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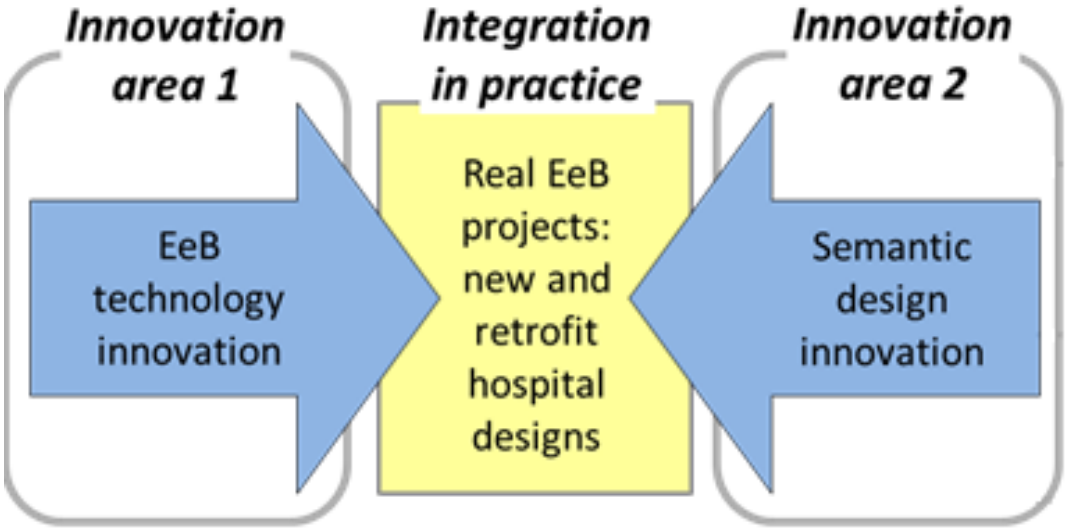
Presenter: T. Liebich

HOSPITAL CAMPUS DESIGN RELATED WITH EEB CHALLENGES

Streamer
European research on energy-efficient healthcare districts

Overall objectives

- on the basis of typologies of buildings and districts (**WP1**), technologies for envelope and MEP (**WP2**) and aims in terms of energy consumption (**WP3**),
- define the processes with right level of information & new contracting method (**WP4**),
- research and develop optimised semantics-driven Design methods (**WP5**) and interoperable tools for building and geo Information Modelling (**WP6**),
- apply all on real demonstration and validation projects across Europe (**WP7**),
- and secure the results by knowledge dissemination and standardization (**WP8**)



Crucial topics

a) the **priority for the design phase** integrated in the neighbourhood energy systems;

b) the **empirical validation** of sustainable EeB solutions and new design tools using 4 real projects from 4 different EU countries:

c) the **latest advancements** in BIM, GIS, Semantic and Parametric modelling and optimization techniques;

d) the **active participation** of industrial partners and direct synergies with other EeB research, demonstration and standardization projects.

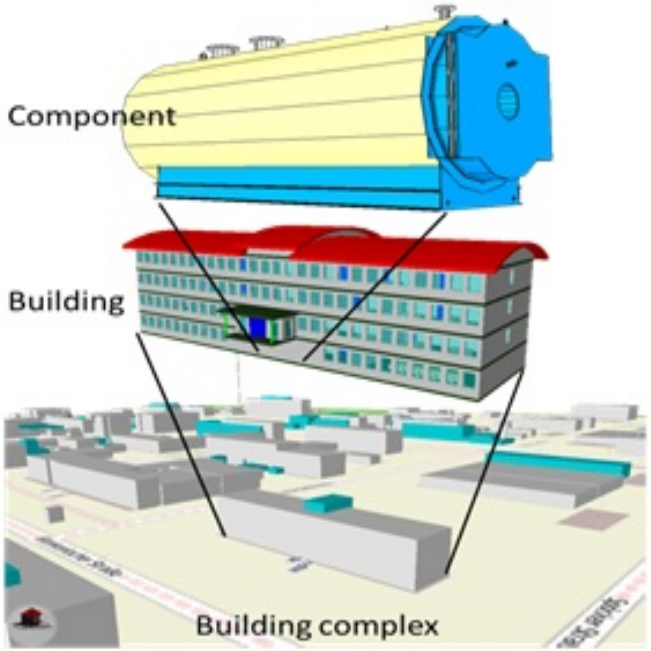
NHS Rotherham (UK) -

Rijnstate Ziekenhuis Arnhem (NL) -

AOUC Firenze (I) -

AP-HP Paris (F)

Context en focus



Context: Hospital campus – mixed-use area with an integrated energy system, consists of various buildings (e.g. hospitals and clinics, research and educational buildings, offices)

Focus: Building design – design optimization of new and existing buildings in 3 areas: MEP/HVAC systems; building envelop and spatial layout; energy grid in campus and surroundings.

First targeted key research achievement

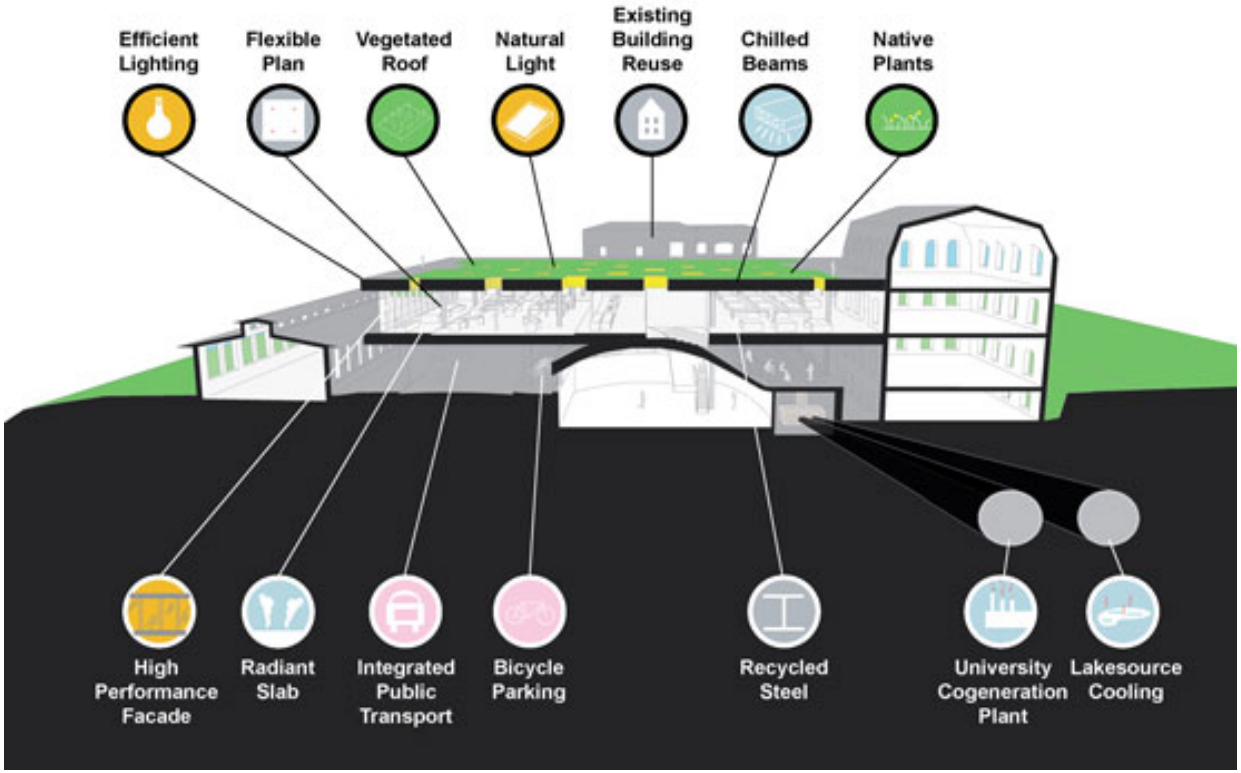
Generic semantic typology models

of energy-efficient buildings in healthcare districts

adjustable semantic design models

templates for new design

and retrofitting.



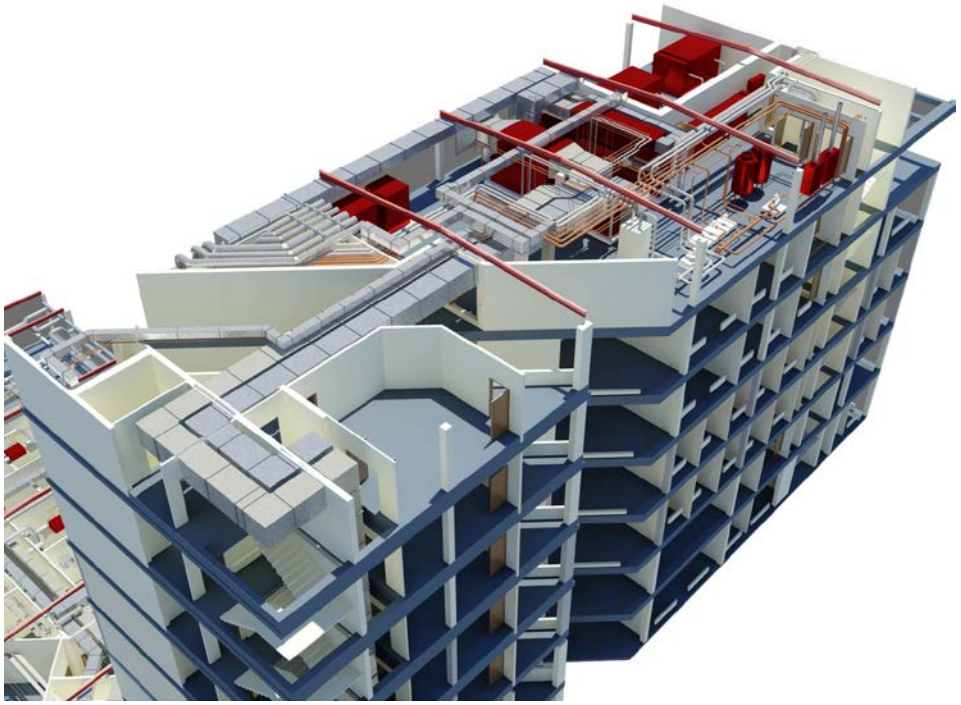
Key areas

New design methodology is required in **three key areas**

1.building envelope and space layout
2.medical, MEP and HVAC systems
3.building and neighbourhood energy grids

The new methodology needs to rely on interoperability between:

Building Information Modelling (BIM)
Geospatial Information Systems (GIS)



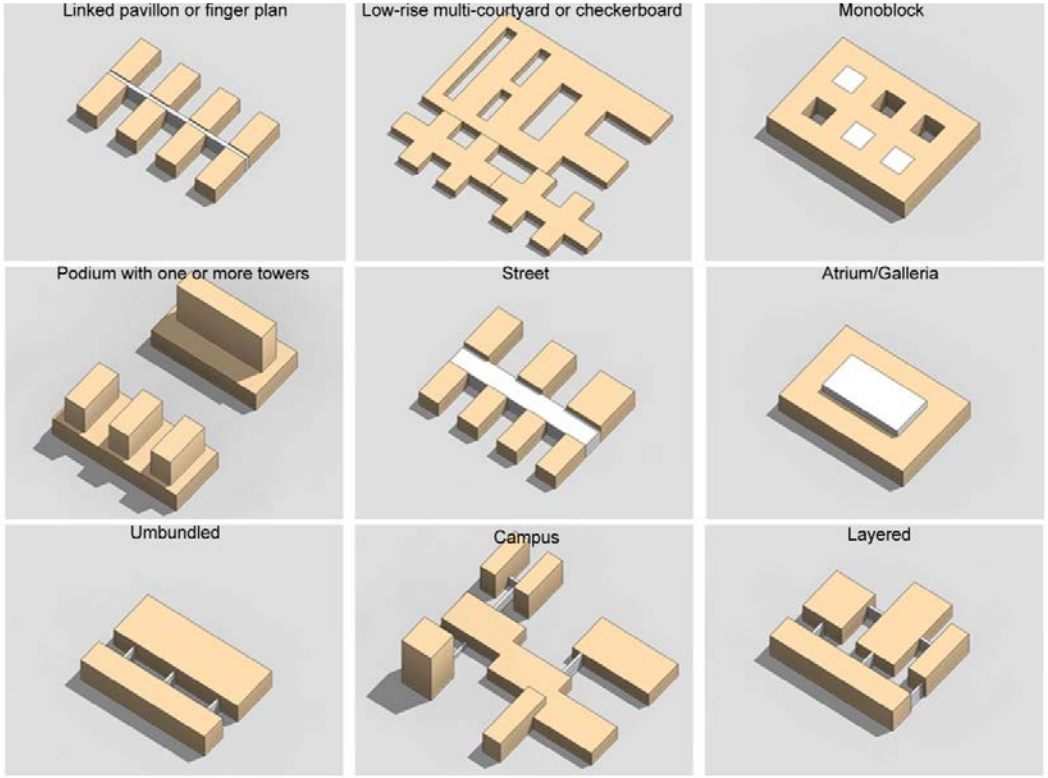
BIM Model, source: Arup

Streamer approach to typology

methodology for organizational, distribution and functional aspects of healthcare buildings

typology in relation to **energy related features** to define design criteria for models and tools.

data and parameter gathered should be suitable for the **semantic typology models** of existing buildings and districts.



nine general arrangements of healthcare districts, source: *De Jong Gortemaker Algra*

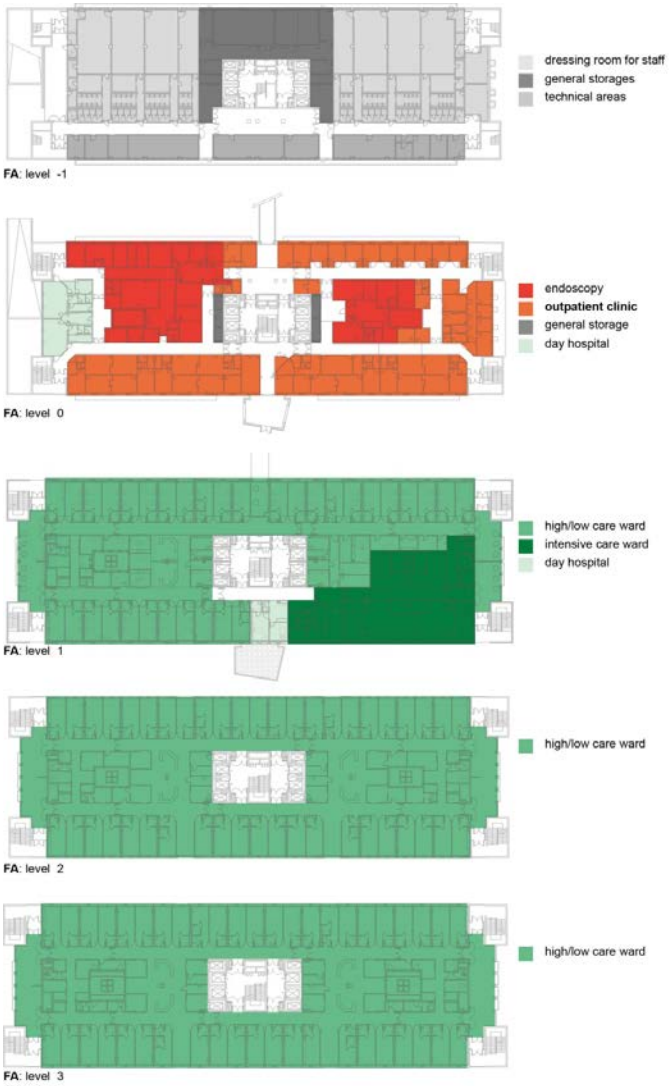
Streamer approach to typology

Single Spaces (S)

Functional Area (U)

Building (B)

District (D)



Functional area of "San Luca Nuovo", AOUC, Florence, Italy, source: *Ipostudio Architetti*

Streamer approach to typology

a top-down

- **“outside/in” approach**
- **or “designer view”**

a bottom-up

- **“inside/out” approach**
- **or “engineers view”**

top-down

“outside/in”

starts from the definition of the main typologies of healthcare district.

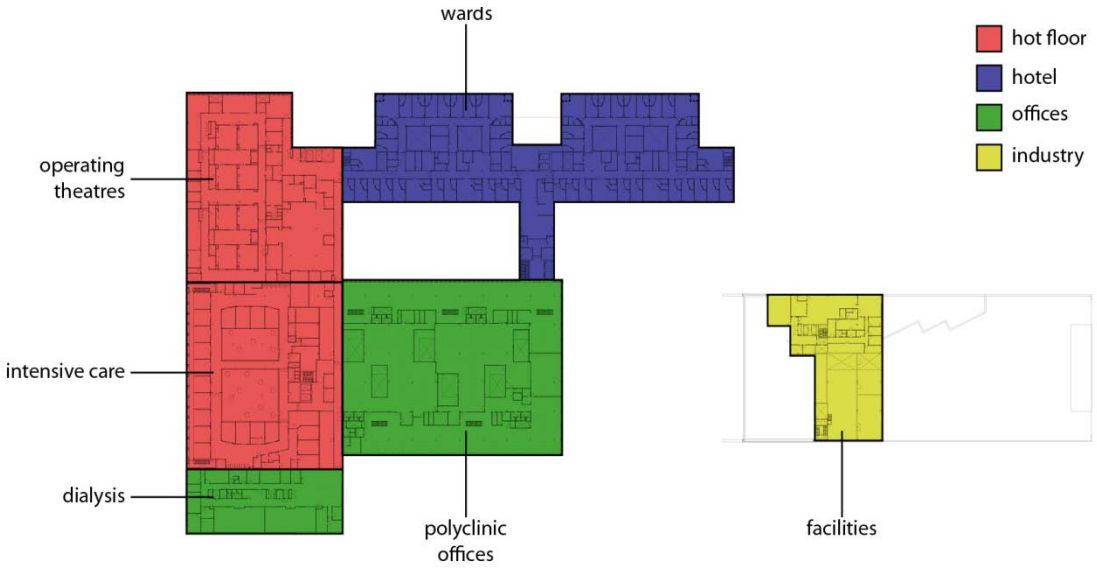
main types

hot floor

hotel

offices

industry



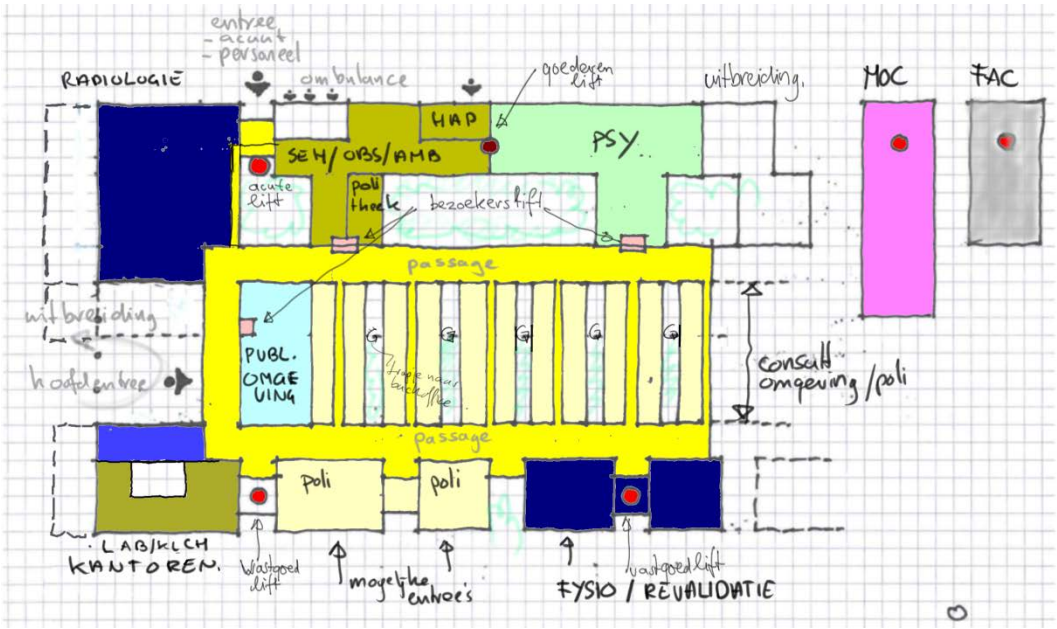
Bernhoven hospital, source: *De Jong Gortemaker Algra*

Typologies, matrix of relationships, interdependencies and functional aggregative configurations are analysed starting progressively from the district level to the single spaces level.

bottom-up

“inside/out”

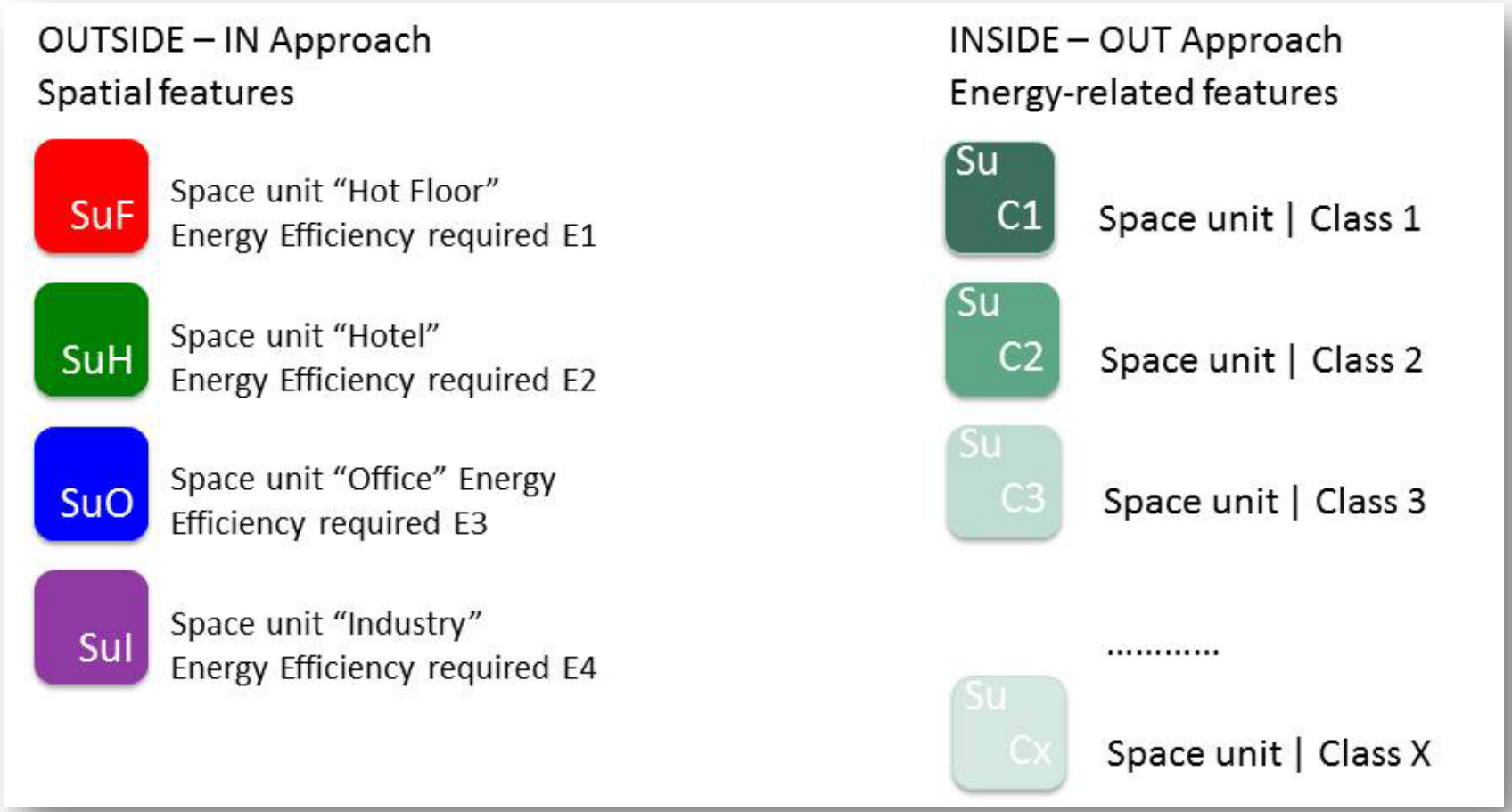
takes definition of spaces and units as starting point for design methodology.



Bernhoven hospital, source: *De Jong Gortemaker Algra*

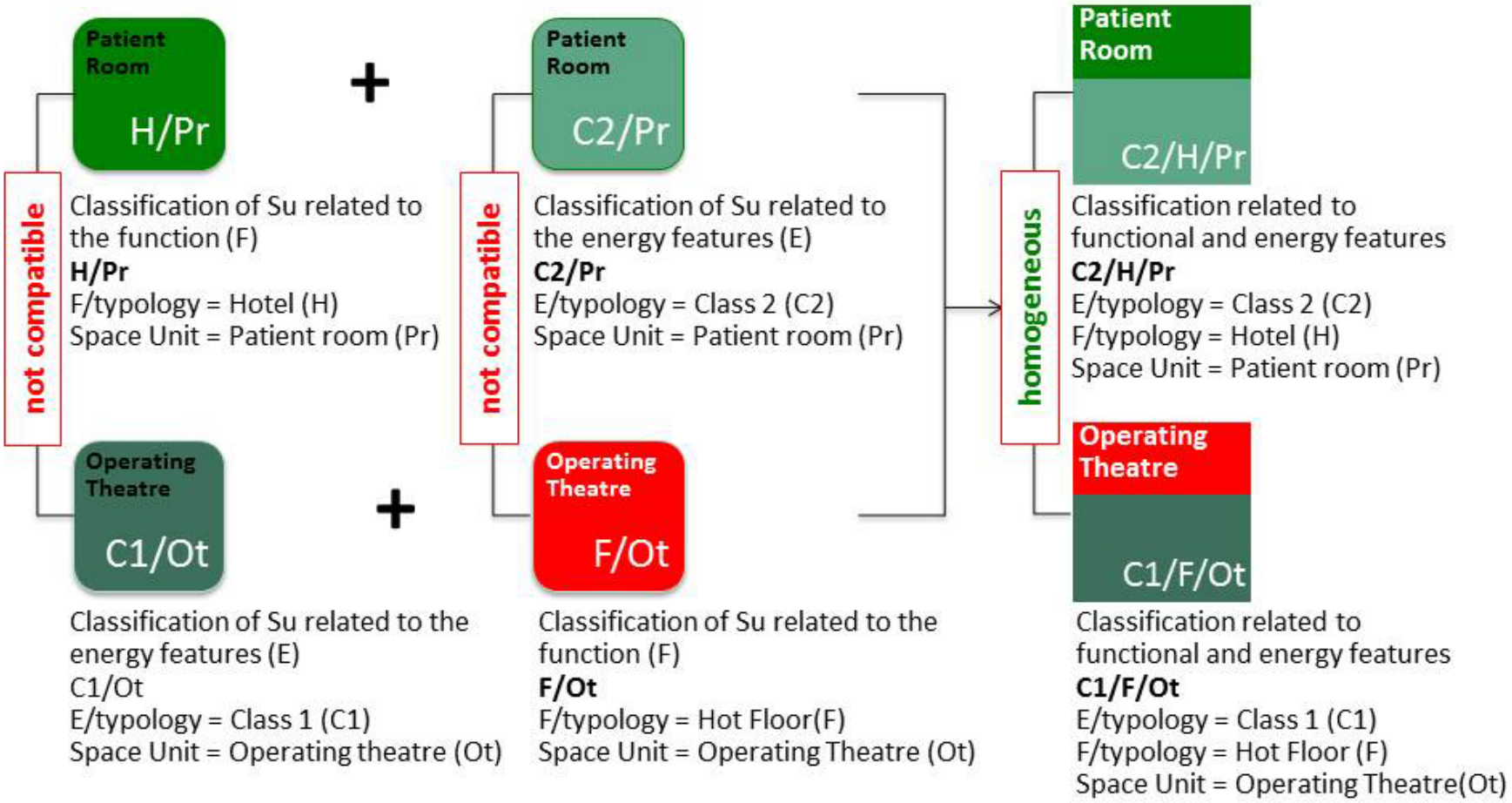
Based on categorization of units depending on the relationships, interdependencies and functional aggregative configurations of single spaces in each unit.

Streamer approach to typology



Categorization of Spaces in the Outside/In and Inside/Out approaches

Space units _ Classification based on Functional and Energy-related features



Categorization of Spaces according to the crossing methods

Conclusion

STREAMER design methodologies will turn around the existing approach

a) Decision-making will be based on inclusiveness in the design phase of both new and retrofitting projects, from the initial brief to the final design implementation.

b) The common parameters and the average energy use will be modelled according to the functional classification, space allocation and building configuration

c) At inter-building, neighborhood and urban levels, the typological meta-design will be used in order to define the most effective strategy for energy-efficiency improvements