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Esperienze di altri progetti europei: Progetto Streamer - AOU Careggi

Project “STREAMER” 2013-2017

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Semantics-driven Design through Geo and Building Information Modelling for Energy-efficient Buildings Integrated in Mixed-use Healthcare Districts

CP-IP FP7.EeB.NMP.2013-5:

Optimised design methodologies for energy-efficient buildings integrated in the neighbourhood energy systems

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Consortium: 20 partners: 7 IND + 5 SME + 4 PUB + 4 RES

No.	Participant organisation name	Acronym	Country	Type	Key competence
1	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO	TNO	NL	RES	Applied research institute
2	Ipostudio Architetti Srl	IAA	IT	SME	Architect & urban designer
3	De Jong Gortemaker Algra	DJG	NL	SME	Architect & building engineer
4	Ove Arup & Partners International Ltd	ARU	UK	IND	MEP/HVAC & structural designer
5	Becquerel Electric Srl	BEQ	IT	SME	MEP & energy system engineer
6	DWA BV	DWA	NL	SME	Environment, MEP, energy engineer
7	AEC3 Ltd	AEC	UK	SME	ICT specialist (BIM)
8	Karlsruher Institut fuer Technologie	KIT	DE	RES	ICT specialist (GIS)
9	DEMO Consultants BV	DMO	NL	SME	ICT specialist (software)
10	Bouygues Construction	BOU	FR	IND	Construction company
11	NCC AB	NCC	SE	IND	Construction company
12	Mostostal Warszawa S.A.	MOW	PL	IND	Construction company
13	Stichting Rijnstate Ziekenhuis	RNS	NL	PUB	Hospital (building owner/user)
14	Assistance Publique - Hopitaux de Paris	APH	FR	PUB	Hospital (building owner/user)
15	The Rotherham NHS Foundation Trust	TRF	UK	PUB	Hospital (building owner/user)
16	Azienda Ospedaliero-Universitaria Careggi	AOC	IT	PUB	Hospital (building owner/user)
17	Mazowiecka Agencja Energetyczna	MAE	PL	IND	Agency for energy management
18	Commissariat a l'Energie Atomique et aux Énergies Alternatives	CEA	FR	RES	Commission for energy research
19	Centre Scientifique et Technique du Batiment	CST	FR	RES	Applied research institute
20	Locum AB	LOC	SE	IND	Property developer & manager

Content:

- Background and chronology
- Context, scope, focus
- Strategic aim and research goals
- Targeted key achievements
- Work packages and demonstration cases

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Background and chronology:

- Main drivers — Sustainable hospitals (energy-efficiency as well as other areas), optimal use of BIM and GIS for design and facility planning.
- June 2012 — EU Call Energy-efficient Buildings (EeB), incl. subject of BIM-GIS.
- July – Nov 2012 — Preparation of STREAMER proposal with hospital campus (healthcare district) as 'very high impact case'.
- Dec 2012 – jan 2013 — Submission and evaluation of STREAMER proposal.
- Feb – Mar 2013 — Positive evaluation result and negotiation with the EC (budget, planning, improvements).
- Apr – Jul 2013 — Contract preparation (GPFs), legal and financial check.
- 1 Sep 2013 — Official project start.
- 17-18 Sep 2013 — General Assembly kick-off meeting in Delft, The Netherlands.

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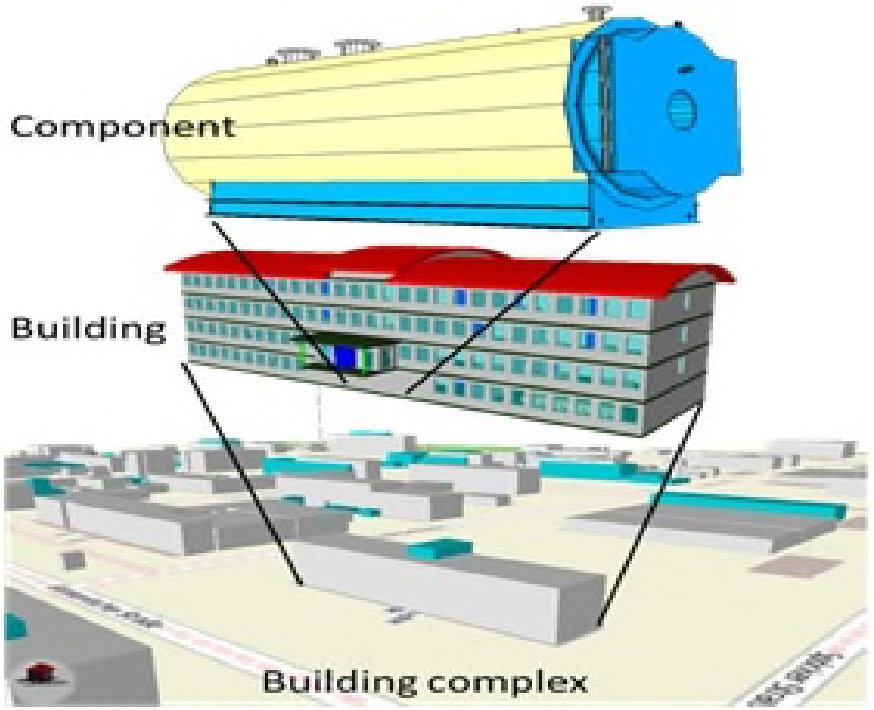
Neighbourhood scale, focused on building design



An example of **mixed-use healthcare district**:
a neighbourhood or a campus area with an integrated energy system, which consists of various buildings (i.e. hospitals and clinics; research and educational buildings; temporary care homes; rehabilitation and sport facilities; offices, retails, and logistic buildings; power and control facilities).

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The STREAMER context:

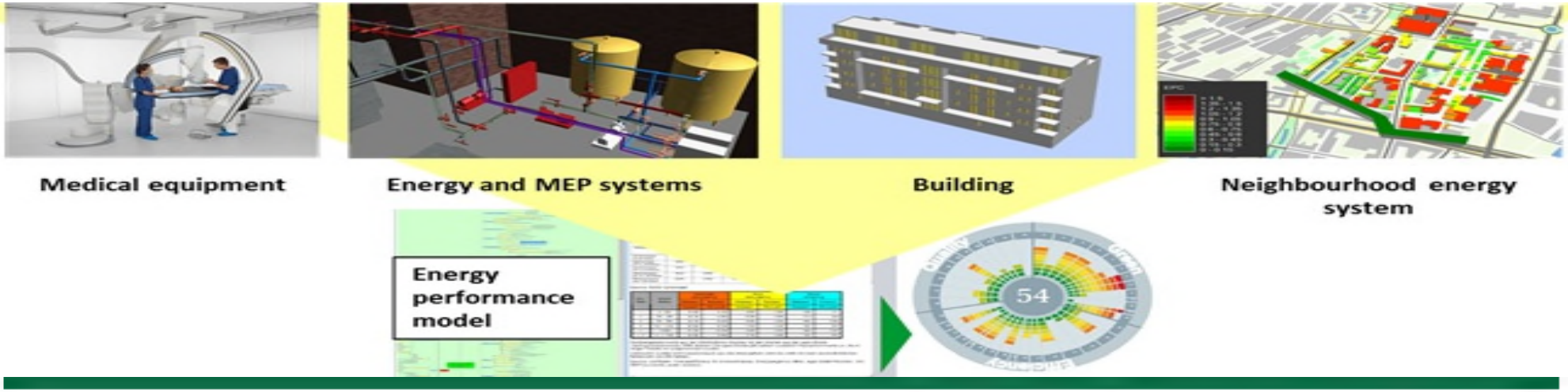
- A healthcare district is a good candidate to progress on the design of complex energy efficient buildings and neighborhood :
  - a HC district is composed of a set of buildings…
  - …with different types of activities.
  - The interaction between the HC district and it's environment is of paramount important
- Specific characteristics of healthcare districts :
  - the interaction between building and medical equipment is also very important
  - Significant impact of energy efficiency measures

Strategic aim and research goals

Aim: 50% reduced energy-use and CO2 emission of healthcare districts in 10 years.

Research: EeB **design optimisation** in 3 levels / areas:

- **Building MEP/HVAC systems** in relation with high-tech medical equipment
- **Building envelope and spatial layout** in relation with new healthcare services
- **Building energy systems** in relation with neighbourhood systems (grid, storage, etc.)



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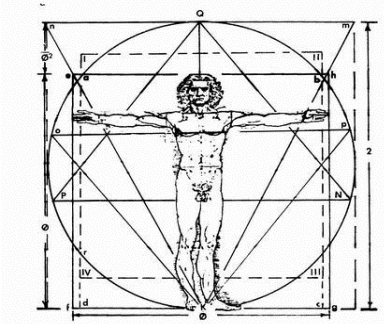
Targeted key research achievement:

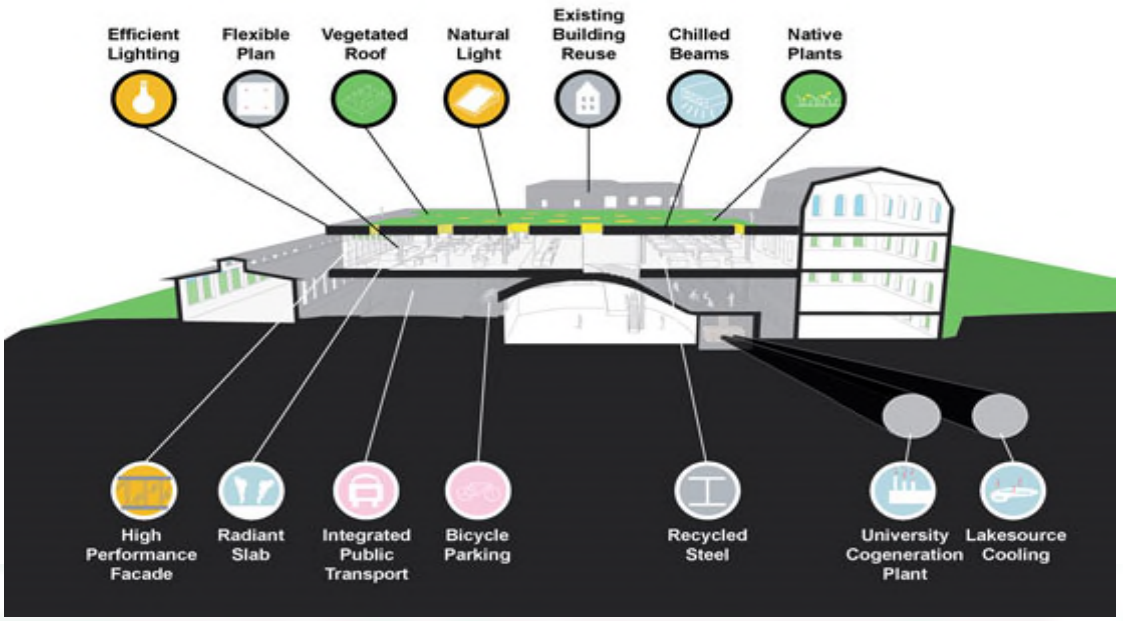
Generic semantic BIM+GIS typology models

of Energy-efficient Buildings in healthcare districts: **1**

adjustable semantic BIM+GIS design models as templates for new design and retrofitting.

- Object → Knowledge modelling
- Evidence → Experience
- Visualisation → Interpretation
- Data / specifications → Performance

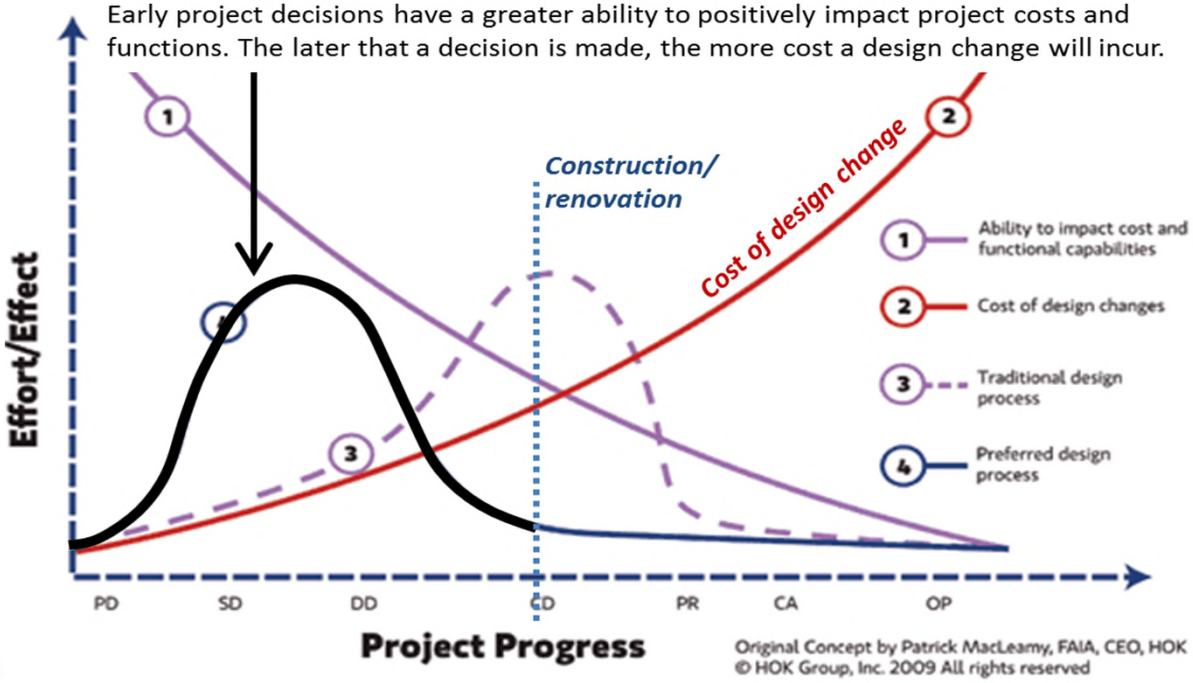


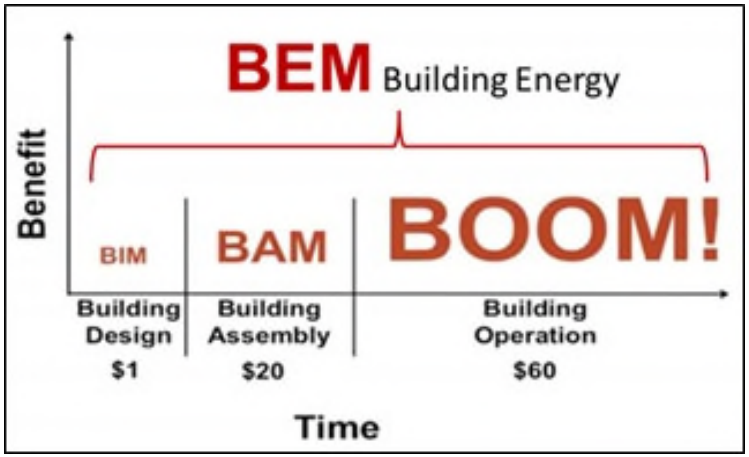


Targeted key research achievement:

Framework for BEM (Building Energy Model) lifecycle model inter-connecting BIM, BAM, BOOM. **2**

STREAMER focuses at the early design process of new and retrofitting projects:
Early project decisions have a greater ability to positively impact project costs and functions. The later that a decision is made, the more cost a design change will incur.





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Targeted key research achievement:

Design decision-support tool 3

as an interactive tool which accommodates:

a)Inter-operable BIM and GIS models

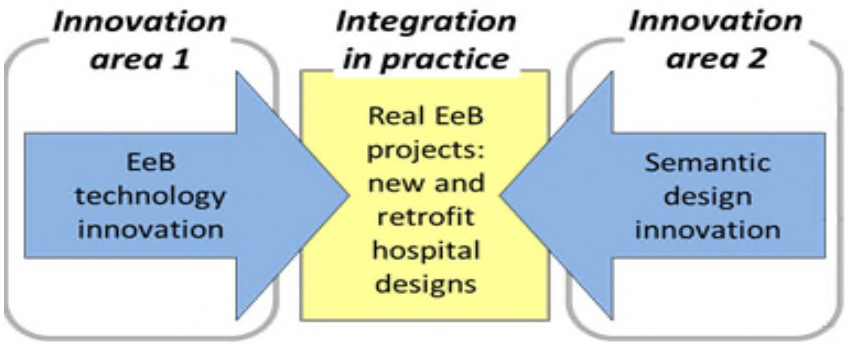
b)Analysis of energy performance, lifecycle-cost, and functional optimisation

c)Stakeholder's / user's requirements, decision criteria and priorities.




Overall objectives:

- On the basis of typologies of buildings / districts (WP1), technologies for envelope and MEP (WP2) and aims in terms of energy consumption (WP3) – Innovation area 1 …
- … Research and develop optimised Semantics-driven Design methods and interoperable tools for Building and Geo Information Modelling (BIM–GIS) – Innovation area 2
- Apply the whole on real demonstration and validation projects across Europe.



Key barriers to overcome

- Lack of a holistic approach to tackle multi-disciplinary complexity.
  - Design is not only about technology, but also, and mainly, about healthcare-related services and building operations: “how can we continue to provide high quality services in a context of budget cuts and reduction of personnel ?”

- Lack of a multi-scale optimisation (components – buildings – neighbourhood).
  - Trial-and-error approach causes many ad hoc changes during the construction stage. This hampers the optimal configuration of the solutions for whole lifecycle benefits as the design solutions cannot cope with rapidly changing healthcare policies, processes and technologies.

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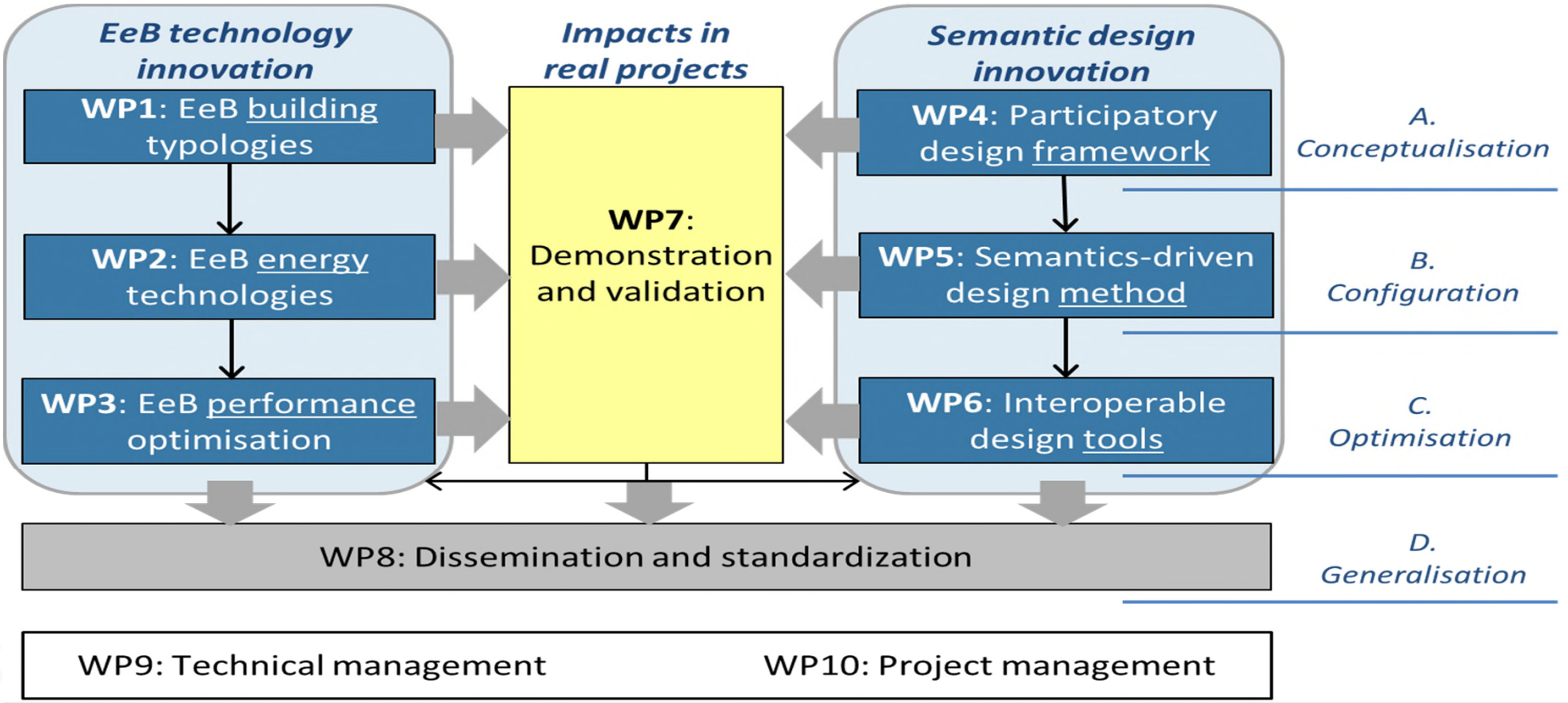
Work packages:



SIAIS

Società Italiana dell'Architettura e dell'Ingegneria per la Sanità

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L'ITA' IN (TEMPI DI) CRISI

REVISIONE DELLA SPESA E OBIETTIVI DI QUALITÀ NELLE AREE TECNICHE

ARCHITETTURE, ESPERIENZE E APPORTO DI FORZE GIOVANI PER ESSERE PROTAGONISTI DELLA RIPRESA

5° CONGRESSO NAZIONALE S.I.A.I.S.

FIRENZE

24-26 Ottobre 2013

N.I.C. (Nuovo Ingresso Careggi)

SEVENTH FRAMEWORK PROGRAMME

Streamer

European research on energy-efficient healthcare districts

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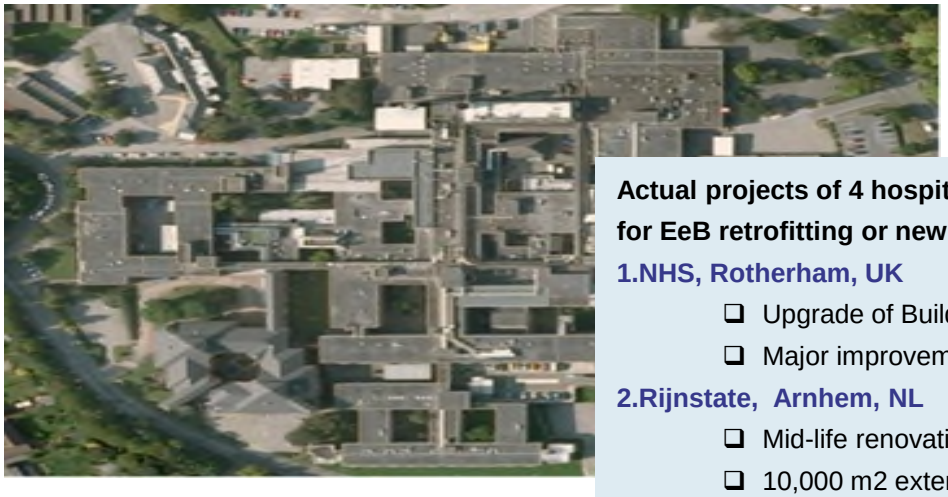


Actual projects of 4 hospital districts with real plans for EeB retrofitting or new design:

1.NHS, Rotherham, UK

- Upgrade of Building Management Systems
- Major improvements in overall building fabric

2.Rijnstate, Arnhem, NL

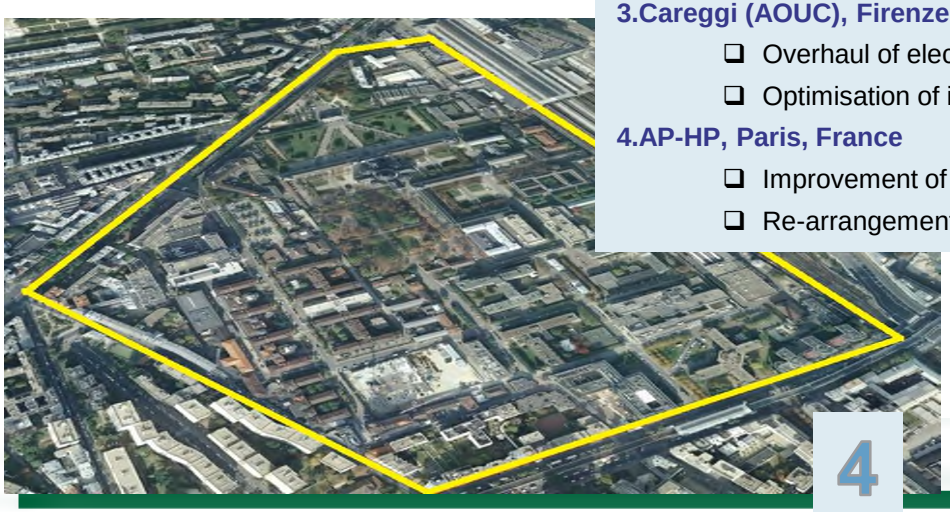
- Mid-life renovation to replace MEP systems
- 10,000 m2 extension and new buildings

3.Careggi (AOUC), Firenze, Italy

- Overhaul of electricity and heat distribution
- Optimisation of inter-building functions

4.AP-HP, Paris, France

- Improvement of logistic and waste systems
- Re-arrangement of building spaces



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3

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How to use the demonstration cases (WP7):

Required input from hospital partners	Real (master)plan of new design or retrofitting of selected building projects
Modelling activity during STREAMER	Generating 4 prototype BIM/GIS typology models based on the selected design projects from 4 hospital cases (↔ WP1 and 5)
Validation step 1	Simulating and configuring proposed EeB design solutions for the 4 cases in the prototype BIM/GIS models (↔ WP2 and 6)
Validation step 2	Measuring performance of the proposed design solutions through 'connecting' BIM/GIS models and prototype assessment tools (↔ WP3)
Validating step 3	Presenting the design models and results of performance analysis to the stakeholders supported by the prototype design decision-support tools (↔ WP3 and 4)
Generalization	Generalization of the 4 prototype BIM/GIS models to support the fulfillment of WP1 'generic typology' and WP8 'standardization' (↔ WP1 and 8)
Remark/reminder	• STREAMER is about design methodology, we are not obliged to show the proposed design solutions in real construction, but real implementations are recommended to ensure practical impacts • STREAMER design solutions are not exclusive for the involved hospital partner only