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# Integrated 3D Facility Management

Presented by **Gregor Vilkner & Marie-Pierre Belanger**



**SKANSKA**

# Agenda

- Overview of Energy Metrics II' product portfolio
- Use Case: Skanska Construction Life Cycle
- Use Case: Challenges
- A better way: Construction Commissioning Management System (CCMS)
- Innovations
- Demo

# Energy Metrics llc



- US based startup
- Skanska is the go to market partner
- Fortune 1000 Data Centers and Commercial Markets
- Customers include some of the largest financial and internet companies
- Software solution for both retrofits and new builds

# Integrated Building Intelligence Platform driven by real-time data



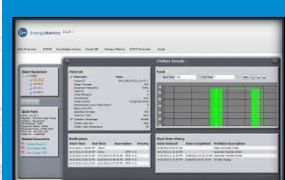
What-if cost & risk



Cost over time



Analytic e.i Utilization



Resource  
management



System performance



3D dynamic data

## Energy Governance

- Utilized BMS embedded intelligence (add meters and sensor if needed)
- Establish Baseline of energy cost – report in real-time deviation from “ideal” and “current.” Vendor agnostic

## Asset management

- **Workflow: Construction Commissioning Management System (CCMS)**
- Real-time performance
- Centralized alarming
- Energy, maintenance (CMMS), operational silos combined into a single merge relational repository

## Cost management business intelligence

- Energy, cost, performance of assets

## Portfolio-wide collaboration portal

- Single source of truth – secure for all type of users; data and visualization into one “pane of glass.”



Use Case Presented Today

**SKANSKA**

# CONSTRUCTION COMMISSIONING LIFE CYCLE

# Challenges

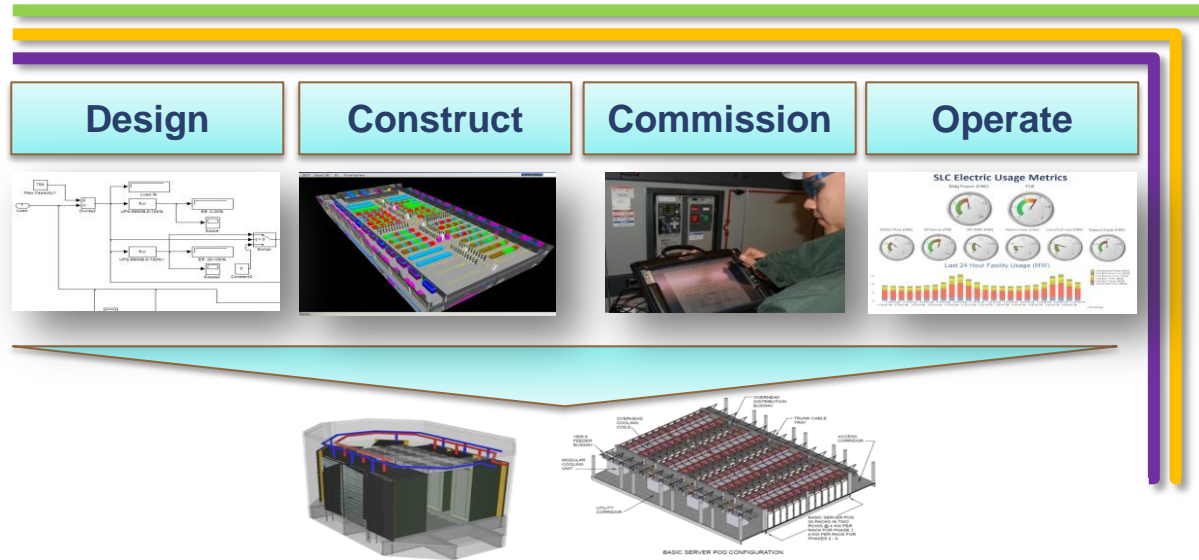
- Construction, facility and business owners are limited by disjoint systems to collaborate on asset life cycle and addressing compliance efficiently
  - Some buildings have performance data going back 25 years
  - Using such information owners could execute performance based maintenance and validate performance as “designed”
  - To address you must monitor, store, easily access real time information



# Solution: Step 1 - Connect Entire Process

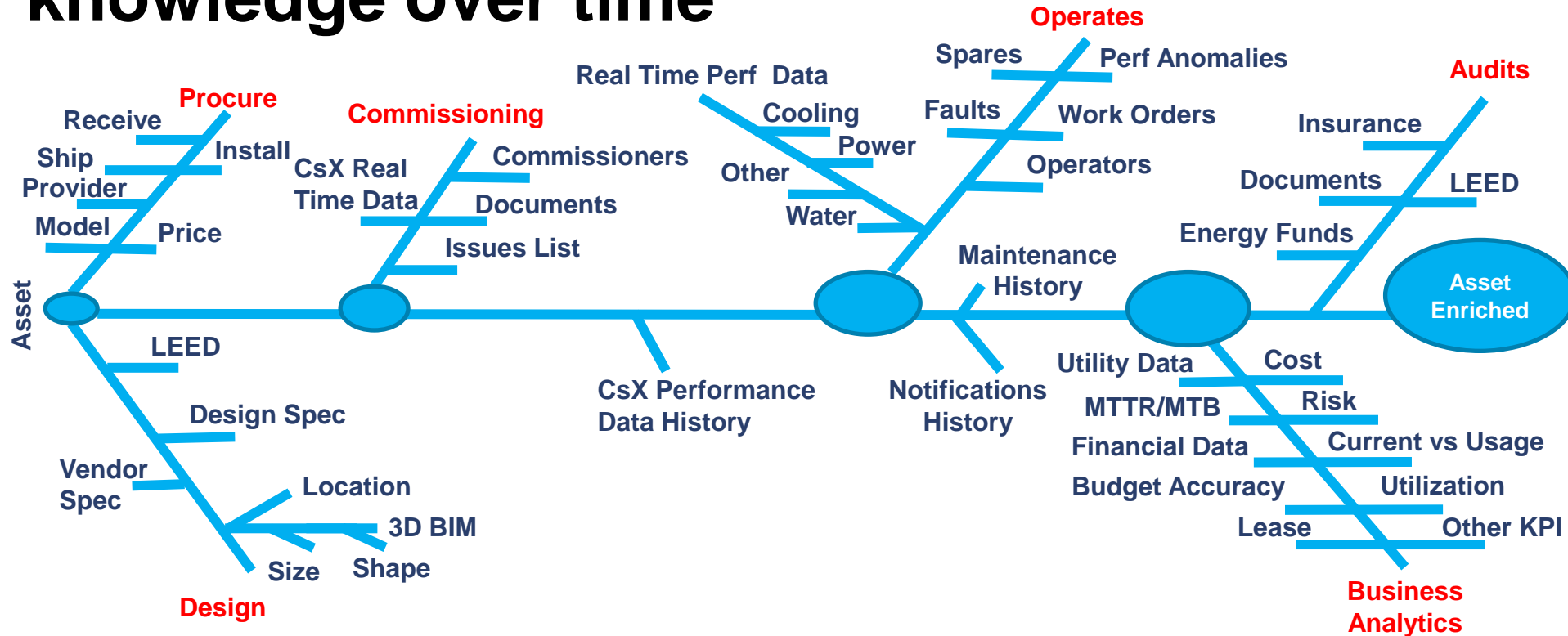
## Infrastructure Asset linked and driven by real time data

Visualization BIM Real Time





# Solution: Step 2 - Track assets; enrich with knowledge over time



# Energy Metrics CCMS Solution

## MS SharePoint

Leverage  
SharePoint best in  
class web workflow  
engine and active  
directory for a  
secure online  
collaboration portal

## SharePoint Viewer

The SharePoint Viewer  
software client application is  
intended for construction and  
facility managers to efficiently  
obtain the construction  
documents for specific equipment  
from SharePoint (Portal,  
knowledge library, database)

## BIM Naviswork Plug-In

Use standalone or with  
SharePoint Viewer the plug-in  
leverages Naviswork 3D BIM  
and PI System real time data  
to visually locate equipment  
from a SharePoint database in  
Navisworks models

# CCMS – Success Stories

Large Canadian Financial  
Canadian Internet Service Provider (ISP)  
Swedish Health Care

CCMS scope during construction:

1. Equipment data collection
2. Document collection
3. Issue tracking
4. Commissioning scripts
5. BIM integration

CCMS scope for Facility Management System (FMS):

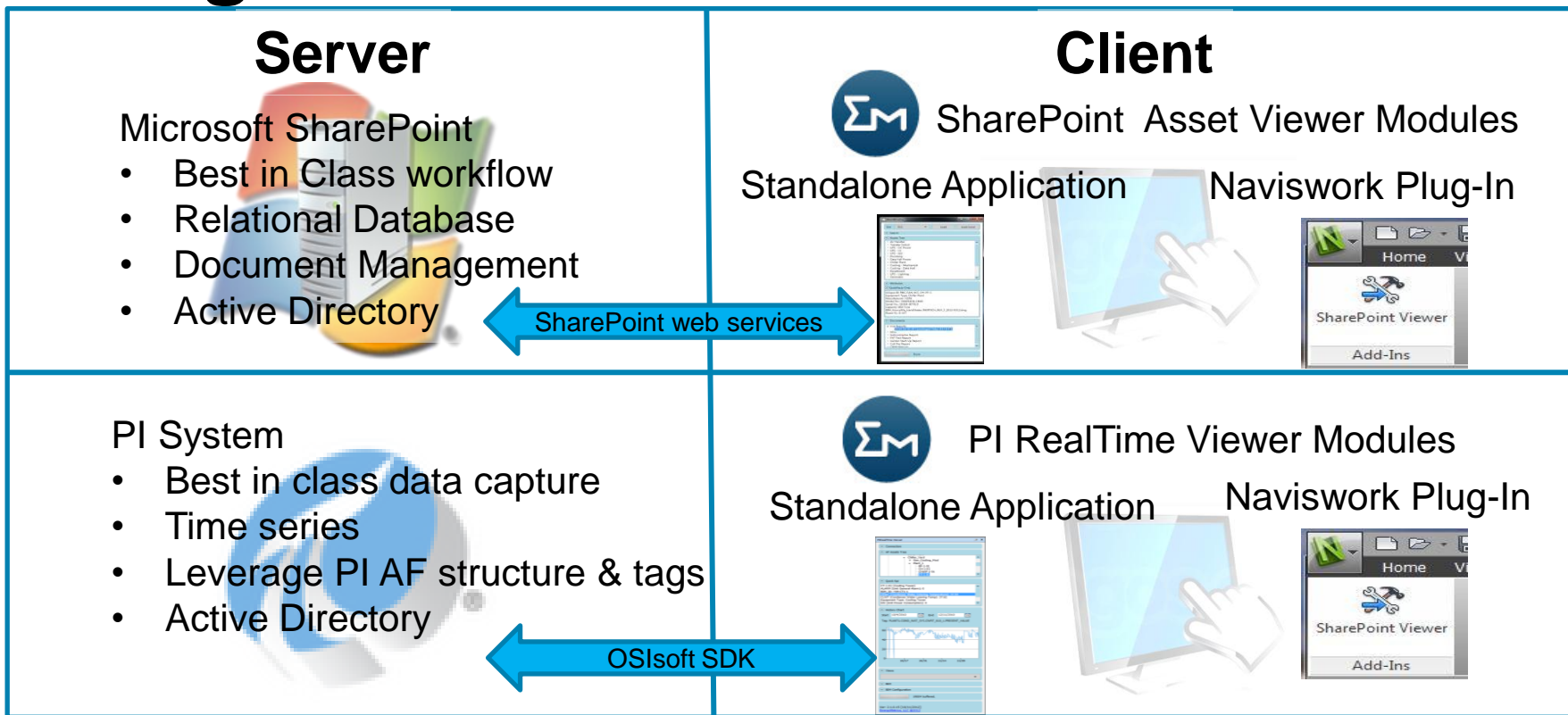
1. Asset management
2. Knowledge Library
3. Real-time performance monitoring
4. BIM integration



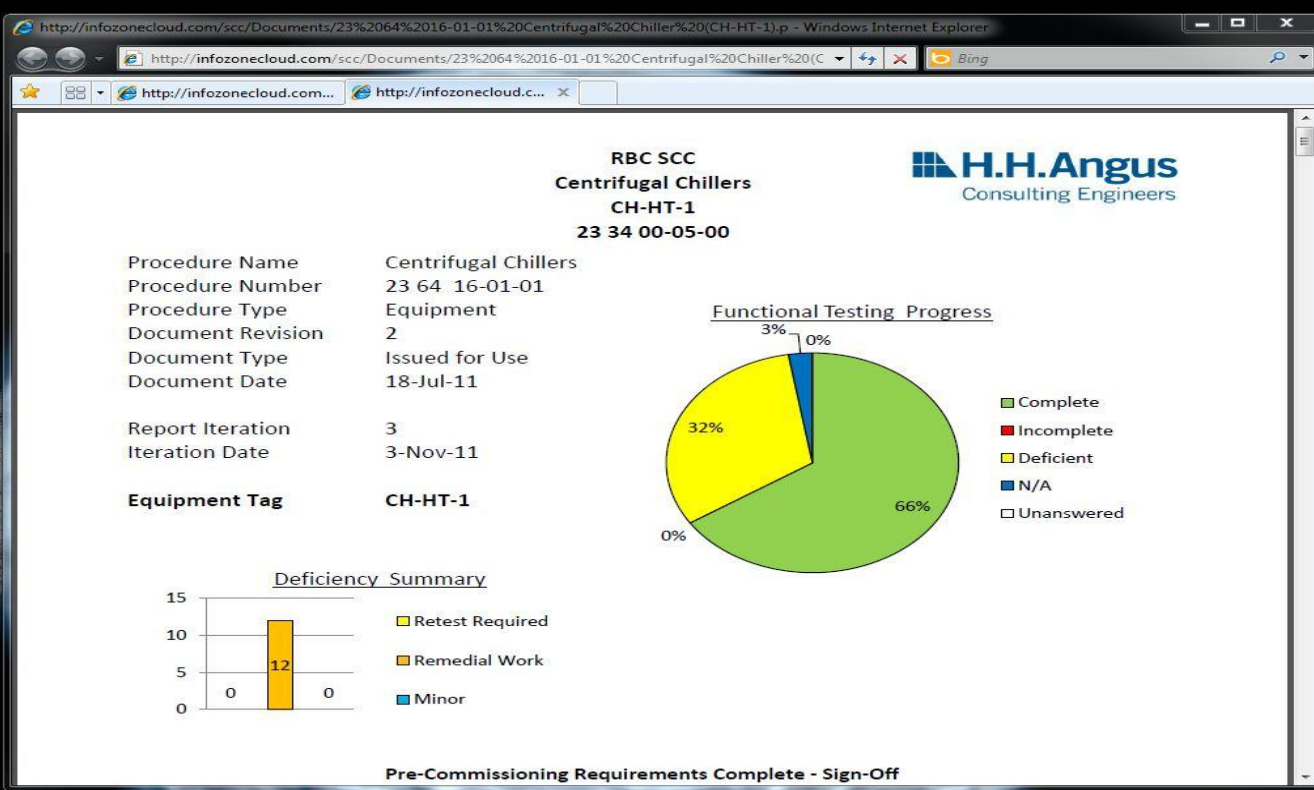
# OSIsoft & Microsoft Products Employed

- PI Server
- PI AF
- Microsoft SQL
- Microsoft Active Directory
- Microsoft SharePoint

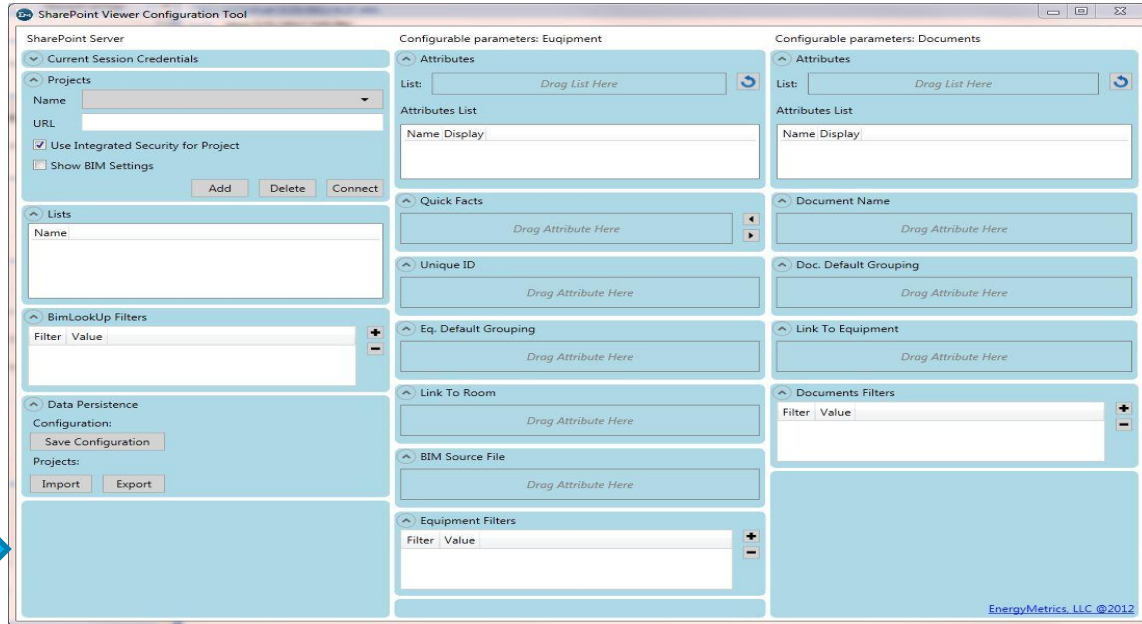
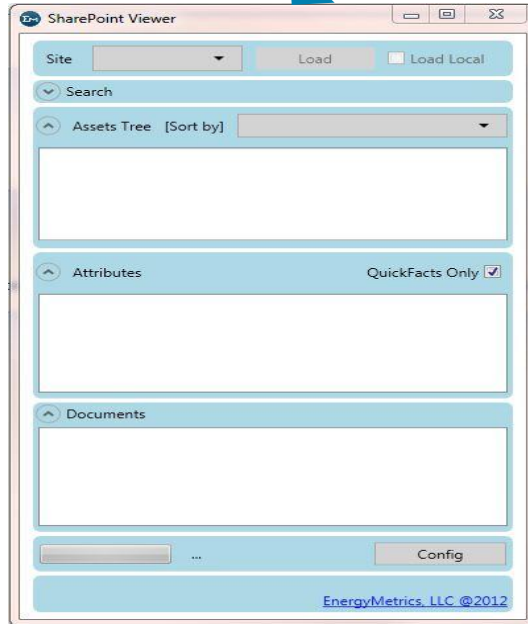
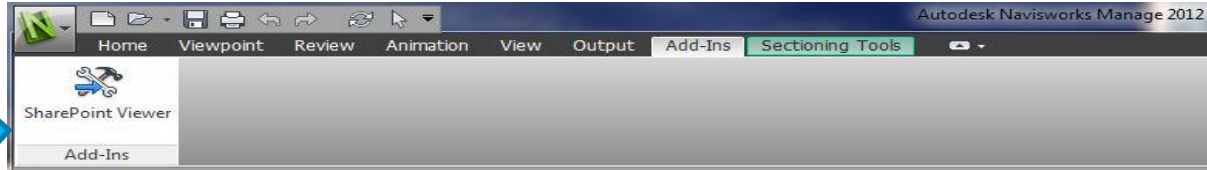
# PI High Level Architecture



# SP Viewer – Stand Alone Application

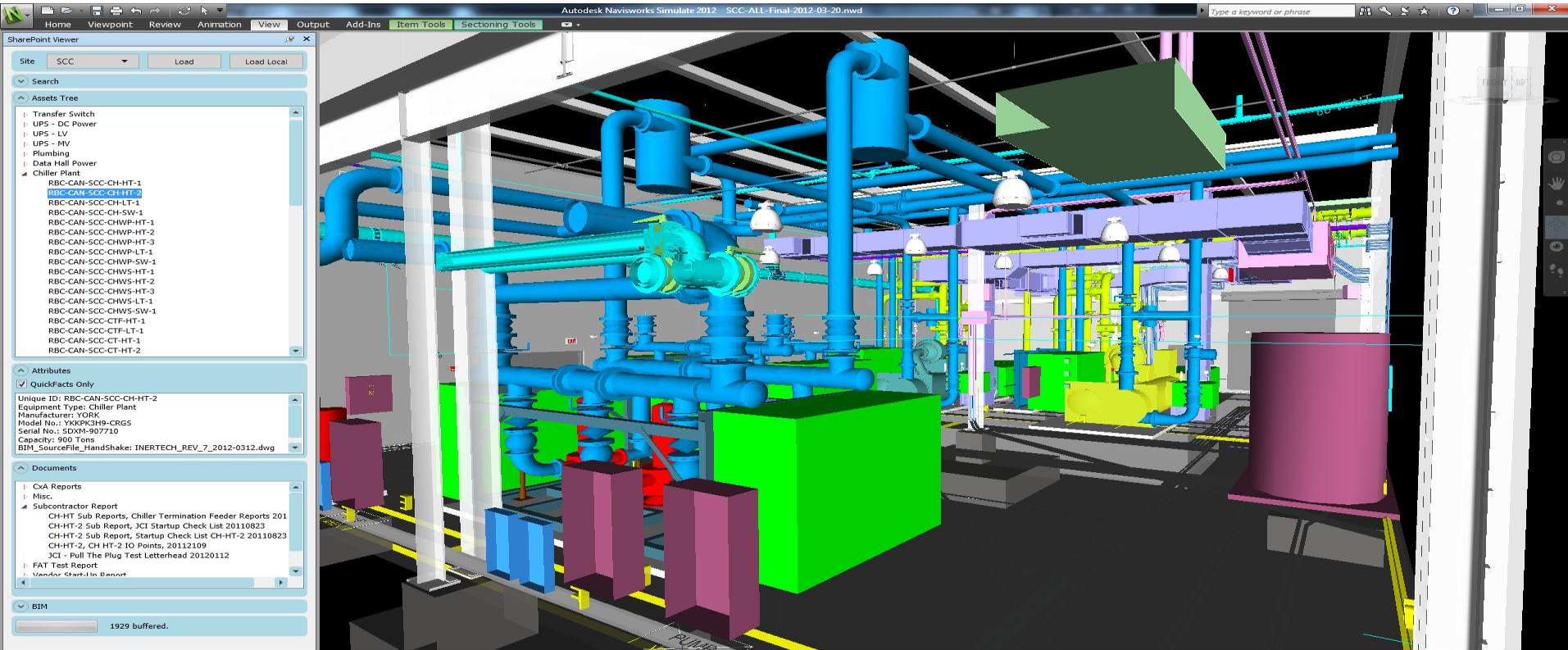


# SharePoint Viewer ToolKit designed for navisworks



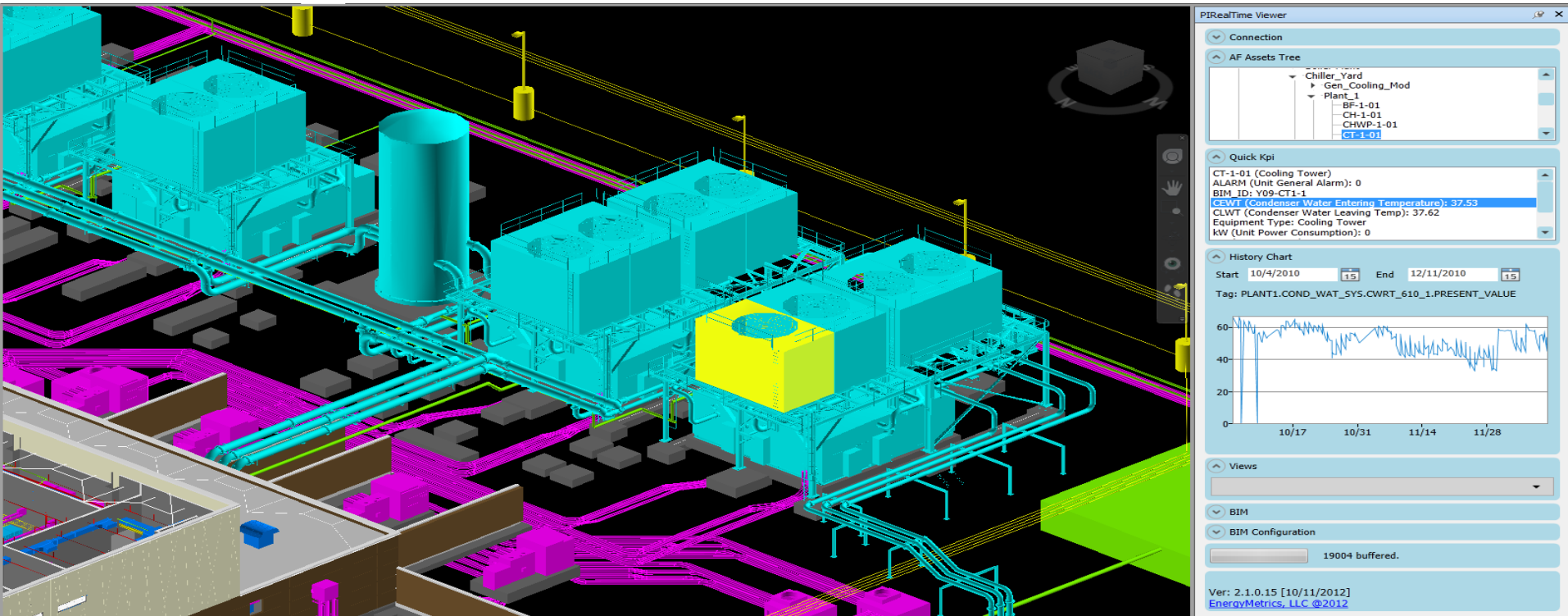


# SP Viewer – BIM Plugin for 3-D Context

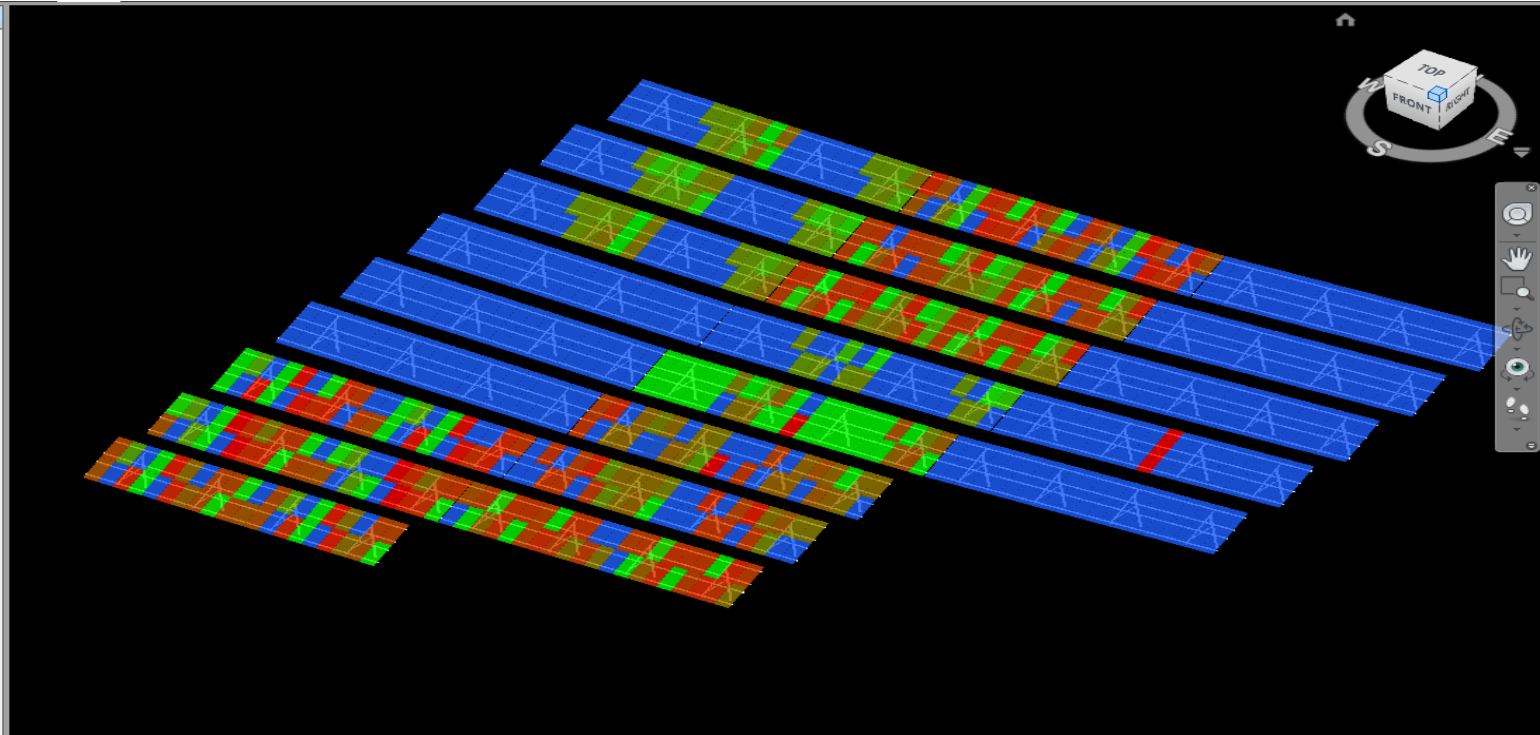
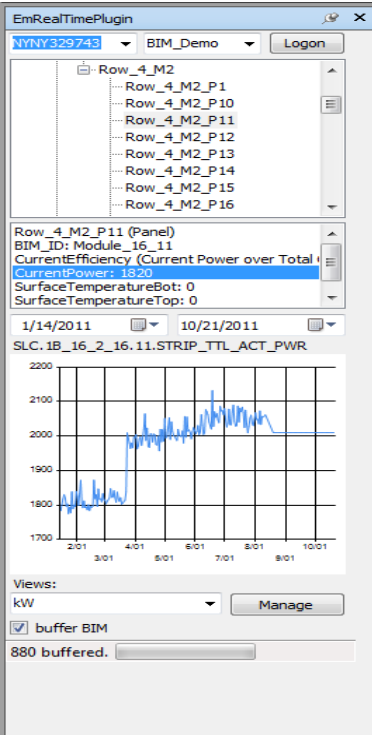




# PI RealTime Viewer – BMS Integration



# Other usage – Solar Panels



# DEMO

# Other Use Cases - LEED



## Cad manual, Required properties

- Location (project spec)
- System (Nat. Code)
- Type (project spec)
- AssetID = Location+system+type+index



## Green List

Product	<u>System, Type</u>	Green Info
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## RH /As Built Documents library

Discipline	<u>System, Location</u>	As Built Doc
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## Asset List

<u>Asset ID</u>	Design info	HandOver info
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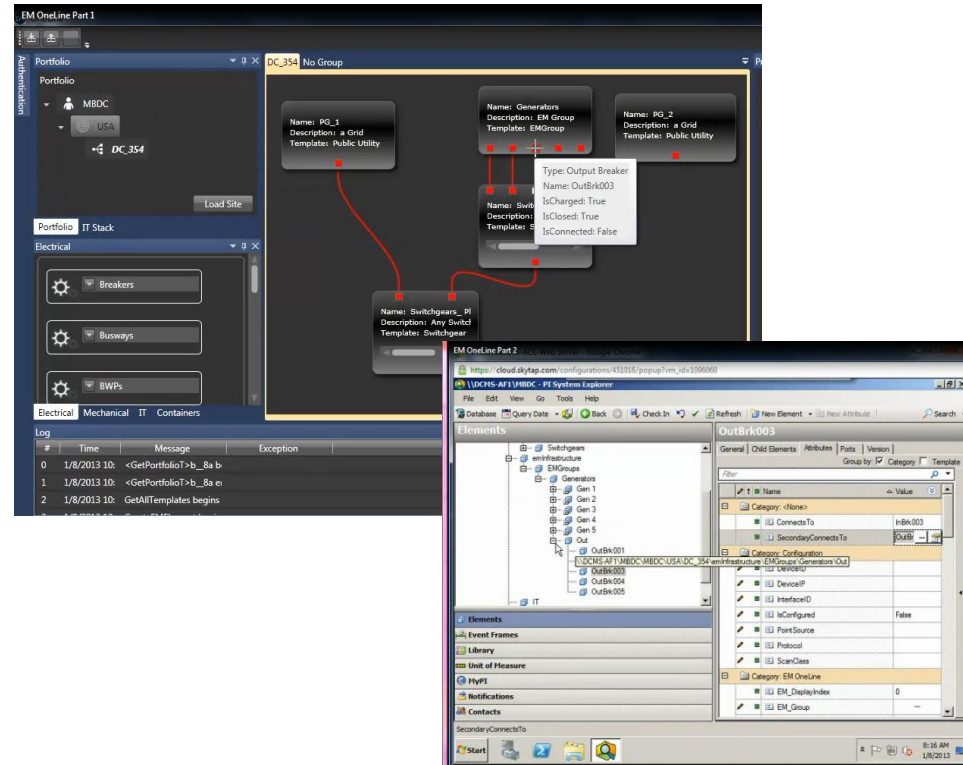
## DU /O&M Documents library

Technical area 1-20	Doc type a-g	O&M Doc
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# Other Innovations – One Line

- Electrical Distribution Management
  - A hosted service for modeling, visualizing and monitoring of electrical distribution networks
- Benefits:
  - Joint web services communication layer API
  - Standardize SharePoint and PI data structure
  - Only basic AF knowledge required to build/maintain model



# Benefits of CCMS solution

- Productivity
  - Solve accessibility of information: Increase between contractors and employees with workflow
- Visibility
  - Knowledge is relationally linked and readily available associated to assets a first for construction manager
- Data Integration
  - Vendor Agnostic and leverage SharePoint and OSIsoft investments
- One source of the Truth
  - Merged asset datastore, true source of record addressing regulatory compliance electronically: Energy, LEED, others
- Security
  - Secure Collaboration Portal
- Scalability
  - Sharepoint based tracking of issues (100s of issues) and itemized commissioning scripts (100,000s of records). Leverage PI System scalability: 250,000 Tags/sec, 21M Points, 400+ Pre-written connectors



### Risk Management

Manage potential critical equipment, people, process degradation, failure and deviation from projection.



### Capacity Planning

View power, cooling and space demand curve and "time to maximum capacity."



### Capital Expenditure vs. Operational Expenditure Analysis

Re-negotiate contracts and services; re-structure systems and capital; re-position – sell, lease, sunset.



### Facility/Building Information Management

Reduce response time to abnormal events by using the 3D BIM model. Reassign IT resources and reschedule IT processes.



### Energy Performance

Get feedback on equipment, maintenance and system-level performance considering design intent and real-time conditions to drive better operational behavior.



### Operational Costs

View real-time energy consumption, maintenance and repair costs.



### Reliability Centered Maintenance

Make maintenance costs and system uptime predictable and maximize availability

Look us up for more solution  
<http://www.energymetricsllc.com>

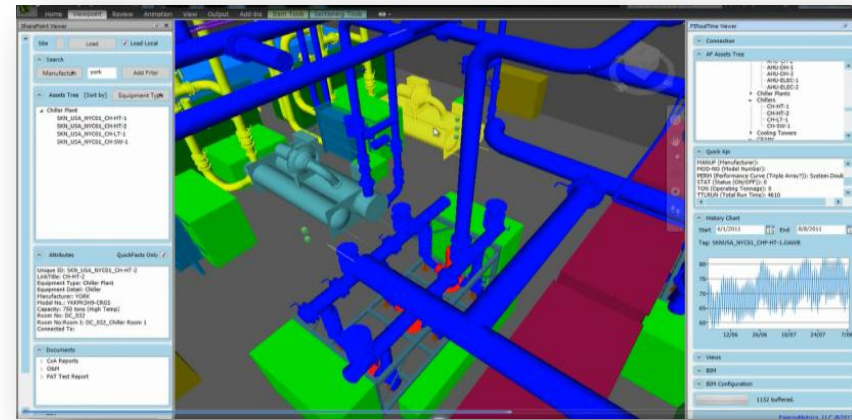


# Summary

## Integrated 3D Facility Management

What we do solve is accessibility of information: knowledge is relationally linked and readily available associated to assets. We use Microsoft SharePoint as a relational database and workflow engine as designed by Microsoft .

The real time plugin integrates 3D-BIM with the PI System allows to comply with compliance regulation: energy, LEED, all the smart grid of tomorrow, all the ISO's; also a lot of Pharma's quality processes



Construction, Facility Operation and Business Decision Makers are limited by disjoint systems to collaborate on managing the asset life cycle; from design to operations and addressing compliance in an efficient way

Merged asset datastore and a standard structured communication layer based on Microsoft SharePoint linking PI Server data, PI AF, related equipment documents, workflow and 3D-Building Information Model

Allows rapid modeling, troubleshooting and retrieval of information in context of a building from weeks down to second. Provides real records for building and data regulation audits





# THANK YOU

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# Abstract

Construction, Facility Operation and Business Decision Makers are limited by disjoint systems to collaborate on managing the asset life cycle, from design to operations, in the most efficient way.

One of our solution offerings is the missing link that leverages the benefits of OSIsoft's PI System and PI AF. Our merged asset datastore based on Microsoft SQL links PI System data, related equipment documents stored on SharePoint and a 3D-Building Information Model (BIM) allowing rapid troubleshooting and retrieval of information in the context of a building.

We will provide an overview of Energy Metrics' product portfolio and a short demo to show:

- Tracking and managing equipment performance data, metadata, documents, issues and commissioning scripts
- Bi-Directional integration of SharePoint based data, PI System data and BIM based 3-D context.

# Gregor Vilkner

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Dr. Vilkner serves Skanska's Mission Critical team as Integrated Applications Director. His versatile expertise includes work-flow integration through automation and custom interoperability, advanced collaboration techniques, and complex data structures. He has in-depth technical knowledge, including data mining, problem modeling and knowledge exchange through the APIs of the Pi System, Revit, NavisWorks, etc.

Dr. Vilkner holds a Dipl.-Ing. diploma from University of Rostock, Germany, and M. Phil. and Ph.D. degrees from Columbia University, New York.

# Marie-Pierre Belanger

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Director of Product Management at Energy Metrics and is the unifying force behind the enterprise solutions software enablement. Marie-Pierre's role is to manage the entire product and solution life cycle. Marie-Pierre works closely with clients and solution partners to define product requirements, drive development releases, lead product marketing and ensure sales readiness and product support tools are in place. Marie-Pierre has been working in technology for 15 years and served in a variety of positions within the North America and International market in the Enterprises and Telecommunications sectors.

Marie-Pierre has extensive product management and product marketing experience in large firms from her employment with EMC Corporation in the network and service assurance product line and as sales engineering, field installation for optical network and microwave radios sites at Nortel Networks. She also has experienced working in smaller firms as product management and product marketing for end user experience, application monitoring at OpTier and service level management IT software products. Marie-Pierre's was Vice President of Product Management at SANpulse a data storage migration services company prior to joining the Energy Metrics Skanska team.

She holds a bachelor's degree in Electrical Engineering from University Laval in Quebec Canada and a Master Degree in Human Factor in Information Design from Bentley College in Massachusetts.