BIM for FM Case Studies

Igor Starkov, CEO
EcoDomus, Inc.
About EcoDomus

Software and consulting firm with several offices in the USA, subsidiary in Asia Pacific (Sydney and Hong Kong), and partners around the world.

#1 Provider of BIM for Facility Management.

#1 COBie-certified provider.

Clients include the leading facility owners.
What Our Clients Say

BIM for FM
“After evaluating all available software on the market we found that EcoDomus was the most advanced BIM for Facility Management tool.”

Description
“EcoDomus-based separation of graphics and data provides real value to our construction model troubleshooting and commissioning process.”

Description
“EcoDomus interface is very intuitive. We like that our technicians use COBie and don’t even know it.

Description
“We chose to partner with EcoDomus and made it clear to our contractors and FM providers that they will work in the EcoDomus BIM environment.”
What is BIM?

Building Information Modeling
Collaborative process of creating 3D geometry, connecting objects, and entering required information.

Building Information Model
Digital representation of a building. It may consist of one or more files in different formats and linked documentation.

Building Information Management
Utilization and maintenance of models for optimization of building performance and streamlining of related workflows.
Facility Lifecycle and BIM

**Design**
- BIM is created for visualization
- Feedback from contractors and FM
- Design-intent attributes

**Construction**
- BIM is updated to 3D as-built
- Installation attributes
- Linked documents to BIM

**Renovation**
- Planning renovations in 3D BIM
- Enhanced condition assessment
- Maintaining as-built models

**Maintenance**
- BIM for energy analysis
- 3D visualization for work orders
- Space optimization
- Shutdown planning
- Risk management
- Improved spare parts procurement
- Business process visualization
- Tenants comfort management
EcoDomus PM
software app for:
• COBie Management & Handover
• BIM Data Quality Control
• Converting CAD to BIM
• Documents Link to BIM
• Energy M&V
• Field BIM Data Entry

Data Collection & Quality Control

Data Maintenance & Analytics

EcoDomus FM
software app for:
• Easy Access to BIM for Everyone
• BIM for Work Orders
• Energy Simulation vs. Actual
• BIM/GIS Integration
• Maintain Up-to-date As-Builts
• Assets Linked to Laser Scans
Each object has any kind of data associated with it: properties, documents, what building systems it is a part of, what other assets and locations this object is affecting, related work orders, etc.

See the real-time and historical values from the corresponding sensors.

Jump to any location within the building using viewpoints.

Search for locations and assets and see through the walls (use object transparency).
Access BIMs anywhere you go: Tablet PC such as iPad, Surface, or Android pads offer full 3D view and finger-friendly interface.

All your digital documents library at the tip of your fingers.

Optimize experience by limiting features: field access needs simple interface.

Split responsibilities between field personnel and back office staff.
Mobile Work Orders and Barcoding

- Scan Barcode
- Find Asset
- Review Documents
- Add Work Order
- Attach Photo of Receipt
- Review Work Orders
Smartphones for BIM

Mobile BIM

Tablet PCs have more screen space, but not always at hand.

Smartphone fits well in a pocket.

3D BIM engine helps locating assets quickly.

Work Orders

Work order is pushed to smartphone.

All asset information is in the palm of your hand.

All documents are easily viewable.
Laser Scanning and FM

Point Cloud Benefits
1) Cheaper and faster than BIM.
2) Highly realistic view.
3) Ability to measure distances.

BIM Benefits
1) Ability to generate drawings.
2) Can isolate (hide / show) objects.
3) Better navigation.
4) Less manual work.
BIM Guidelines Development

1. **Roadmap**
   Macro-level approach to defining how BIM will help organization to address its strategic challenges.

2. **Guidelines**
   Detailed set of requirements specifying how BIM will be created, validated and maintained for Lifecycle BIM. Includes requirements for design, construction, handover, operation and maintenance.

3. **Use Cases**
   Business workflow scenarios explaining how BIM will be utilized.
Kaiser Permanente hired EcoDomus to help identify the BIM Roadmap, and the workgroup has made recommendations to Sr. Leadership to proceed with key elements to move the program forward.

KP believes that investment in a comprehensive BIM strategy will transform how KP manages infrastructure data and critical processes delivering better, smarter, greener facilities for less money.
1. Systems must be named correctly, connected with correct flow directions and design data such as CFM for diffusers. (figure 4)

15. MEP systems should not be undefined or have disconnects. (figure 5)

17. Rooftop units should have a room object in architecture and a similar space in MEP. (figure 6)

---

**BIM Guidelines**

1. **Be Clear**
   Guidelines should be unambiguous: all data and geometry requirements clearly defined, provide examples.

2. **Focus on Lifecycle**
   Think about BIM implementation for all phases of facility lifecycle: not only design and construction, but O&M and FM as well.

3. **Use Open Standards**
   Apply open standards where it makes sense. Don’t blindly go with it just because it’s free: calculate total ROI.
How to Select Use Cases

- Identify stakeholders: facility managers, technicians, planners, energy managers, IT group, procurement, etc.
- Each stakeholder reviews personal needs for facility data and provides feedback.
- Consultants analyze the use case description and come up with a set that includes deliverables, naming conventions, software, etc.

8.6 - BUILDING AUTOMATION SYSTEMS BAS INTEGRATION

- **Description:**
  Integration of mobile BIM graphics (2D & 3D) with building automation systems is in its early phases. BIM provides spatial location points for building systems and components. It integrates sensor data for real-time displays of system activities. This integration provides better management of systems and work orders. Integrated lifecycle BIM also enables the use of visual work orders by mechanical engineers and others.

- **Responsibility:**
  MPA facility managers, the DTIG Manager will work with the building system consultants to integrate project BIM data with building systems.

- **Model Elements:**
  Building systems and components from model. MPA equipment naming conventions and room numbering.

- **Deliverables:**
  Model integrated into the Building Automation system. Mobile tablet download.

- **Software:**
  Revit Suite, EcoDomus, software managing building systems, mobile tablet system.
FM Business Need
A business need - Use Case - “pulls” required information from the providers. For example, Preventative Maintenance procedure for a Heating Unit requires to “Check fan RPM and compare to specification”.

Handover
FM Data Manager adds “Fan Speed” attribute to the handover deliverables specification.

Capital Projects
Construction Manager ensures that “Fan Speed” attribute is collected for a Heating Unit.

Contractor & Architect
Providers request that Manufacturer provides “Fan Speed” attribute values. Renames the field name as needed.
Systems

Systems are groups of components that, when connected, provide specific building services. Subsystems, if required, may be identified using parent-child relationship ("nested").

Affects

Objects can be identified as affecting each other. For example, Valve 111 is not only on a Hot Water system, but it also affects Boiler 1. A VAV box may affect rooms 101 and 102, etc.
Systems
BIM and BAS Integration

This scenario demonstrates an investigation into a complex system utilizing live and historical BMS data.

BIM and BAS

1) Sensors and “Internet of Things” analytics need BIM to provide more data about the facility.
2) Cost of BIM and BAS integration is now affordable.
3) EcoDomus uses open standards and proprietary APIs to establish integrations and analysis.
About COBie

- **Construction** **Operation** **Building** information exchange
- Open IFC-based international standard
- Major facility owners require it
- EcoDomus PM was the first middleware to get COBie-compliant (2009)
- Looks easy to do at first glance (“we’ll just fill out that Excel spreadsheet”) – later becomes a four-letter word at some organizations

All of the above can be Linked to Documents

All of the above can be Described by Attributes
What data is required: asset types, attributes, document categories, system levels, zone types?

How
How is the data collected: exported from BIM, entered by subs online, on mobile devices or on paper?

When
What are the milestones for data checking?

Who
Who provides the data and who checks and validates it (Responsibility Matrix)? Who updates the model?

Where
Where is the data managed: in EcoDomus PM? Excel? Revit?
COBie Data Collection Example
EcoDomus COBie Benefits

Create Useful BIM
EcoDomus BIM and Data experts have unmatched experience in preparing models and datasets for the successful handover. BIM for FM modeling has unique requirements that most modelers do not know, and as a result, most so-called BIMs have limited value for FM.

Information Reuse
EcoDomus Product Library allows storing standard product information for reusing across projects and properties. No need to re-enter data that is already available.

Quality Control
EcoDomus PM’s automated quality control features allow for checking attributes and documents for compliance with facility owner’s requirements.

Optimization
EcoDomus PM and BIM Connector help filter data to reduce unnecessary data collection, focusing attention on the required data.
Free COBie Toolkit

- Load Revit with unnecessary information:
  - Added cost of modeling
  - No data access security
  - No attributes versioning
  - Increased file size
  - Slow, non-collaborative process
- Use Excel export from Revit:
  - Introduce typos
  - Limited data validation
  - Cumbersome and costly quality control
- No bi-directional data exchange
- No lightweight 3D-based data editing
- No support

Total Cost: High

EcoDomus PM

- Collaborative process where data is entered at the place of origination: lower cost per entry
- Simpler interface: adjusted per provider
- Higher quality of data: less rework and additional costs
- Roles/permissions-based secure environment
- Unique software features allow for better BIM 3D experience
- Advanced filtering helps optimize data
- Bi-directional exchange with Revit. Works with AutoCAD, Bentley, Navisworks, IFC
- High-quality support from EcoDomus

Total Cost: Lower
Contact Us

Greg Hall
+1-817-845-4273
ghall@ecodomus.com

Igor Starkov
+1-571-277-6617
igor@ecodomus.com

www.ecodomus.com