

# CLIENT-DRIVEN INNOVATION THROUGH PERFORMANCE APPROACH & VALUE MANAGEMENT

**Greg Foliente**

CSIRO Manufacturing & Infrastructure Technology  
Melbourne, Australia

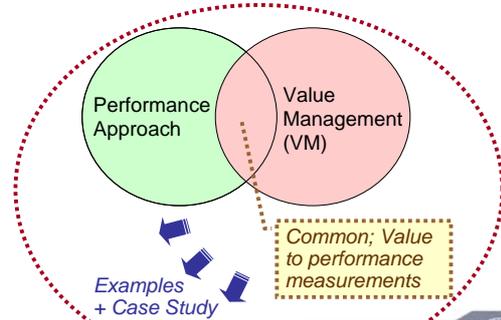
**John Kelly**

Glasgow Caledonian University  
Glasgow, UK

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## CLIENT-DRIVEN INNOVATION

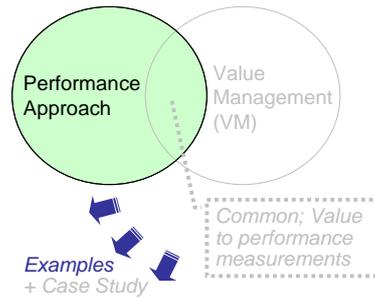


CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



APPLICATIONS OF PERFORMANCE APPROACH & VALUE MANAGEMENT FACILITATE INNOVATION & CLIENT SATISFACTION

## AGENDA



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## THE PERFORMANCE APPROACH ('PA')

... is primarily concerned with the description of **what a building process, product and/or service is/are required to achieve** (the 'end'), **not about how they should be achieved** (the 'means')

e.g. T-Q-C, H&S, ROI, etc

e.g. facility management issues, etc

i.e. functional/technical (note this has been the traditional focus of the 'PA')

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



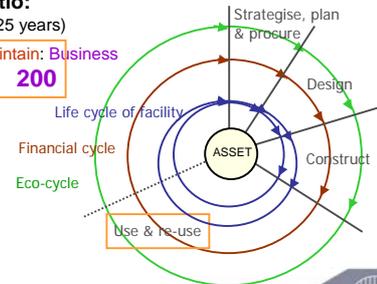
## CONSIDERING WHOLE-OF-LIFE PERFORMANCE OF 'ASSET/FACILITY'

**Example cost ratio:**

(UK Office Building, 25 years)

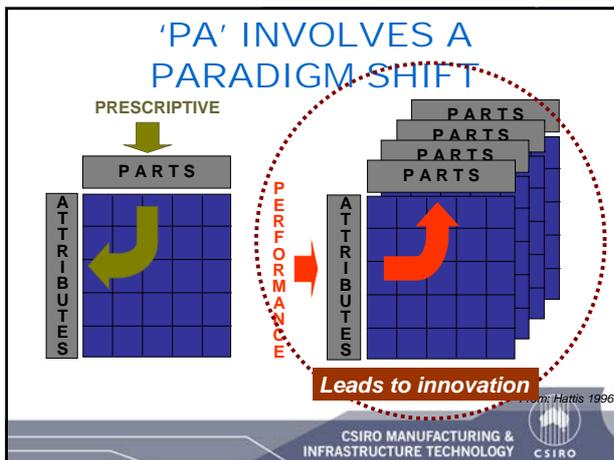
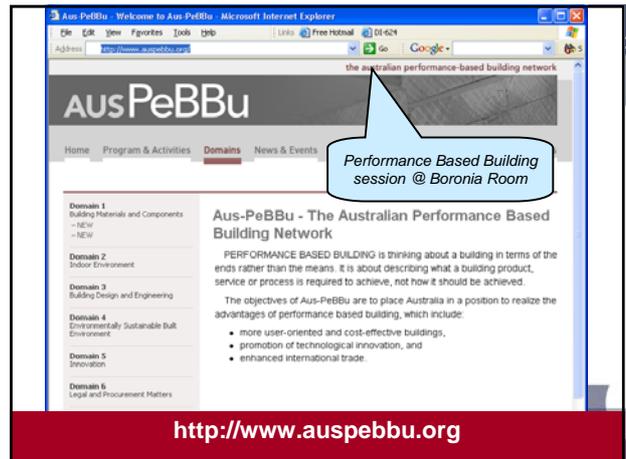
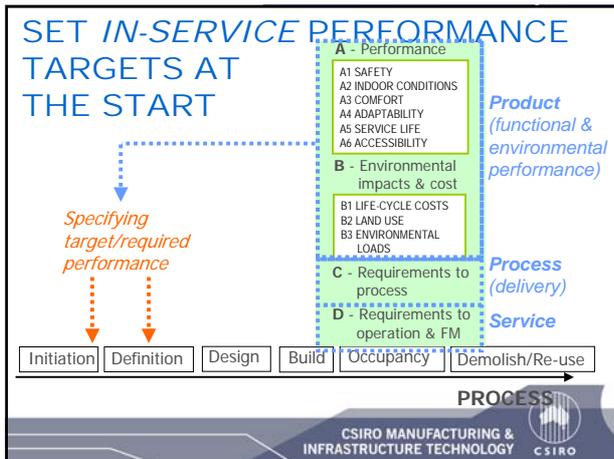
Capital : Operate : Maintain : Business

1 : 5 : 200



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY





### EXAMPLE: SYDNEY 2000 FACILITIES – Performance based fire safety engineering

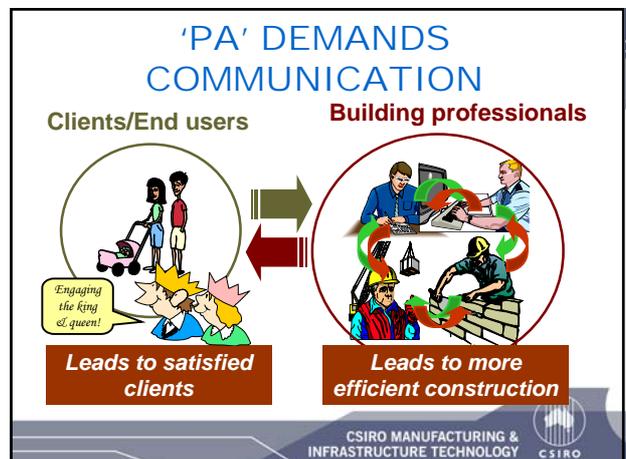
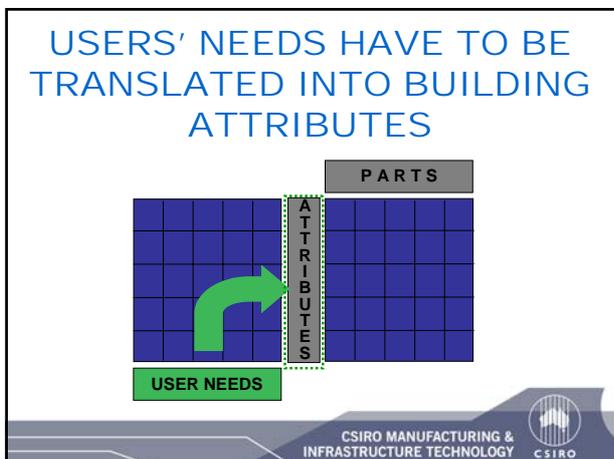
**Stadium Australia**

- Capital value: Aus\$690 million
- Capacity: 110,000 people
- Larger fire compartments
- Reduced sprinkler coverage
- Passive ventilation systems

**Olympic park railway station**

**Sydney Superdome**

CSIRO



## EXAMPLE: US COAST GUARD FACILITIES (with Int'l Centre for Facilities)

**WHY**  
is it **REQUIRED**  
Describe mission and purpose

**WHAT**  
IS **REQUIRED**  
Define ends and expected results in support of business OR other mission

**CLIENT**  
users/customers understand

**Compare & Match**

**HOW**  
CAN ONE OR MORE **SOLUTIONS** meet the requirements. Assess capability to perform.

**SUPPLIER**  
supply chain participants understand and respond appropriately

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

## Matching Process

**Operations**

**Required Functionality**

Calibrated tools to define the levels of functionality and service life required by the mission

**Suitability**

**Compare (Gap Analysis)**

Exceeds need = ■

Good fit = ■

Less than required = ■

Standard demand and supply scales are different, but matched

**Logistics**

**Rating of Capability**

Calibrated tools to measure the levels of capability to perform of a logistics system, or of a building or infrastructure, and the anticipated remaining service life

© 1993, 2004 International Centre for Facilities, reproduced with permission Diagram by Françoise Szigeli and Gerald Davis

### Data Stamps

summarize key facts about each asset

LEGEND: STAMP FOR SUITABILITY IN RESPONSE TO REQUIREMENTS				
Mission Dependency Index	S=Security	F=Functionality	C=Condition and Service Life	U=Utilization
100-150	High	High	High	High
150-200	Medium	Medium	Medium	Medium
200-250	Low	Low	Low	Low
250-300	Urgent	Dysfunctional	Urgent	Overutilized

Diagram by Françoise Szigeli and Gerald Davis in collaboration with ICF Technologies, Inc. © 2003 International Centre for Facilities

## Weighted Data Stamp

Indicates how well the ISC supports the missions of each unit

Site G

S Deficient

C

B

A

Site F

S Deficient

C

B

A

Site C

S Consider

C

B

A

Site A

S Exceeds Need

C

B

A

Site E

S Deficient

C

B

A

Site D

S Consider

C

B

A

Site B

S Good Fit

C

B

A

© 2003 International Centre for Facilities, Inc.

## LEADS TO PROCESS INNOVATION

Leads to process innovation

- ▶ organisation & management (process & data)
- ▶ procurement & contractual arrangements
- ▶ design & construction process
- ▶ lean construction
- ▶ whole life design & management

Specifying target/required performance

Initiation

Definition

Design

Build

Occupancy

Demolish/Re-use

PROCESS

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

## ... INCLUDING SUPPLY CHAINS

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

## EXAMPLE: NATIONAL MUSEUM



Procurement by 'Project Alliancing': The National Museum of Australia Project, Canberra

### 'Requirements'

- Capital value: Aus\$155M
- Completion: March 2001
- Floor Area: 60,000 m<sup>2</sup>
- Completed *on brief, on budget & on time!*

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



*If the building & construction industry does not build efficiently to meet customers/users' needs, someone else will innovate to do so...*

## EXAMPLE: ALTERNATIVE 'SUPPLIERS'



IKEA



## EXAMPLE: ALTERNATIVE 'SUPPLIERS'



Temporary facilities



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## EXAMPLE: ALTERNATIVE 'SUPPLIERS'



Paper industry



## EXAMPLE: ALTERNATIVE 'SUPPLIERS'



Shipbuilding



## EXAMPLE: ALTERNATIVE 'SUPPLIERS'

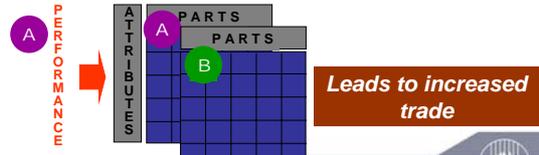


Offshore industry

## WTO General Agreement on Tariffs & Trade

Clause 2.8, Agreement on Technical Barriers to Trade

"Wherever appropriate, (GATT) Members shall specify technical regulations based on product requirements *in terms of performance* rather than design or *descriptive* characteristics."



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## EXAMPLE: TRADE TO JAPAN & TO/WITHIN EUROPE

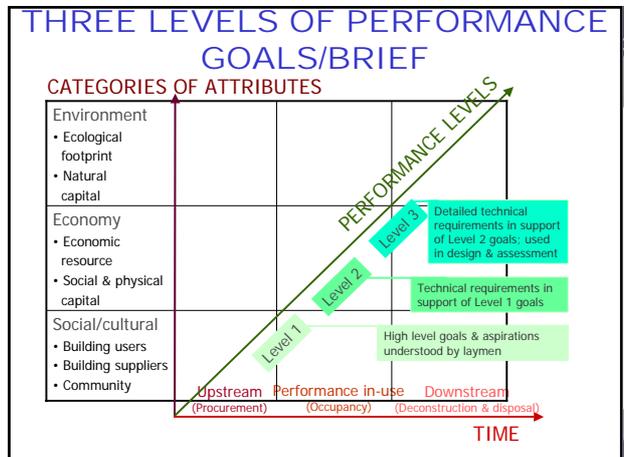
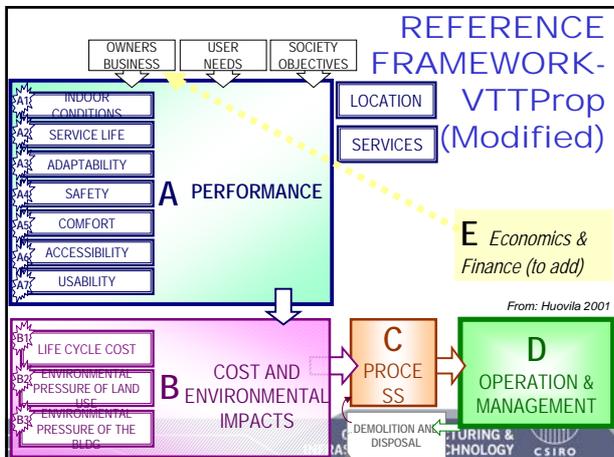
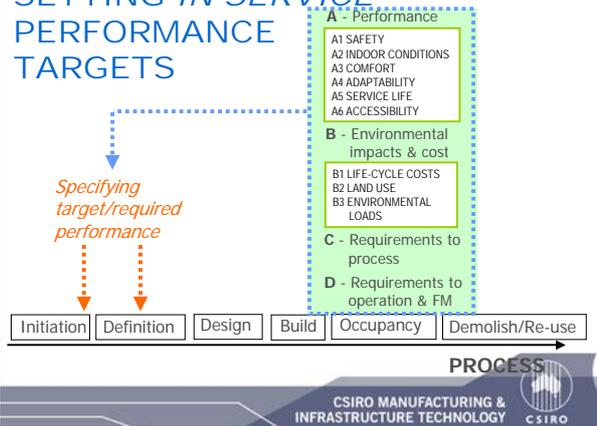
- **Japan:** Australian light-gauge steel framing for housing
- **Europe:** Through Construction Products Directive (CPD)

3:00 PM Session @ Boronia Rm  
"CPD implications to Australian industry..."

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## SETTING IN-SERVICE PERFORMANCE TARGETS



## EXAMPLE: MELBOURNE COUNCIL HOUSE CHARRETTE-WORKSHOP



eco-nomics

people ↔ eco exchange

green print

**GREEN PRINT**

- IMPLIED CONTINUITY & GROWTH
- ADJOINING FABRIC
- GREEN REPLICABLE SYSTEMS
- PUBLIC SPACE
  - Access
  - Opportunities
- GREEN RATIO
- CARBON FIXATION INDEX
- OXYGEN
  - Production vs Demand
- % ENDEMIC SPECIES (BIODIVERSITY)

## MELBOURNE CITY COUNCIL & CSIRO

RESULT → GBC 6 Green Stars – 'World leader'



## EXAMPLE 2: SUSTAINABLE BUILDING @ VICTORIA HARBOUR

MELBOURNE Docklands




CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## EXAMPLE SET OF SUSTAINABLE PERFORMANCE INDICATORS

**SUSTAINABILITY** 30/02/2003 - v7

- Natural Capital**
  - Materials
  - Biodiversity
  - Water
  - Soil
  - Air
- Accessibility**
  - Transport
  - Internal
- Serviceability**
  - Purpose / Service Life
  - Maintainability
  - Deconstruction
  - Robustness vs Adaptability
- Active & Evolving**
  - Function
  - Infrastructure & Technology Change
  - Plug & Play
- Context**
  - Built Environment
  - Natural Environment
  - Social Environment
- Economics**
  - Capital
  - Operating
  - Wholesale Life
  - Return of Investment
- RESOURCE USE**
  - Energy
    - Generation
    - Embedded
    - Loss
  - Water
    - Conservation
    - Recycling
  - Waste
    - Conservation
    - Recycling
  - Materials
    - Conservation
    - Recycling
- SOCIAL CAPITAL**
  - Health
    - IAQ
    - Lighting
    - Comfort
    - Noise
  - Connectivity
  - Productivity
  - Amenity

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## THREE LEVELS OF PERFORMANCE GOALS/BRIEF

CATEGORIES OF ATTRIBUTES

Environment			
• Ecological footprint			
• Natural capital			
Economy			
• Economic resource			
• Social & physical capital			
Social/cultural			
• Building users			
• Building suppliers			
• Community			

PERFORMANCE LEVELS

Level 1: High level goals & aspirations understood by laymen.

Level 2: Detailed technical requirements in support of Level 2 goals, used in design & assessment.

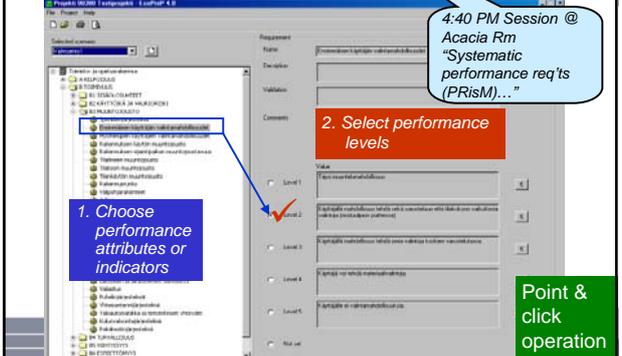
Level 3: Detailed technical requirements in support of Level 2 goals, used in design & assessment.

Upstream (Procurement) → Performance in-use (Occupancy) → Downstream (Deconstruction & disposal)

TIME

Needed for design

## USING EcoProp/PRISM SOFTWARE TO SET, DOCUMENT & MANAGE REQUIREMENTS FOR EACH INDICATOR

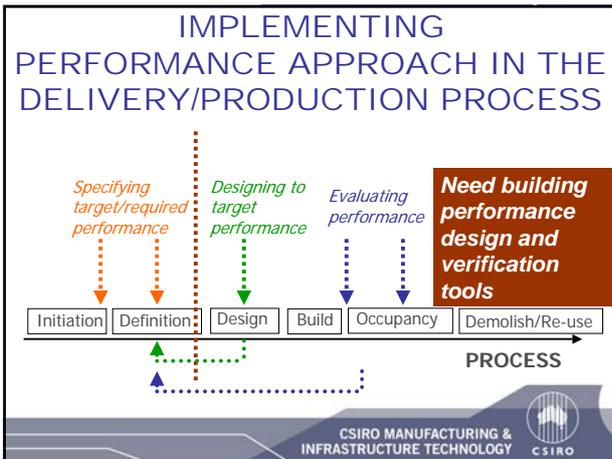


4:40 PM Session @ Acacia Rm "Systematic performance req'ts (PRISM)..."

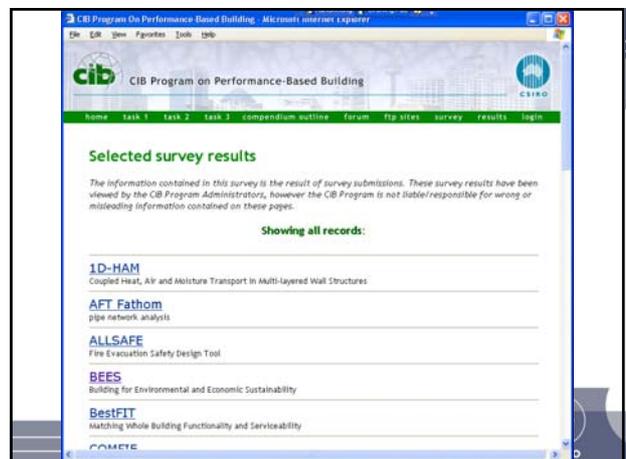
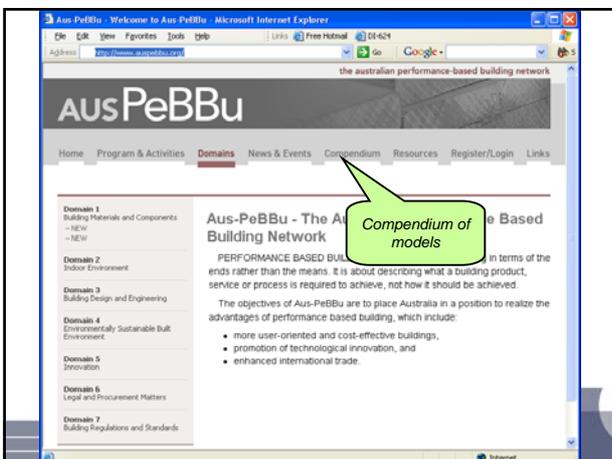
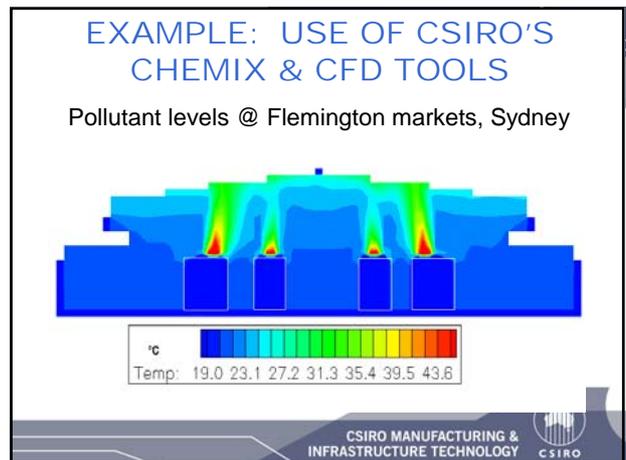
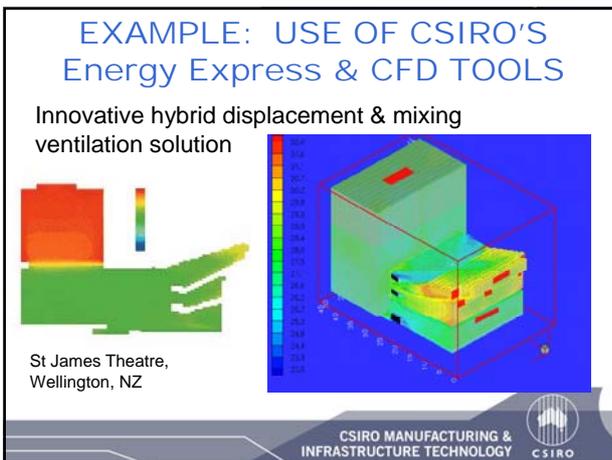
1. Choose performance attributes or indicators

2. Select performance levels

Point & click operation



- ### CIB-AusPeBBu COMPENDIUM OF BUILDING PERFORMANCE MODELS
- Building performance models are any calculation procedures or computer models/programs that can be used for performance-based design + verification
  - Example: "Virtual Design & Construction" (VDC) tools (ref: M Fischer's presentation)
- CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO



### EXAMPLE: CRC-CI'S LCADesign SOFTWARE TOOL

**LCADesign** An automated eco-efficiency design tool for commercial buildings

Life Cycle Inventory of materials

Environmental impacts Direct from CAD to Analysis

CSIRO INFRASTRUCTURE

### EXAMPLE: Comparing Eco-Efficiency of Alternative Facades

4:40 PM Session @ Boronia Rm "LCADesign..."

Pre-Cast Concrete Panel

Brick Masonry

Glass Curtain Wall

Global Warming Potential

Acid Equivalents

Human Health

Low Glass  
Mid Concrete  
High Brick

### AGENDA

Performance Approach

Value Management (VM)

Common; Value to performance measurements

Examples + Case Study

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

### VALUE MANAGEMENT (VM)

BS EN 12973 (2000)

- Value Management is a *style of management*, particularly dedicated to motivate people, develop skills and promote synergies and innovation, with the aim of *maximizing the overall performance* of an organization.
- Three root principles:
  - Continuous awareness & measurement of business value
  - Focus on *objectives & targets* before making decisions
  - Focus on *function* to promote innovation

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

### WHAT IS VALUE?

Value =  $\frac{\text{Satisfaction of Needs}}{\text{Use of Resources}}$

What is necessary for a desired user

Everything that is required to satisfy needs

~~1~~ Cost ? **Function** Cost ✓ ?

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

### WAYS OF INCREASING VALUE?

V

F C

F C

F C

F C

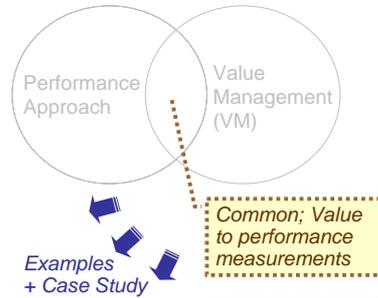
F C

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY CSIRO

## APPLYING 'VM'

- Value Management:
  - is *not* value engineering
  - uses the 'job plan' for process
  - takes a functional view
  - engages stakeholders
  - is a strategic business development tool
- Its effectiveness depends on:
  - facilitator
  - workshop culture/environment
  - stakeholder engagement & willingness

## AGENDA



## 'PA' & 'VM' COMMON AREAS

- Prime importance of (real & perceived) needs & requirements of clients/users (demand-side stakeholders)
  - capturing & maintaining them
  - meeting/exceeding them
- Focus on objectives and targets rather than the means of achieving them
- Importance of measurements, feedback & iteration
- Focus on innovation

## APPLICATION IN PERFORMANCE MEASUREMENT IN INDUSTRIAL BUILDINGS

- Objective: Integrated performance measurement that adds value to client organisation
- Example: BMW-Mini plant in Oxford, UK



- Bringing together the totality of performance measurement
- Through analysis of the process
- And understanding of stakeholder values

## CONCLUSIONS FROM GLAGOW CALEDONIAN UNIV EPSRC STUDY

- Manufacturing FM with production engineers
- Buildings are not viewed as production plant
- Building costs = fixed overheads
- No data held by DTI in UK on manufacturing capacity beyond economic stats

## Problem

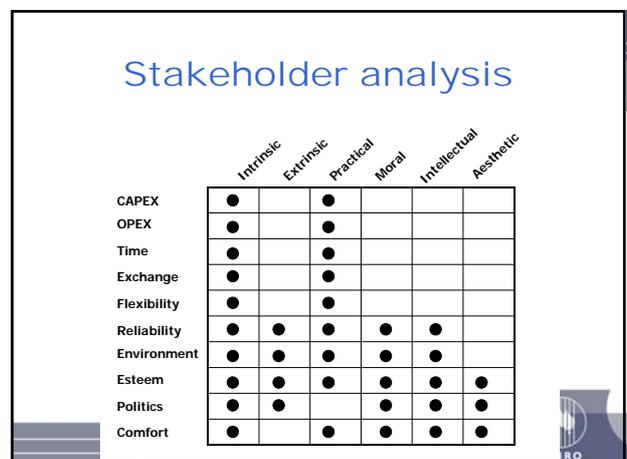
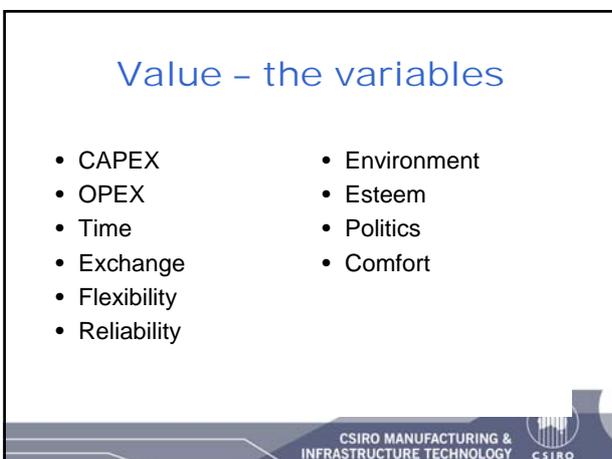
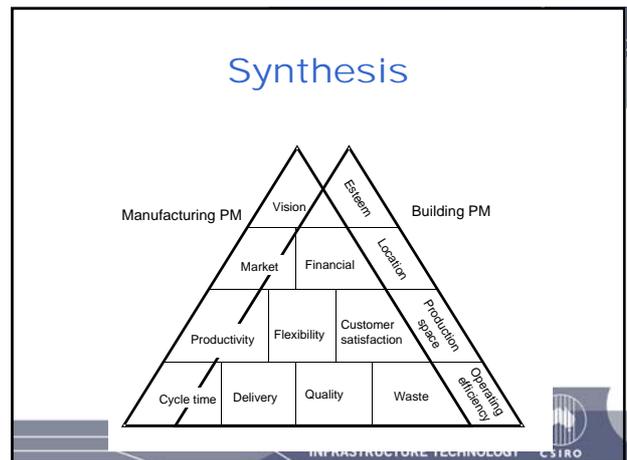
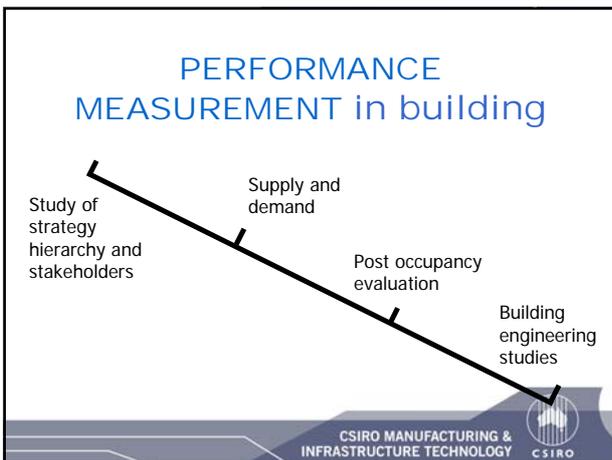
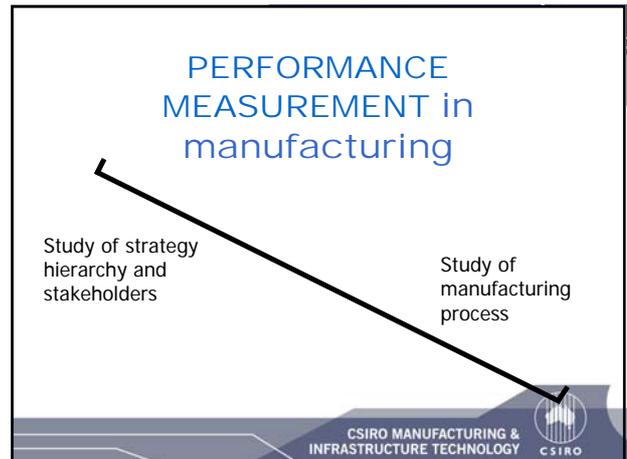
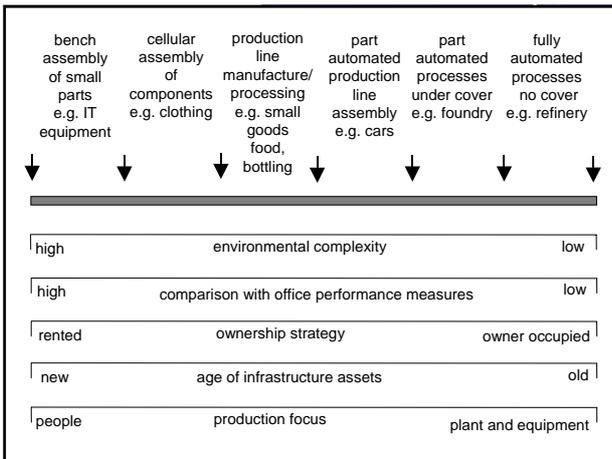


PM in manufacturing



PM in building

VS





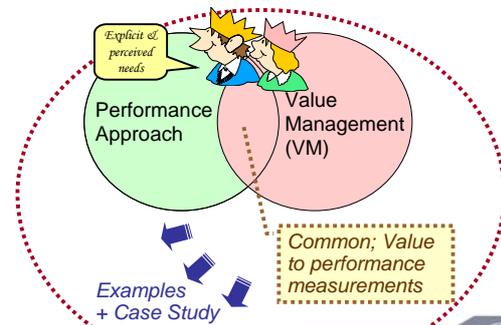
## APPLICATION RECAP GLASGOW CALEDONIAN UNIV EPSRC STUDY

- Analysis of project
- Define the problem
- Select appropriate performance measure to get information
- Use information to maximise value
  - Action on analysis
  - Workshop

CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## CLIENT-DRIVEN INNOVATION



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



## A NOTE ON INNOVATION...

## A NOTE ON INNOVATION

- (Rogers 1995): **Innovation** is 'an idea, practice or object that is perceived as new by an individual or other unit of adoption'



CSIRO MANUFACTURING & INFRASTRUCTURE TECHNOLOGY



A collaboration with CSIRO



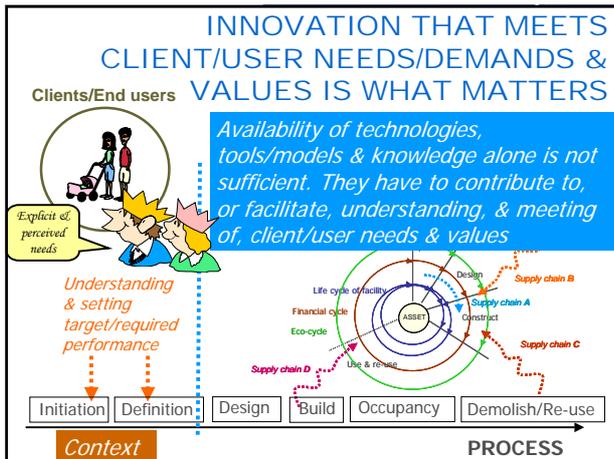
Ultimate adoption unit:  
Australian industry

Following 'tipping  
point' principle

## The Evergen Initiative

Innovation and Technology Diffusion for  
High Performance Buildings

## TO SUM UP...



*APPLICATIONS OF  
PERFORMANCE APPROACH &  
VALUE MANAGEMENT  
FACILITATE INNOVATION &  
CLIENT SATISFACTION*