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Study of Energy and Cost Savings of Demand Controlled Fresh Air Systems for Existing Offices

A. Ricchetti BEng(Hons) MSc and I. Chaer BEng CEng, PHD F.Inst R

School of the Built Environment and Architecture, London South Bank University

E-mail: Tony.Ricchetti@arup.com / tonyr10@hotmail.co.uk / chaeri@lsbu.ac.uk

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Phone: 07747081706

BACKGROUND

- The design of partially centralised air conditioning systems in the UK, both new and existing, generally consists of a centralised fresh air plant designed and sized to provide peak anticipated fresh air volumes to office floors.
- Where this is provided at a constant rate, energy is expended to deliver the peak design volumes throughout the whole occupied period.
- Nowadays greater emphasis is being put on fresh air provision, with developers aiming to future-proof their offices.
- Coupling the above with increasingly complex and un-predictable office occupancy profiles, constant volume fresh air systems are a logical place to target energy savings.

AIM

- The main aim of the research is to study the energy and cost savings of demand controlled fresh air systems for existing office buildings.

APPROACH

Collation of Technical Data

Technical analysis of data from an existing 11 storey office building located in London.

Design of a retro-fit Solution

Mechanical and controls solution to convert existing constant volume fresh air system to a demand based system with:

- ❑ Occupancy detection device,
- ❑ Local ventilation zone branch control,
- ❑ Central ventilation plant control
- ❑ Overall controls logic

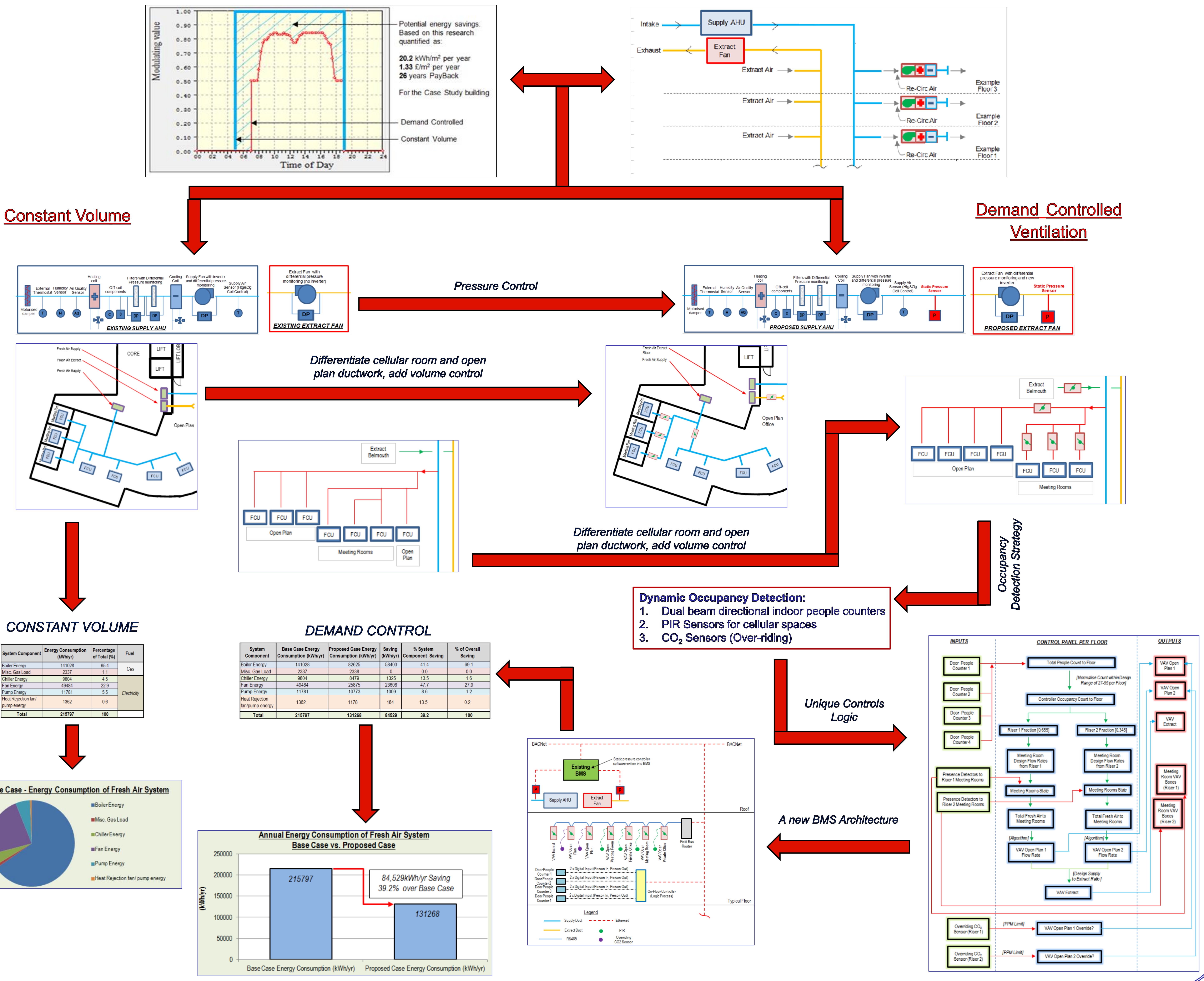
Analysis

The existing and new systems were simulated using simulation software.

Evaluation of Solution

Energy and cost savings were evaluated.

DESIGN PROCESS & RESULTS



CONCLUSIONS

The results revealed up to 39% annual energy savings could be achieved for the fresh air plant. This related to 4% reduction of the overall building annual energy. This equated to a 38% annual cost saving to the fresh air plant and an overall building annual energy cost saving of around 3%.