that is intended to be handled by the device.	
Pset_ElectricalDeviceCommon	PhaseAngle		The angular difference between two waveforms of the same	

