

# CIBSE Conference 2009

## Energy Efficiency & Carbon Management by the application of Continuous Commissioning (ConCom)

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# Topics

- Energy efficiency & carbon management
- Continuous Commissioning (ConCom)
- Case Study - *Imperial College Healthcare NHS*

# Energy Efficiency & Carbon Management

## What is it?

Consuming and emitting only what is necessary to enable the business to meet or exceed its objectives while providing a safe and comfortable working environment

- Eliminating avoidable waste
- Reducing environmental impact
- Saving money

*The ConCom process delivers and **sustains** Energy & Carbon Efficiency*

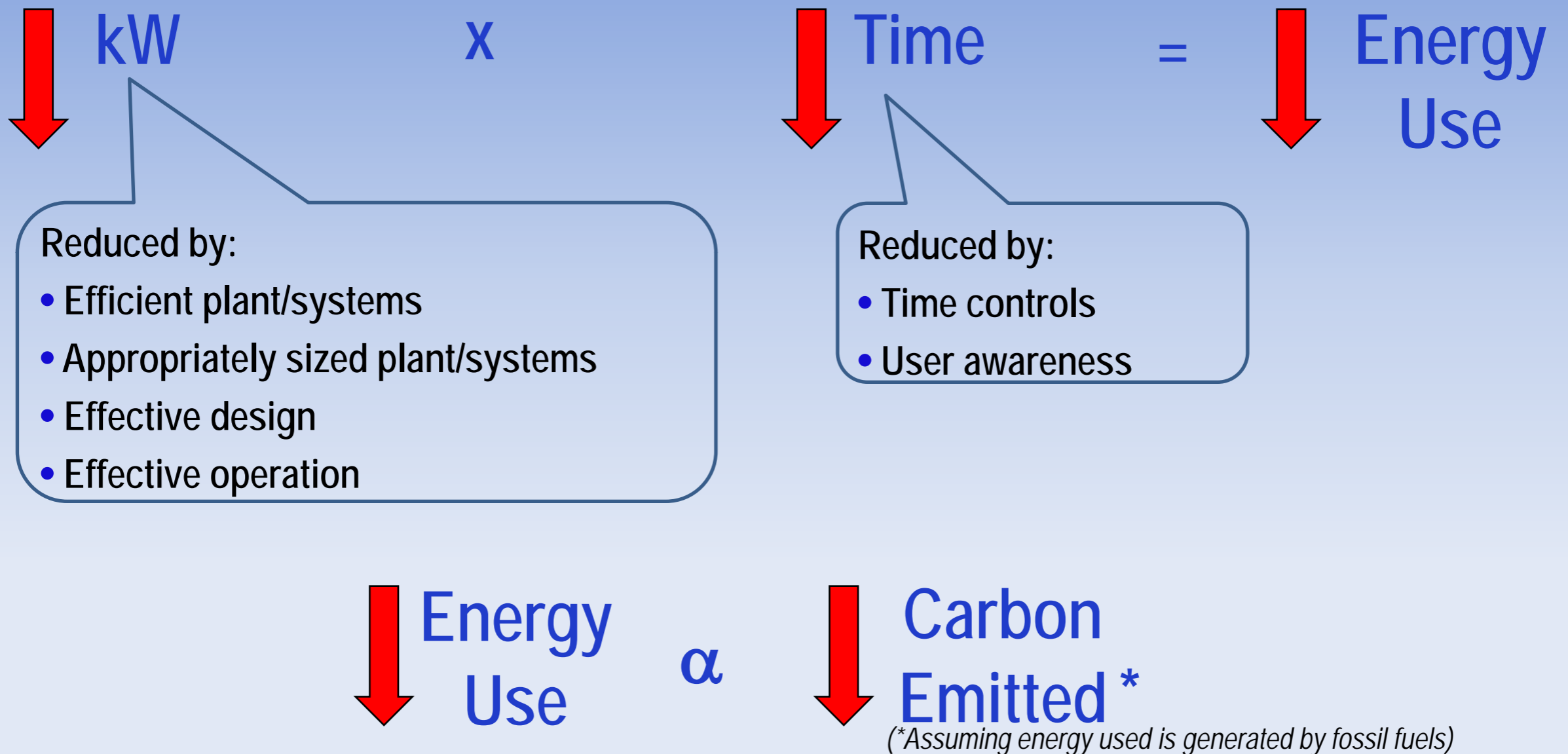
# Energy Consumed

$$\text{kW} \quad \times \quad \text{Time} \quad = \quad \text{Energy used}$$

*ConCom gathers the information to calculate Energy used and Carbon Emitted*

# Energy Consumed & Carbon Emitted

## How do we reduce?



*ConCom identifies and manages Energy and Carbon reduction projects*



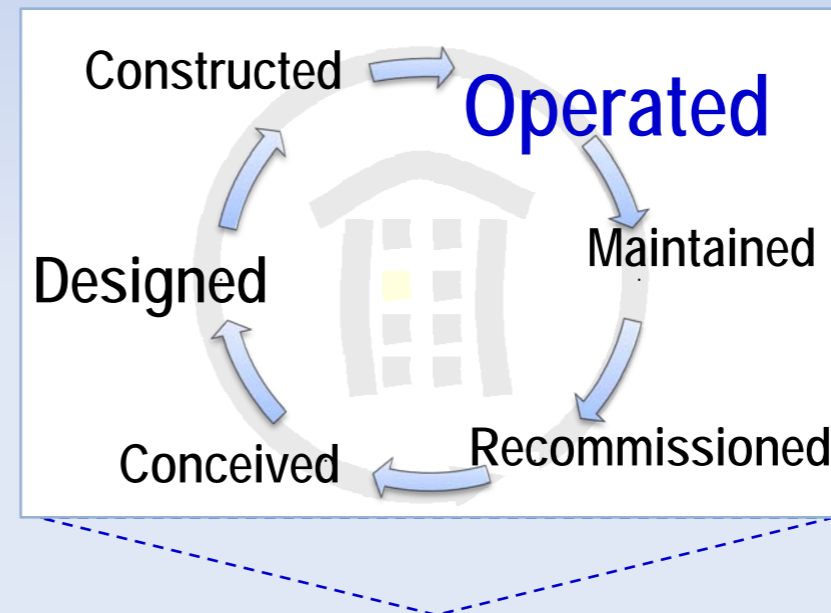
# Continuous Commissioning (ConCom)

What is it?  
What does it deliver?  
When should it be done?  
How is it done?

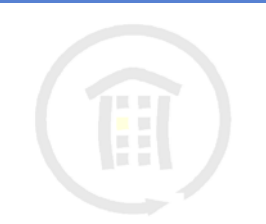


## ConCom Definition:

- A strategic approach to building operation
- A process for optimising a building's:
  - ✓ Energy efficiency
  - ✓ Operating cost
  - ✓ Occupant comfort
- It guides the way a building and its services are:

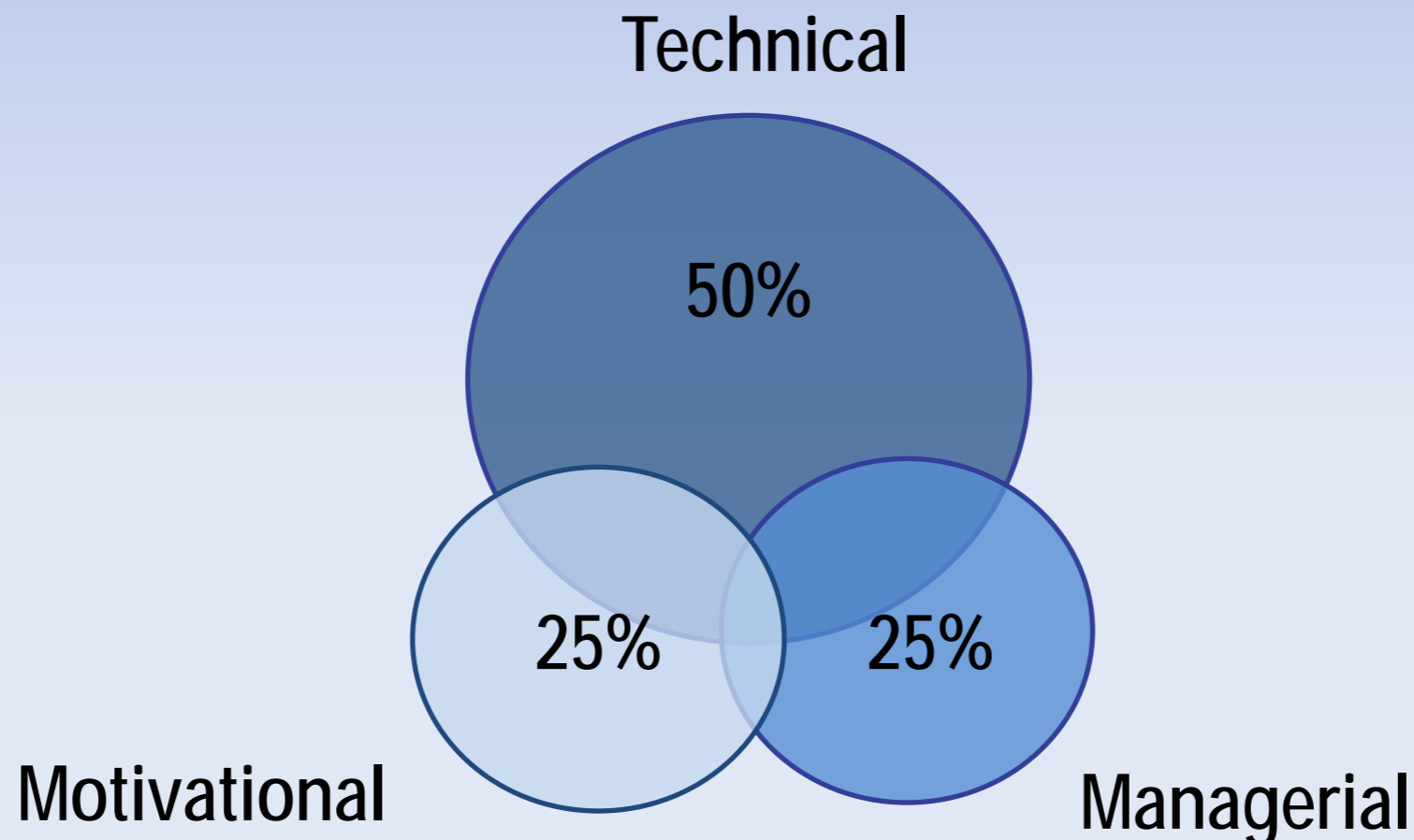


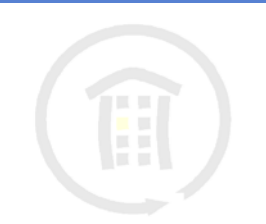
To provide the optimum of COST and VALUE for the occupier



## ConCom Approach:

- Continuous
  - Embedded in the overall strategy and daily operations
- Holistic
  - Involves all aspects that affect a building's performance:





Reduced Costs  
Increased asset value  
Improved working environment



Reduced CO<sub>2</sub> emissions  
Corporate Social Responsibility  
and



Best value from existing systems  
Reduced exposure to energy price increases  
The information needed for EPCs, DECAs, CRC & AC inspections

*Concom delivers more benefit from a building, with less resource input.  
More from less*



# ConCom

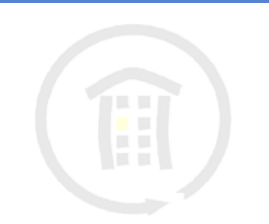
What?

Why?

When?

How?

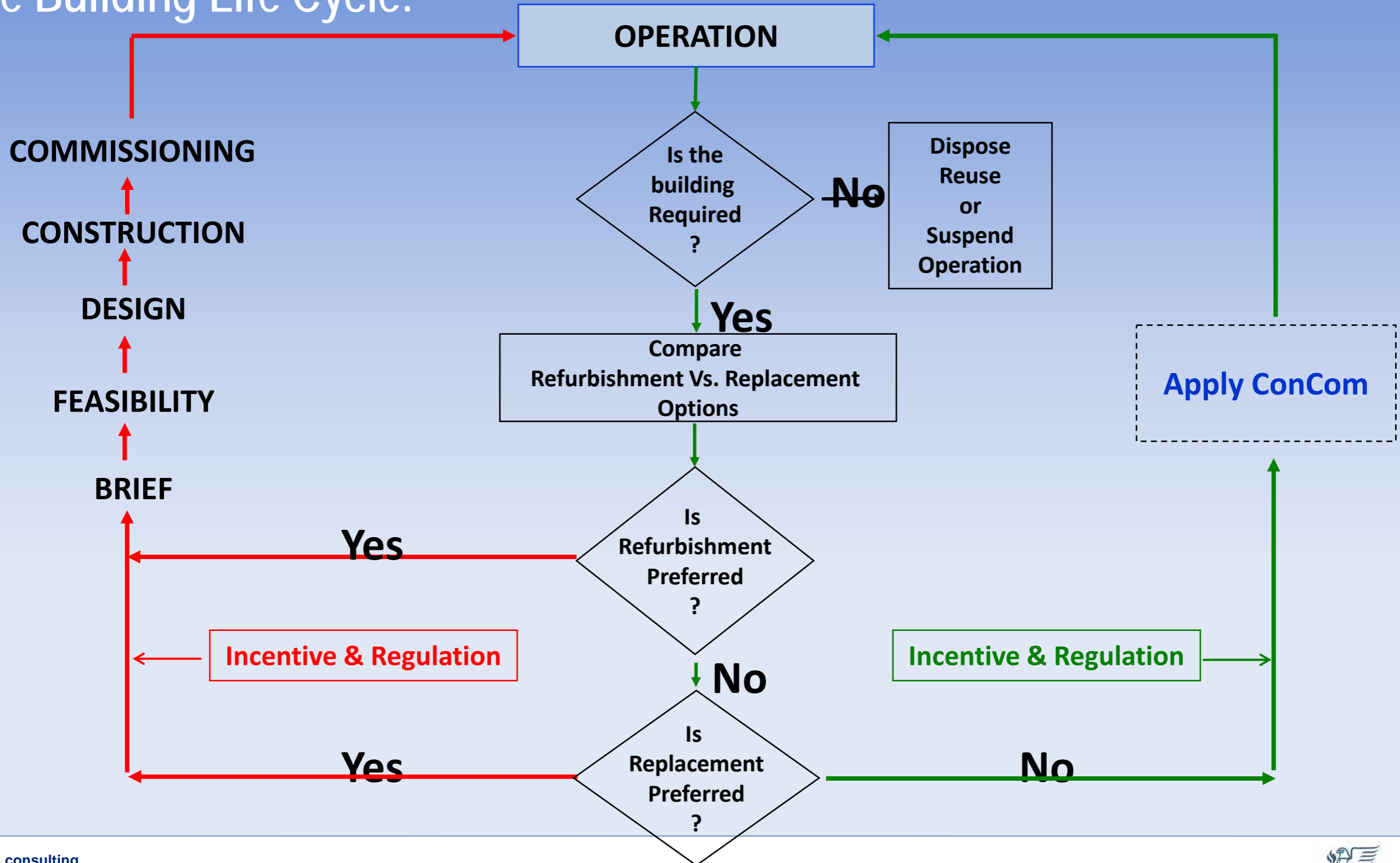
# NOW

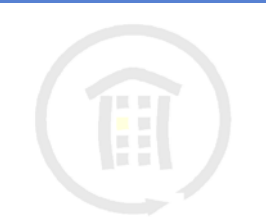


# ConCom

What? Why? When? How?

## The Building Life Cycle:

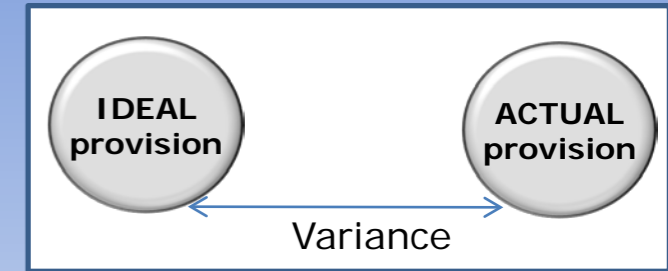




## A. The Strategy - Variance Analysis:

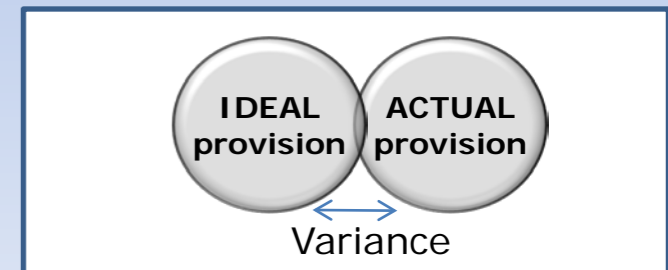
Stage 1  
Scoping

1. Determine what is required of the buildings and their services to meet the business needs (IDEAL provision)
2. Review the existing design, maintenance and operation (ACTUAL provision)
3. Identify the Variance between IDEAL and ACTUAL provision



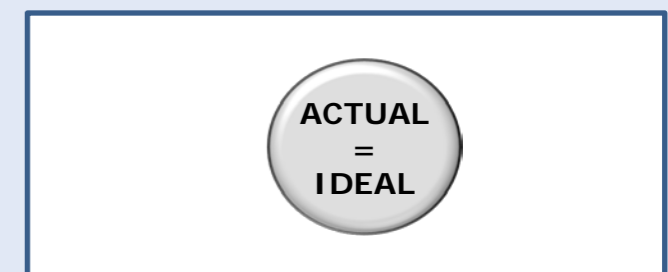
Stage 2  
Implementation

4. Implement strategies to eliminate the variance between IDEAL and ACTUAL provision of building services and energy use

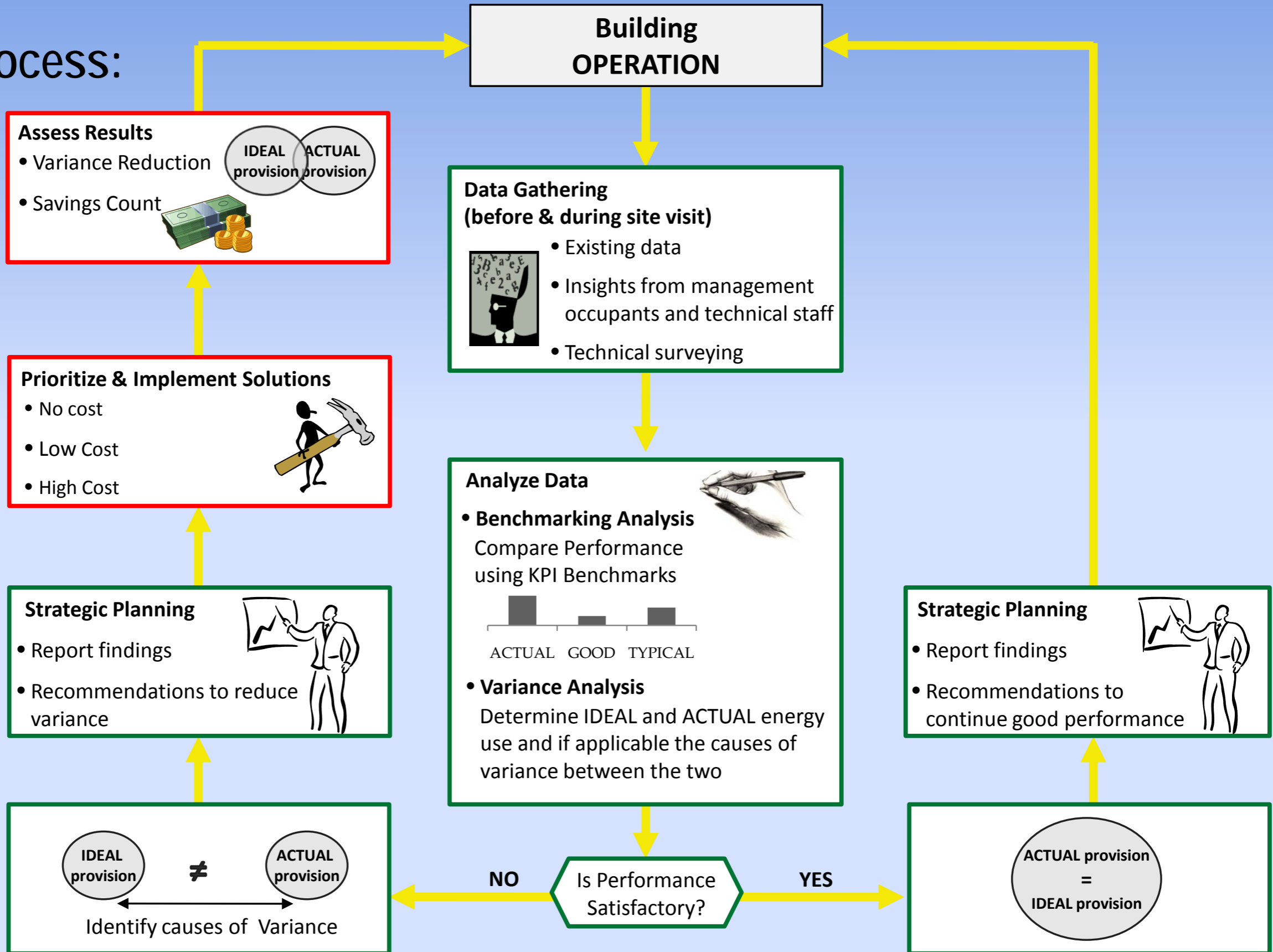


*Outcome:*

- ★ *ConCom delivers the energy consumption that is the minimum necessary to provide an environment within which specified activities can be carried out at maximum efficiency, in safety & comfort*



## B. The Process:





## C. The Support:

### People

- Involve the management
- Involve the occupants
- Involve the service partners

### Supplementary Activities

- CEM policy & strategy
- Energy Monitoring & Targeting System
- Motivational Workshops
- Occupant Perception Surveys (OLS)

*Concom is a holistic approach involving all aspects of the organisation*



# ConCom

What?

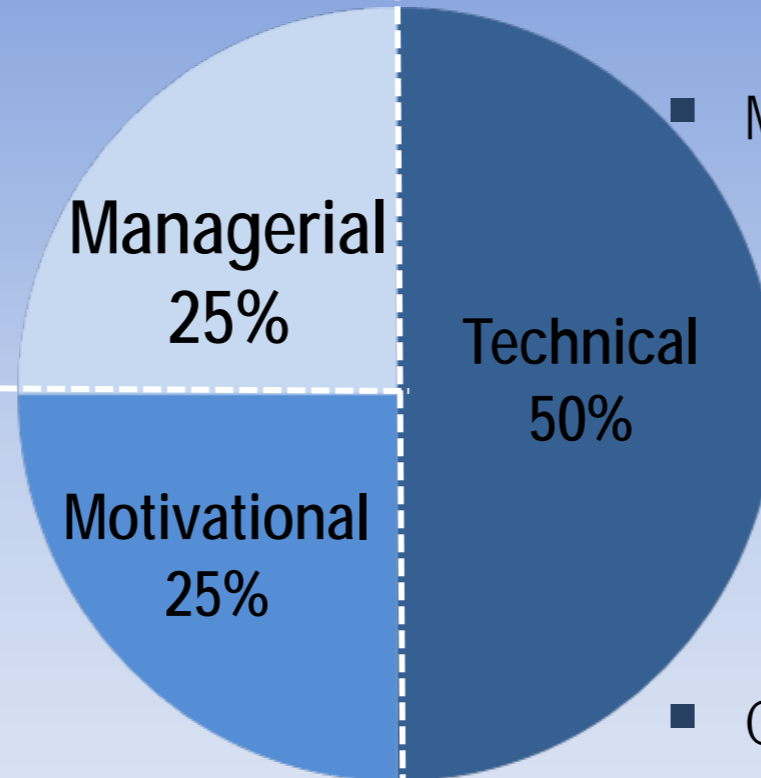
Why?

When?

How?

- CEM policy/strategy
- Review current energy & carbon data
- Demand Side reduction
- Training Workshops
- Energy Monitoring & Targeting
- ConCom delivery teams

- Workshops to motivate all to be involved
- Regularly update savings and communicate progress
- Occupant perception surveys
- Suggestion box/ Ideas log



- BMS interrogation (Quick wins)
  - Reduce out of hrs energy consumption
  - Optimise BMS control set points
- Medium cost CEM projects:
  - M&T
  - Lighting controls
  - Variable Speed Drives
  - BMS upgrades
  - Recommissioning HVAC
- Capital CEM project feasibility studies
  - CHP, BSE system replacement, etc
- Select priority projects and test before roll-out

**Focus on**

- Motivation
- Occupant concerns
- M&E energy reduction
- Monitoring



# ConCom in Action

Imperial College Healthcare **NHS**  
NHS Trust

- Case Study- ConCom at Imperial College Healthcare



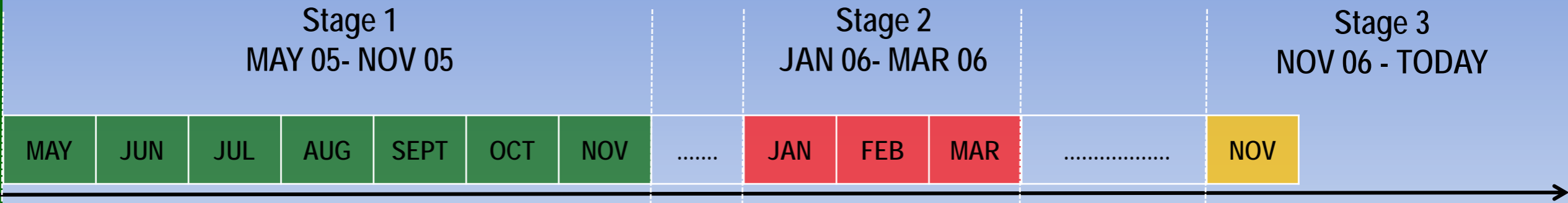
Winner Low Carbon Consultant- Innovation of the Year Award 2008



# ConCom Case Study- Timeline

Imperial College Healthcare **NHS**  
NHS Trust

START  
Annual Energy Spent: £6.8 M



## Scoping

- Surveys and validation
- Occupant Perception Surveys using Overall Liking Score (OLS)
- Lighting control trials
- ConCom motivational and technical workshops

## Implementation

- Form and motivate the ConCom teams
- Identify projects and implement in priority
- Determine financing options
- Provide updating workshops – *knowledge and process transfer*
- Review BMS Strategies
- Monitor, record and publish savings

## Long-term strategy

*Self-supporting, self- motivating & self-financing*

- Delivered through ConCom teams
- Consultancy support for Strategy and Process management
- Technical support as required

*ConCom identifies and manages all Energy and Carbon reduction initiatives*

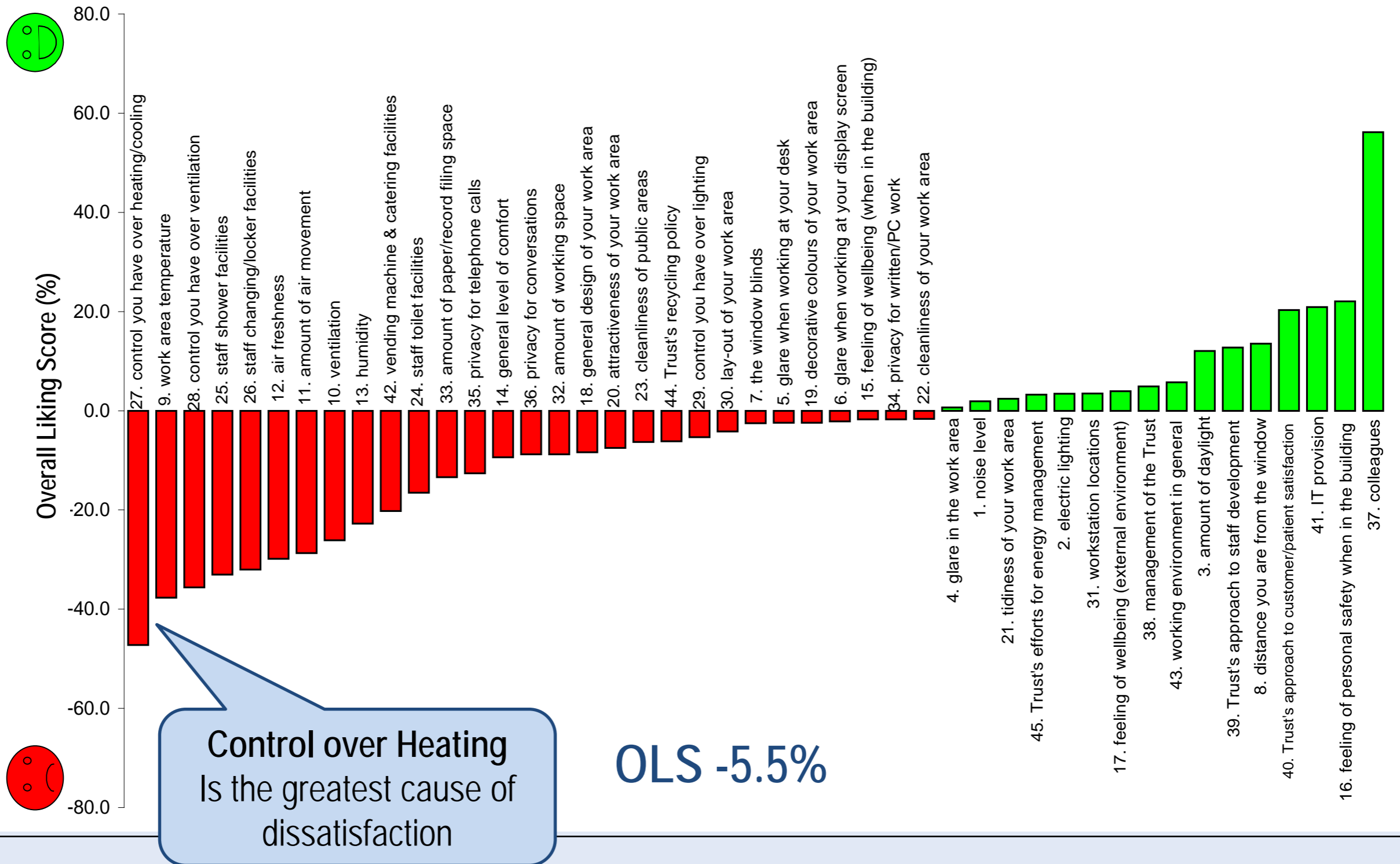




# ConCom Case Study- OLS

Imperial College Healthcare **NHS**  
NHS Trust

## Detailed OLS Fingerprint- Imperial College Healthcare



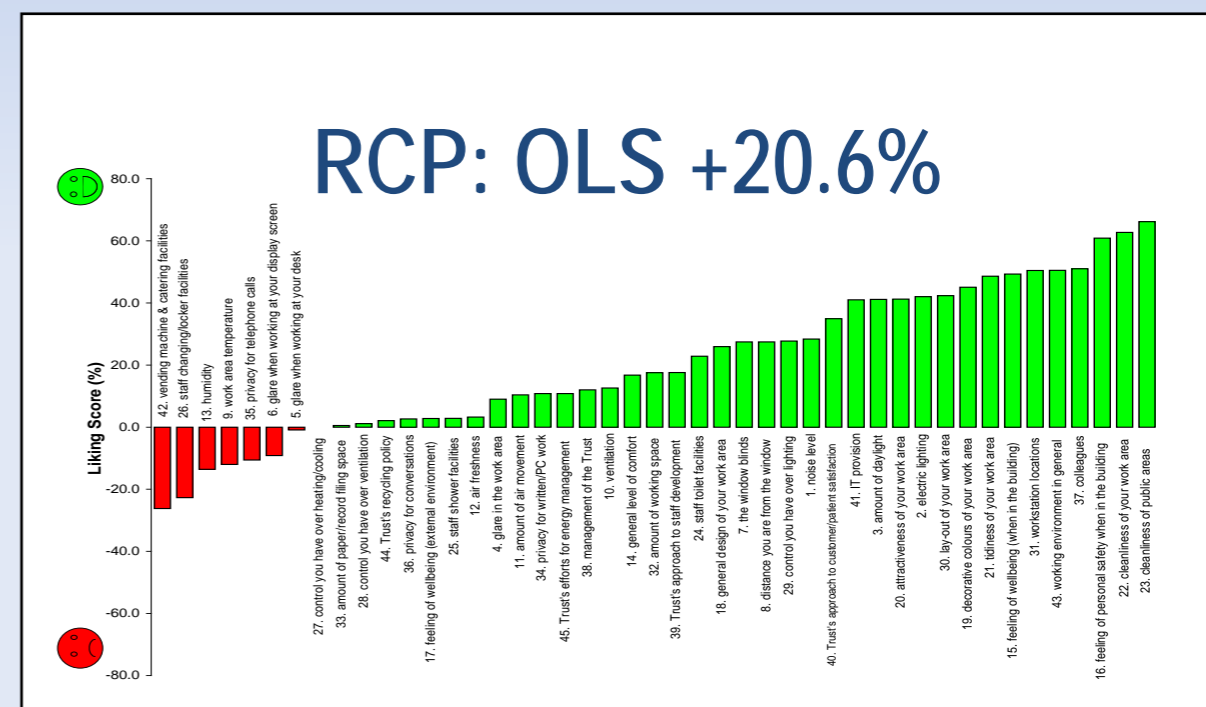
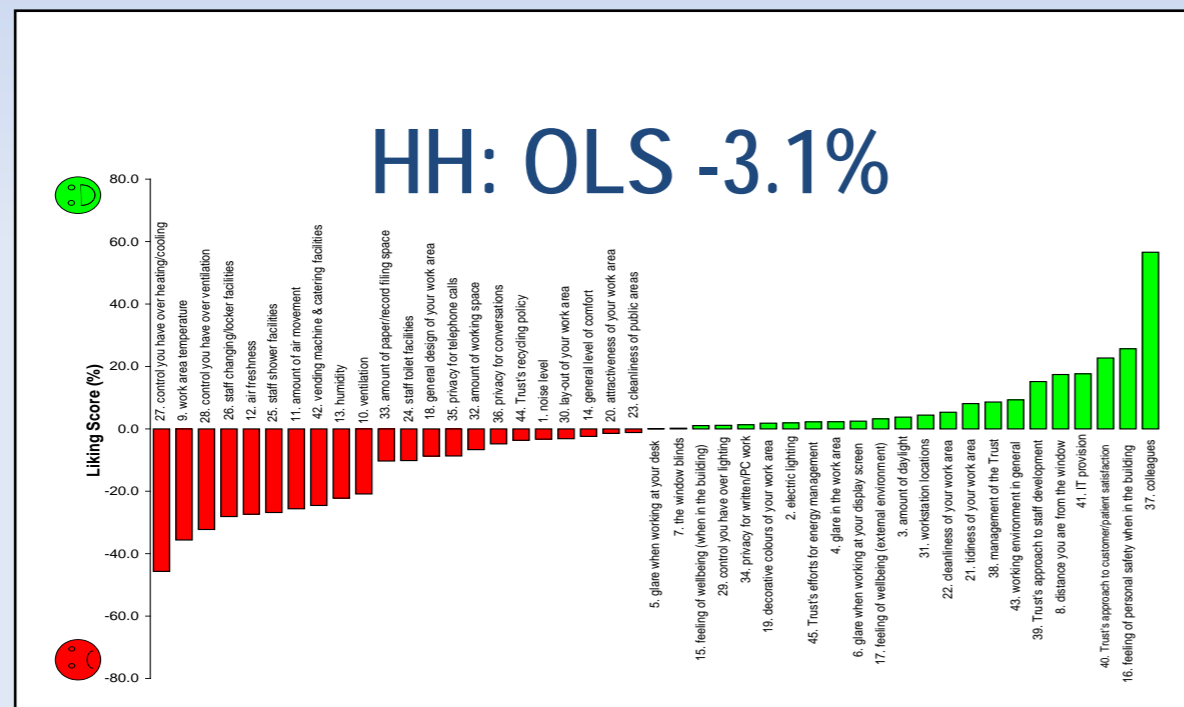
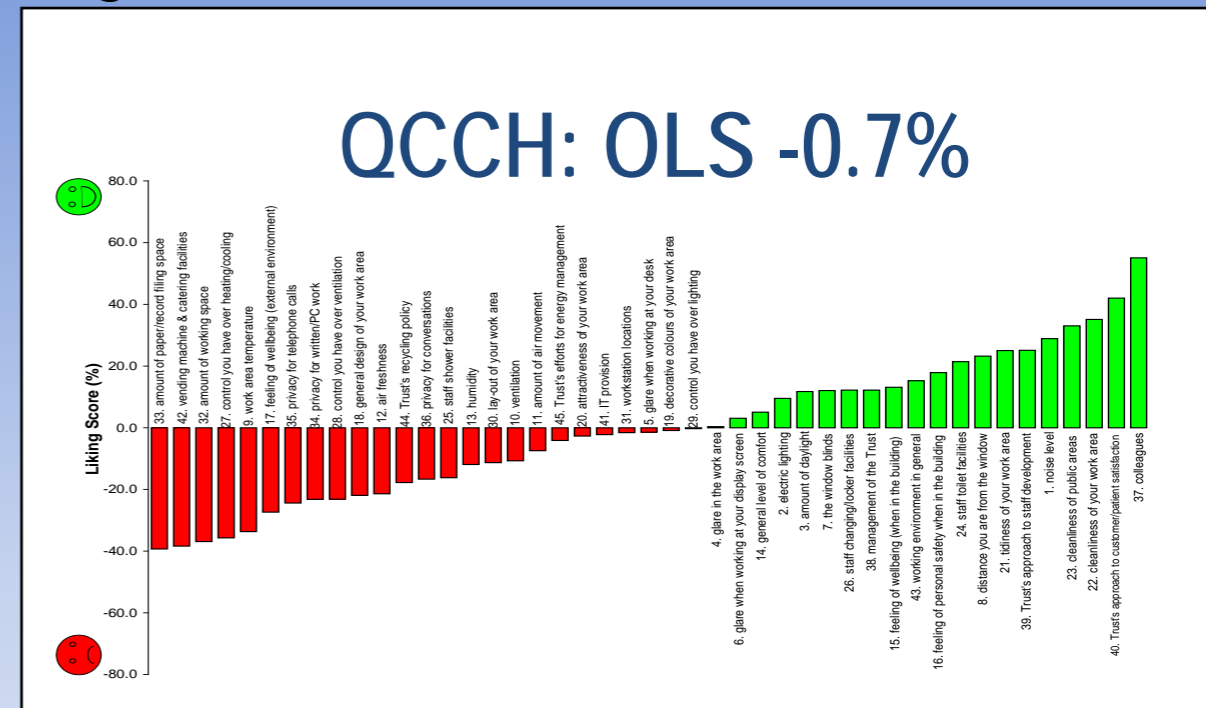
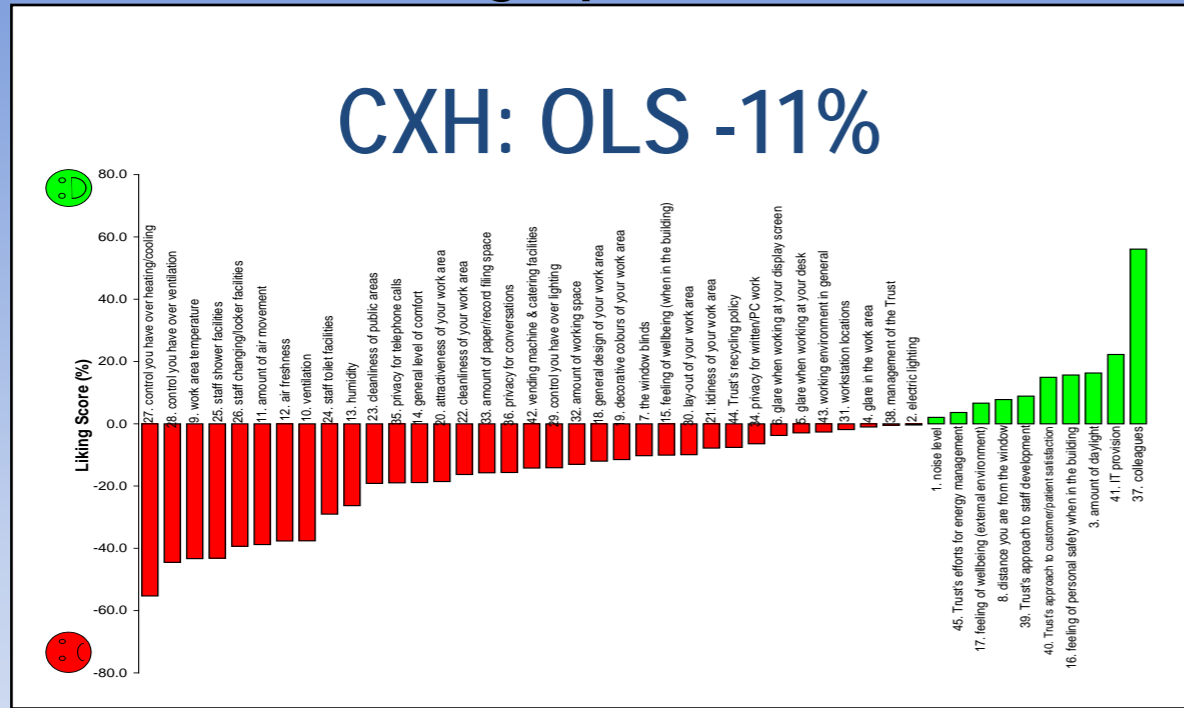
ABS has measured working environments with OLS ranging from -39% to +30.9%



# ConCom Case Study- OLS

Imperial College Healthcare **NHS**  
NHS Trust

## Detailed OLS fingerprints for different working environments within the estate:



*Occupant satisfaction varies in different parts of the estate*



# ConCom Case Study - Savings

Imperial College Healthcare **NHS**  
NHS Trust

## 6,000 tonnes of CO<sub>2</sub> pa saved from:

- Lighting controls and replacement
- Installation of 69 VSDs
- Commission VSD
- Operational improvements via BMS
- Energy management and staff awareness

## Projects currently being implemented:

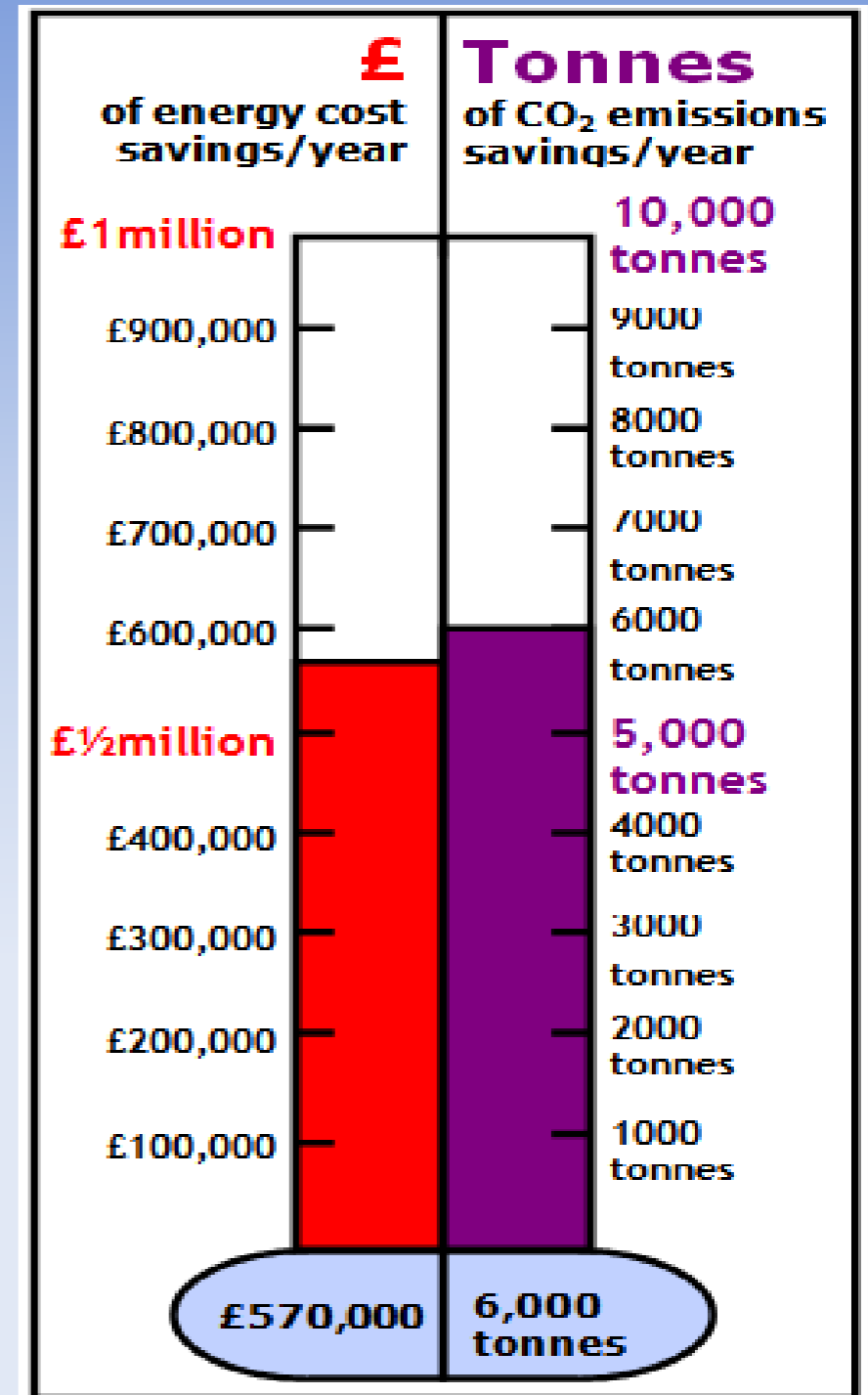
- CHP – saving 2,000 tonnes of CO<sub>2</sub> pa
- Steam replacement with MTHW - saving 1,700 tonnes of CO<sub>2</sub> pa

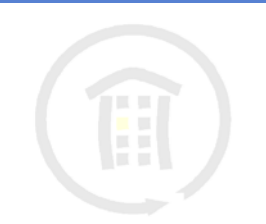
## Projects yet to be implemented that will save 3,400 tonnes of CO<sub>2</sub> pa :

- More lighting and controls
- Commissioning of VSDs
- Improved M&T
- Recommission HVAC

capex and non capex projects

Energy Savings Thermometer  
JAN 08





# Summary of Concom Fundamentals

A tiered process for optimising a building's:

- ✓ Energy efficiency
- ✓ Operating cost
- ✓ Occupant comfort



BY:

- Using tried and tested techniques, technologies and processes
- Empowering everyone in the organisation to make a contribution
- Addressing all aspects that affect a building's performance
- Keeping up with energy related regulation
- Taking advantage of grants, incentives and financing options
- Communicating efforts and results to all stakeholders

A holistic and ongoing approach that delivers  
More benefit from a building, with Less resource input

*More from Less*

# ConCom helps to avoid distraction and know what's ahead



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