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**DE MONTFORT  
UNIVERSITY  
LEICESTER**

**INSTITUTE OF ENERGY &  
SUSTAINABLE DEVELOPMENT (IESD)**

Dr Neil Brown  
Senior Research Fellow

Successfully shaping our world

# THE INSTITUTE

- Five professors
- 25 academic staff
- Five administrative staff
- 43 PhD students
- £5.4m research projects

# MSC PROGRAMMES

1. Climate Change & Sustainable Development
2. Energy & Sustainable Building Design
3. Energy and Industrial Sustainability

180 students

# IESD THEMES

- Low carbon building design
- Zero carbon & renewable technologies
- Intelligent energy
- Behaviour change & public engagement

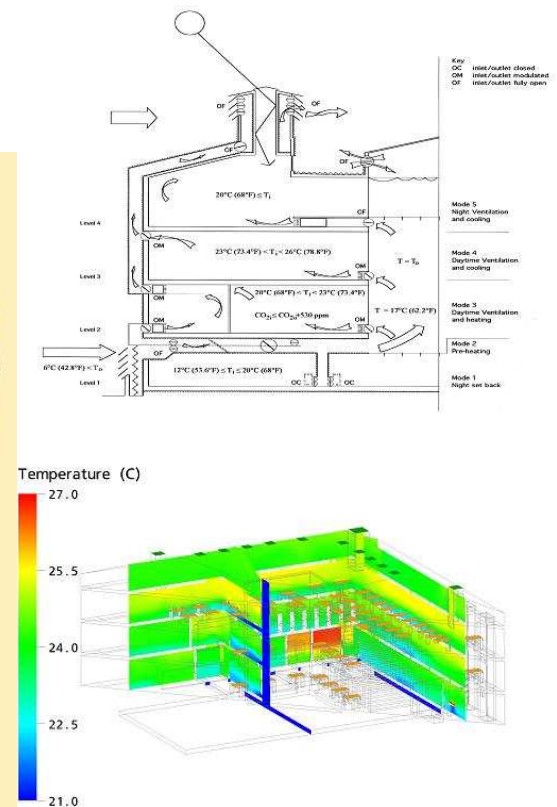
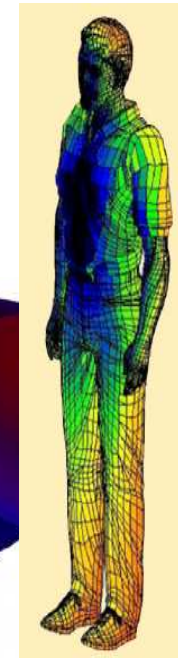
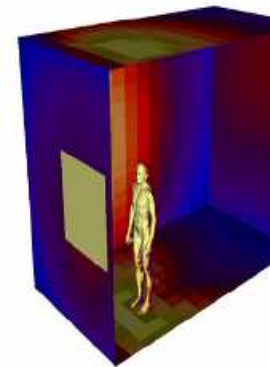
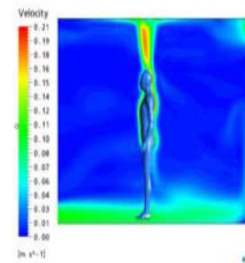
# LOW CARBON BUILDING DESIGN

- Queens Building, Leicester – Green Building of the Year (1995);
- Lichfield Garrick Theatre – CIBSE Project of the Year (2004);
- School of Slavonic and East European Studies - CIBSE Innovation of the Year (2006);
- New York Times Building (Renzo Piano);
- Australia Stadium – the focal point of the Sydney Olympics;



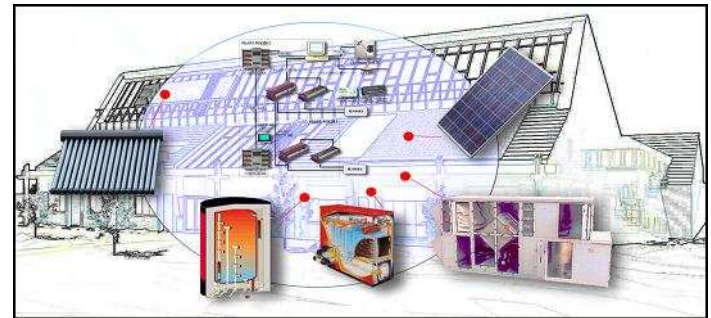
# ZC & RENEWABLE TECHNOLOGIES

- Monitoring , measurement & carbon foot printing
- Sustainable design
  - Natural ventilation
  - Natural lighting
- Simulation
  - Energy consumption
  - Lighting
  - Air flow
  - Thermal comfort



# ZC & RENEWABLE TECHNOLOGIES

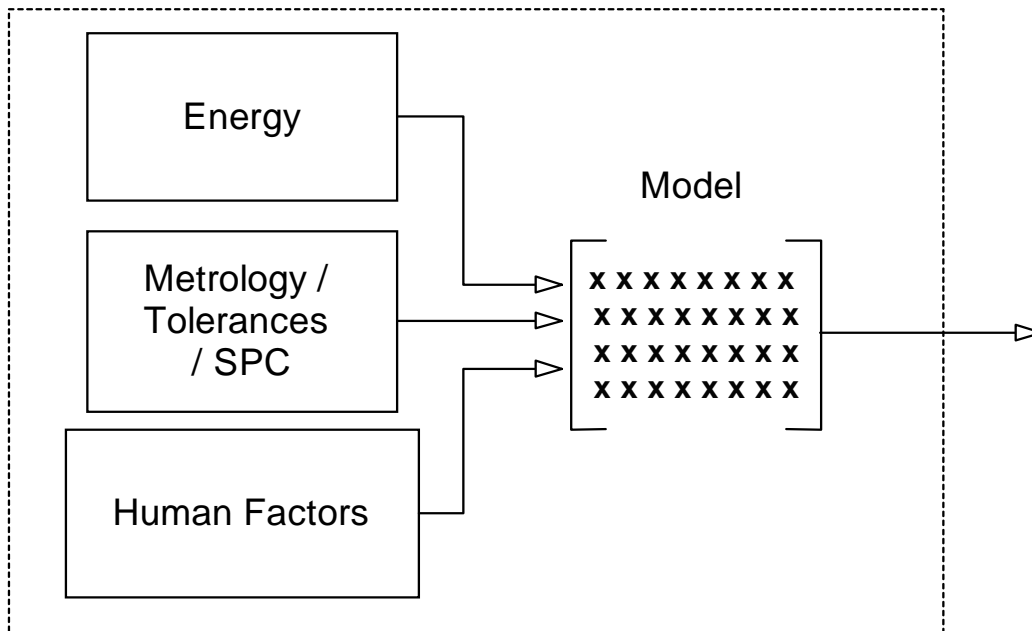
- Renewable technologies
  - Wind turbines
  - Solar PV
  - Solar thermal
  - Ground source heat pumps



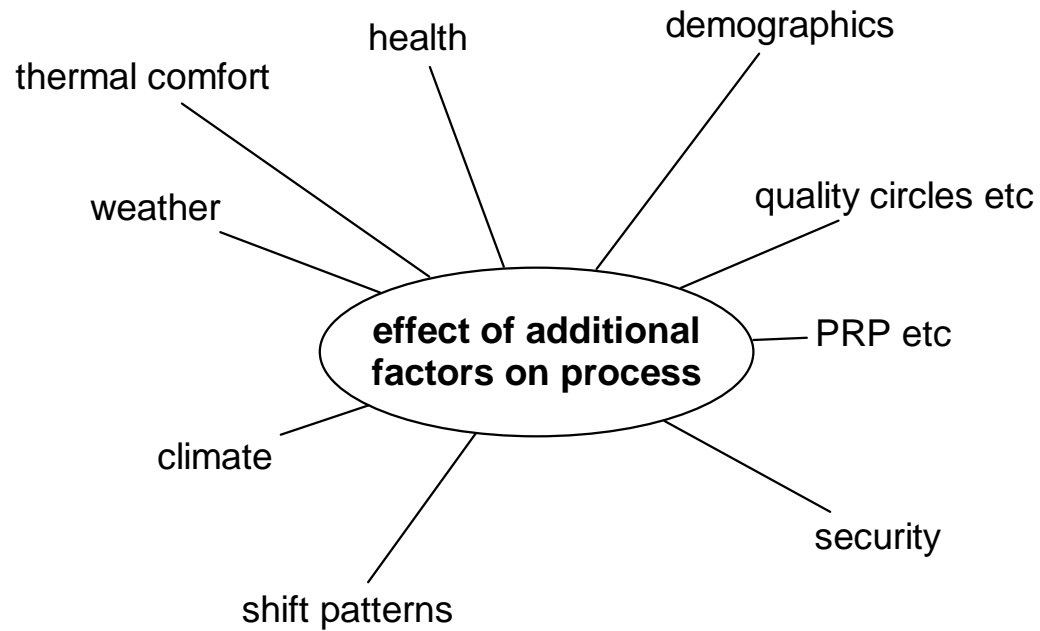
# IESD in Manufacturing

- FoF Project KAP (Sept '10)
  - Monitoring and reporting of carbon emissions from manufacturing processes
- UK TSB project THERM
  - Modelling energy use to identify opportunities to re-use energy between processes and in factory building services
- Energy Analysis of SMEs
- Energy efficiency research and consultancy
- Data centre energy analysis
- Smart grid, CHP, renewables
- Widely published in energy efficiency, taught courses in energy management

# Context level linear model

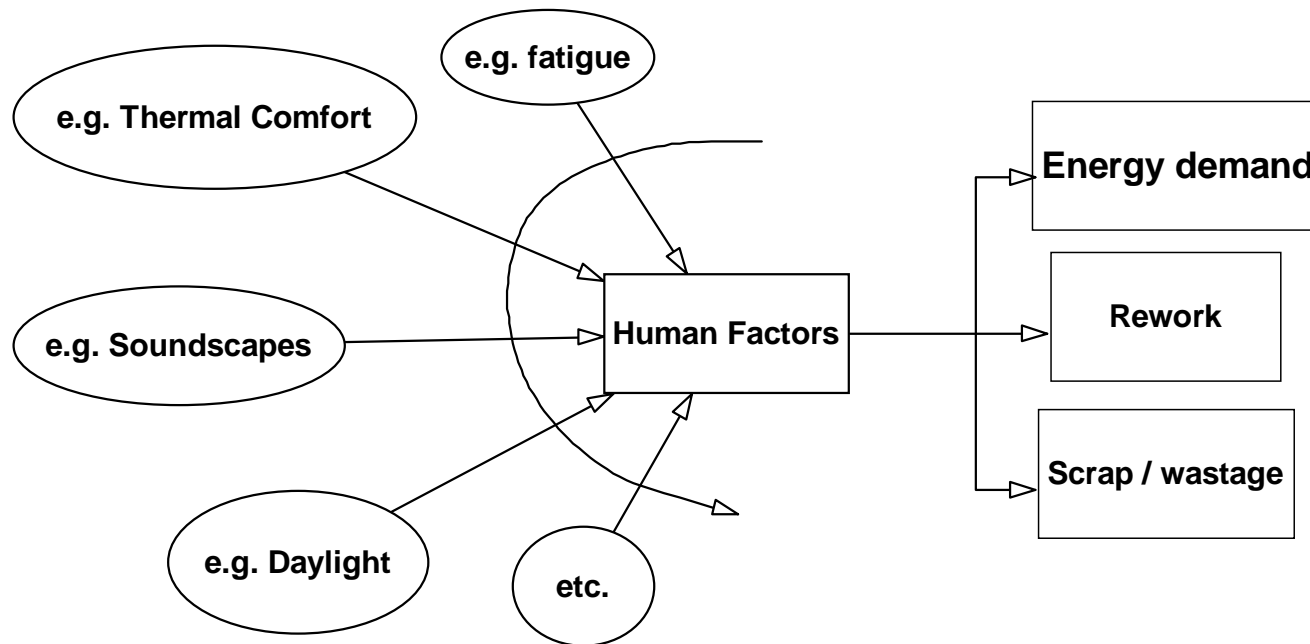


## Human, climatic and other factors

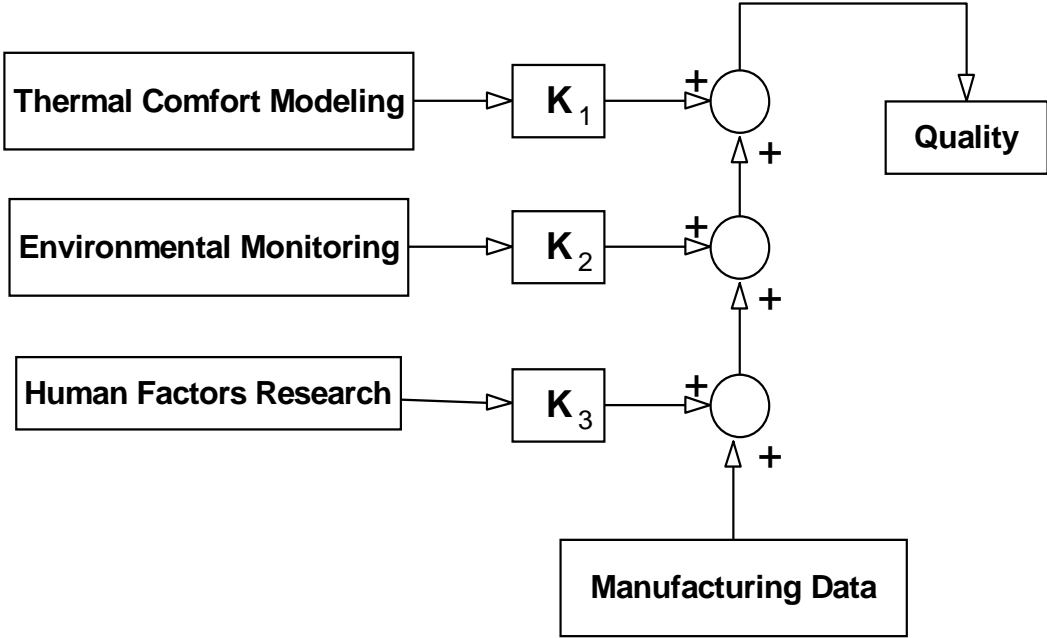


# What is the effect of this?

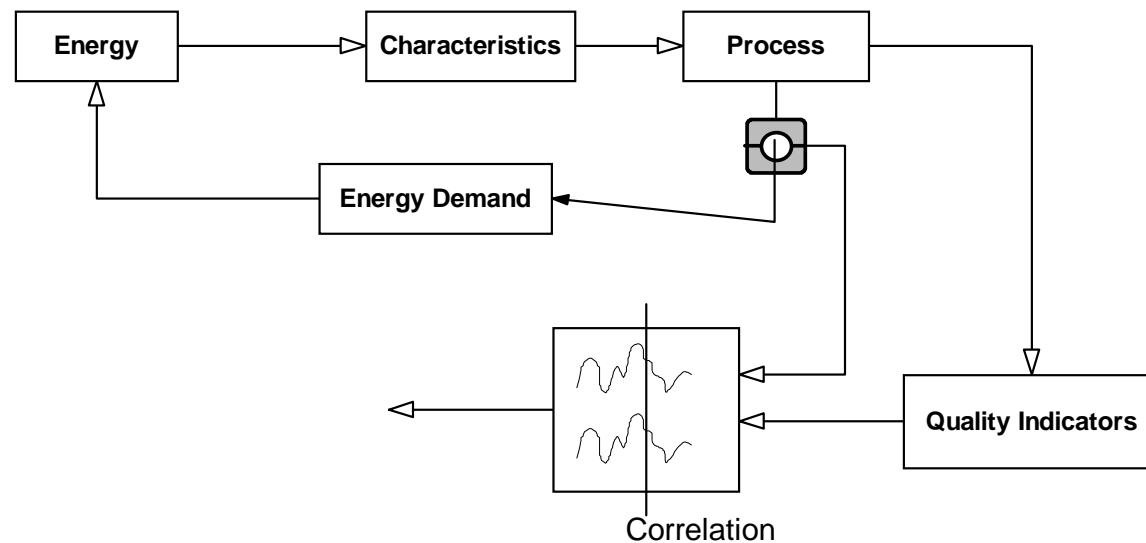
## Fusion of human factors research with sustainability and productivity



# Putting product quality on the critical path

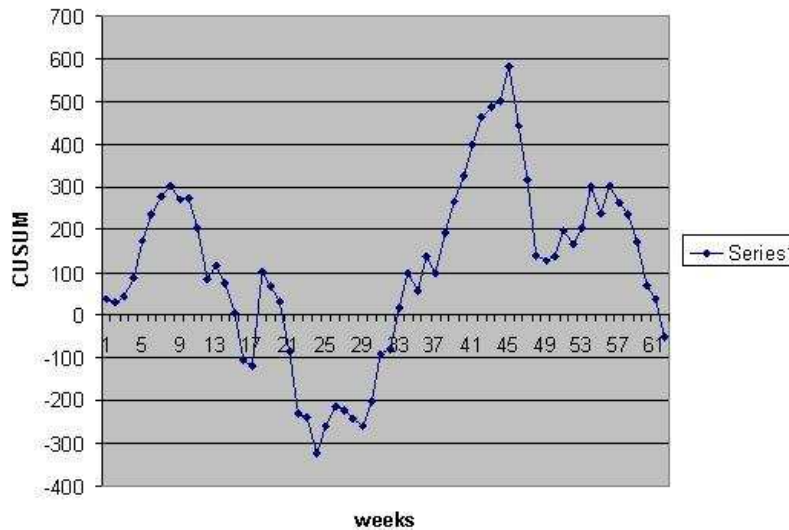


# Establishing the relationships between quality factors and energy savings

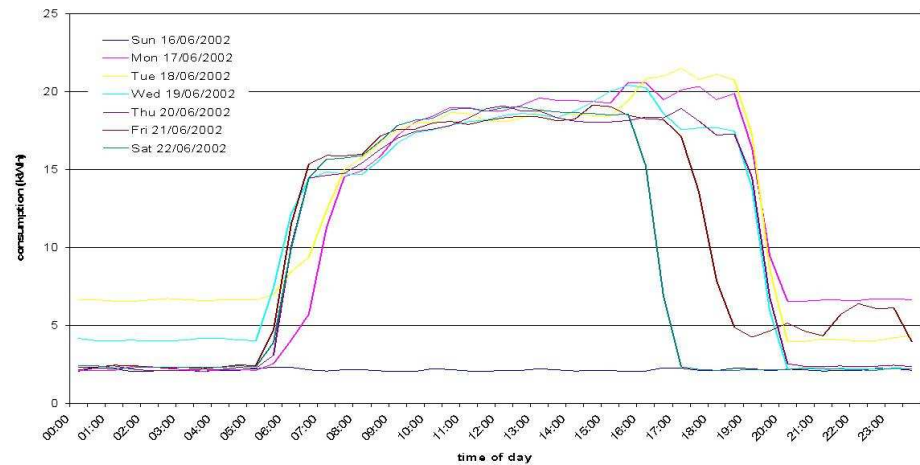


# Energy Consumption Analysis

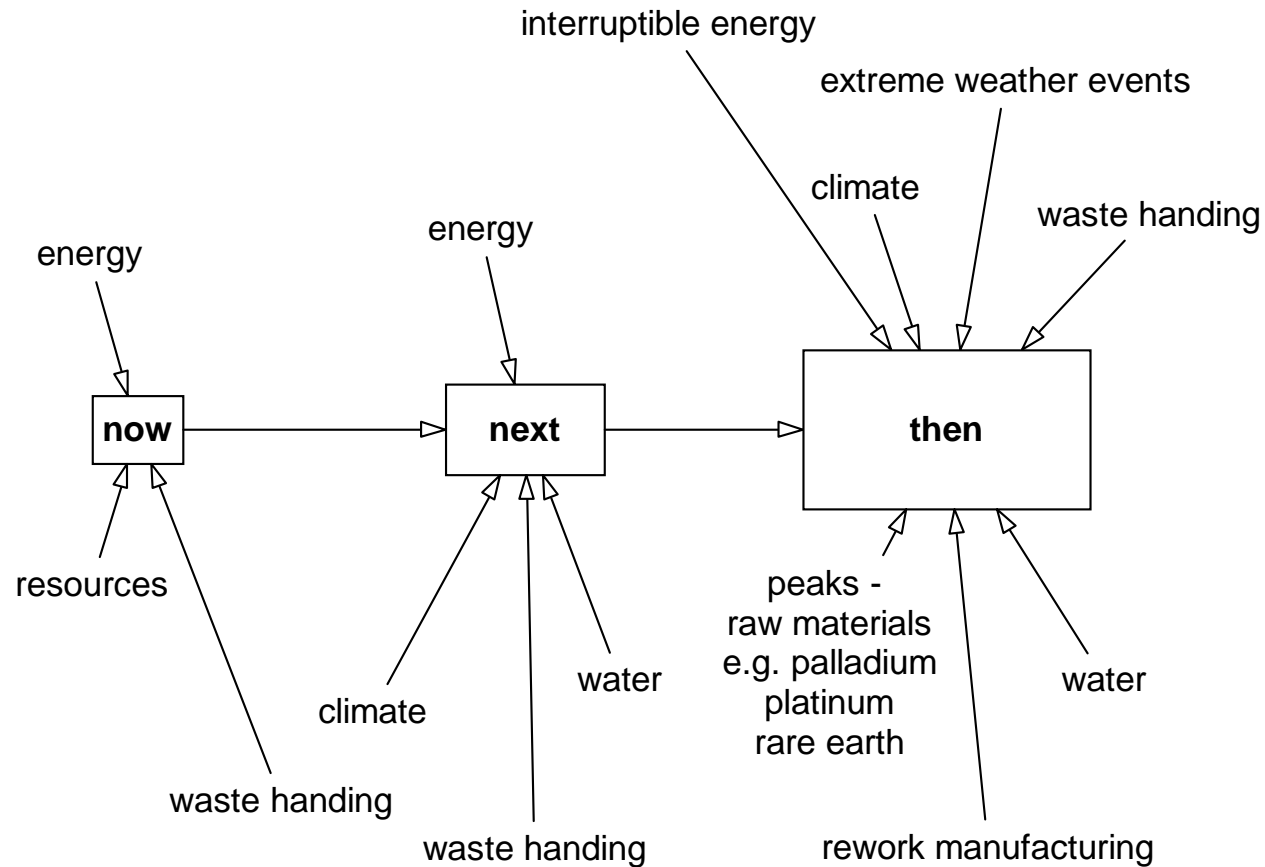
All Data CUSUM



Daily profiles 16th - 22nd June 2002



# Futurology of manufacturing



# Modeling the future of manufacturing

Productivity to increase

Material waste to be reduced

Energy waste to be reduced

Changing availability of fuel

Changing human factors

Changing Climate

*Increased profits, lower environmental impact*

# INTELLIGENT ENERGY

## Smart Grid

- complex system models
- intelligent enabling technologies
- home automation systems
- energy market models

## Distributed Energy etc

- spatial planning issues
- hybrid system models
- system and control optimisation
- load profile models

# BEHAVIOUR CHANGE & PUBLIC ENGAGEMENT

- Lifestyle, behaviours and practices
- Communities, ownership and social movements
  - Public engagement
  - Schools
- Energy literacy and visibility

