

Whole life costing

Costing of projects should include full life-cycle costings of the facility as well as more immediate construction and project costs. The quality of both design and construction has the potential to greatly reduce whole life costs, including costs-in-use and the eventual disposal of the built facility.

Too often building cost, maintenance and operational costs are seen as fixed overheads, rather than variables which contribute to bottom line profitability.

Procuring a new building is expensive, and is often an unwelcome distraction from the main business activities of the company. Maintenance work has been described as a 'distress purchase' – unplanned and unwanted. In the past, 60% of construction clients have been disappointed by their purchase. These are all reasons to try to ensure construction is procured cost-effectively and efficiently.

Owners typically adopt whole life costing as part of a strategic reassessment of its facilities. It affects procurement of new buildings and choices about renewal, refurbishment and disposal. Introducing structured management of its facilities to an organisation can readily reduce workspace costs by 10%, rising to twice that amount in the medium term. The economic benefits show through improved productivity and better production quality and overheads control. Both bottom line cost-effectiveness and predictability are improved.

Different building types require different spending profiles and the greatest gains can be made by considering and minimising avoidable costs at the design stage.

New work – layout and height

Options identified during the design can generate savings in both capital and operating costs. For example, the heat loss from a compact single storey school with a 2.4m storey height should be about 30% less than one with an irregular layout, and a storey height of 3.4m, given the same overall floor area. The initial capital costs would also be about 20% less.

Reducing costs of access - for maintenance and replacement

A whole life costs analysis enables designers to consider the possibility of reducing maintenance costs at no additional initial or capital cost. This is achieved by improving the accessibility of various elements for foreseeable maintenance and replacement work or removing the need for access all together.

The highest savings can occur when:

- regular maintenance is completely avoided by redesign
- entire cycles of maintenance are removed at high level where scaffolding costs will often exceed the costs of the work to be carried out. More than half of all accidents in construction are as a result of falls from a height
- consequential damage to adjacent surfaces is avoided by providing enough space and removable panels to access boilers, tanks and cisterns and plant.

Targeting the major elements of cost

The following breakdown of operational costs indicates the major areas where savings can be made. Average figures, provided by BMI at 1990 rates, indicate that occupants' spending falls into a number of categories for different building types:

Spending category	Commercial	Recreation	Educational	Residential
Utilities + energy	35%	22%	32%	22%
Overheads	24%	19%	23%	13%
Administration	12%	29%	14%	20%
Cleaning	12%	13%	16%	25%
Fabric maintenance	9%	6%	5%	6%
Services maintenance	5%	7%	7%	6%
Decorations	3%	4%	3%	8%
	100%	100%	100%	100%

Table Breakdown of operational costs

However, average historic cost statistics hide significant variations between the best and worse performers in each category. For example, the most efficient examples may reduce cleaning costs to about half those of the least efficient. Large energy savings and costs over life are readily achievable at early design stage by avoiding the need for air conditioning for example.

Maintenance expenditure also varies between different building types and elements:

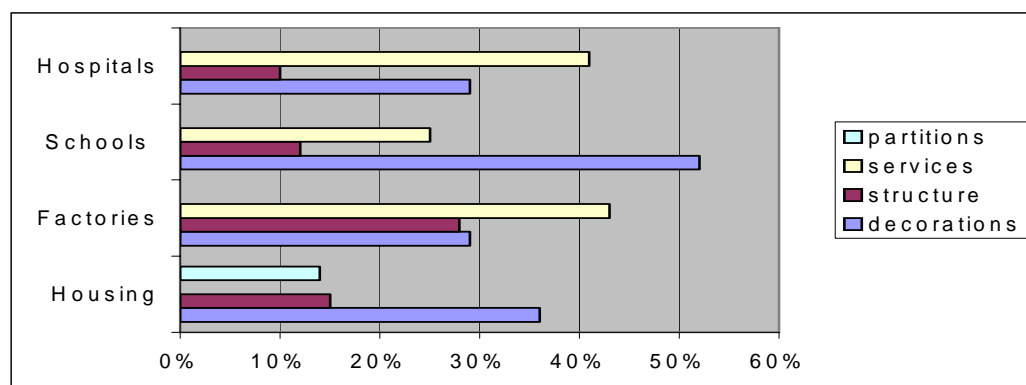


Table Top three categories of annual maintenance expenditure by building type

Following best practice in energy efficiency

Large amounts of data have been produced to indicate the savings possible by reducing energy consumption and improving energy efficiency of plant and equipment. As the operational costs in Table 1 show, energy and utilities use are major contributors to running costs.

The Energy Efficiency Best Practice programme has published guidance indicating that organisations in most sectors should be able to make average savings of about 30% of their

previous energy use, with an average payback period of less than three years. At least half the savings are from simple low cost measures with much shorter payback periods. The savings are even greater and capital costs less, if options are chosen at design stage and integrated with the main building work.

Payback period	Boiler room / heating system	Other
Free	<ul style="list-style-type: none"> • Eliminate weekend / holiday heating • Check settings of controls / thermostats • Isolate winter heating circuits in summer 	<ul style="list-style-type: none"> • Reduce hot water temperatures • Use swimming pool cover if fitted • Replace 38mm tubes with more efficient 26mm tubes at failure
Short (< 2 yrs)	<ul style="list-style-type: none"> • Regularly check boiler / air fuel ratio • Repair leaks on distribution mains • Fit boiler sequence controls • Fit / repair / replace thermostats 	<ul style="list-style-type: none"> • Seal unused chimneys / stacks • Fit foil behind radiators • Replace tungsten lighting with compact fluorescent lamps
Medium (2-5 yrs)	<ul style="list-style-type: none"> • Install a Building Management System • Replace central boiler with point of use heaters 	<ul style="list-style-type: none"> • Install swimming pool cover • Install cavity insulation • Install heat pump heat recovery system to pool

Table Examples of measures recommended for schools

Summary

- The earlier that whole life costing is considered, the greater the potential benefits.
- Lower capital costs, reflecting a more efficient design, can result in lower whole life costs.
- A building with in-built low running costs will have a lower impact on the profitability of the owner or occupier's business.
- Buildings whose performance can be readily and economically maintained will benefit the occupants and improve their productivity.