TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Semergy – neue Ansätze in der Planung energieeffizienter Gebäude

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11. ZIG-Planerseminar 25.03.2015

SEMERGY

Building physics TU WIEN Building ecology

ifs Information & Software Engineering Group

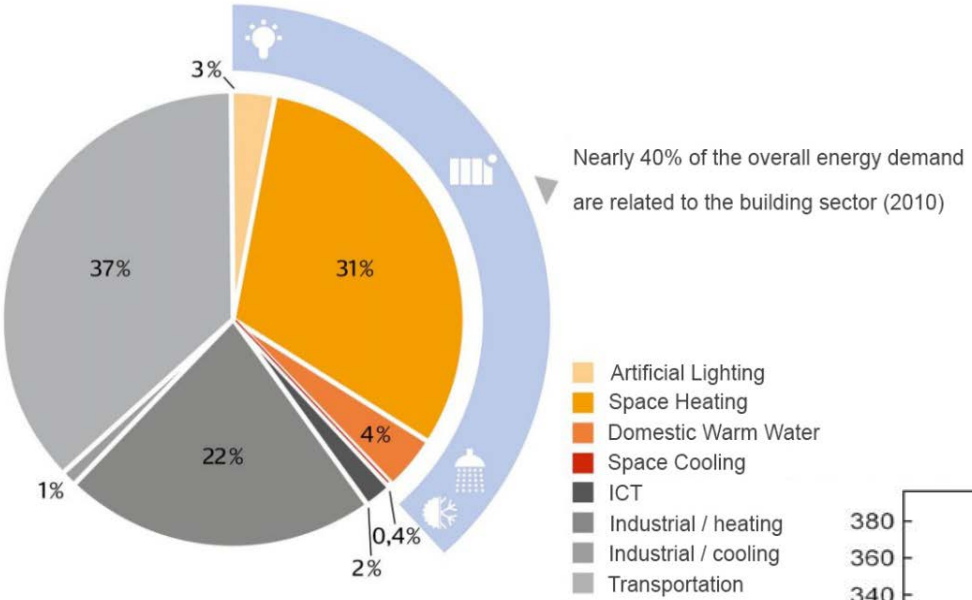
SEMERGY

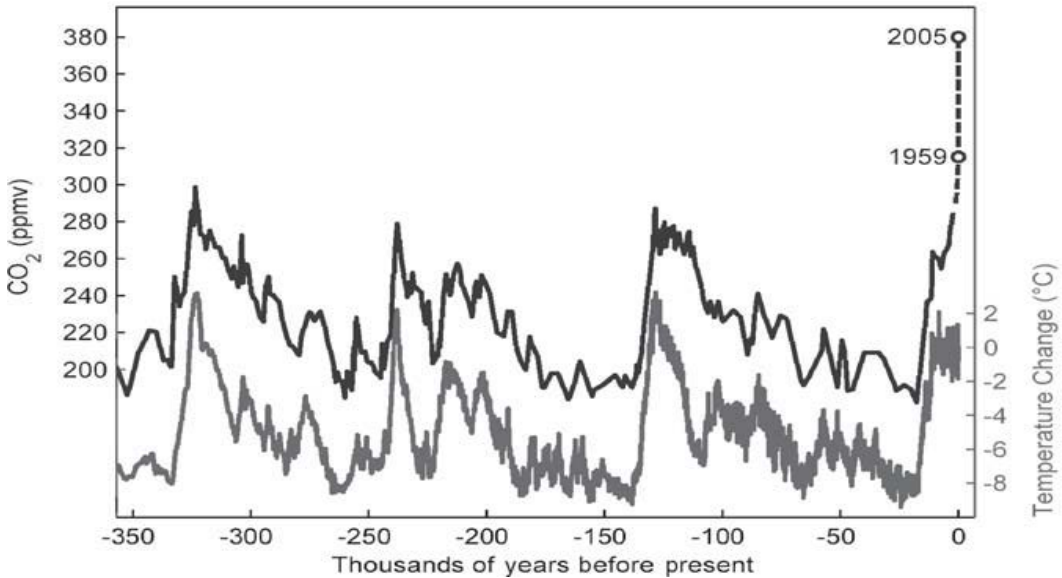
Inhalt:

- Idee & Motivation
- System-Architektur
- Gebäudedatenmodell
- Vorlagen & Alternativen-Generierung
- Semantisches Web & Ontologien
- Berechnungs & Simulation-Engines
- Optimierung
- GUI | Benutzeroberfläche
- Demo

SEMERGY

Idee & Motivation:





Wohlbekannte

- Klimafakten
- Energiefakten
- Gebäudefakten

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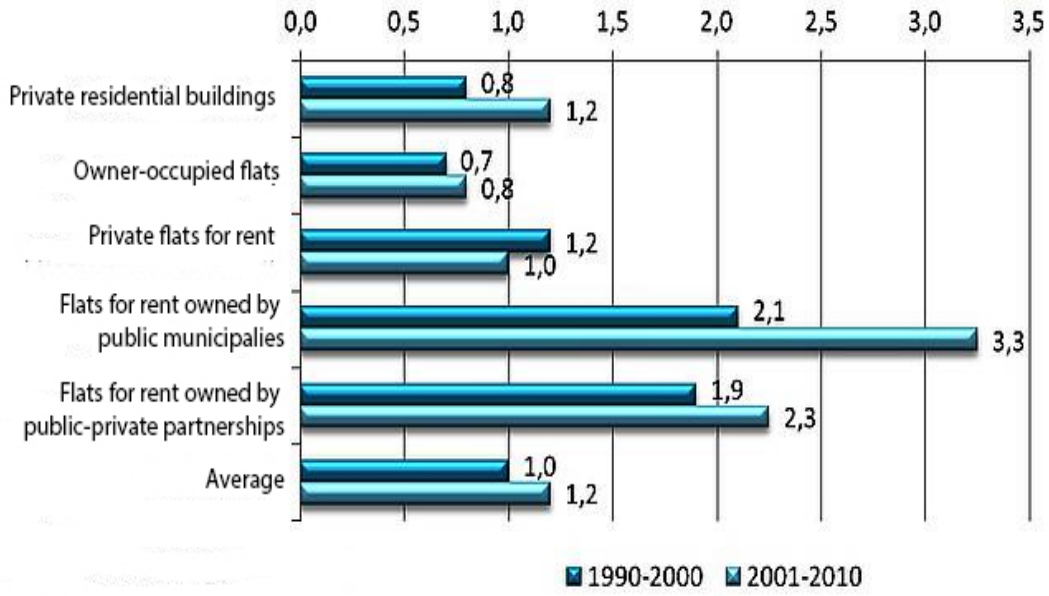

- Kleiner Anteil von Neubauten
- Retrofit-Rate sehr gering
- In Ö: nur 60% der Sanierungsmaßnahmen thermische Sanierungsmaßnahmen

- Suboptimale Lösungen & verlorene Möglichkeiten

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Idee & Motivation:

- Hohe Komplexität für Planer und Bauherrenschaft

- Große Anzahl an verschiedensten Informationsbündeln erforderlich (Bauteile, HVAC, gesetzliche Rahmenbedingungen, Förderungen, Klimadaten, …)

- Viele Daten im WWW (z.T. for free)

- Manuelle Suche: ermüdend | fehleranfällig | zeitraubend

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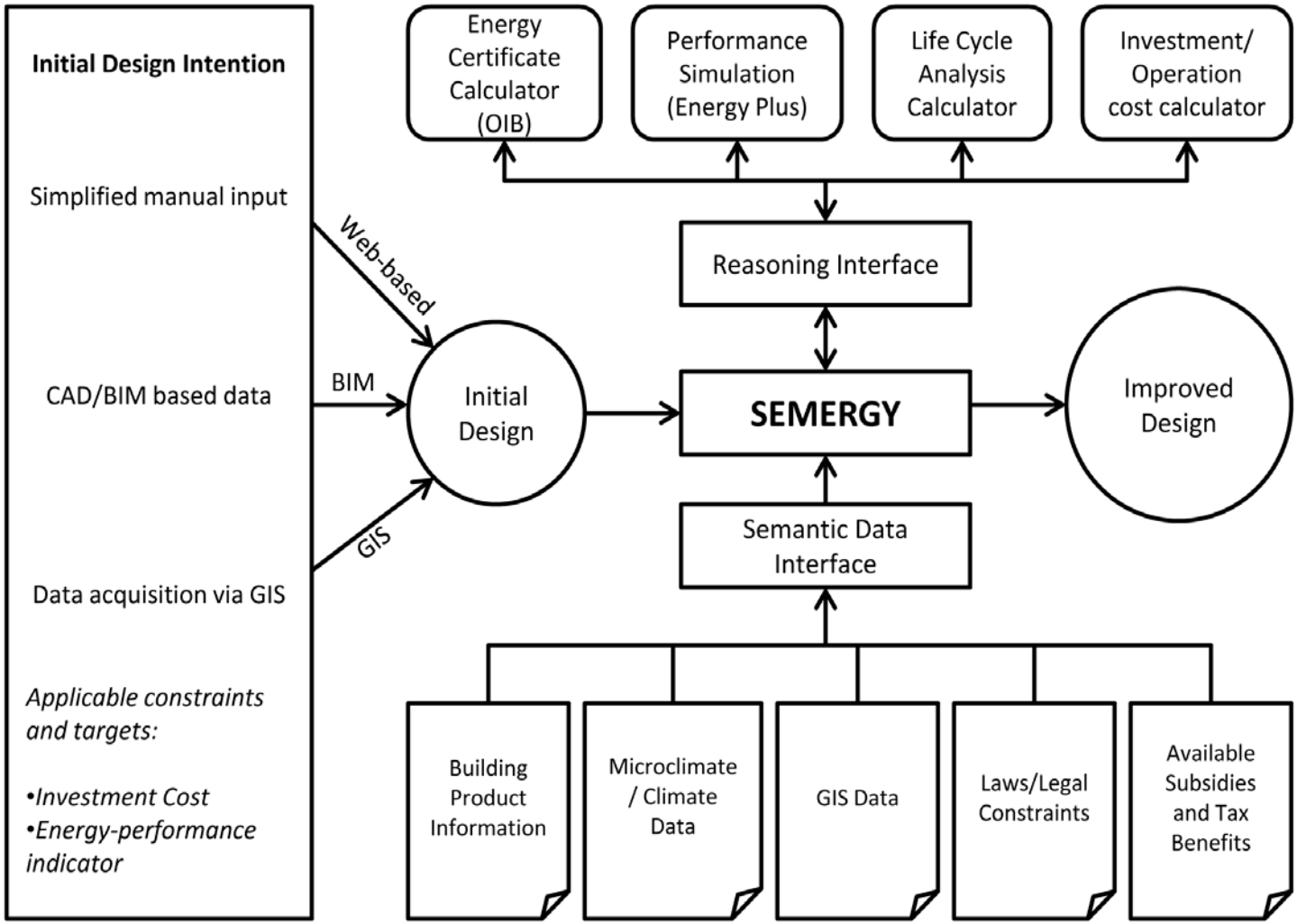
System-Architektur:



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Gebäudedatenmodell:

	IFC	gbXML	SOM
First appearance	1995	Around 2000	1995
Basic Approach	Generation of a general data model to be used throughout the whole life-cycle of a building by different stakeholders.	Facilitated date exchange between drawing and analysis tools	Bottom-Up approach of a building data representation tailored to the requirements of a number of technical analysis applications.
Subschemes	no	no	yes
Object-orientated	yes	yes	yes
Extensibility	yes	no	yes
Space-based structure	Partial (conversion and postprocessing efforts necessary	yes	yes
Enclosure simplification to 2D-entities	yes	yes	yes

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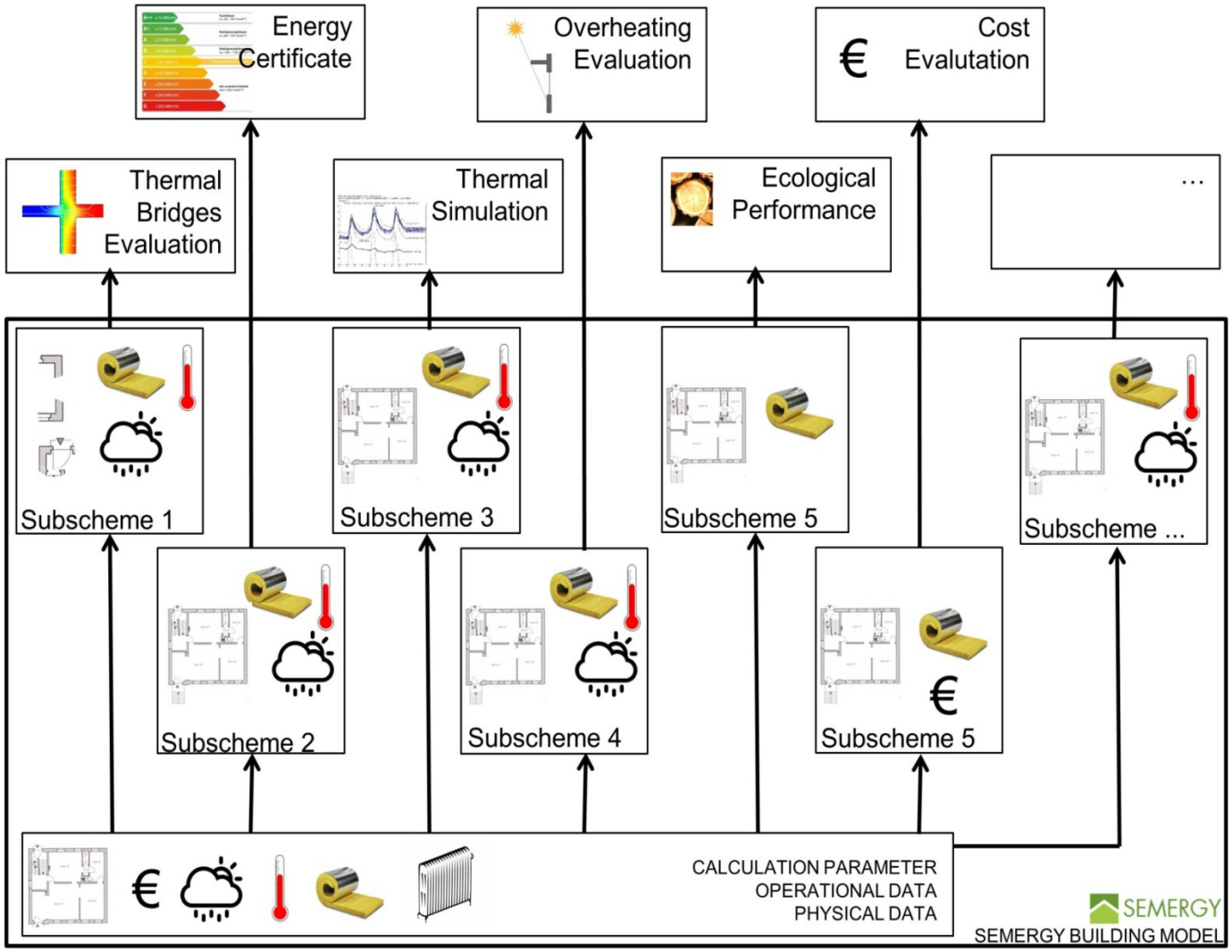
Gebäudedatenmodell:



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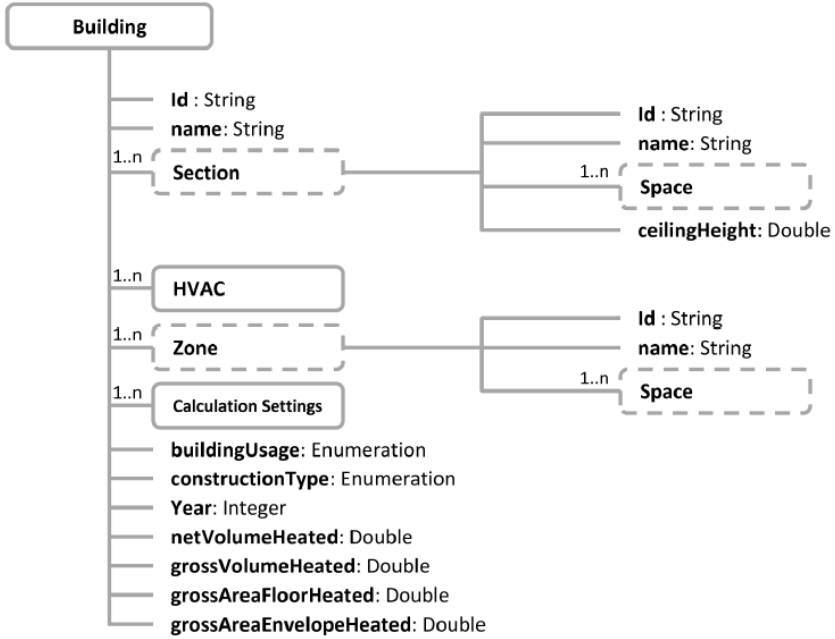
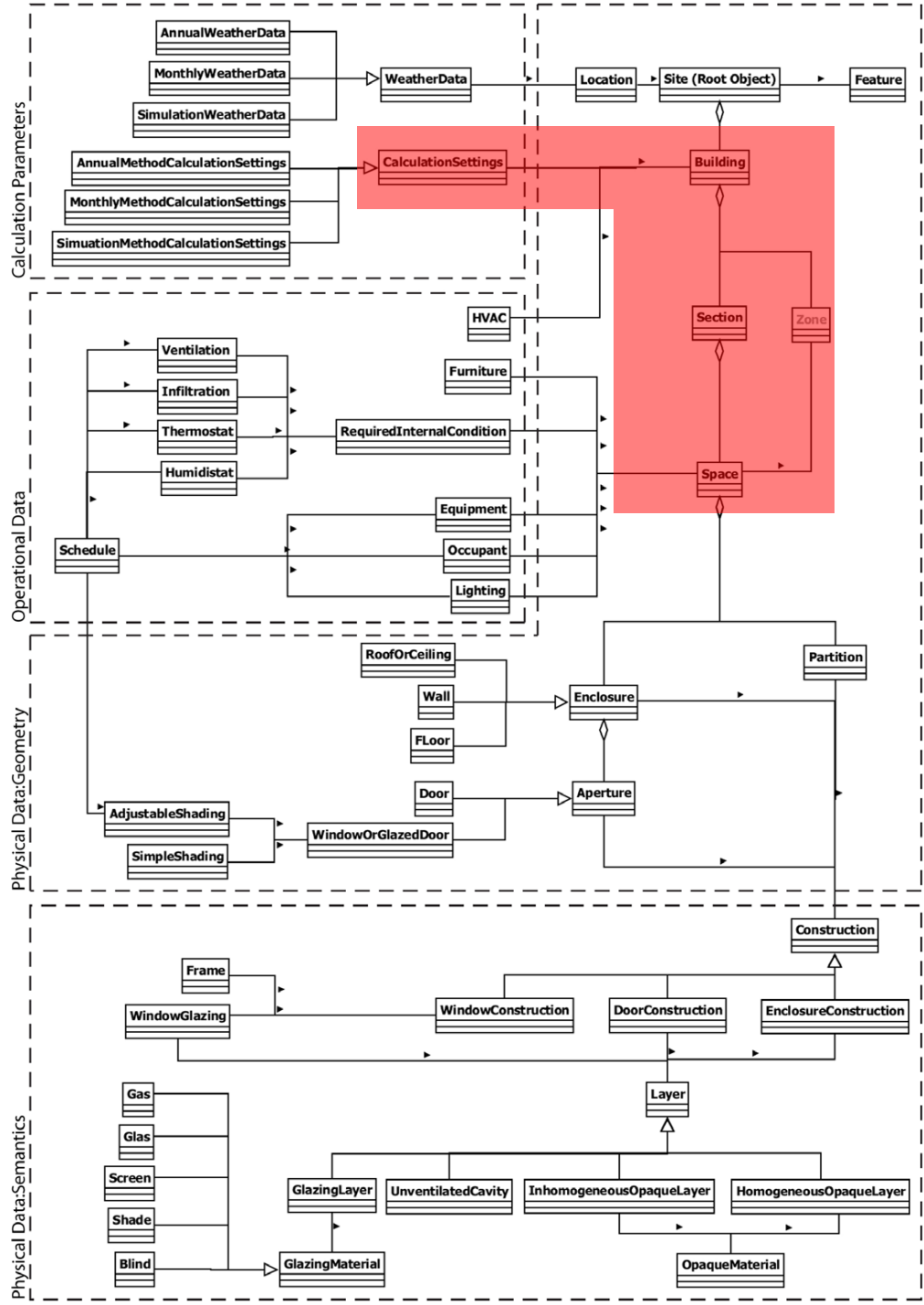
Gebäudedatenmodell:





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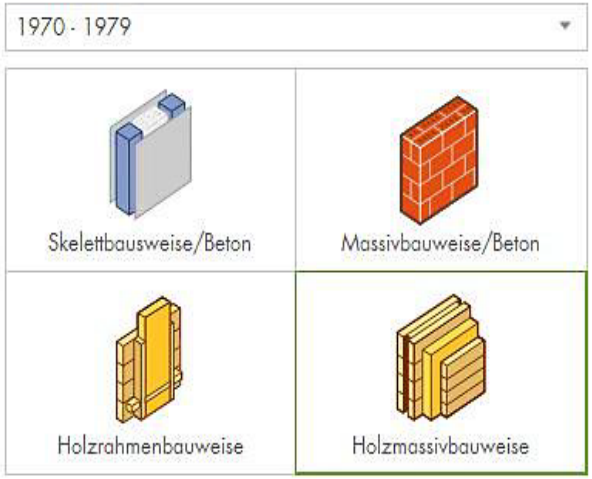
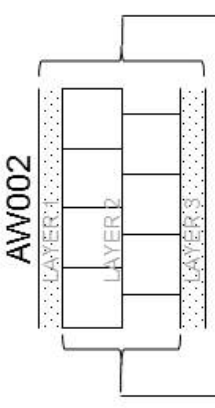


Vorlagen & Alternativen-Generierung:

Templates (as stored in the SEMERGY environment)



SEARCH PARAMETERS

MAIN CONSTRUCTION METHOD:
MMB (Massive, Masonry or Concrete)
Determined by building construction template

FUNCTION:
Sem_Massiv
POSITION:
Sem_Aussenwand_Normal
FORMAT:
Sem_Formstabil
Determined by layer properties

Building Material / Building Product Repository / ONTOLOGY

Query results of product (categories) for layer 2 of AW002:
ID_8234: Betonhohlsteinmauerwerk
ID_8235: Betonsteinmauerkwer
ID_8239: Leichtbetonsteinmauerwerk (mineralischer Zuschlag)
ID_8240: Leichtbetonsteinmauerwerk (synthetischer Zuschlag)
ID_8236: Kalksandsteinmauerwerk
ID_8242: Natursteinmauerwerk
ID_8241: Porenbetonsteinmauerwerk
ID_8228: Hochlochziegelmauerwerk
ID_8232: Verfüllziegel
ID_8201: Baustellenbeton
ID_8202: Transportbeton
ID_8220: Wandelemente aus Leichtbeton (mineralischer Zuschlag)
ID_8221: Wandelemente aus Leichtbeton (synthetischer Zuschlag)
ID_8218: Wandelemente aus Normalbeton
ID_8222: Wandelemente aus Porenbeton
ID_8223: Wandelemente aus Stahlbeton
ID_8225: Wandelemente aus Ziegel

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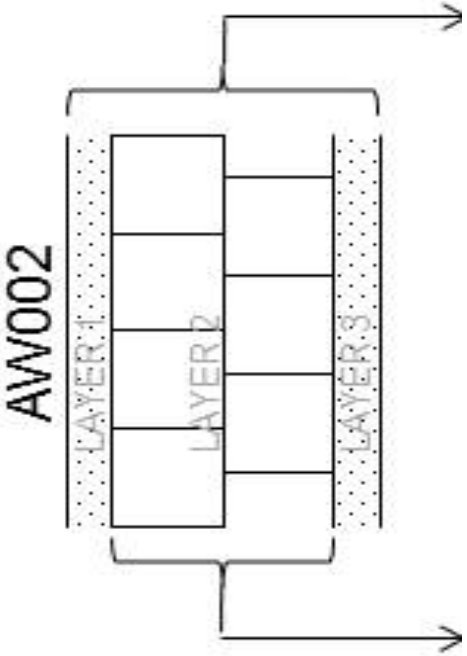
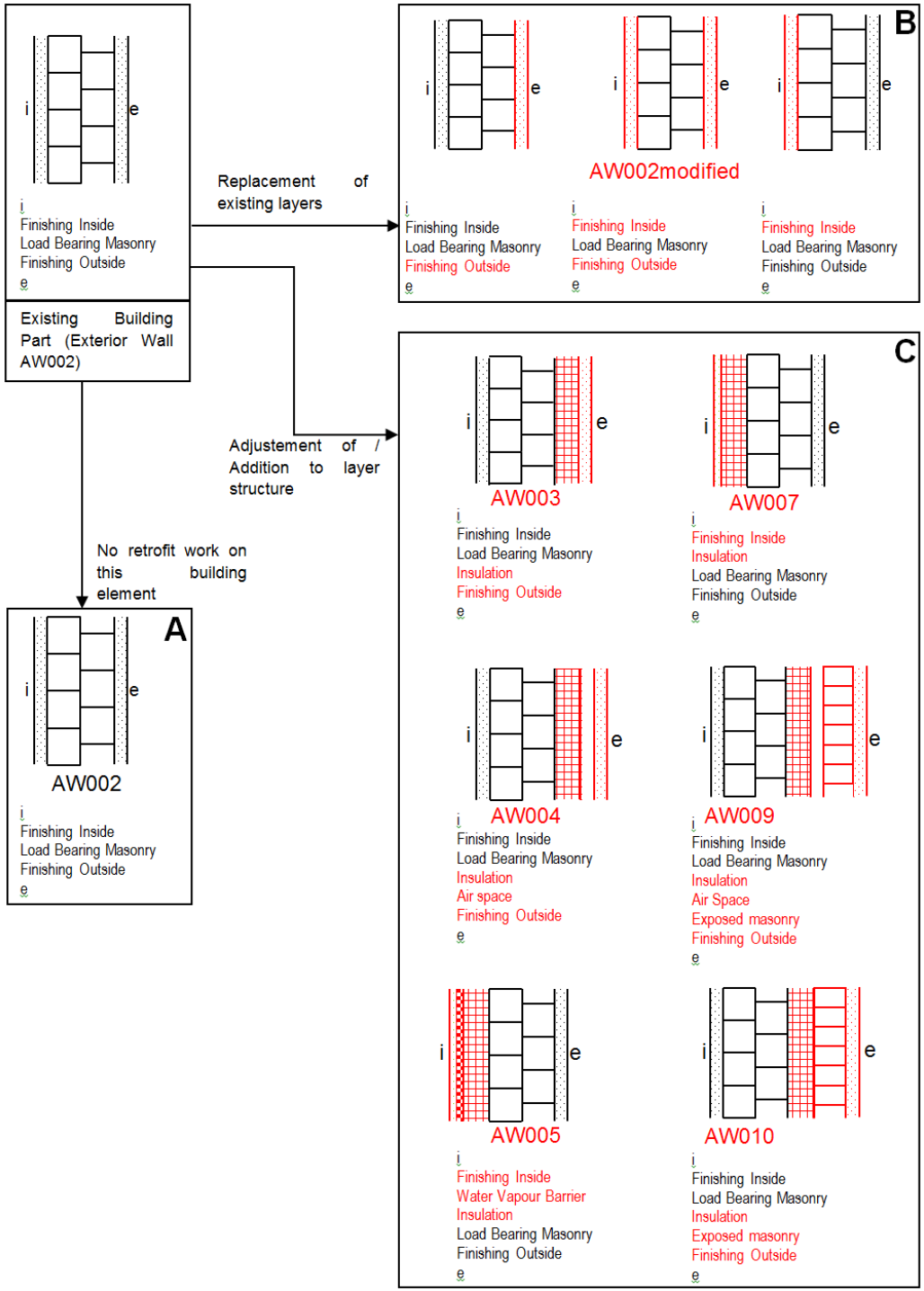
Vorlagen & Alternativen-Generierung:





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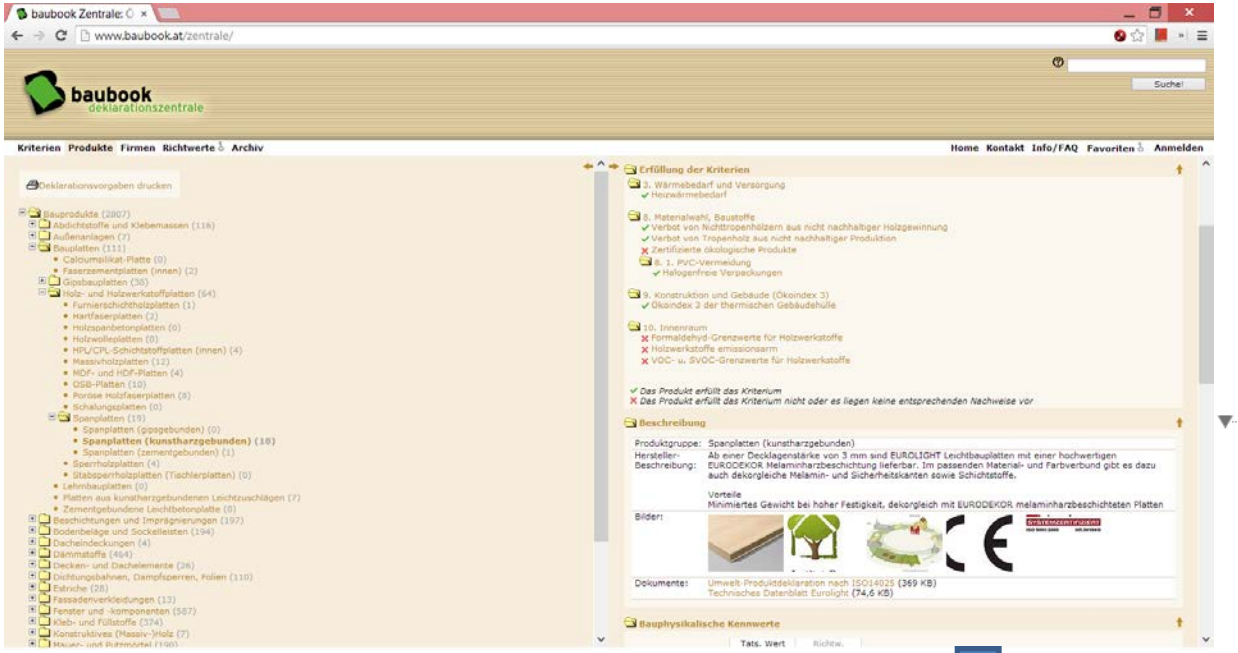
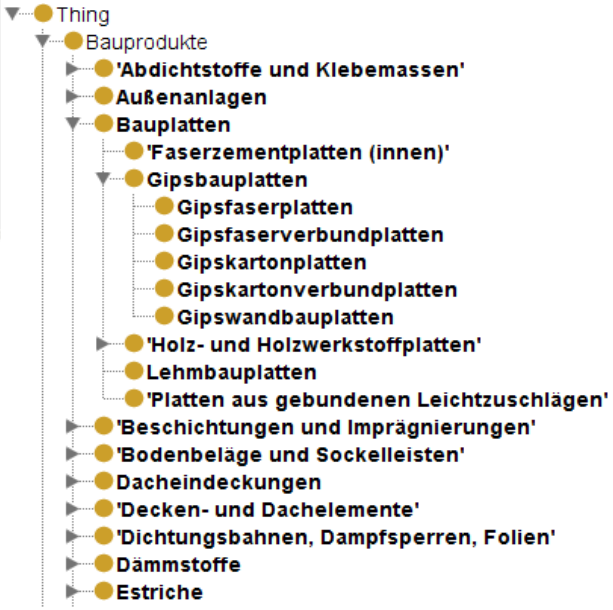
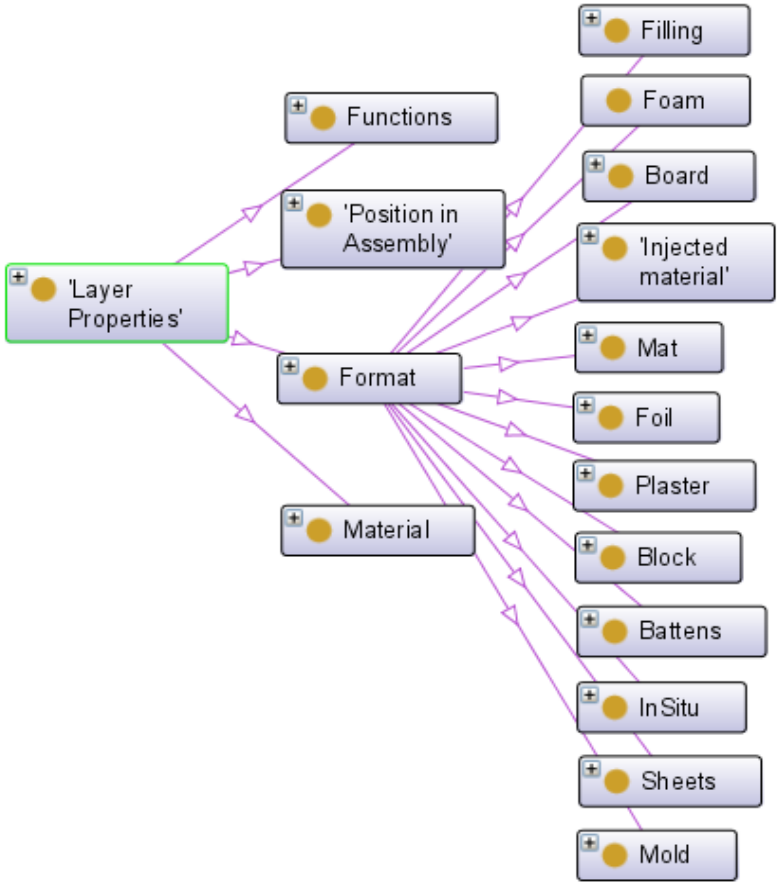
Semantisches Web & Ontologien:





Semantisches Web & Ontologien:

```
<owl:NamedIndividual rdf:about="#solidwood_2142705277">
  <rdf:type rdf:resource="#SolidWood"/>
      <rdfs:label l:lang="de">Brettsperrholzplatte</rdfs:label>
  <rdfs:comment xml:lang="de„>  Großformatige Massivholzpaneele aus
     Kreuzweiseverleimten Brettlagen ...
  </rdfs:comment>
  <semergy:heatTransferCoefficient>0.12</semergy:heatTransferCoefficient>
  <semergy:acidificationPotential>0.00341</semergy:acidificationPotential>
  <semergy:notRenewablePEI>8.04</semergy:notRenewablePEI>
  <semergy:gloablWarmingPotential>-1.26</semergy:gloablWarmingPotential>
</owl:NamedIndividual>
```



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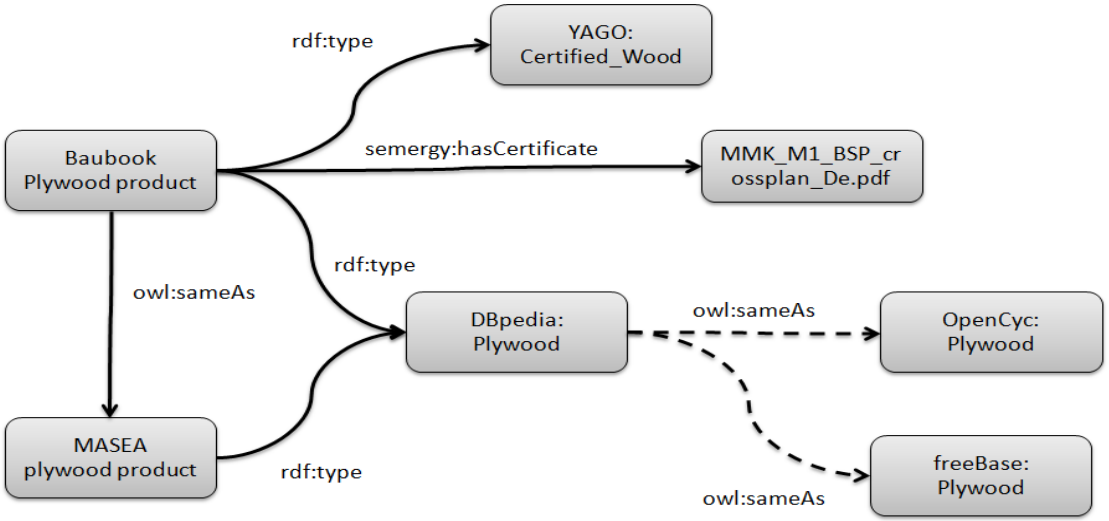
Semantisches Web & Ontologien:




```
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    <rdf:type rdf:resource="yago:Certified_wood"/>
    <rdf:type rdf:resource="dbpedia:Plywood"/>
    <owl:sameAs  rdf:resource="semergy:#masea_sperrholz_1"/>
    <semergy:hasCertificate rdf:resource="#M1BSPcrossplan_certificate"/>
</owl:NamedIndividual>

<bibo:LegalDocument   rdf:about="#M1BSPcrossplan_certificate">
  <bibo:uri>
     http://www.mm-kaufmann.com/fileadmin/ablage/dokumente/MMK_M1_BSP_crossplan_De.pdf
  </bibo:uri>
</bibo:LegalDocument>
```
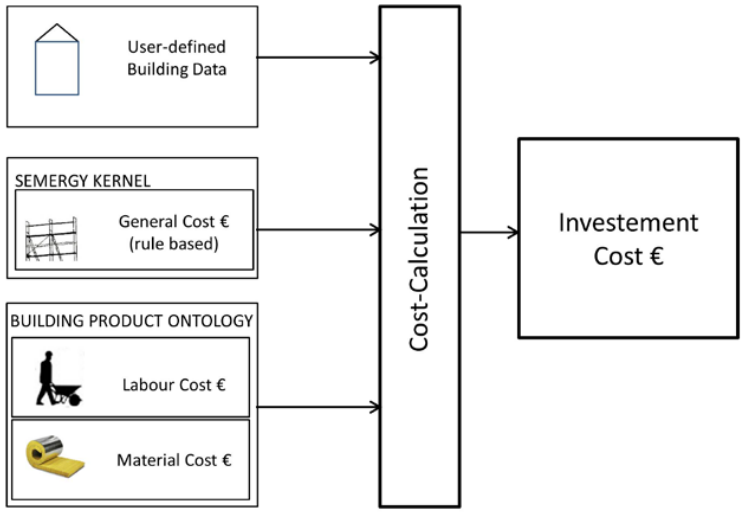

Berechnungs & Simulations-Engines

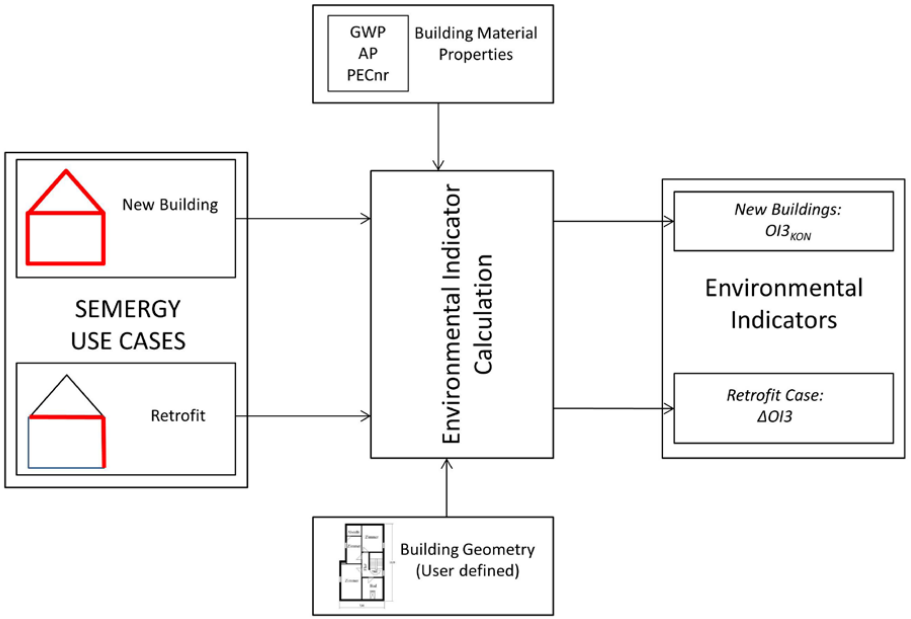
- Annual heating demand (HWB)

$$Q_H = (Q_T + Q_V) - \eta \cdot (Q_i + Q_S)$$

- Investment Cost (€)



- Ecological footprint (OI3)



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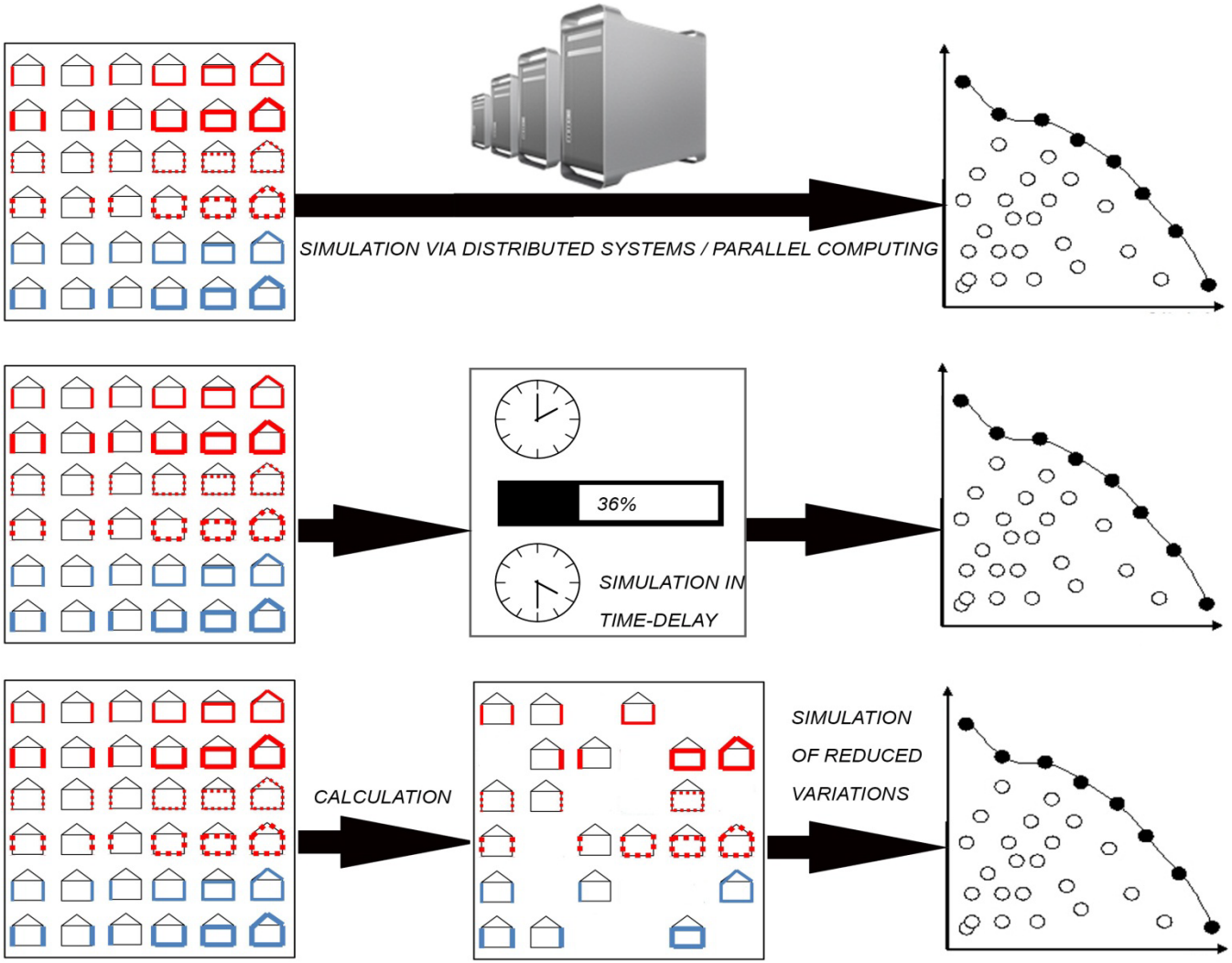
Berechnungs & Simulations-Engines



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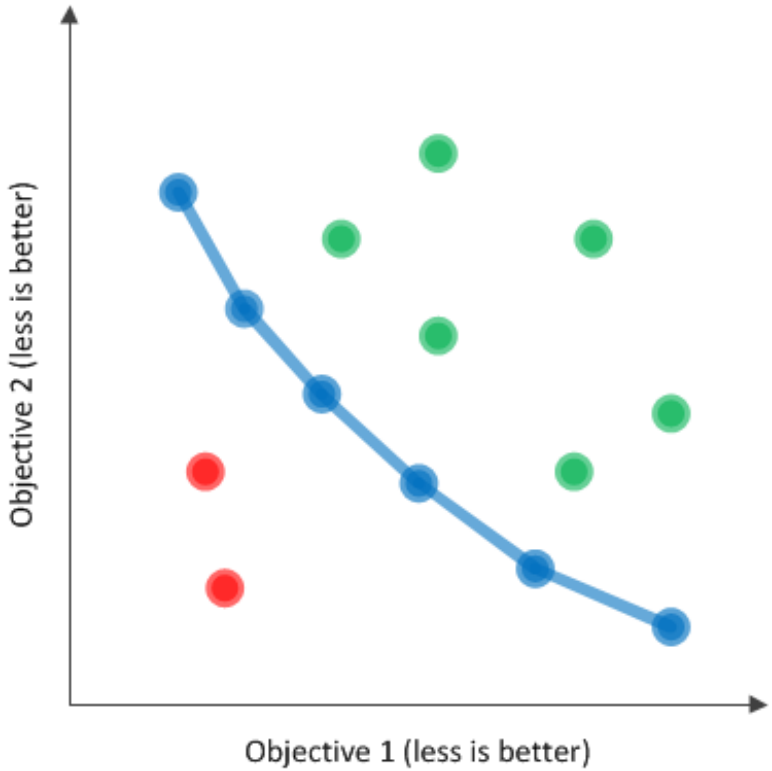
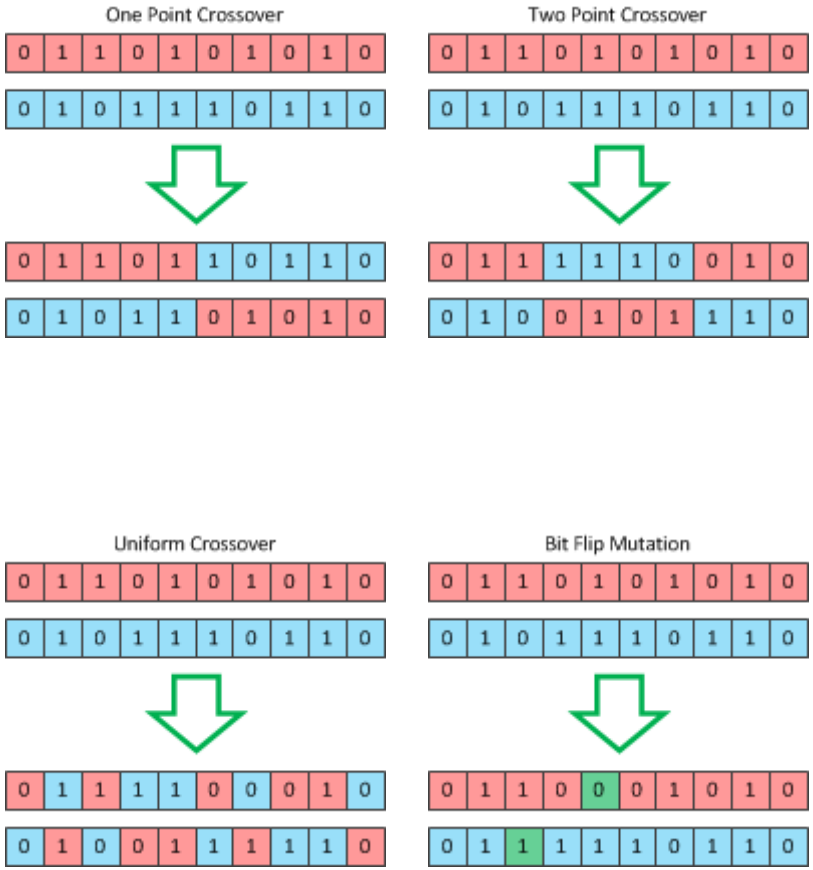
Optimierung:





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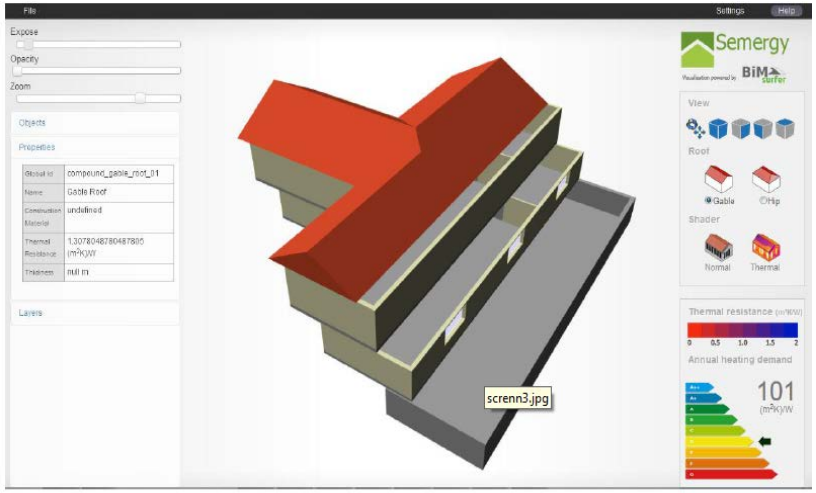
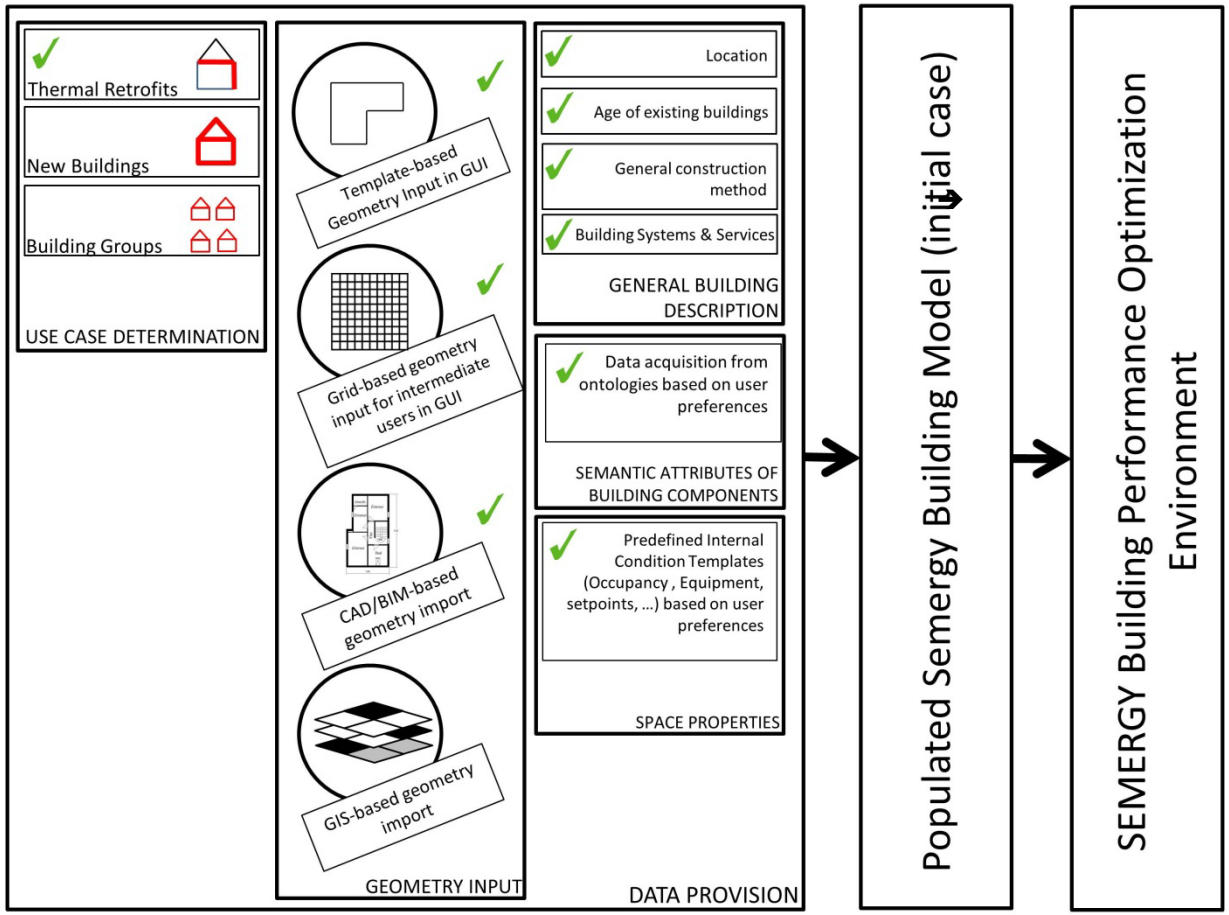
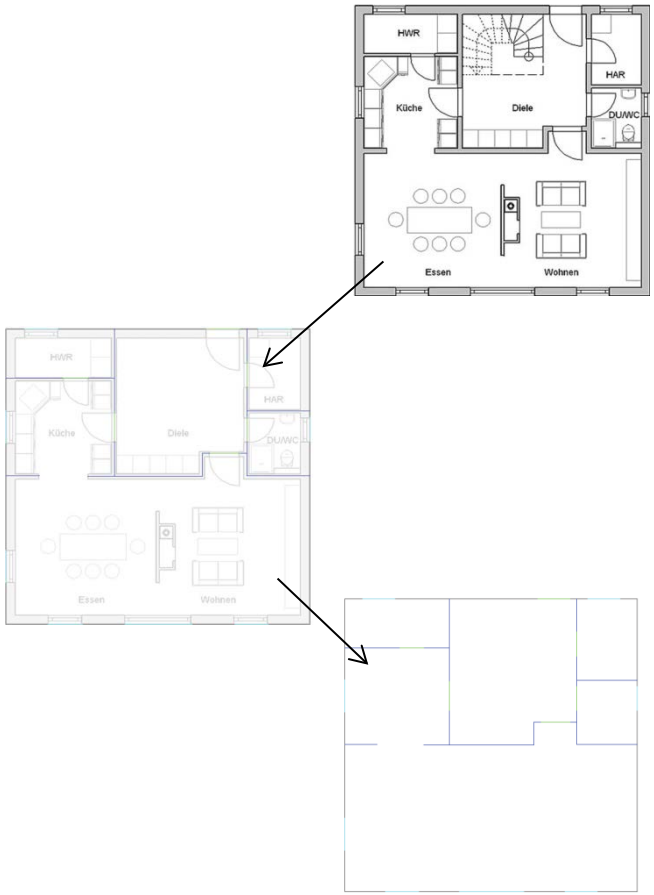
GUI | Benutzeroberfläche:







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Demo:

www.semergy.net

(bzw. Video)

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Vienna University of Technology

Danke für die Aufmerksamkeit

SEMERGY

The SEMERGY Project- TEAM included

A. Anjomshoaa, S. Fenz, N. Ghiassi, K. Hammerberg, J. Heurix, A. Mahdavi, I. Merz, T. Neubauer, U. Pont, C. Sustr, F. Shayeganfar, M. Taheri, A.M. Tjoa, A. Wurm.