

LCC, Energy saving and improving quality by using BIM and A.I.

ENERGY EFFICIENCY IN EARLY DESIGN OF HEALTHCARE BUILDINGS

**From a research project to
commercial market**

Sustainable Places 2019

DEMO Consultants– André van Delft



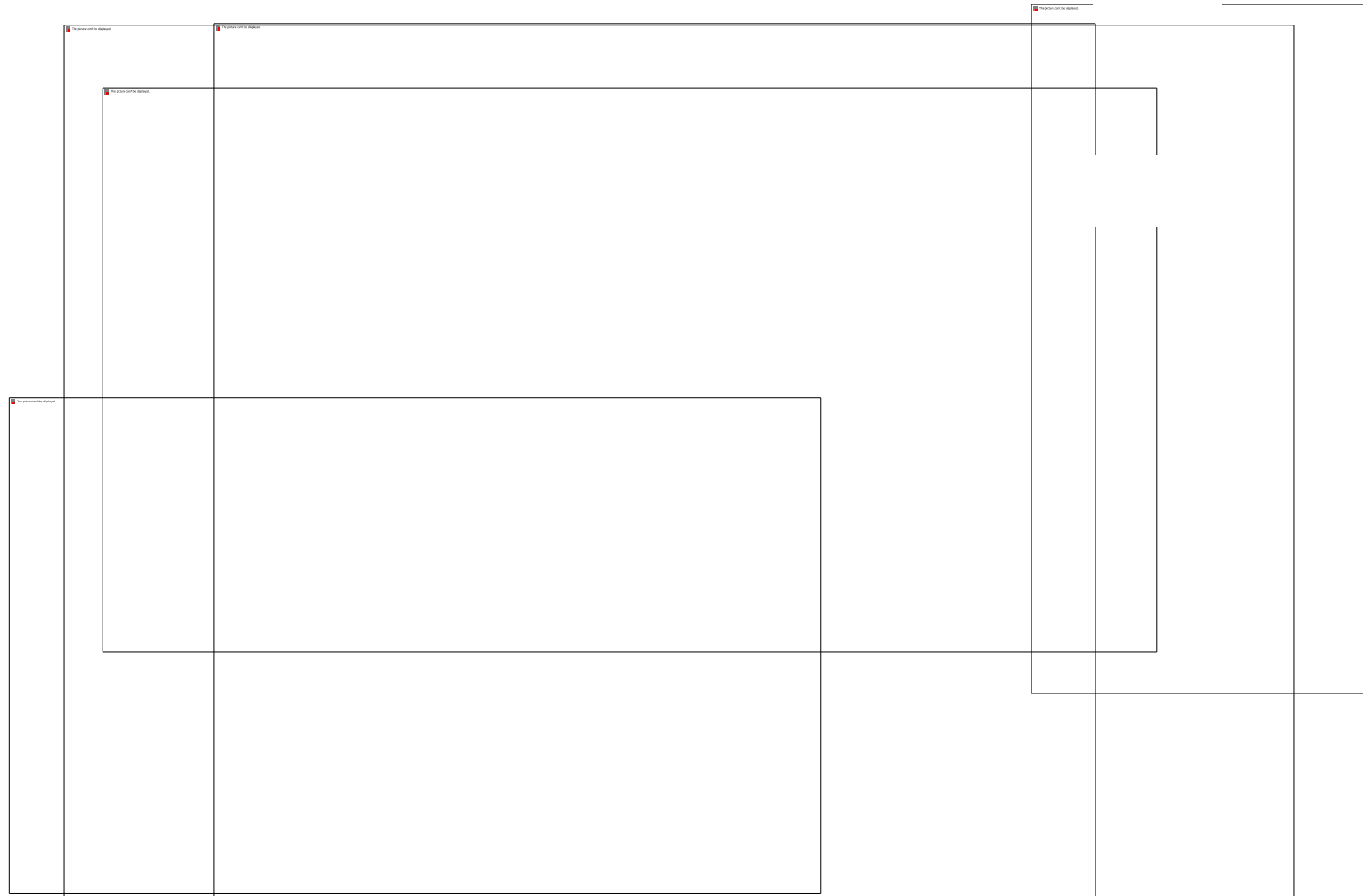
From a research project to commercial market

1. Background and context
2. Research project Streamer
3. Key Exploitable Result: RE Design
4. What happened afterwards?
5. Key elements in commercialisation

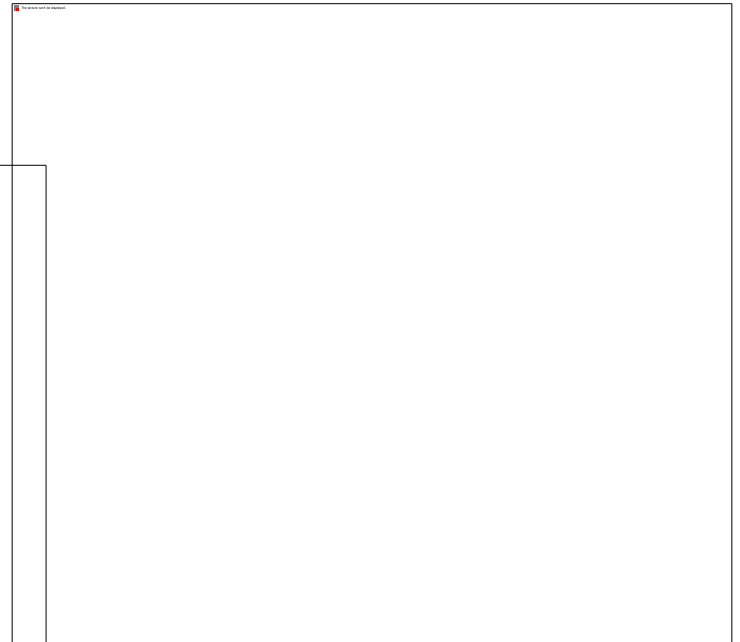
1. Background and context

- 2013 to 2017
- A hospital –which is a part of a healthcare district– uses 2.5 times more energy than an office in average. There are some 15,000 hospitals in the EU responsible for at least 5% of the annual EU's carbon emission
- Sustainability - Energy savings
- Trends
 - Digitization
 - Automation
 - Virtualisation
 - Artificial Intelligence
- Disruptive technologies
- Hospitals are very complex buildings
- **Is the traditional way still working?? Or could it be improved..?**

1. Current practice before STREAMER



1. The whole life cycle



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2. The project Streamer

2. Streamer in the FP7 Framework

- Reduction of energy use in Healthcare districts
- 48 months
- 20 partners
- BIM - Sustainability
- **Overall aim: the optimisation of energy-efficient designs of new and retrofitted buildings in the healthcare district and designing new advanced tools**
 - Objective 1: To substantially optimise the energy-efficient design..
 - Objective 2: To provide the multidisciplinary design teams with advanced design tools
 - Objective 3: To effectively manage information flow..
- See more: <http://www.streamer-project.eu>
- **In other words: just another research project?**

2. The Challenge



2. EDC in the STREAMER workflow



2. Key Exploitable Results

- Emphasis is more and more on dissemination and exploitation
- Early Design Configurator
- A.K.A.: **RE Design**

2. Project finished

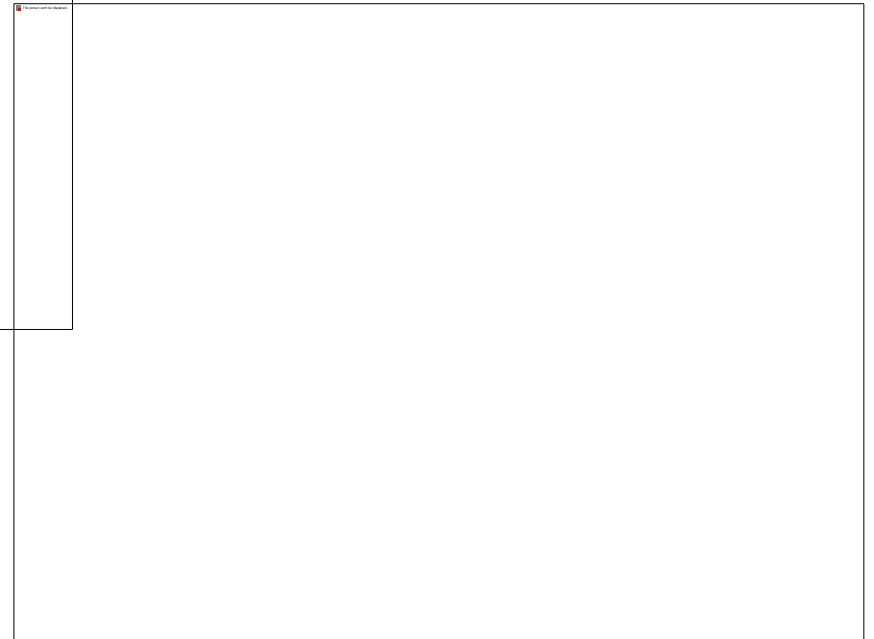
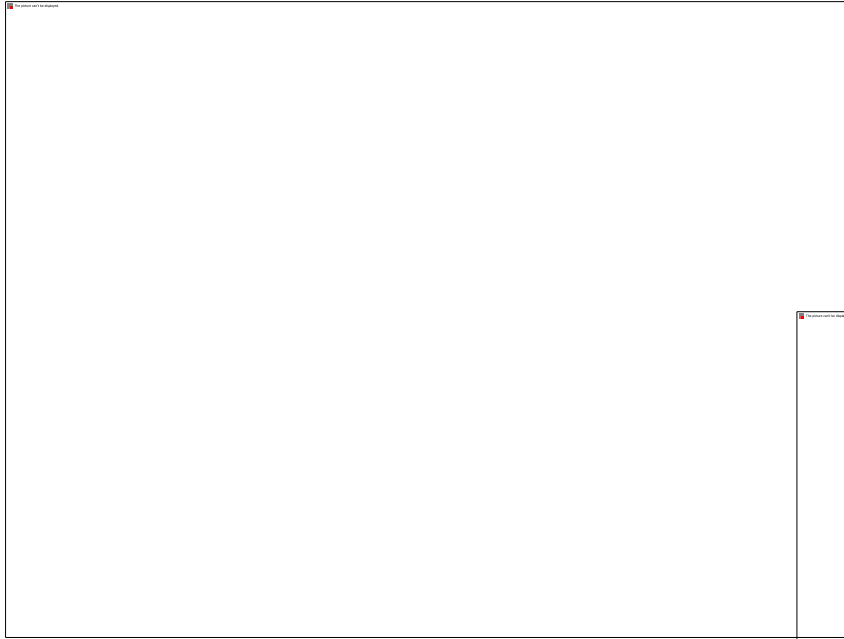
- September 2017
- Deliverables submitted
- Final review
- Move on to the next?
- NO!!
- Design workshop after project

3. Key Exploitable Result

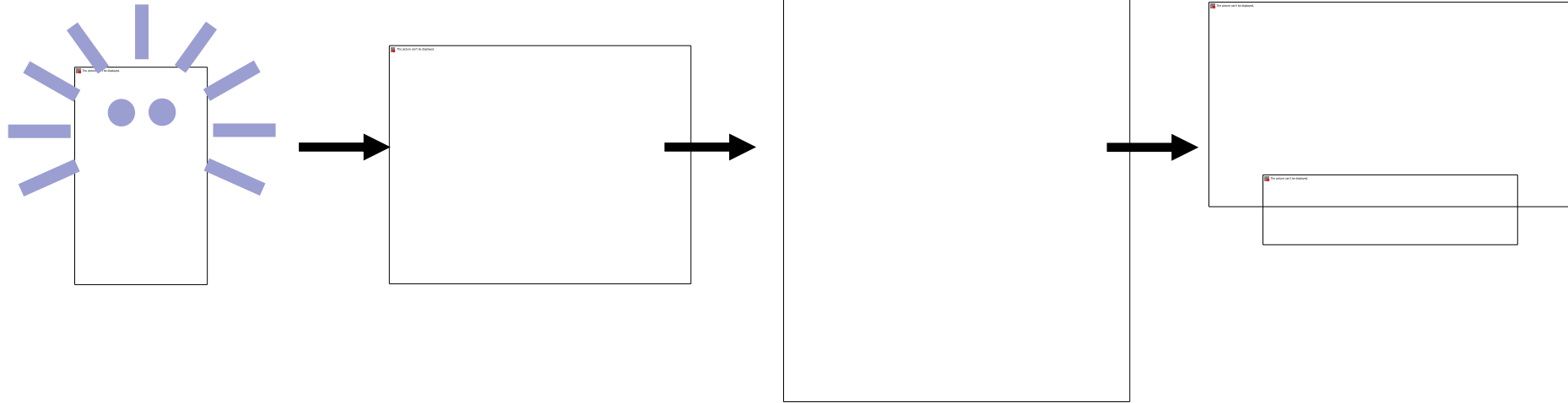
***RE Design
Early Design
Configurator***

3. RE Design in the STREAMER workflow

3. RE Design – practice before Streamer



3. RE Design- Current practice with...



3. Description of RE Design



Generating optimal designs for hospitals in an early phase based on a program of requirements and design rules by using genetic algorithms (artificial intelligence) for new built and refurbishment scenarios.

3. RE Design- Current practice characteristics

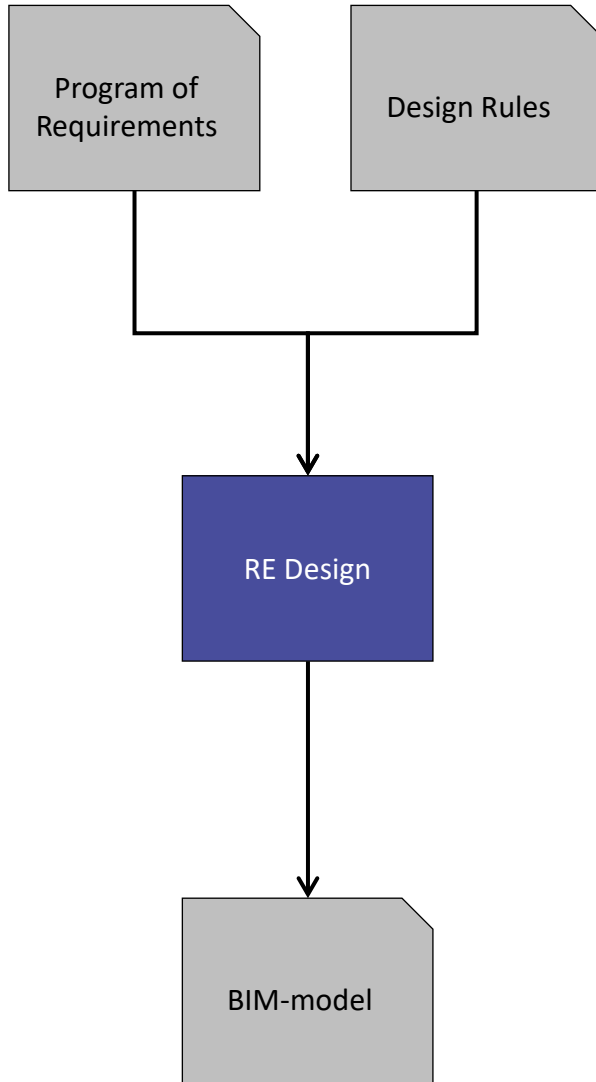
- Brief / Programme of Requirements
- Design Rules
- Building contours new & existing
- Early phase!! – Labels
- Brief by Briefbuilder

LABELS

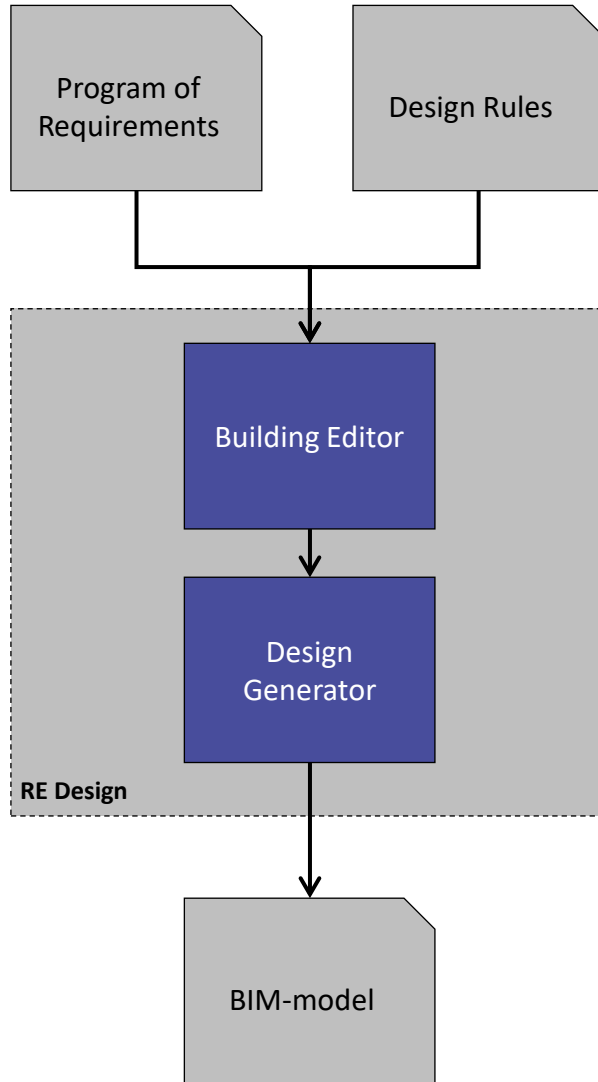
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DESIGN CONFIGURATOR

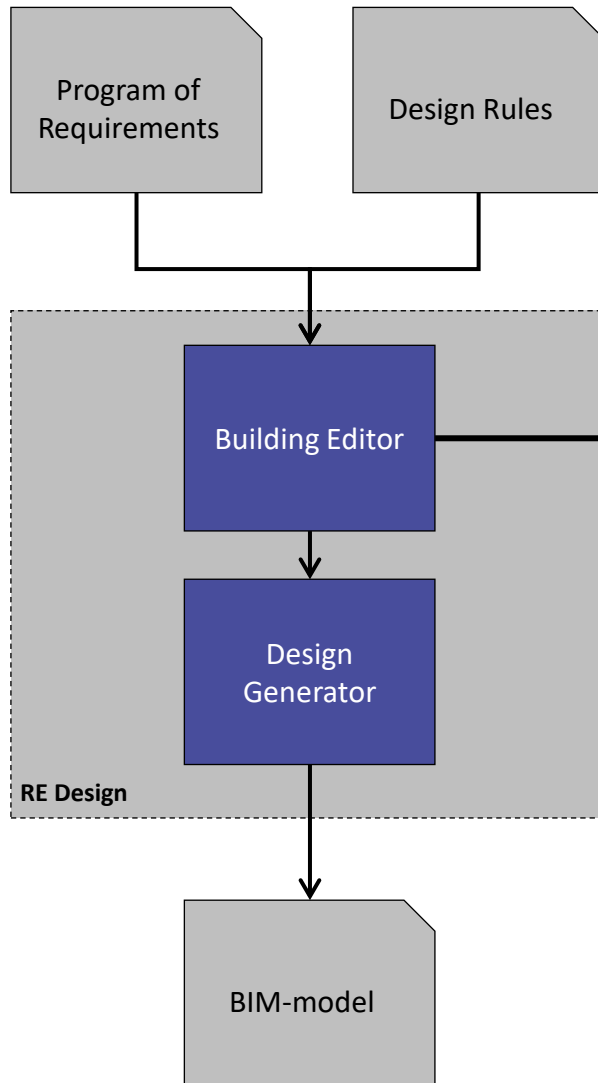
3. RE Design



3. RE Design

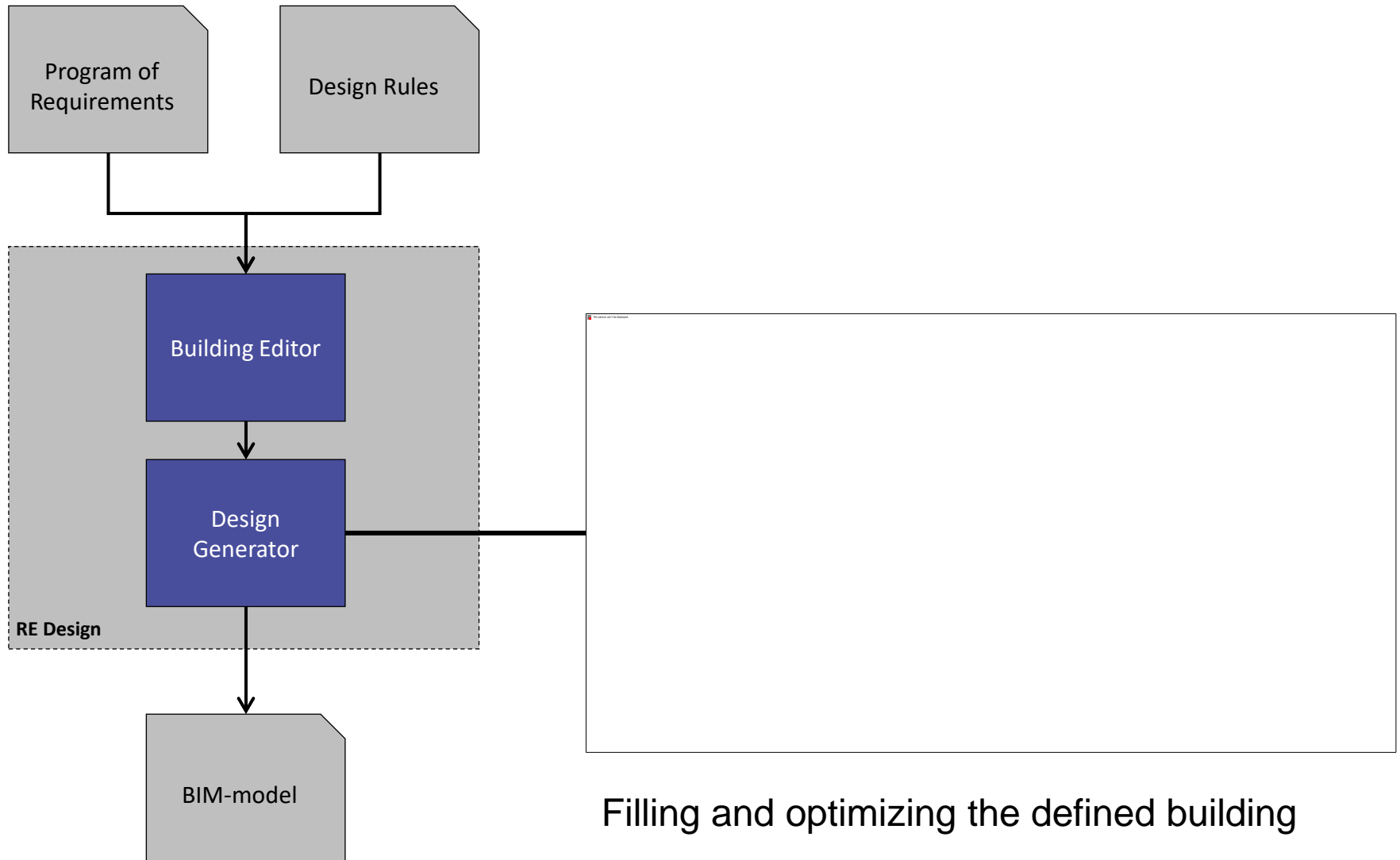


3. RE Design

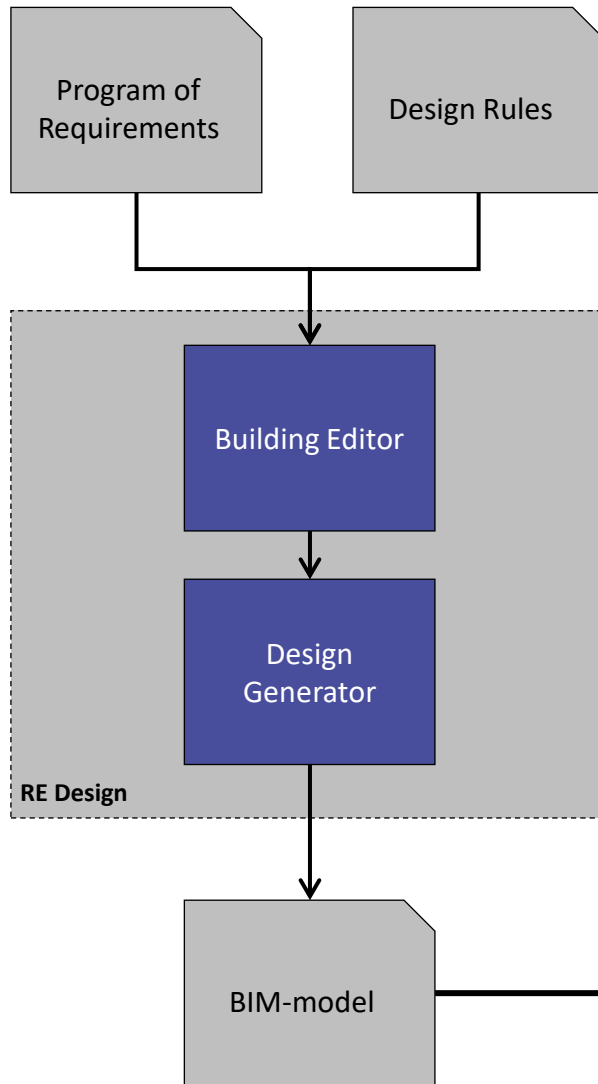


Defining the building shape, blocked building elements and traffic systems

3. Description of RE Design



3. RE Design

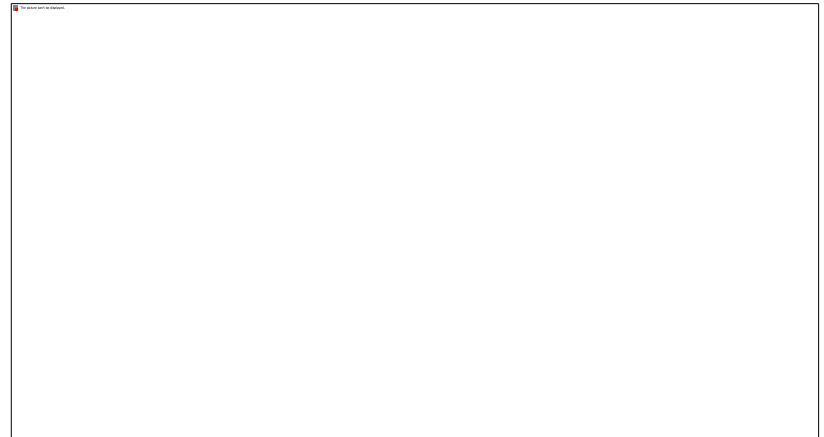
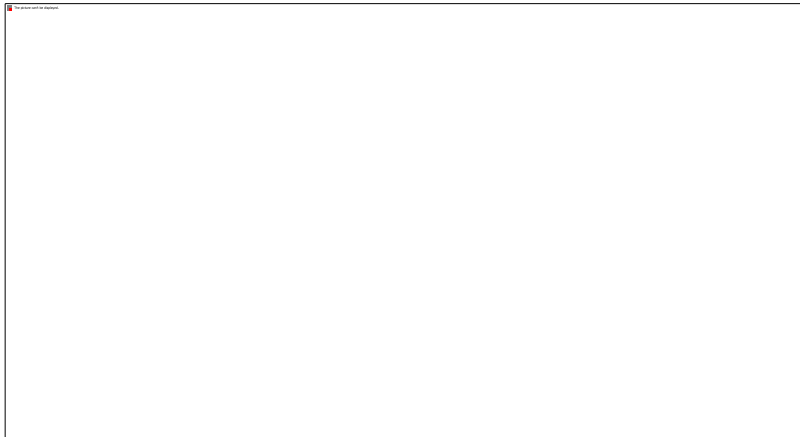


3. RE Design - Decision Support functionality

a decision-support tool that also addresses LCC considerations

Included research scope:

- **KPIs** for energy-efficient hospitals, focused on the **building level**
- **BIM interoperability** solution for existing energy simulation tools
- **User-friendly** dashboard for KPI analysis and **decision-support**

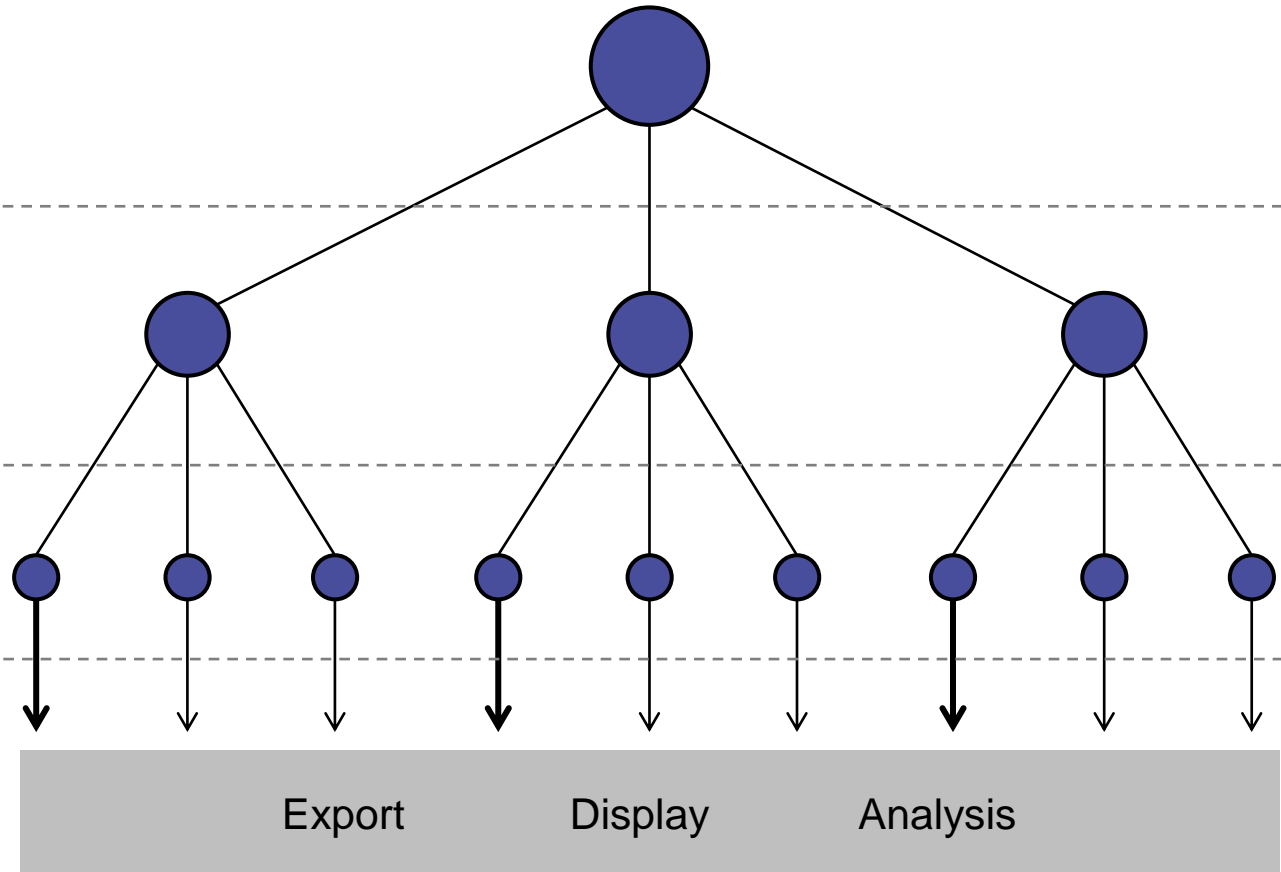


3. Case definition

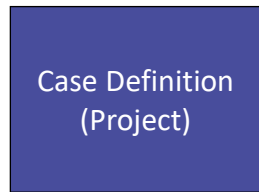
Case Definition

Case Alternative

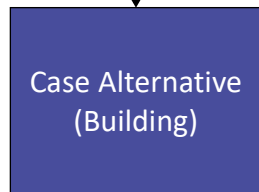
Case Optimization



3. RE Design - Case alternative definition



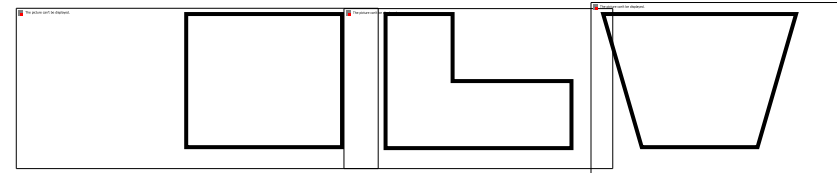
Rijnstate Hospital



Different Building Shapes

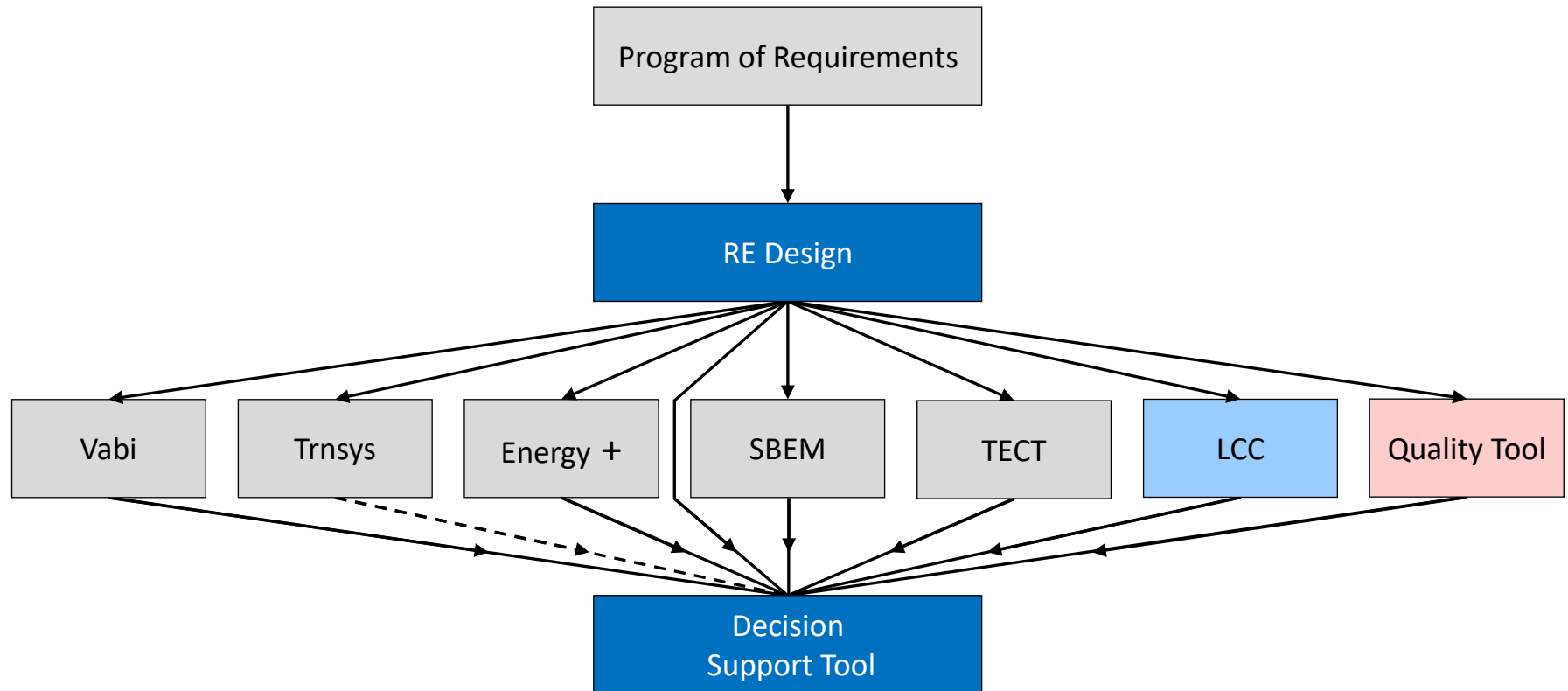


Different Design Rules

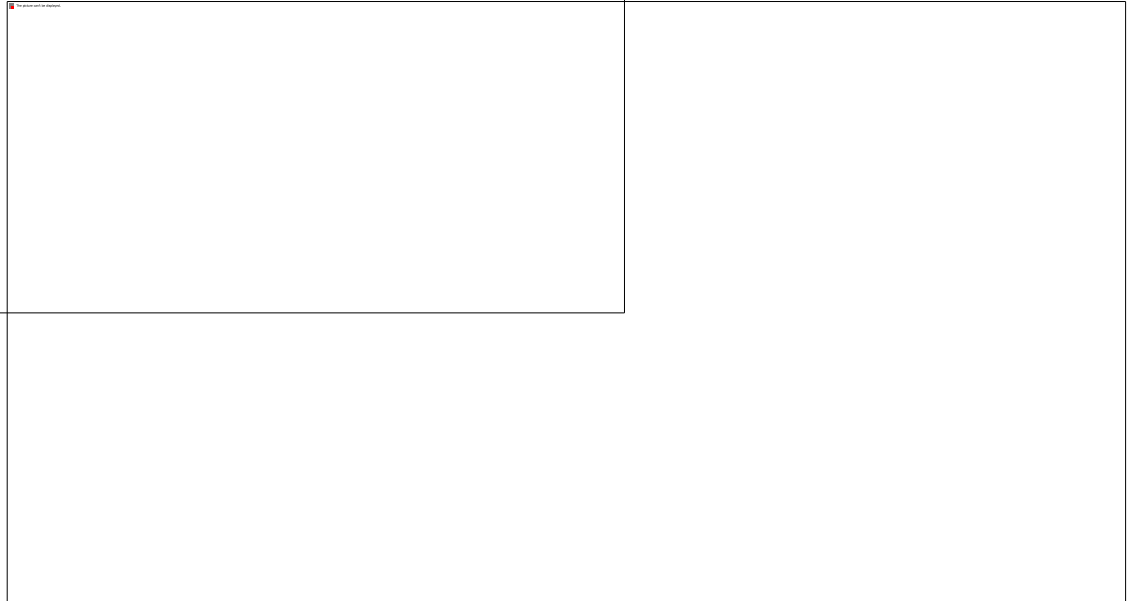
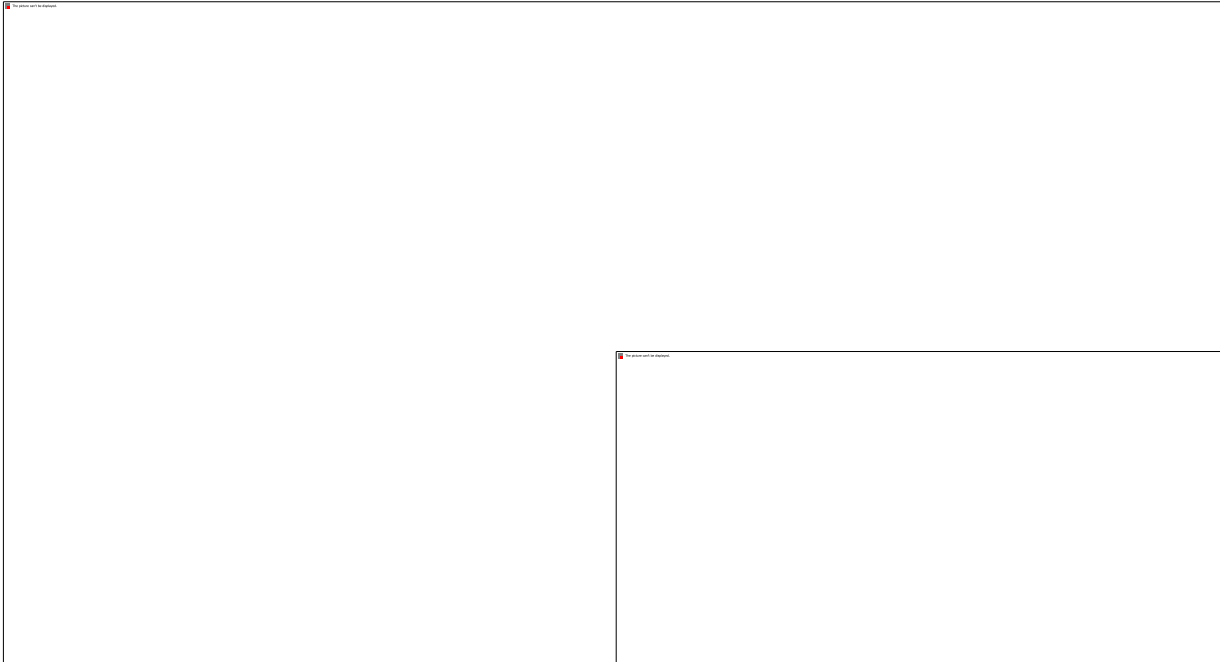


Functional Clustering
60:40 Room Proportions

3. RE Design - energy calculation



3. RE Design - Calculation of LCC



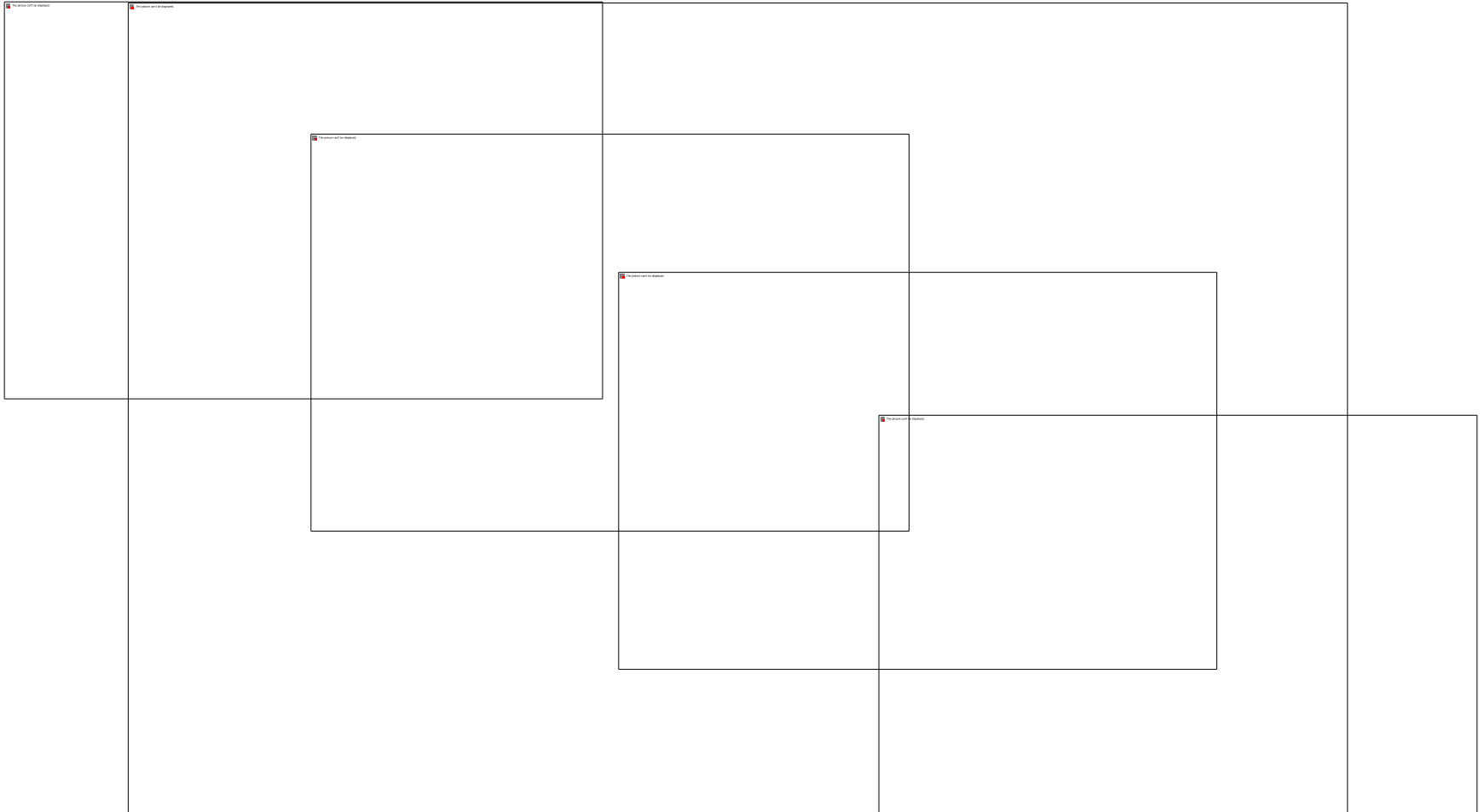
3. RE Design - MCA



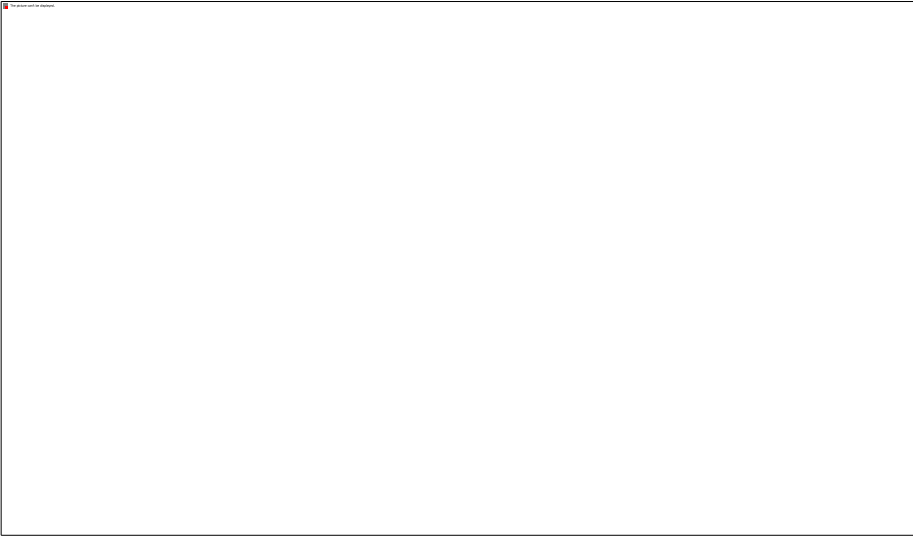
4. What happened afterwards?

- Organisation of a Design Workshop after finish of the project
 - Hesitating partners..
 - Non eligible
 - What is the purpose?
 - Etc. etc.
- Workshop October 2017

4. Workshop and Results



4. And then..

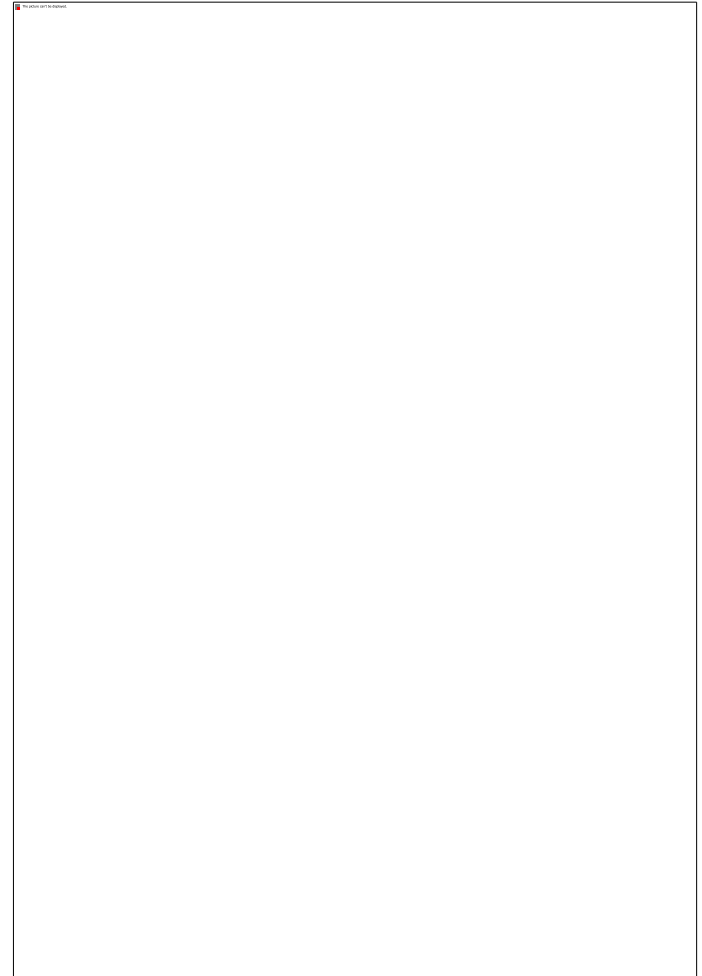
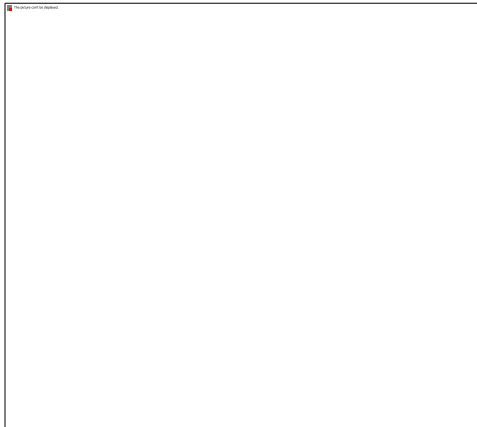


- Window dressing?
- 3 times new..



4. Order for implementation RE Design

- Hospital Pharmacy
- Approx. 2000 m2
- Refurbishment while running
- D&B contract
- Tender 3 consortia



4. Order for implementation of software RE Design

- Instruction and use
- Evaluation for bids

4. And then after the tender ?

- Software successfully used while tendering
- Software in use after selection of 1 contractor
- Software is used by Principle and contractor to optimize designs and validate them.
- **Additional assignment for DEMO for consultancy services and enhancement of the tool**
- The status this week..

4. The status



RE Suite

Intakeform | Over | Planning | **Design** | Calculat | Asset Management | Maintenance | Energie | Optimalis | Brandveilig | RisicoAnalyse | Verzekering | Technische | DEMO

Bestand - Bewerken - Vormaat - Gebouw - Optwerpgenerator - Optwerpbeveiler - Analyse - Dashboard beheer - Bestanden en instellingen - Help

Optimalisatie | 3D Visualisatie

Case definitie
Case alternatieven
Case optimalisatie

Gebouwidio
Gedownload

Pre-optimalisatiecheck
Optimalisatie

MEP & E&B Selector

Kwaliteit
Energie
LCC
MCA per case

Id Naam Case n

26 Zekerhuisapotheek - Geen Fasering 2
27 Zekerhuisapotheek - Fasering 1 2
28 Zekerhuisapotheek - Fasering 2 2

Naam: Zekerhuisapotheek - Fasering 2
Omschrijving:
Case alternatief: Zekerhuisapotheek - Fasering 2
Optimalisatiestatus: Aan het optimaliseren

Levels
Current
0

Status
Aan het optimaliseren

Totale programmaprojectvloer: 895.5 m2
Totale aantal te plaatsen ruimtes: 35
Geplaatste ruimtes: 35
Totale fitness: 95.56%
Geplaatste ruimtes fitness: 100%
Fasering fitness: 100%
Ruimteproportie fitness: 82.38%
Ontwerpregel fitness: 87.47%
Ruimteoppervlakte fitness: 100%

Stop

Design | RE_Suite_TPL12 | demo@re.nl | Administrator | DEMO Consultatie TPL12 | CAPS | N/A | V2.2.1005.34816

4. The status

- Hospital pharmacy will open in October 2019
- Symposium will be held at **2 October** in Arnhem
 - Show the operational new building
 - Show RE Design that was used in this process
 - Explain the process and used artificial Intelligence
 - Share the lessons learned with the community
- Showcase for Hospitals
With Rijnstate as ambassador
- From Hospitals to ?

5. Commercialisation Key Elements take outs

1. A Mind is like a parachute (the same goes for BIM!).
2. Start as soon as possible to involve / engage stakeholders / target groups during your research project!!
3. Keep a sound balance between shared objectives and your own objectives
4. Build relationships and work on it
5. If it doesn't have added value for end users, forget about it..
6. Formulate your own goals related your own core business, communicate transparently, make unambiguous agreements, be persistent, have a plan B and C... and be patient..
7. Keep in mind that it should fit to your company profile
8. Use a step by step approach
9. **Don't underestimate the value of a launching customer!!**

Just one more question..

Wanna Buy?

Colophon

PowerPoint: RE Design
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Version: 1.0

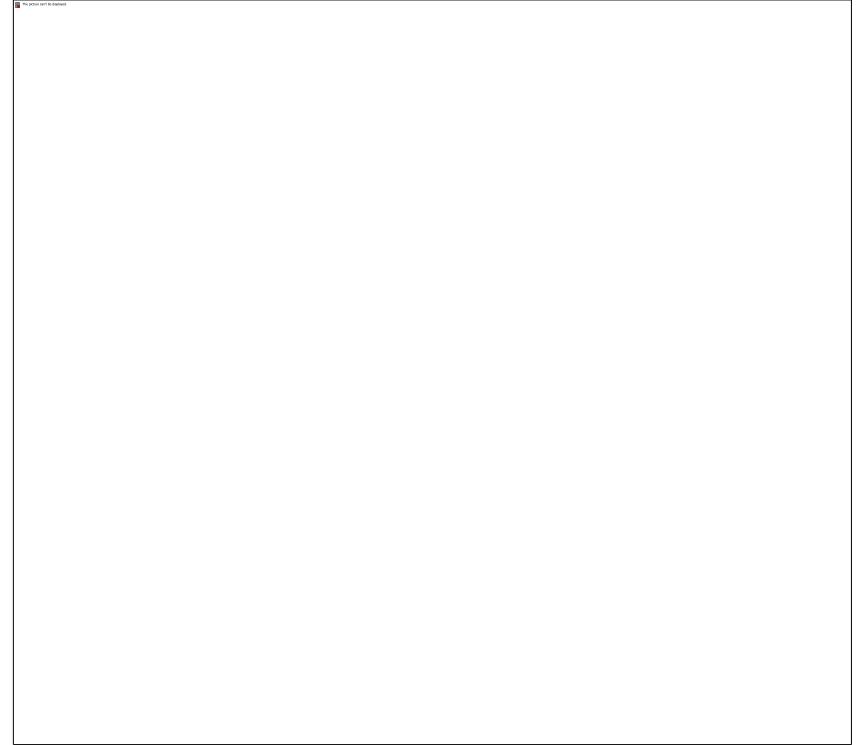
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1. RE Suite – Real Estate Suite



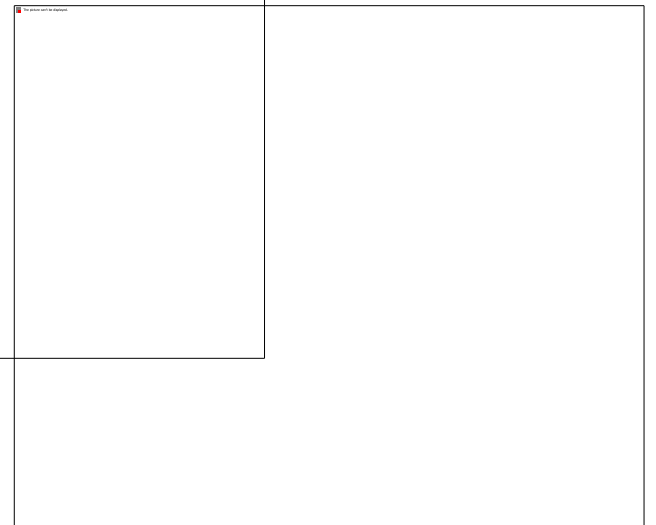
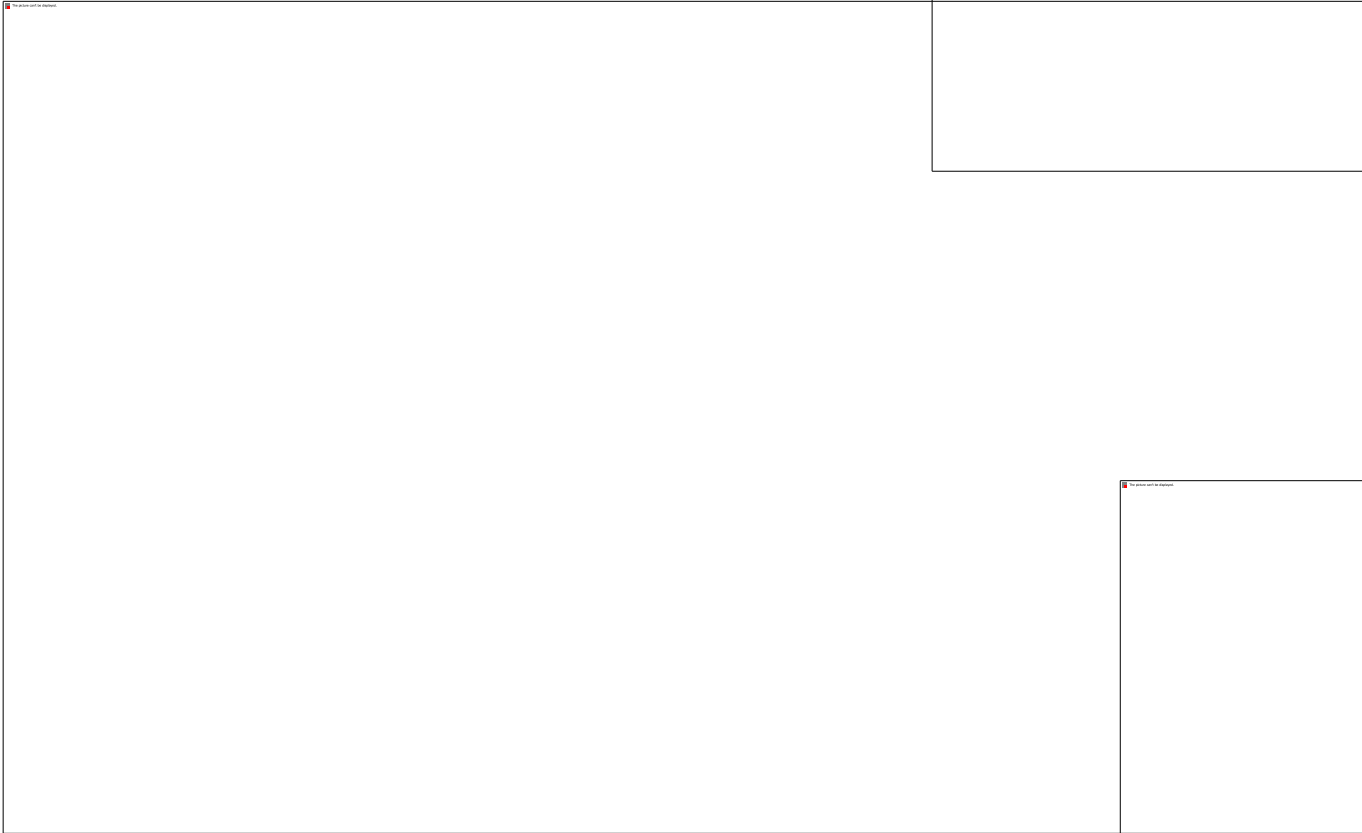
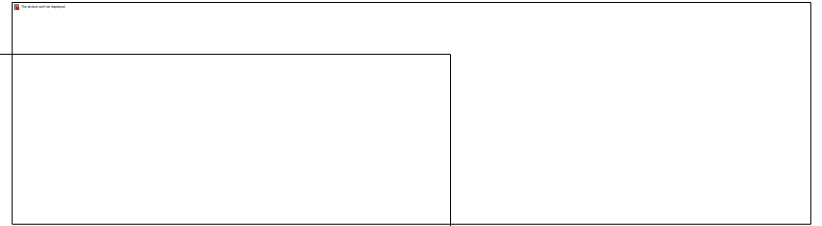
7. BIM / IFC



7. Energy



7. Maintenance



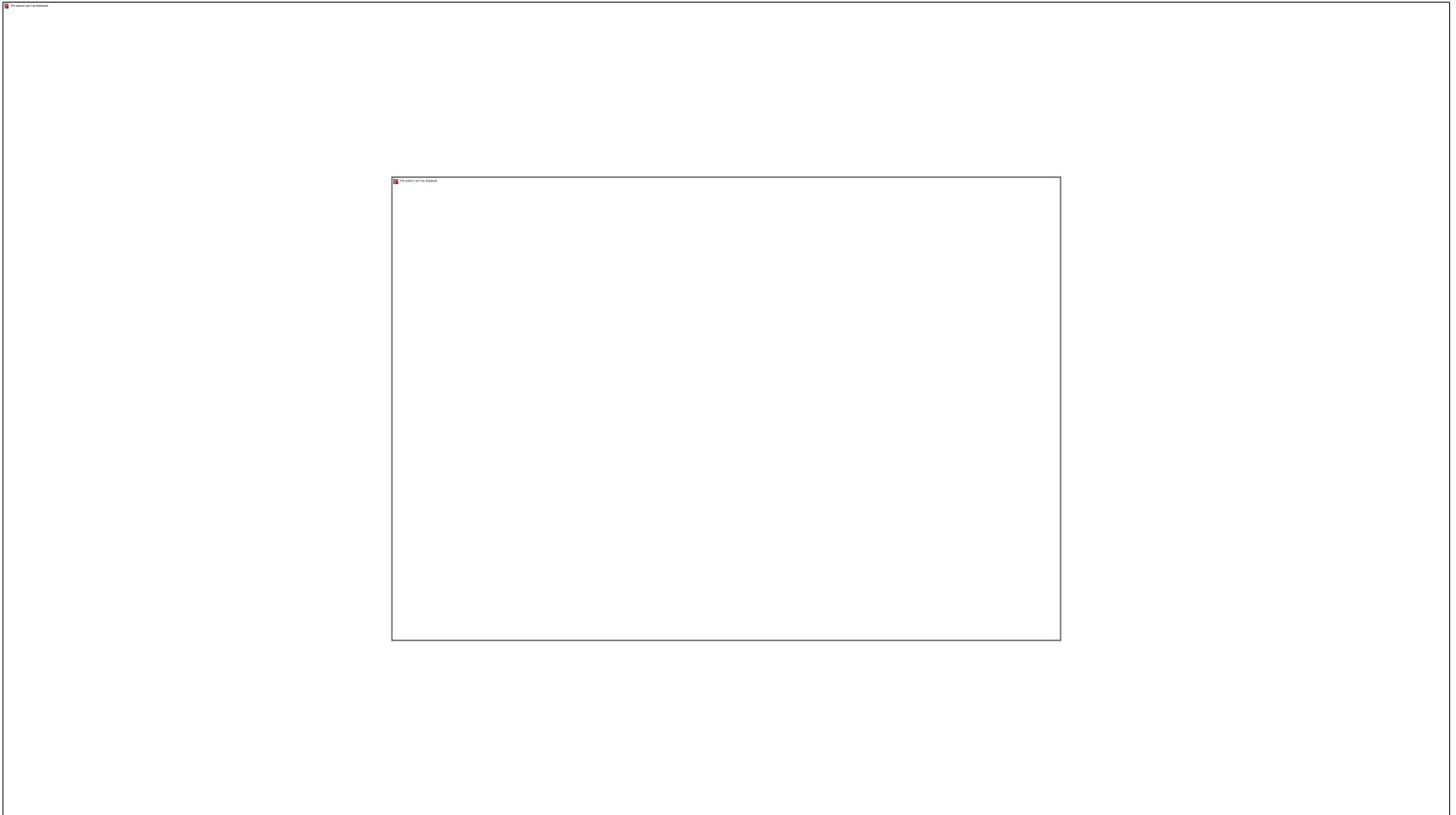
7. Cashflow en costs



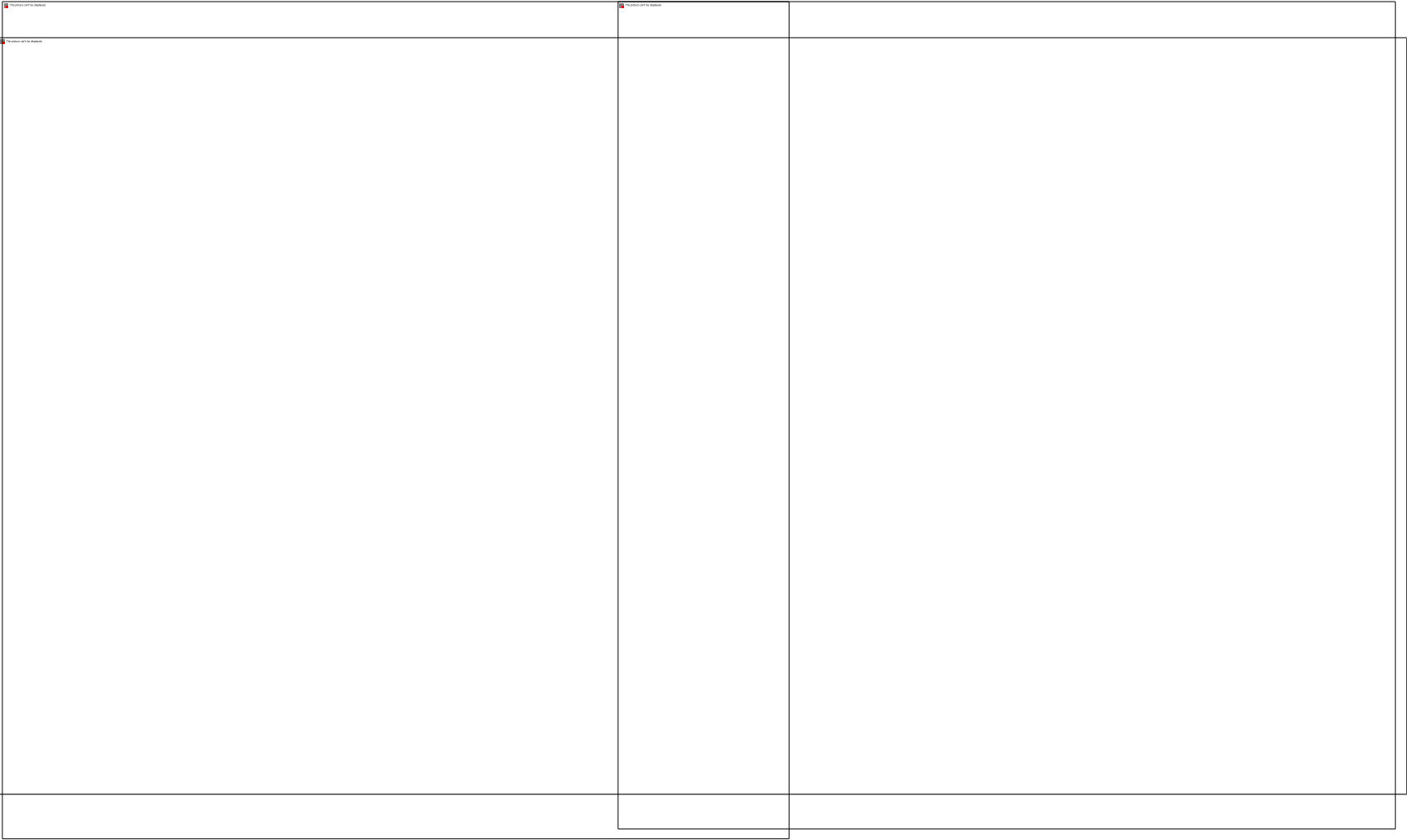
7. In depth insight in data and information



7. Risk management



7. Dashboard



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