



# Il processo di change management avviato con l'introduzione del BIM lungo l'intero ciclo di vita

31 Maggio 2024

**Settore Costruzioni di AICQ** - *“Il Settore delle costruzioni tra presente e futuro. Come il Codice dei Contratti Pubblici aiuta ad innovare e a gestire processi sostenibili nella realizzazione delle infrastrutture”.*

Ing. Chiara Butera  
*Head of BIM Transformation Office*



# Agenda

**01** BIM and information management

**02** BIM Use cases

**03** Action plan

**04** Summary

An aerial photograph of a wind farm situated in a lush green, hilly landscape. Several white wind turbines are scattered across the terrain, connected by a network of roads. In the upper left, a multi-lane highway runs parallel to a river. A small cluster of buildings is visible in the center of the image. The overall scene is bathed in soft, natural light, highlighting the vibrant green of the grass and the white of the turbines.

# 01. BIM and information management

# BIM

Area of interest

BIM is the “*use of a **shared digital representation** of a built asset to facilitate design, construction and operation processes to form a **reliable basis for decisions.**”*

ISO 19650-1:2018



# E2E process and benefit obtainable

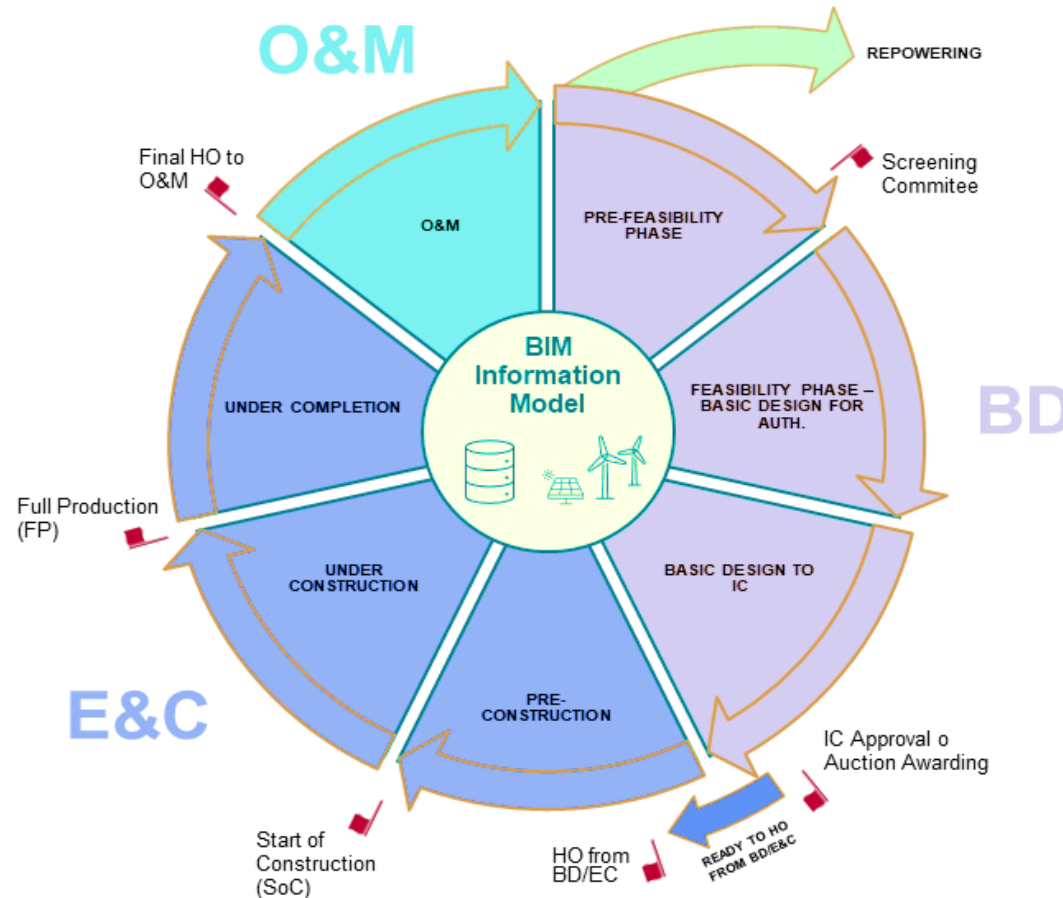
BIM life cycle, use cases actually covered

## O&M

- HO to O&M
- Digital data of the Asset
- Predictive Maintenance
- Digital Twin
- Training & Gamification
- Material and equipment on-site maintenance
- ....

## CONSTRUCTION

- Digital collaboration
- Construction monitoring
- Time control check
- Safety
- Logistic Planning
- Material Tracking
- Change reduction
- ....



## DESIGN

- Standardization & automation (AI)
- BIM Design (Different design scenarios and immediate changes)
- BIM Design (Accurate BoQ)
- Digital validation (technical and regulatory)
- Digital Validation (free clash projects)
- Digital collaboration
- Change reduction
- ....

# Impact in the organization and benefit obtainable

Intro to BIM



WHO	WHAT	WHERE	WHEN	WHY
<ul style="list-style-type: none"><li>• E&amp;C</li><li>• O&amp;M</li><li>• Designers</li><li>• BoP/Contractors/EPC</li><li>• Suppliers</li><li>• Proc, PO, ICT</li></ul>	<p><b>From DRAWING BASED PROCESS</b></p> <p>The plant is human-only readable drawings.</p> <p><b>To BIM PROCESS</b></p> <p>The plant is data-based Information model.</p>	<ul style="list-style-type: none"><li>• Basic Design to IC</li><li>• Detail Design</li><li>• Construction</li><li>• As Built</li><li>• HO to O&amp;M</li><li>• Maintenance rework</li></ul>	<ul style="list-style-type: none"><li>• BIM Requirements are included in the contract</li><li>• Support/Project team is BIM ready</li><li>• Designer/contractor/supplier are BIM ready</li></ul>	<p><b>BENEFITS DURING THE ENTIRE LIFE CYCLE</b></p> <p>Unique source of data, improve the collaboration and coordination, check for conflicts and manage changes, increase the information management.</p>

## BIM USE CASES ADOPTED

Digital Collaboration

BIM Design

Validation

Construction Monitoring

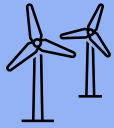
HO to O&M

# BIM Application field

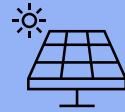
## Technologies



**WIND**



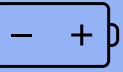
**SOLAR**



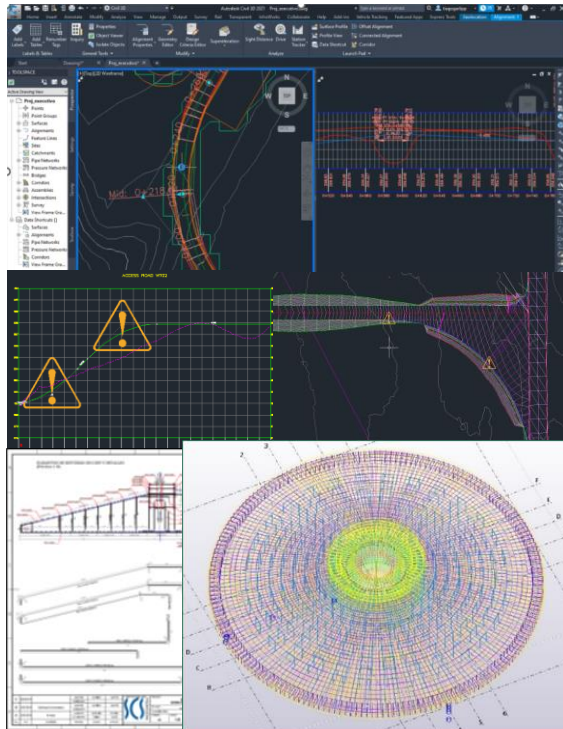
**SUBSTATION**



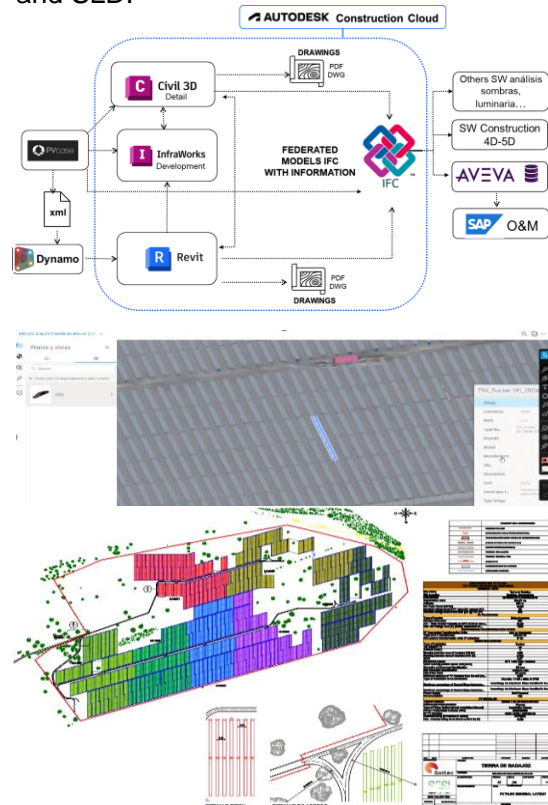
**BESS**



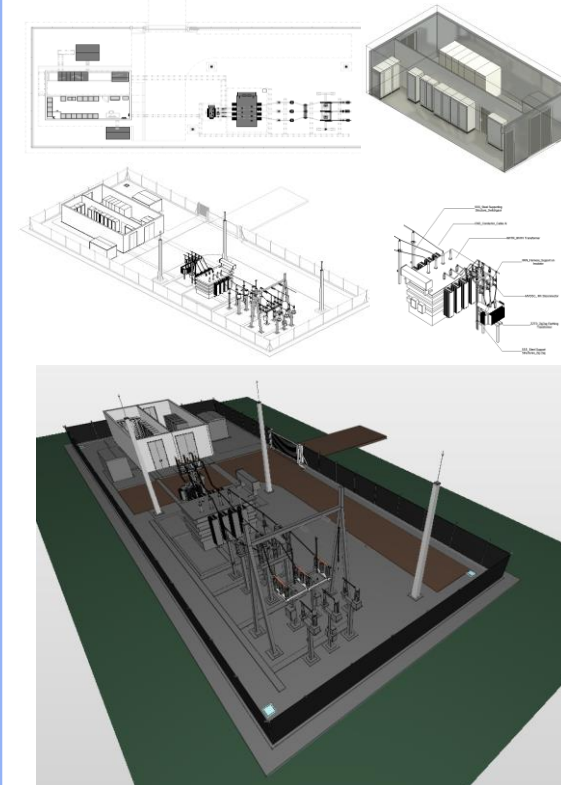
Es: Civil 3d is business as usual for road design, verification and earth movement calculation. Also, for structural foundation in BIM.



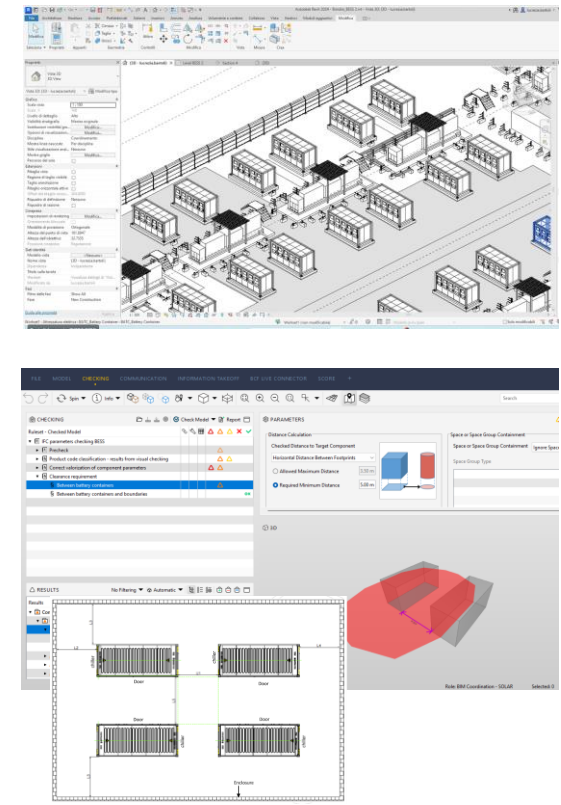
Es: Workflow for BIM model creation, layout and SLD.



Es: Layout Standardization in BIM for Basic Design (Spain and Italy)



Es: first project developed in-house in BIM.

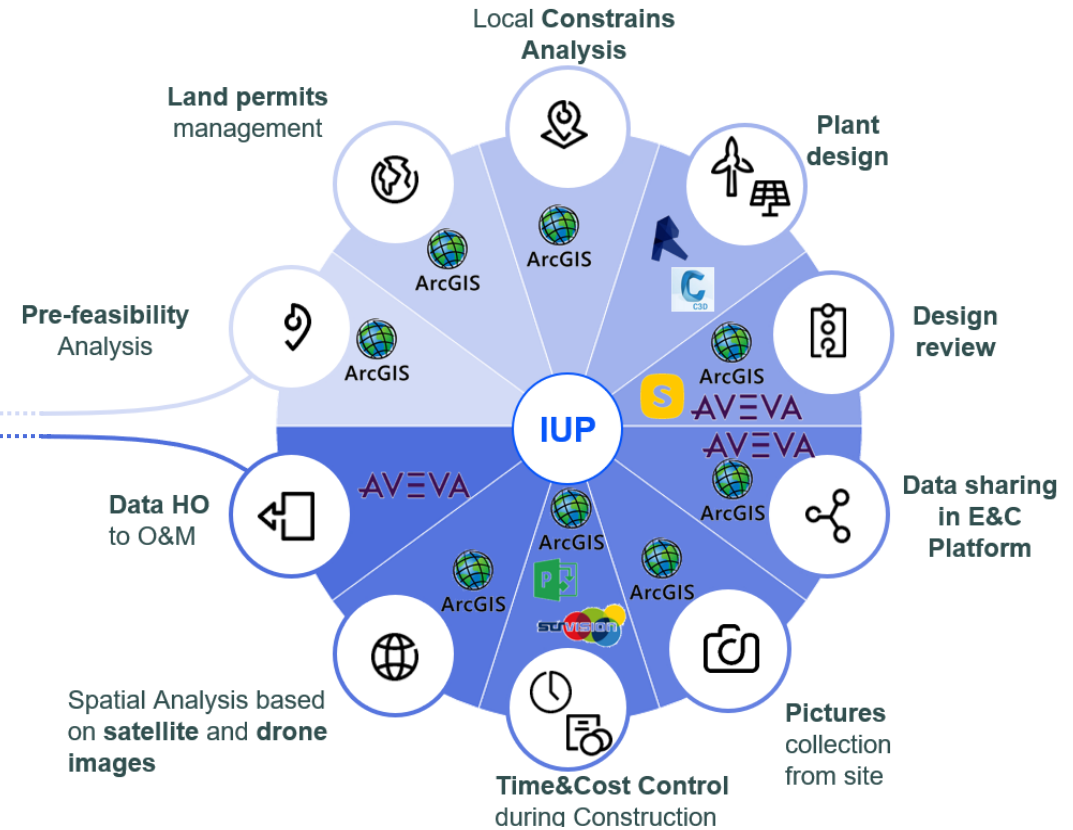


# Information management

Data Model improvement as main goals

## DATA MODEL CONCEPT

- ✓ Improvement of information collaboration
- ✓ mistakes reduced
- ✓ duplication avoided
- ✓ Design review optimization
- ✓ Control check standardized
- ✓ Improvement data quality





An aerial photograph of a wind farm situated in a lush green valley. The landscape is characterized by rolling hills and a network of dirt roads. A multi-lane highway runs along the top left edge of the frame. In the center, a small cluster of buildings is visible. Numerous white wind turbines are scattered across the terrain, following the contours of the hills. The overall scene is bathed in soft, natural light, highlighting the vibrant green of the vegetation.

# 02. BIM Use cases



# 2.1 Use cases definition

Digital Collaboration



Digital Collaboration

Common Data Environment for all stakeholders, single source of truth.

ACC (Autodesk Construction Cloud)

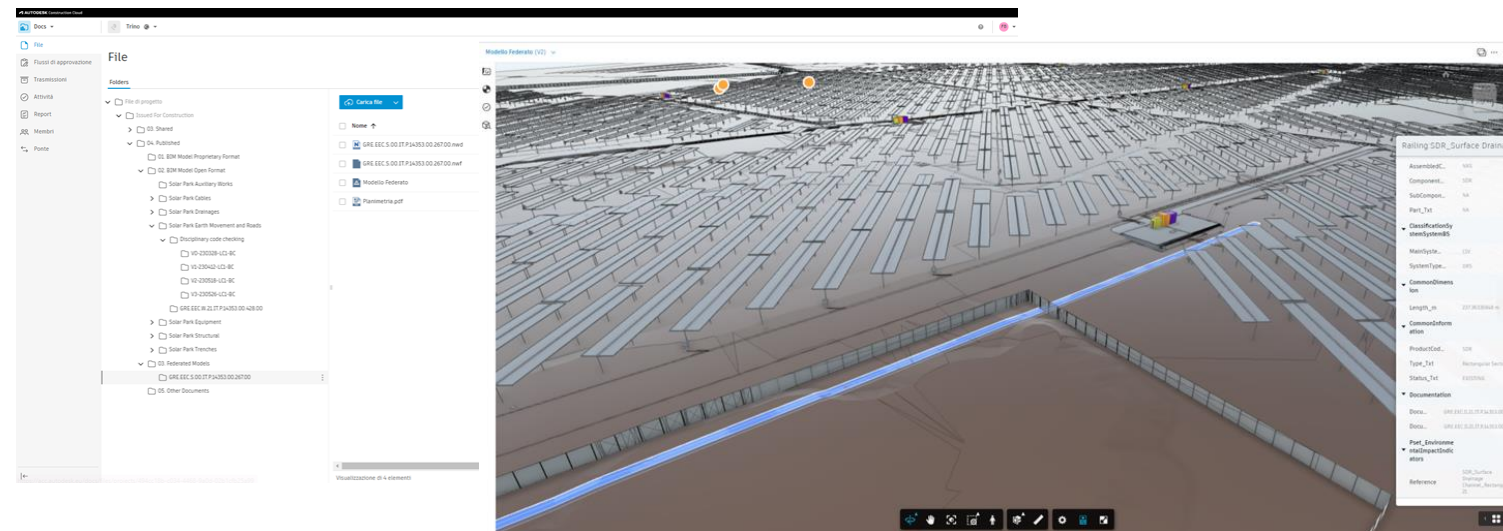
BIM Design

Validation

Construction Monitoring

Ho to O&M

## Trino, Solar, Italy



### PEOPLE TO BE INVOLVED

- PE
- PM
- ENG SPECIALIST
- BIM COORDINATOR
- EXTERNAL ENG DESIGNER
- SITE MANAGER
- COCC
- CONTRACTOR
- SUPPLIER
- CDE MANAGER

### BENEFITS

- Speed and ease in exchanging information – “unique source of truth”
- Reduction of human error
- Improve project management and work organization
- No using mail, wetransfer, paper drawings etc.

### ACTIONS TO INCREASE BENEFITS

- Adoption in all projects of ACC, integrate with IUP Platform
- Mandatory workflow BIM for the project team
- More training on the job to use ACC
- Participation of stakeholders

# 2.2 Use cases definition

## BIM Design

Digital Collaboration

**BIM Design**

Validation

Construction Monitoring

Ho to O&M

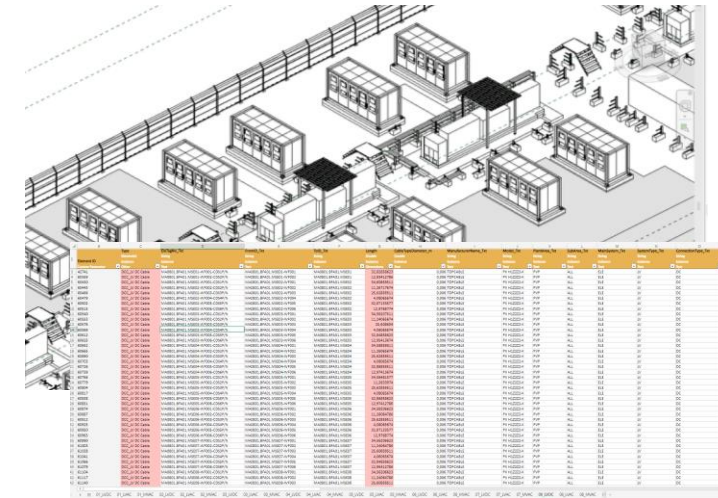
Collaborative design, 3d visualisation, standard, extraction of graphic design drawings, accurate & automatic BoQ.

Revit, Civil3D, Infracore, others...

### Piani della Marina, Solar, Italy



### Brindisi BESS 1, 2 (Insourcing)



#### PEOPLE TO BE INVOLVED

- PE
- PM
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- BIM COORDINATOR**
- EXTERNAL ENG DESIGNER**
- SITE MANAGER
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- CONTRACTOR
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#### BENEFITS

- Single model from which to derive all information such as QTO, ITO and to extract 2d/3d representations, rendering or real-time 3d
- The possibility for multiple professionals to work on the same model simultaneously
- The ability to reuse elements (families) or standards created for one model in other models, increasing production speed over time
- Makes it easier to evaluate alternative design solutions

#### ACTIONS TO INCREASE BENEFITS

- Establish project standards conventions and develop the BIM library
- Appropriate training of personnel.(tight files dimension)

# 2.3 Use cases definition

## Validation

Digital Collaboration

BIM Design

Validation

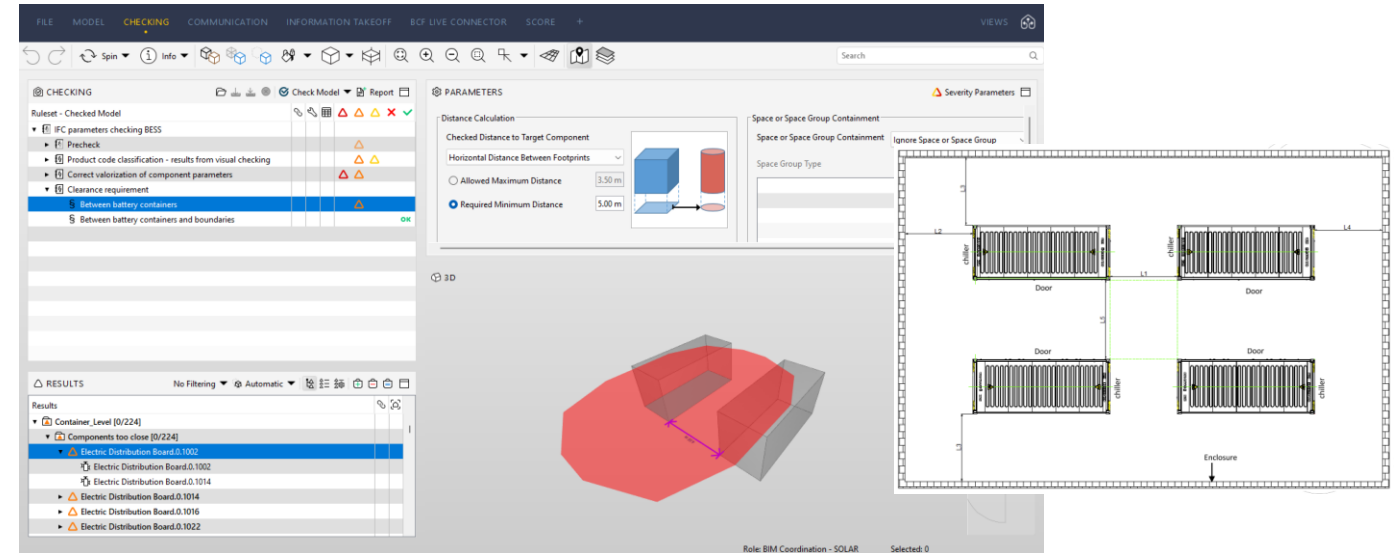
Data validation, automatic checks and validation, design quality prevent interferences.

ACC (Autodesk Construction Cloud)  
Solibri

Construction Monitoring

Ho to O&M

### Trino, BESS, Italy



#### PEOPLE TO BE INVOLVED

- PE
- PM
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#### BENEFITS

- Create automatic, smart and efficient design and review processes
- Easier evaluation of design effectiveness in terms of geometric interferences, project requirements and regulations
- Easily communicate issues to the various professionals involved

#### ACTIONS TO INCREASE BENEFITS

- Increase training and adoption by people involved
- Development of new automatic check rules based on standardized processes



# 2.4 Use cases definition

Constructon monitoring



Digital Collaboration

BIM Design

Validation

**Construction Monitoring**

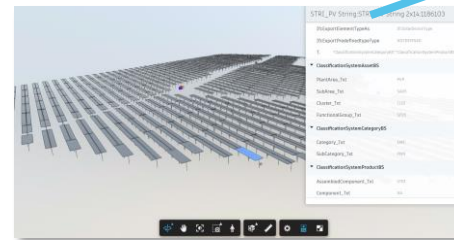
Ho to O&M

Red mark check, digital data exchange, visualize progress and actual vs. forecast.

Navisworks or CPM (4D) (linked with POnline), ACC (red mark)

## Tierra de Badajoz, Solar, Spain Arinos, Solar, Pedra Pintada, Wind, Brasil

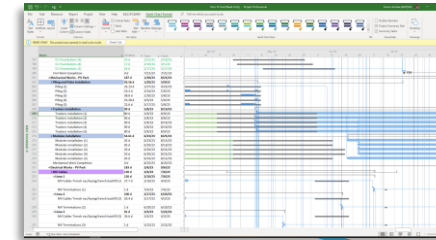
Revit



Project Models



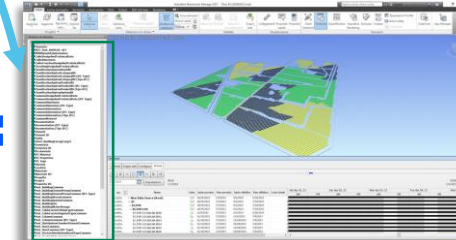
MS Project



Project Schedule



Navisworks



4D Simulation

### PEOPLE TO BE INVOLVED

- PE
- PM
- ENG SPECIALIST
- BIM COORDINATOR
- EXTERNAL ENG DESIGNER
- SITE MANAGER
- COCC
- CONTRACTOR
- SUPPLIER
- CDE MANAGER

### BENEFITS

- Early visualization of problems or potential delays
- Improving decision support tools for time management (4D)
- Improving decision support tools for cost management (5D)

### ACTIONS TO INCREASE BENEFITS

- Increase training and adoption by people involved
- Mandatory workflow BIM for the project team based on standardized processes
- BIM-based tools integration

# 2.5 Use cases definition

HO to O&M



Digital Collaboration

BIM Design

Validation

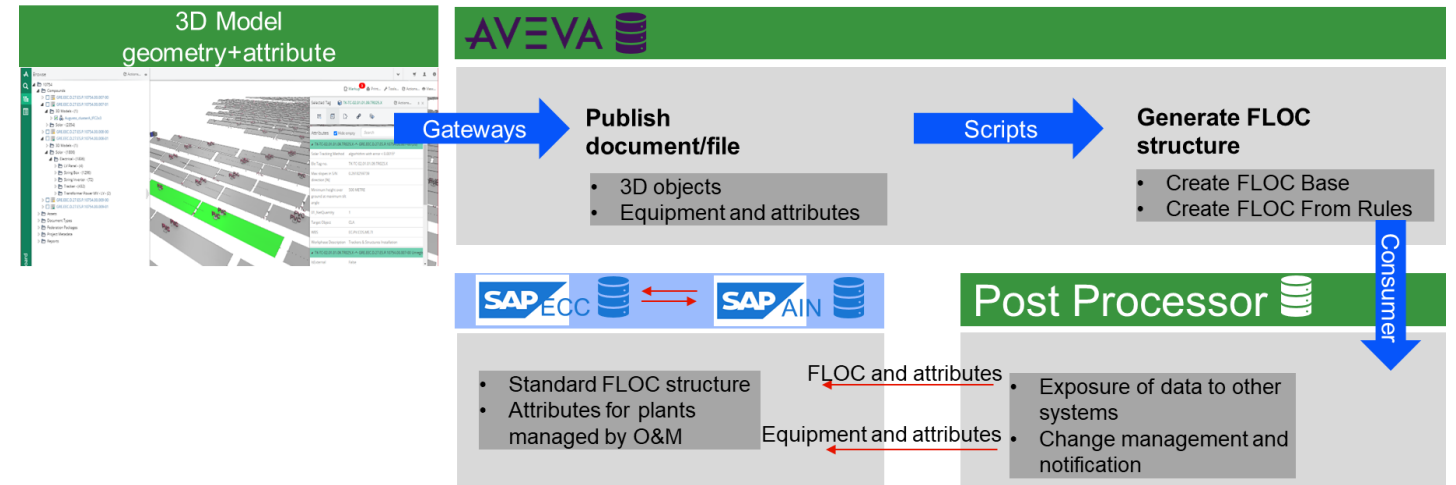
Construction Monitoring

Ho to O&M

AVEVA

Digital data, automatic FLOC/Asset registry, input for Digital Twin and other O&M uses.

## Tierra de Badajoz, Solar, Spain



### PEOPLE TO BE INVOLVED

- PE
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- ENG SPECIALIST**
- BIM COORDINATOR**
- EXTERNAL ENG DESIGNER
- SITE MANAGER
- COCC
- CONTRACTOR
- SUPPLIER
- CDE MANAGER**

### BENEFITS

- Faster and more accurate data transfer from the as-built project, which collects information developed during the E&C process, to O&M tools.
- Reduced errors associated with manual data entry
- Improve project management and work organization

### ACTIONS TO INCREASE BENEFITS

- Adoption digital asset registry also for SS and BESS
- Identify workflow and standard to make naming convention between E&C and O&M efficient
- Increased involvement of O&M people in E&C processes



An aerial photograph of a wind farm situated in a lush green valley. The landscape is characterized by rolling hills and a network of dirt roads. A multi-lane highway runs along the top left edge of the frame. In the center, a small cluster of buildings is visible. Numerous white wind turbines are scattered across the terrain, following the contours of the hills. The overall scene is bathed in soft, natural light, highlighting the vibrant green of the grass.

# 03. Action plan

# BIM Activities

The main actions to promote the change management

## BIM IMPROVEMENT



## BIM GOVERNANCE

Digital  
Collaboration

BIM Design

Validation

Construction  
Monitoring

Ho to O&M

### Intro of ACC (collaboration platform)

#### Standardization activities

- Classification System PIR (project information requirements)
- BIM Library
- Standardization (es: SS Spain)
- Automation activities for BoQ
- Ruleset for automatic validation
- MIDP updated with BIM Models
- Tools become BIM oriented and GIS&BIM integration

#### Partners Engagement

- Survey/meeting
- MG update

#### BIM on Site

Test for Redmark (minor change detection) in Trino and Piani della Marina

#### HO to O&M

Integration E&C platform with O&M platform

### Update Internal procedure

with BIM processes

### BIM GUIDELINE «BIM Handbook»

is under QCHECK validation

### BIM ACADEMY 1° session

(open to partners)

### Internal AUDIT for BIM Certification

(«Sistema di Gestione BIM» pdr 74/2019 and ISO19650)

### Partecipazione in the workgroup to update BIM codes

(Es: UNI 11337 part 9 «BIM infrastructure» including renewable)



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# 04. Summary

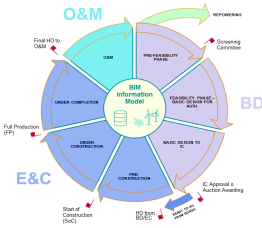
# Summary

R  
E  
C  
A  
P

## INTRO TO BIM

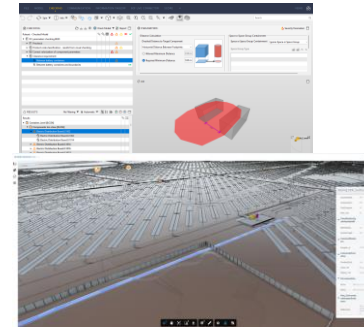
WHO, WHAT, WHERE, WHEN, WHY

BIM ADOPTION YTD



## USE CASES AND BENEFITS

- Digital Collaboration
- BIM Design
- Validation\
- Construction Monitoring
- Ho to O&M



## ACTION PLAN

BIM IMPROVEMENT

BIM GOVERNANCE

N  
E  
X  
T  
  
S  
T  
E  
P

POINTS of ATTENTION

FOCUS FOR THE FUTURE

- Commitment
- Processes
- Standardization

- People
- Technology
- Competitors

1. Improve synergies with partners and with others main areas of the value chain
2. Tools definition along the value chain to be impacted from BIM adoption
3. Update strategic plan for adoption (tech./country, main roles impact, etc...)



An aerial photograph of a wind farm. The landscape is lush green with rolling hills and a winding road. A multi-lane highway is visible in the upper left corner. A small cluster of buildings is situated in the middle ground. Numerous white wind turbines are scattered across the terrain, some in a line and others more isolated. The overall scene is bright and clear, suggesting a sunny day.

**THANK YOU**

*For any clarification do not hesitate to contact me [chiara.butera@enel.com](mailto:chiara.butera@enel.com)*

**enel**  
Green Power