Streamer

European Research for Innovative Healthcare Districts

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

COORDINATOR: Dr. Rizal Sebastian, TNO, The Netherlands; rizal@demobv.nl

TELEPHONE: **+31 15 750 2520 / +31 6 538 141 18**

WEBSITE: www.streamer-project.eu

DURATION: 48 months

EU GRANT: EUR 8 million

PROGRAM AREA: EeB (Energy-efficient Buildings)

SUMMARY

STREAMER is an industry-driven collaborative research project on Energy-efficient Buildings (EeB) with cases of mixed-use healthcare districts. This research will enable architects, contractors, clients and end-users **to design** new EeB. as well as retrofit existing buildings integrated in a healthcare district using enhanced **Semantic BIM-GIS** methods and tools for the holistic optimisation of EeB innovations.

Healthcare-related buildings are among the top EU priorities since they play a key role for a sustainable community, but their energy use and CO2 emissions are among the highest of all building types. The energy use of 1 healthcare district could exceed that of 20,000 dwellings. STREAMER aims at 50% reduction of the energy use and CO2 of new and retrofitted buildings in healthcare districts in the next 10 years.

RESEARCH:

EeB design optimisation in 3 levels/areas:

- **Buildings 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 (e.g. electricity, grid, heat storage, etc.)

TARGETED KEY ACHIEVEMENTS:

- **Generic semantic BIM+GIS typology models** of EeB in healthcare districts: adjustable semantic BIM+GIS design models as templates for new design and retrofitting;
- **Framework for BEM (Building Energy Model)** lifecycle model inter-connecting BIM, BAM, BOOM;
- **Design decision-support tool** as an interactive tool which accommodates: interoperable BIM and GIS models; Analysis of energy performance, lifecycle-cost, and functional optimisation and Stakeholder's user's requirements, decision criteria and priorities.

WORK PLAN

The research in STREAMER will proceed in the following 10 work packages:1. EeB building typologies, 2. EeB energy typologies, 3. EeB performance optimization, 4. Participatory design framework, 5. Semantics-driven design method, 6. Interoperable design tools, 7. Demonstration and validation, 8. Dissemination and standardization, 9. Technical management, 10. Project management.

Empirical validation of sustainable EeB solutions and new design tools will be done through 4 real projects/hospitals from 4 different EU countries:

- **NHS, Rotherham, UK (**Upgrade of Building Management Systems and Major improvements in overall building fabric)
- **Rijnstate, Arnhem, NL** (Mid-life renovation to replace MEP systems and 10,000 m2 extension and new buildings)
- **Careggi (AOUC), Firenze, Italy** (Overhaul of electricity and heat distribution and the Optimisation of inter-building functions)
- **AP-HP, Paris, France** (Improvement of logistic and waste systems and Re-arrangement of building spaces).

The STREAMER consortium consists of 13 industrial partners (6 large companies + 6 SMEs + 1 non-profit private hospital), 4 research organisations, and 3 public bodies (hospital institutions). In total 20 partners from 7 EU members states representing 5 European regions:

- *TNO, the Netherlands*
- *Ipostudio Architetti, Italy*
- *De Jong Gortemaker, the Netherlands*
- *OVE ARUP, United Kingdom*
- *Becquerel Electric, Italy*
- *DWA B.V., the Netherlands*
- *AEC3 LTD, United Kingdom*
- *Karlsruher Institut fuer Technologie, Germany*
- *Demo Consultants, the Netherlands*
- *Bouygues Construction, France*
- *NCC AB, Sweden*
- *Mostostal Warszawa SA, Poland*
- *Stichting Rijnstate Ziekenhuis, the Netherlands*
- *APH Paris, France*
- *NHS Rotherham, United Kingdom*
- *AOC Careggi, Italy*
- *Mazowiecka Agencja Energetyczna, Poland*
- *Commissariat a lénergie atomique, France*
- *Centre Scientifique et technique du batiment, France*
- *Locum AB, Sweden*

This research project has received funding from the European Union's Seventh Framework Programme for Research and Technological Development and Demonstration under grant agreement no 608739 - FP7-2013-NMP-ENV-EeB

TARGETED KEY ACHIEVEMENTS

- Generic semantic BIM+ GIS EeB, typology models
- Framework for BEM (Building Energy Model)
- Design decision-support tool focused on energy

FLAGSHIP PROJECTS

- NHS, Rotherham, UK
- Rijnstate, Arnhem, NL
- Careggi (AOUC), Firenze, IT
- APH Paris, FR

PARTNERS