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# THE REFERENCE BUILDING PROCESS

## Special respect to sustainable certification and the mandatory BIM requirements management

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des Deutschen Bundestages

**BIMiD**



**Fraunhofer**

**IBP**

Lake Constance 5D-Conference 2015



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# AGENDA

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- Challenges today
- The Reference Building Process Map (RBPM)
- Sustainability certification and BIM
- Integration with the BIM Requirement Management (ReqCap)
- Summary and Outlook

# CURRENT CHALLENGES



Cost Explosion: Price To

railway-

The Sydney Morning Herald

Traveller

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You are here: Home > Travel > Travel Planning > Travel News

Berlin's new airport's problems an 'embarrassment' for Germany

March 14, 2013

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The Berlin Brandenburg Willy Brandt Airport has

The seemingly neverending story of much-delayed project is expected to be planning a return to the airport's



The terminal building at the construction site of the new 'Willy Brandt' Berlin Brandenburg International (BER) airport. The new airport has been plagued with problems, undermining Germany's reputation for engineering skill. Photo: Bloomberg

ures Videos White Papers

t 21 project

erator Deutsche Bahn (DB) will he controversial Stuttgart 21 station pproving an additional €2bn.

?1 project, which involves the f a new underground main station, l to cost €2.6bn when it was floated sts climbed to €4.5bn in 2009 and id €6.5bn.

be completed by 2022, three years nally planned, the project would art's main terminus station with an rough-station that will be integrated



s it also a criminal case? Photo: DPA

concert house 'possibly

MT+02:00 IT+02:00

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amburg could open a criminal investigation ezzlement and fraud in the long-running i €800-million concert house.

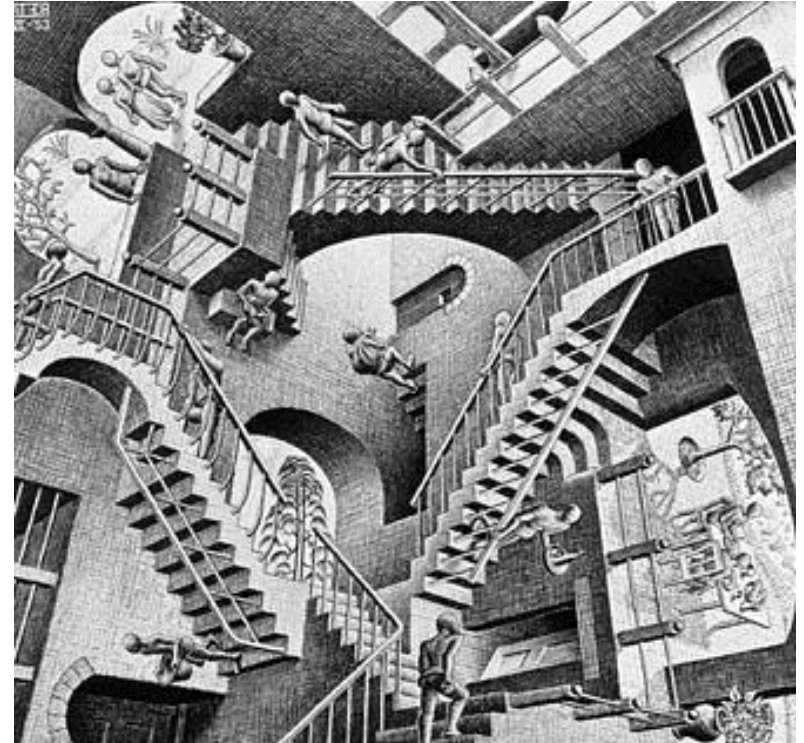
# Current Challenges

- More and more complexity for the buildings
  - Demanding design
  - Resource and energy efficiency
  - Social aspects
  - Etc.
- „One-of-a-kind“ projects
- Use of high-tech products
- Highly specialized experts
- Increase in the number of people involved



# Current Challenges

- Hard to assess the current state of planning
- Inefficiencies due to multiple capturing of data
- Collusion of tasks
- Loss of information during different stages



# Current Challenges

- Need for optimization of building processes and better communication
- Need for a holistic project planning **AND** management tool

**„We need a line of action“ \***

\*Peter Meijnen, Porsche Consulting  
BIMiD 3. Fachsymposium, Stuttgart, 23.04.2015

# THE REFERENCE BUILDING PROCESS MAP (RBPM)



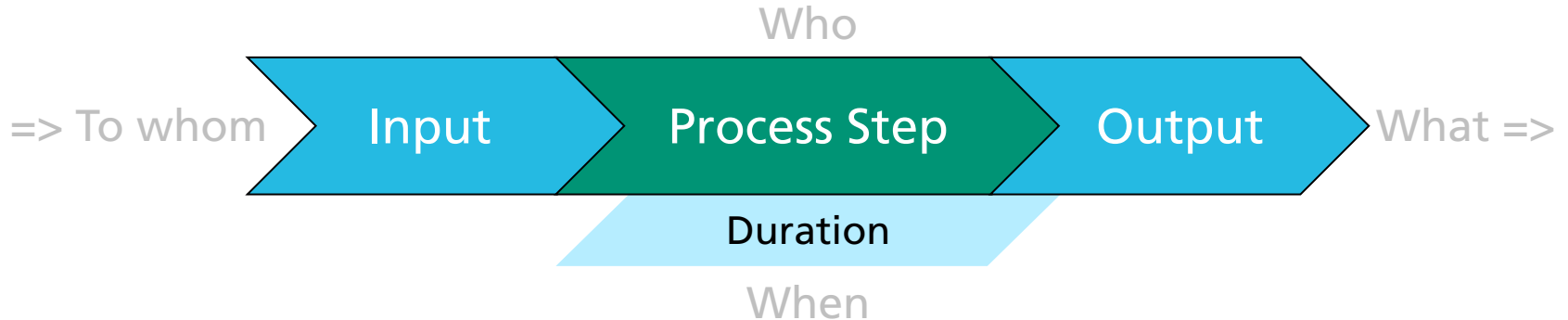
# What is the question?

***Who  
delivers  
when,  
what,  
to whom,  
and in  
which quality ? \****

\* Thomas Liebich, AEC3  
BIMiD 2. Fachsymposium, Braunschweig, 16.10.2014

# A Process Map

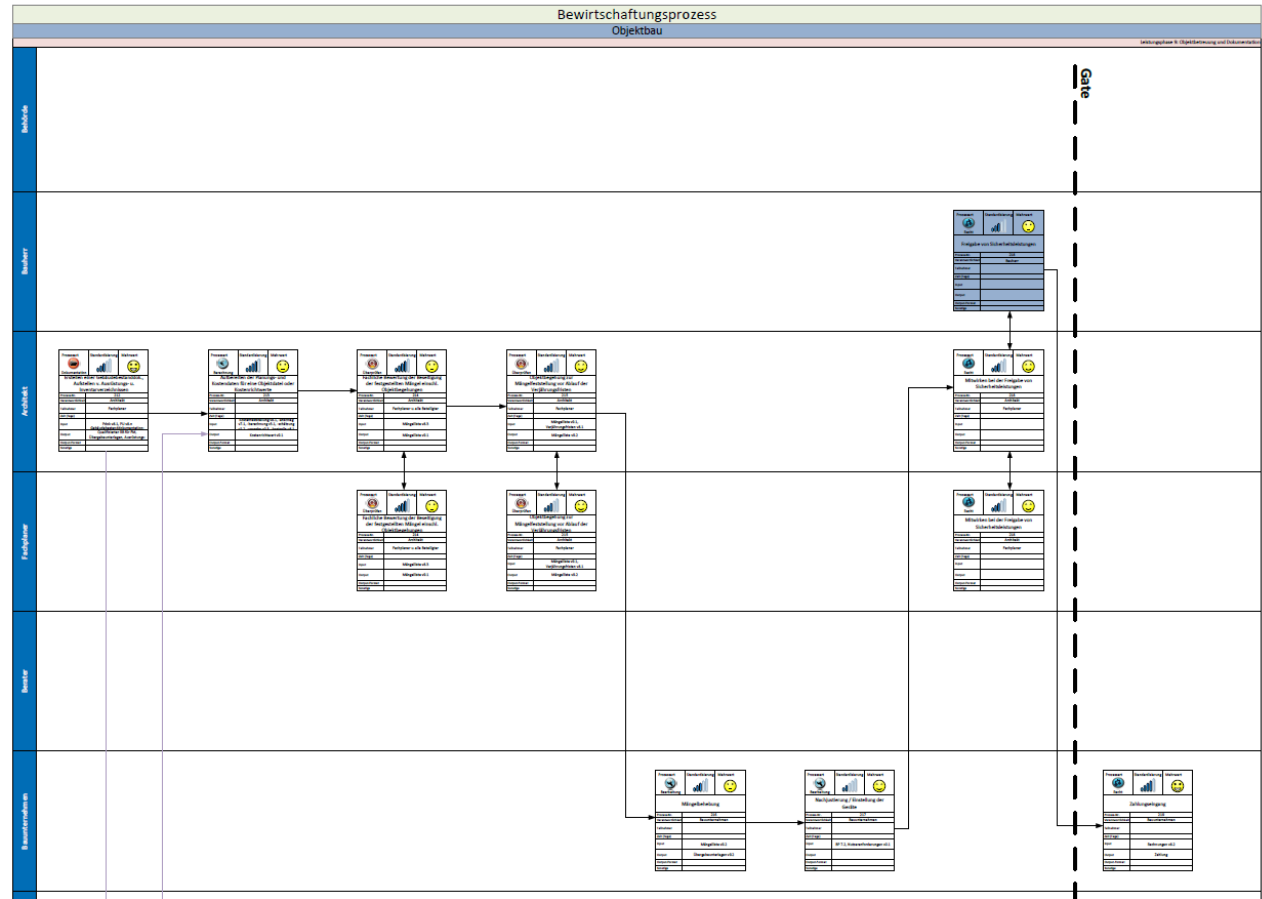
- **Process flow:** Direct sequence of events
- A process step is defined by:



- Effectivity of a process :
  - Time duration
  - To produce the result
  - In a defined quality

# The Building Process Map

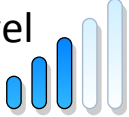

©Fraunhofer IBP in Zusammenarbeit mit AEC3 Deutschland GmbH



Source: Fraunhofer IBP

# The Building Process Map

©Fraunhofer IBP in Zusammenarbeit mit AEC3 Deutschland GmbH

|                                  |  |  |  |
|----------------------------------|--|--|--|
| © Fraunhofer IBP<br>Process type |  | Standard. level<br> | Added value<br> |
|                                  |  |  |  |
| Process Nr.                      |  |  |  |
| Responsible ent                  |  |  |  |
| Participants                     |  |  |  |
| Duration                         |  |  |  |
| Input                            |  |  |  |
| Output                           |  |  |  |
| Output format                    |  |  |  |
| Others                           |  |  |  |

Bewirtschaftungsprozess  
Objektbau

**Design Brief Evaluation**

|  |  |
|--|--|
| <b>Project Identification</b>            |  |
| Project Title – Ref. Nr.                 | Test Project   |
| Address                                  | Junlan Road, Guangzhou   |
| Building Category                        | High rise building   |
| <b>Project Purpose</b>                   |  |
| Main reason for the project              | Create an example for a well performed collaboration to realize a certified high rise building   |
| Main aims of the project                 | <ul style="list-style-type: none"> <li>4 Zeros – Zero complaints, Zero damages, Zero time delay, Zero cost exceed</li> <li>Lu Ban Award</li> <li>3 Star/SA, DGNB Certification</li> <li>Optimized building process</li> <li>German standard in planning, technology and energy efficiency</li> </ul> |
| Tasks of the brief                       | Identify all necessary information, goals and requirements   |
| <b>Project Scope</b>                     |  |
| Size                                     | 200.000m²  |
| Quality                                  | <ul style="list-style-type: none"> <li>Good international standard at feasible costs</li> <li>DGNB Gold Core and Shell</li> <li>Appropriate cost-performance relationship</li> <li>High Durability and system reliability</li> </ul>   |
| Financial frame                          |  |
| Time frame                               | 2 months   |
| Current stage of project planning        | <ul style="list-style-type: none"> <li>De</li> <li>De</li> <li>Inf</li> <li>De</li> <li>Im</li> <li>Re</li> <li>Tit</li> </ul>   |
| Future changes                           |  |
| <b>Identification of Participants</b>    |  |
| Client                                   | Developing   |
| Occupiers/Users                          | International companies  |
| General Manager                          | Mir. X   |
| Briefing consultants                     | Fraunhofer   |
| General Planner                          |  |
| Local Design Institute                   | Design & R   |
| Other consultants                        | Certification  |
| Builder                                  |  |
| <b>Identification of relevant groups</b> |  |
| Central government                       |  |
| National/International Agencies          |  |

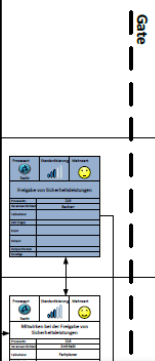
**Energie-Checkliste**

**Projektangaben**

Bezeichnung Projekt: WE-Nr.: Adresse:

| Id. Nr. | Kap. | Thema  | liegt vor  | Anmerkung  |
|---------|------|--|--|--|
| 1       | 1a   | Tageslichtkonzept erarbeitet, Lichtumlenksysteme berücksichtigt                      | <input type="checkbox"/> ja<br><input type="checkbox"/> nein | (wenn <b>nein</b> , bitte <b>Begründung und/oder Anlage beifügen</b> ) |
| 2       | 1b   | Neubauten: Einhaltung des Passivhausstandards  | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 3       | 1b   | Modernisierungsvorhaben: Passivhaus-Bauteile o. U-Werte nach Leitlinien              | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 4       | 1b   | Wärmetechnisch verbesserter Randverbund bei Fenstern                                 | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 5       | 1b   | Maßnahmen für sommerlichen Wärmeschutz vorgesehen                                    | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 6       | 2    | Fernwärmeversorgung möglich und geplant  | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 7       | 2    | Ermittlung der Heizwärmeleistung nach Rechenverfahren (ausführlich oder vereinfacht) | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |
| 8       | 2    | Auslegung der Systemtemperaturen auf eine Spreizung von max. 60/40° C                | <input type="checkbox"/> ja<br><input type="checkbox"/> nein |  |

Gate



Source: Fraunhofer IBP

# The Reference Building Process Map (RBPM)

- Based on: HOAI, Norms, Guidelines

| Grundleistungen   | Besondere Leistungen   |
|---|--|
| <b>LPH 1 Grundlagenermittlung</b>   |  |
| a) Klären der Aufgabenstellung auf Grundlage der Vorgaben oder der Bedarfsplanung des Auftraggebers<br>b) Ortsbesichtigung<br>c) Beraten zum gesamten Leistungs- und Untersuchungsbedarf<br>d) Formulieren der Entscheidungshilfen für die Auswahl anderer an der Planung fachlich Beteiligter<br>e) Zusammenfassen, Erläutern und Dokumentieren der Ergebnisse | - Bedarfsplanung<br>- Bedarfsermittlung<br>- Aufstellen eines Funktionsprogramms<br>- Aufstellen eines Raumprogramms<br>- Standortanalyse<br>- Mitwirken bei Grundstücks- und Objektauswahl, -beschaffung und -übertragung<br>- Beschaffen von Unterlagen, die für das Vorhaben erheblich sind |

- General flow for a design and construction project
  - Logical sequence flow based on the state of the art
  - From the first idea (Phase 0)
  - To the operation phase (LPh 9 / HOAI)

## HOAI – Fassung 2013

LPH 1 - Grundlagen-  
ermittlung

LPH 2 - Vorplanung

LPH 3 – Entwurfs-  
planung

LPH 4 – Genehmigungs-  
planung

LPH 5 – Ausführungs-  
planung

LPH 6 – Vorbereitung  
der Vergabe

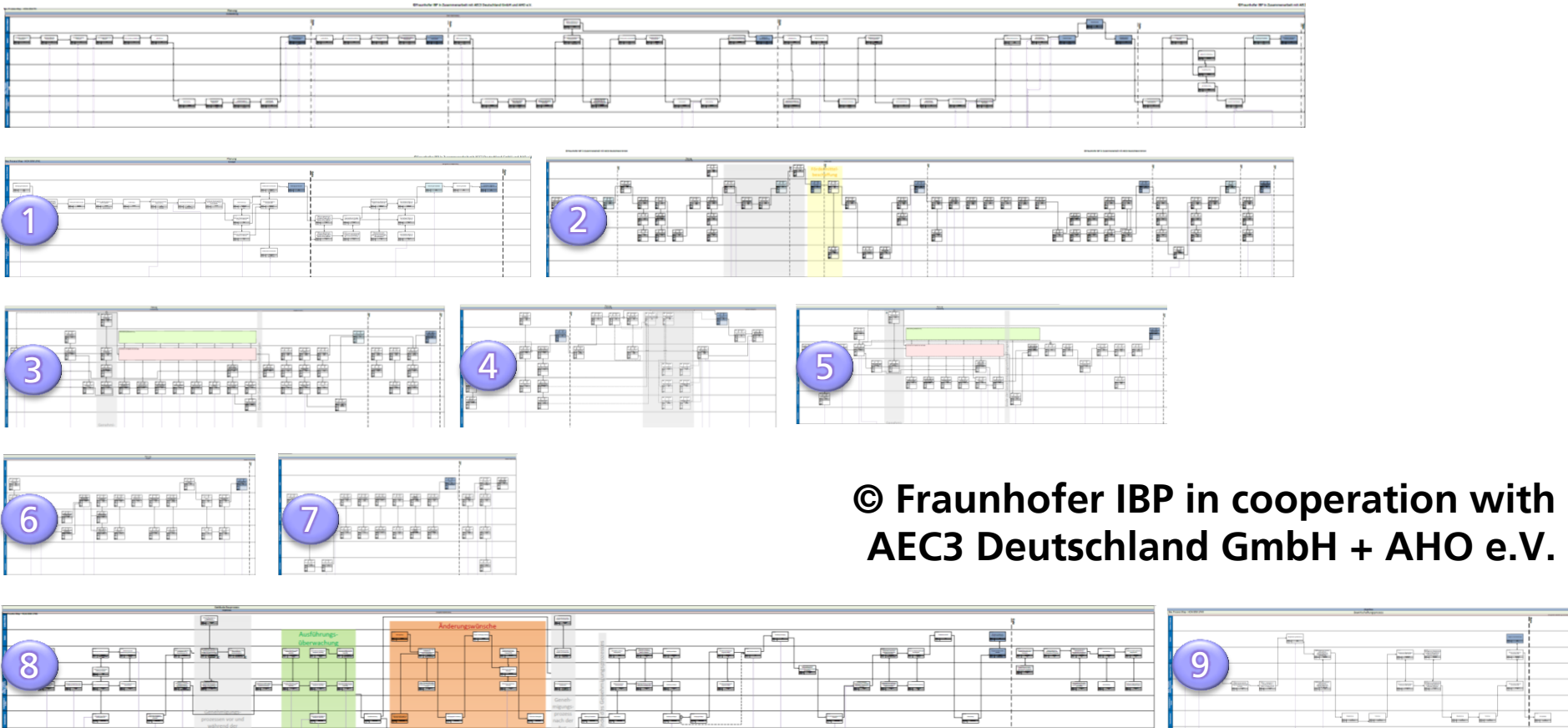
LPH 7 – Mitwirkung bei  
der Vergabe

LPH 8 – Objekt-  
überwachung  
und  
Dokumentation

LPH 9 – Objekt-  
betreuung

Source: HOAI 2013

# The Reference Building Process Map (RBPM)

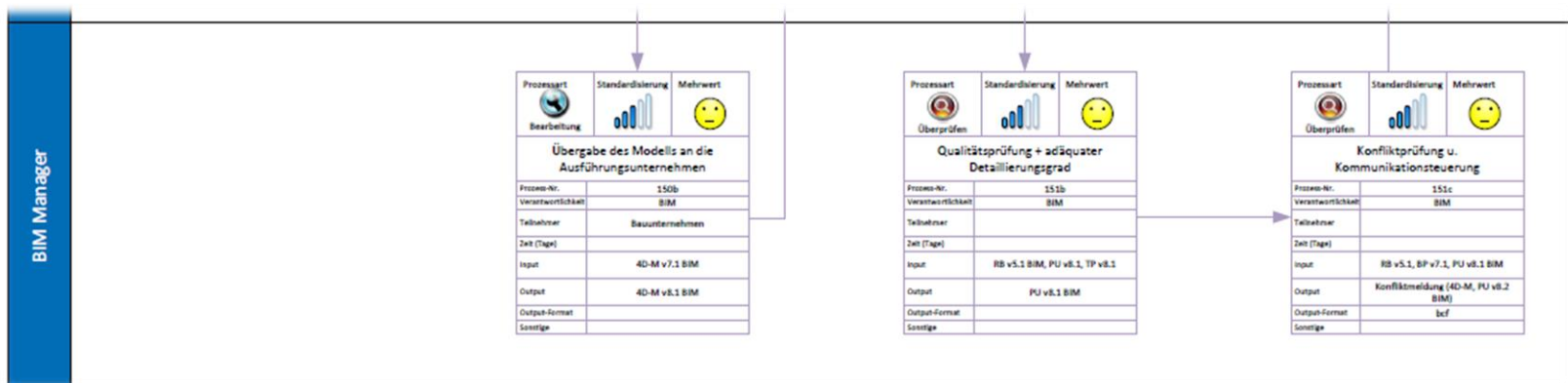


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Source: Fraunhofer IBP

# The BIM Reference Building Process Map (HOAI+BIM)

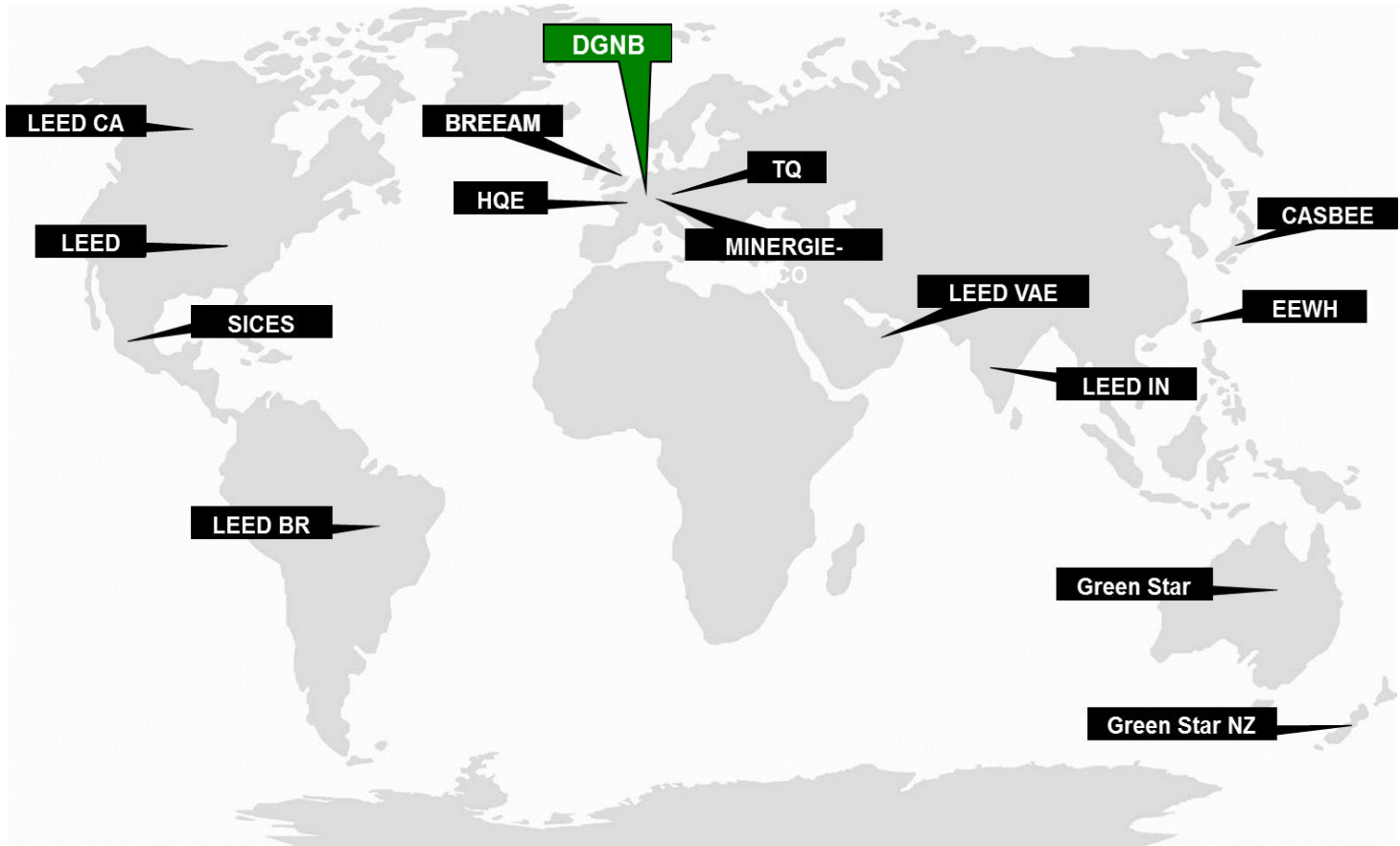
- What is different using BIM?
  - New process steps
  - Output formats
- BIM-Manager?
  - Roles and responsibilities



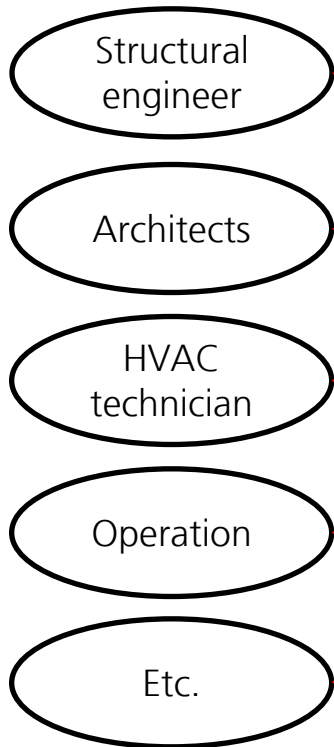
Source: Fraunhofer IBP

# CERTIFICATION SCHEMES AND BIM AS A POSSIBLE SOLUTION

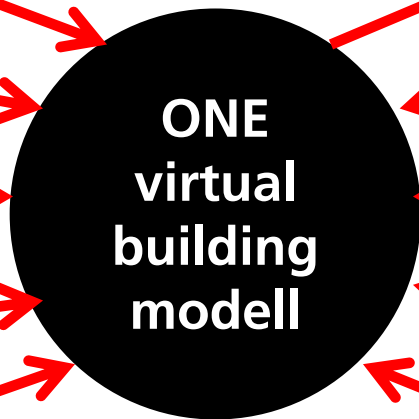
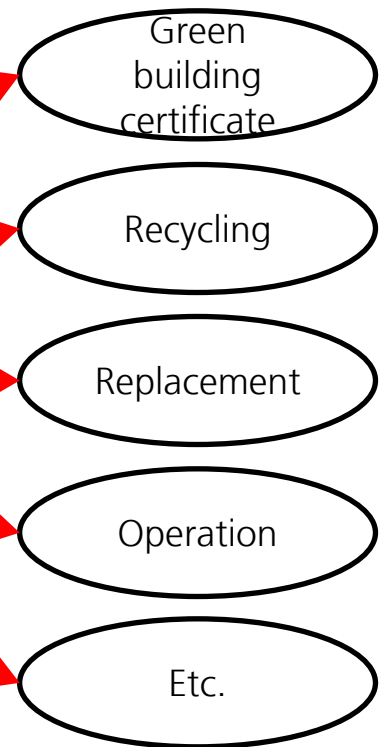


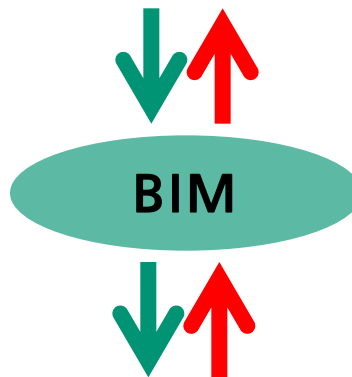
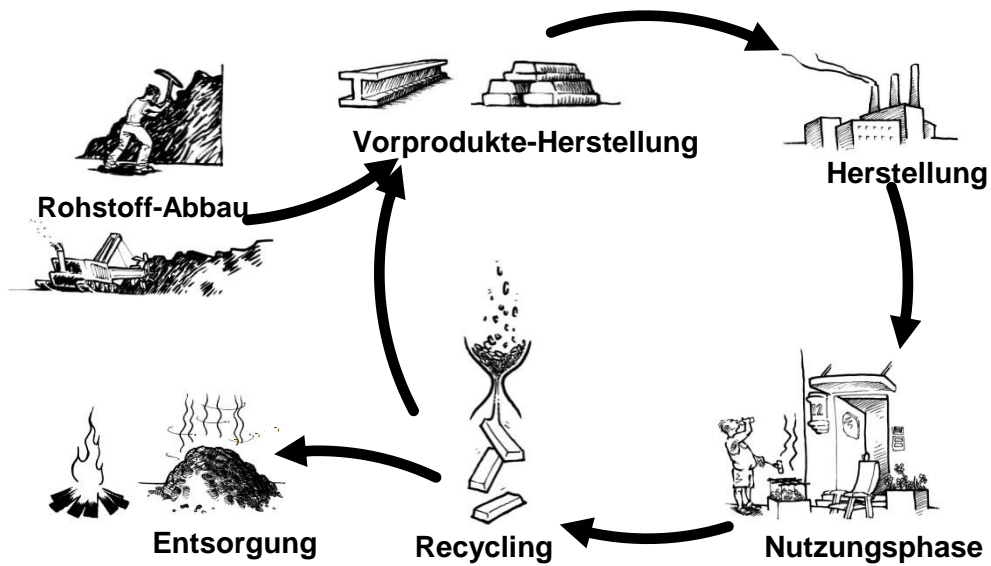


## People involved



## Field of application





## Green building certification schemes

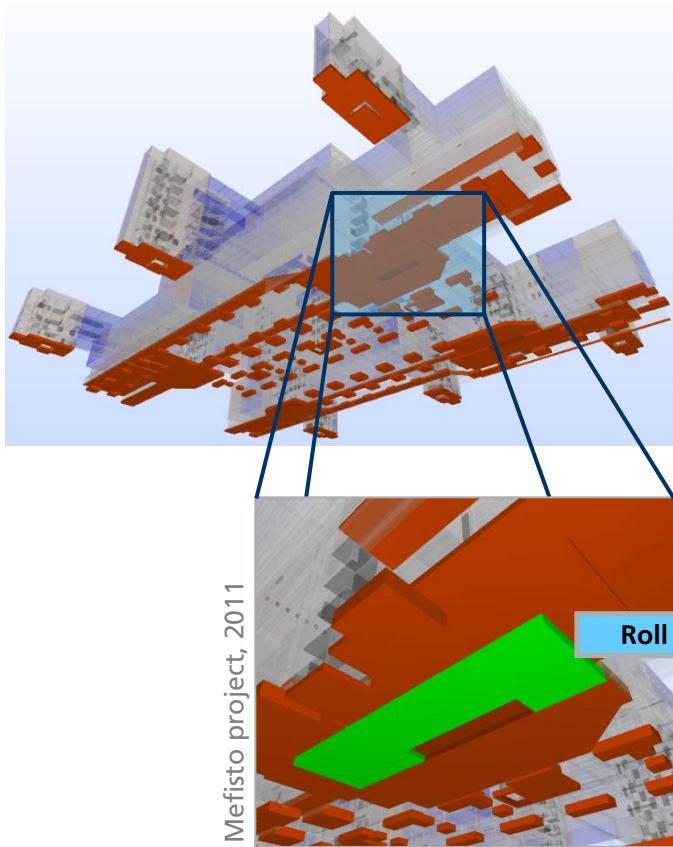
# Advantages of a combined BIM - building certification approach

- BIM as centralized communication platform
- Ease of the documentation effort for green building certification schemes
- Effects on the overall sustainability rating can be instantly illustrated
- Information from green building certification process can be included into the virtual building model and used in other life cycle stages (e.g. for facility management)



# INTEGRATION WITH BIM REQUIREMENT MANAGEMENT (AEC3 REQCAP SYSTEM)

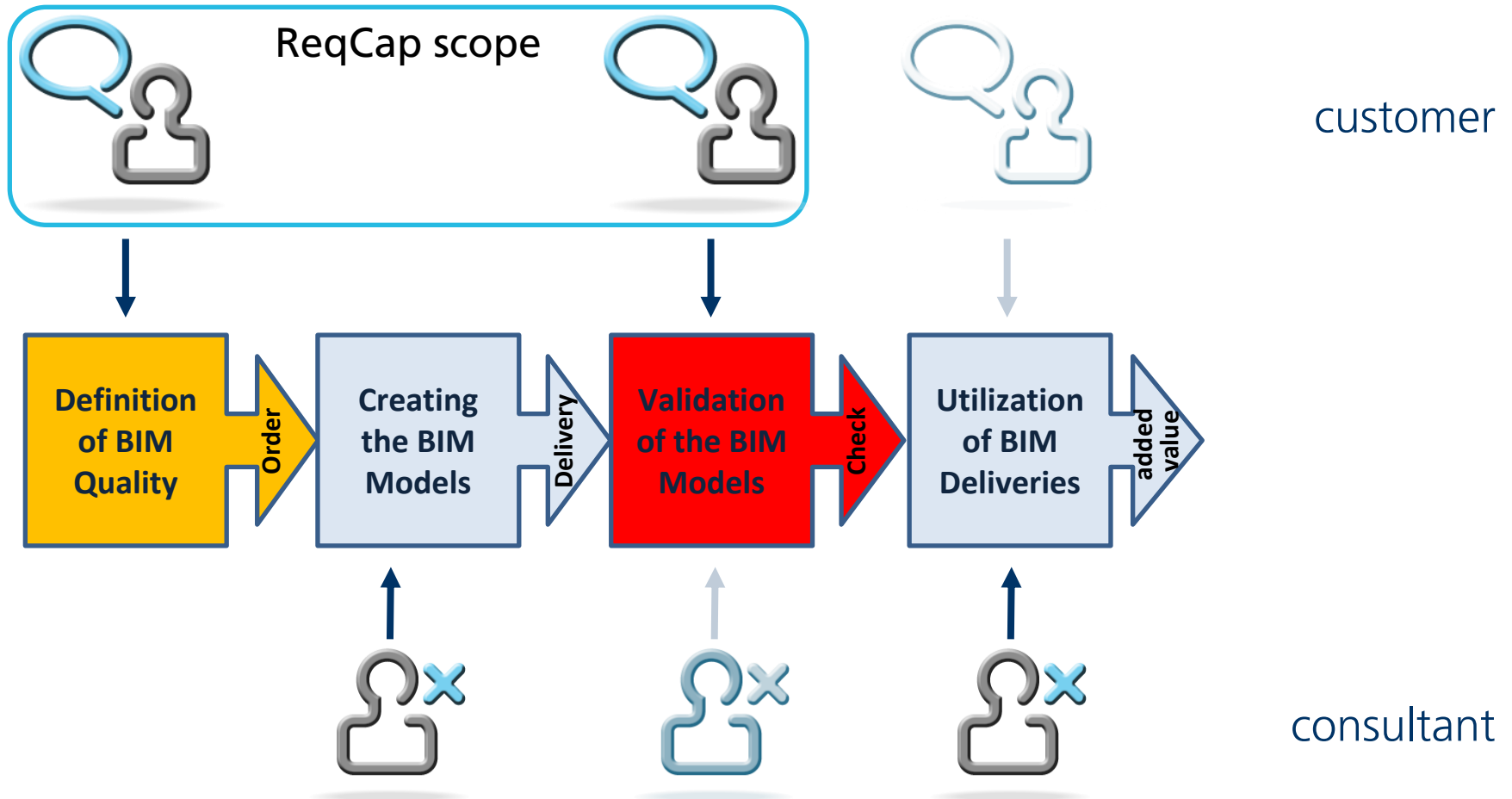
# Remember the question ?!



| Objektdaten                           | Linienmuster   | Verdeckt                             | Objektdaten                                   | Montage_Abweichung  |
|---------------------------------------|--|--------------------------------------|---|---|
| Sdki Abdichtung Dickbeschichtung      | 0  | Linienstärke                         | 1   | 9999  |
| Sdki Abdichtung Vertikaldämmmatte     | 0  | MB_Bauteilgruppe                     | Slab  | Montage_Ist-erfolgt   |
| Sdki Abdichtung zweilagig             | 0  | MB_Neigung_Geschossdecke_Bodenplatte | 0.0000  | 11d47a2a-0004-4d8b-898c-0a2c1a804e1f-000371ab                               |
| Sdki Betonklasse                      | C30/37   | MB_Neigung_Rampe                     | nicht_vorhanden                               | PSP-Code  |
| Sdki Bewehrung FT kg pro m2           | 0.0000   | MaterialID                           | Projektname::31e3ad7d-6b006-f622ba43f524-0004 | F2  |
| Sdki Bewehrung Liste kg pro m3        | 0.0000   | MaterialName                         | Beton - Stahlbeton                            | Phase erstellt  |
| Sdki Bewehrung Matte kg pro m2        | 0.0000   | Name                                 | 4.OG  | Neu   |
| Sdki Bewehrung Matte kg pro m3        | 125.0000   | Neigung                              | 0.0000 [deg]                                  | Planeingang_Abweichung  |
| Sdki Bewehrung Spann kg pro m2        | 0.0000   | NrLayers                             | 1   | 9999  |
| Sdki Bewehrung Stab kg pro m2         | 0.0000   | Phase erstellt                       | Neu   | Planeingang_Ist-erfolgt   |
| Sdki Bewehrung Stab kg pro m3         | 0.0000   | Raumbegrenzung                       | 1   | 0   |
| Sdki Deckenüberhöhung                 | 0  | RevitCategory@BuiltIn                | OST_Floors                                    | Planfreigabe_Ist-erfolgt  |
| Sdki FT Plattengröße                  | 0.0000 [m2]  | RevitCategoryName                    | Geschossdecken                                | 0   |
| Sdki Flügelglätzen                    | 0  | RevitFamilyName                      | Geschossdecke                                 | Produktion_Abweichung   |
| Sdki IndBoPla Breccopac               | 0  | RevitID                              | 1216530                                       | 9999  |
| Sdki IndBoPla Breccoplan              | 0  | RevitLevelID                         | 0   | Produktion_Ist-erfolgt  |
| Sdki IndBoPla Feinplanum              | 0  | RevitLevelName                       | Projektname::04fb13a6-bf...                   | 0   |
| Sdki IndBoPla Genauigkeit             | 0  | RevitObjectName                      | Sdki Decke Ortbeton 35cm                      | OST_Structure@Foundation  |
| Sdki IndBoPla Hartstoffstreuung       | 0  | RevitType                            | 1   | Name  |
| Sdki IndBoPla Stahlfaserbeton         | 0  | Standarddicke                        | 0.3500 [m]                                    | Name  |
| Sdki IndBoPla Vakuumbehandlung        | 0  | Stärke                               | 0.3500 [m]                                    | RevitID   |
| Sdki Mobilkran                        | 0  | Symbol bei Ende 1 Standard           | 0   | 227390  |
| Sdki Sauberkeitsschicht               | 0  | Symbol bei Ende 2 Standard           | 1   | RevitLevelID  |
| Sdki Schalhöhe                        | 0  | Beschreibung Ebene                   | 0   | 2011-06-29_H090017_ARGE Rohbau  |
| Sdki Sichtbeton                       | 0  | Typverwendung                        | 3   | Flugsteig_Vertragsmodell.rvt::e5e960dd-d8fa-4bd5-9e20-795ce8924e3d-00000d11 |
| Sdki Trennlage                        | 0  | Umfang                               | 109.2693 [m]                                  | RevitLevelName  |
| Sdki Typ                              | 0  | Volumen                              | 224.2117 [m3]                                 | ELZ   |
| Sdki WU                               | 0  |                                      |   |   |
| Sdki kalkulierte Mindestöffnungsgröße | 0.0000 [m2]  |                                      |   |   |
| Sdki ...                              | 15.9200 [m]  |                                      |   |   |
| Sdki ...                              | 0  |                                      |   |   |
| Sdki Querschnitt                      | 1.0000   |                                      |   |   |
| Sdki Bearbeitungsbereich              | 0  |                                      |   |   |
| Sdki Ebene                            | 4.OG   |                                      |   |   |
| Sdki Farbe                            | 16711680   |                                      |   |   |
| Sdki Farbfüllung für groben Maßstab   | 0  |                                      |   |   |
| Sdki FloorsLayer_00_MaterialID        | Projektname::31e3ad7d-6545-4987-b006-f622ba43f524-00046d0a |                                      |   |   |
| Sdki FloorsLayer_00_MaterialName      | Beton - Stahlbeton   |                                      |   |   |
| Sdki FloorsLayer_00_Thickness         | 0.3500 [m]   |                                      |   |   |
| Sdki Fläche                           | 640.6077 [m2]  |                                      |   |   |

who everybody ?  
 when anytime ?  
 what ever ?  
 which requirement ?

# Definition of BIM Quality



Source: AEC3 Deutschland GmbH

# Definition of BIM Quality



REQCAP Guides Requirements Filter Settings Components Signed in as user@testserver.de

**bSN-Guide (Prototype 1)**

Show Mass Update Form Clear Filter

Concept Definition

IFC binding Role Task

| Concept Definition                | Datastructure: IFC4             | Owner             | S04-P01 | S05-P01 | S06.1-P0 | S07-P01 | S08-P01 | S09-P01 |
|-----------------------------------|---------------------------------|-------------------|---------|---------|----------|---------|---------|---------|
| 265 : Nedløp                      | IfcPipeSegment.###.###          | R3-01 : RIV - Rør | OPT     | OPT     | MANC     | MANC    | MANC    | MANC    |
| Pipe segment type common          | Pset_PipeSegmentTypeComm        | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Qto_ pipe segment base quantities | Qto_PipeSegmentBaseQuantit      | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| 265 : Takrenne                    | IfcPipeSegment.IfPipeSegme      | R3-01 : RIV - Rør | OPT     | OPT     | MANC     | MANC    | MANC    | MANC    |
| Pipe segment type common          | Pset_PipeSegmentTypeComm        | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Qto_ pipe segment base quantities | Qto_PipeSegmentBaseQuantit      | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| 21 : Rør                          | IfcChimney.###.###              | R2-03 : RIBrann   | ?       | ?       | ?        | ?       | ?       | ?       |
| 21 : Rør                          | IfcChimney.###.###              | R2-03 : RIBrann   | ?       | ?       | ?        | ?       | ?       | ?       |
| 302 : Rør                         | IfcPipeSegment.IfPipeSegme      | R3-01 : RIV - Rør | OPT     | OPT     | MANC     | MANC    | MANC    | MANC    |
| Pipe segment type common          | Pset_PipeSegmentTypeComm        | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Inner diameter                    | InnerDiameter                   | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Nominal diameter                  | NominalDiameter                 | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Outer diameter                    | OuterDiameter                   | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Pressure range                    | PressureRange                   | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Reference                         | Reference                       | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Status                            | Status                          | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Temperature range                 | TemperatureRange                | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Working pressure                  | WorkingPressure                 | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| Qto_ pipe segment base quantities | Qto_PipeSegmentBaseQuantit      | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |
| 302 : Forbindelsesledd            | IfcPipeFitting.IfPipeFittingTyp | R3-01 : RIV - Rør | OPT     | OPT     | MANC     | MANC    | MANC    | MANC    |
| Pipe fitting type common          | Pset_PipeFittingTypeCommon      | ?                 | ?       | ?       | ?        | ?       | ?       | ?       |

Model element

Property

Requirement

Source: AEC3 Deutschland GmbH



# Validating the BIM Quality

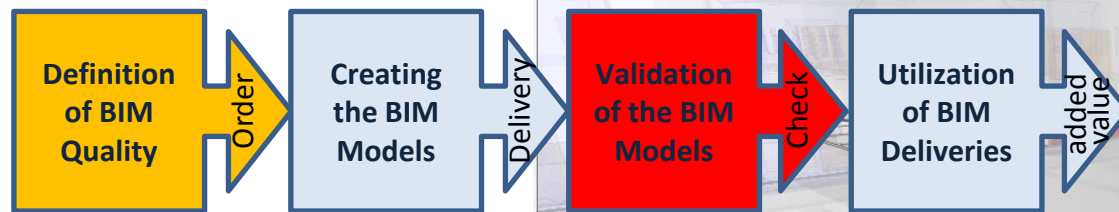
- Automatic generation of checking rules from the Level of Development

The screenshot displays a BIM software interface with a 3D model of a building and a table of checked components. A red arrow points from the 'Eigenschaftensätze' table to the 3D model.

| Status       | Komponente | Eigenschaft | Operator | Wert |
|--------------|------------|-------------|----------|------|
| Einschließen | Wand       |             |          |      |

| Komponente | Eigenschaftensatz | Eigenschaft          | Wert ist vorhanden  | Wertbedingungen             | Visualisierung |
|------------|-------------------|----------------------|---------------------|-----------------------------|----------------|
| Wand       | Pset_WallCommon   | ThermalTransmittance | Muss vorhanden sein | $X \geq 0,1$ und $X \leq 1$ |                |



Source: AEC3 Deutschland GmbH

# SUMMARY AND OUTLOOK

# Outcomes

- ***Who delivers when, what to whom, and in which Quality?***

- “I have delivered my dataset!”
- Essential as guidance for the design and building phases

- Use of the RBPM:

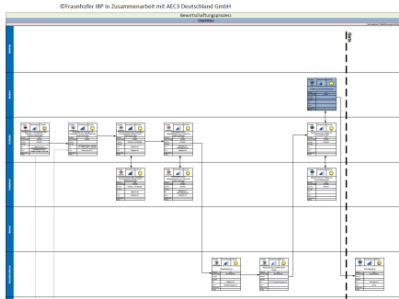
- Transparency
- Clearly defined roles
- Assume one’s own responsibilities

 More efficient communication and collaboration

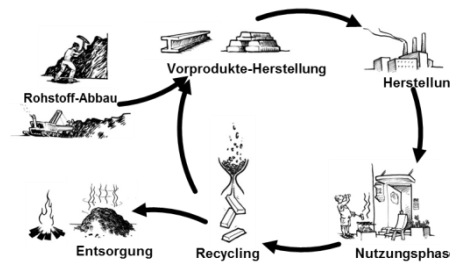
# Outlook

- Combination of BIM & sustainable certification
  - Proof of concept needed (suitable tools and processes)
- Lean Construction
  - Continuous improvement using the **Reverse Process Design (RPD)**
- Provide a continuous status as decision-support
  - For all phases incl. tendering, operation, dismantlement
  - For better services: sustainability rating consultancy, Facility Management, collaboration with equipment producers

# QUESTIONS?



|                |                |             |
|----------------|----------------|-------------|
| Fraunhofer IBP | Standard level | Added value |
| Process Nr.    |                |             |
| Responsible em |                |             |
| Participants   |                |             |
| Duration       |                |             |
| Input          |                |             |
| Output         |                |             |
| Output format  |                |             |
| Others         |                |             |



REQCAP - Requirements - Tree - Settings - Connections - Signal in an overview view

ISRN-Guide (Prototype 1)

#C binding, Task, Task

| Concept Definition | Parent/Child     | Category         | ISRN-1           | ISRN-2           | ISRN-3           | ISRN-4           | ISRN-5           | ISRN-6           | ISRN-7           | ISRN-8           | ISRN-9           | ISRN-10          |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| ISRN-1: ISRN-1     | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   | ISRN-1: ISRN-1   |
| ISRN-2: ISRN-2     | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   | ISRN-2: ISRN-2   |
| ISRN-3: ISRN-3     | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   | ISRN-3: ISRN-3   |
| ISRN-4: ISRN-4     | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   | ISRN-4: ISRN-4   |
| ISRN-5: ISRN-5     | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   | ISRN-5: ISRN-5   |
| ISRN-6: ISRN-6     | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   | ISRN-6: ISRN-6   |
| ISRN-7: ISRN-7     | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   | ISRN-7: ISRN-7   |
| ISRN-8: ISRN-8     | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   | ISRN-8: ISRN-8   |
| ISRN-9: ISRN-9     | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   | ISRN-9: ISRN-9   |
| ISRN-10: ISRN-10   | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 | ISRN-10: ISRN-10 |

Model element, Property, Requirement

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