



BCIS

Independent cost information
for the built environment

Life cycle costs and sustainability

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Ecobuild, 4 March 2009



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How much does it cost?

How much does it cost to run?



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Who is asking?

- **Developer**
- **Owner occupier**
- **Tenant**
- **'The earth'**

- **Life cycle cost: ‘the cost of an asset, or its parts throughout its life cycle, while fulfilling the performance requirements’ (ISO 15686-5)**
- **Life cycle costing: ‘methodology for systematic economic evaluation of life cycle costs over a period of analysis as defined in the agreed scope’ (ISO 15686-5)**

Life cycle costing is therefore

- **an economic evaluation method**
- **that accounts for all relevant costs**
- **over the investor's time horizon**
- **adjusting for the time value of money where appropriate**



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why do we need LCC?



A dog is for life and not just for Christmas



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why do we need LCC?



A building is for life not just for the opening ceremony

-
- **Outline business case (OBC) – option appraisal – issues of comparing like for like**
 - **Final business case – cash flow forecast prediction of the future based upon one option – issues of loans, sinking funds, cash flow smoothing, etc**
 - **Investment for return – measures of economic performance, payback, internal rate of return**

- **The principles are the same whenever and why ever you do it**
- **They are the same for option appraisal of a whole building or an individual component**
- **They are the same for setting a major replacement budget for a new building or a maintenance budget on an existing one**

LCC asks these simple questions:

- What do I need now and how much will it cost me?
- What will I need to do in the future because I have done it and how much will that cost me?
- How long is the 'future'?
- How do I evaluate future costs v current costs?

However.....

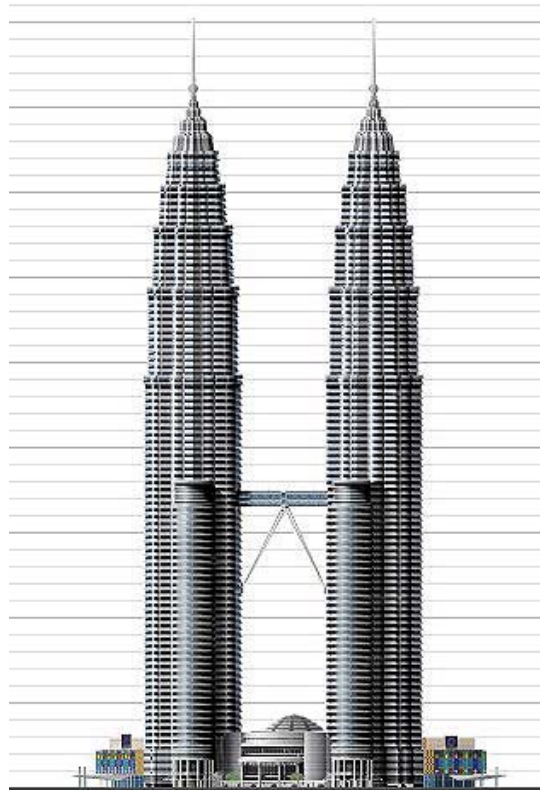


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LCC is complicated?

.....buildings are complicated



.....and client's needs can be downright confusing!

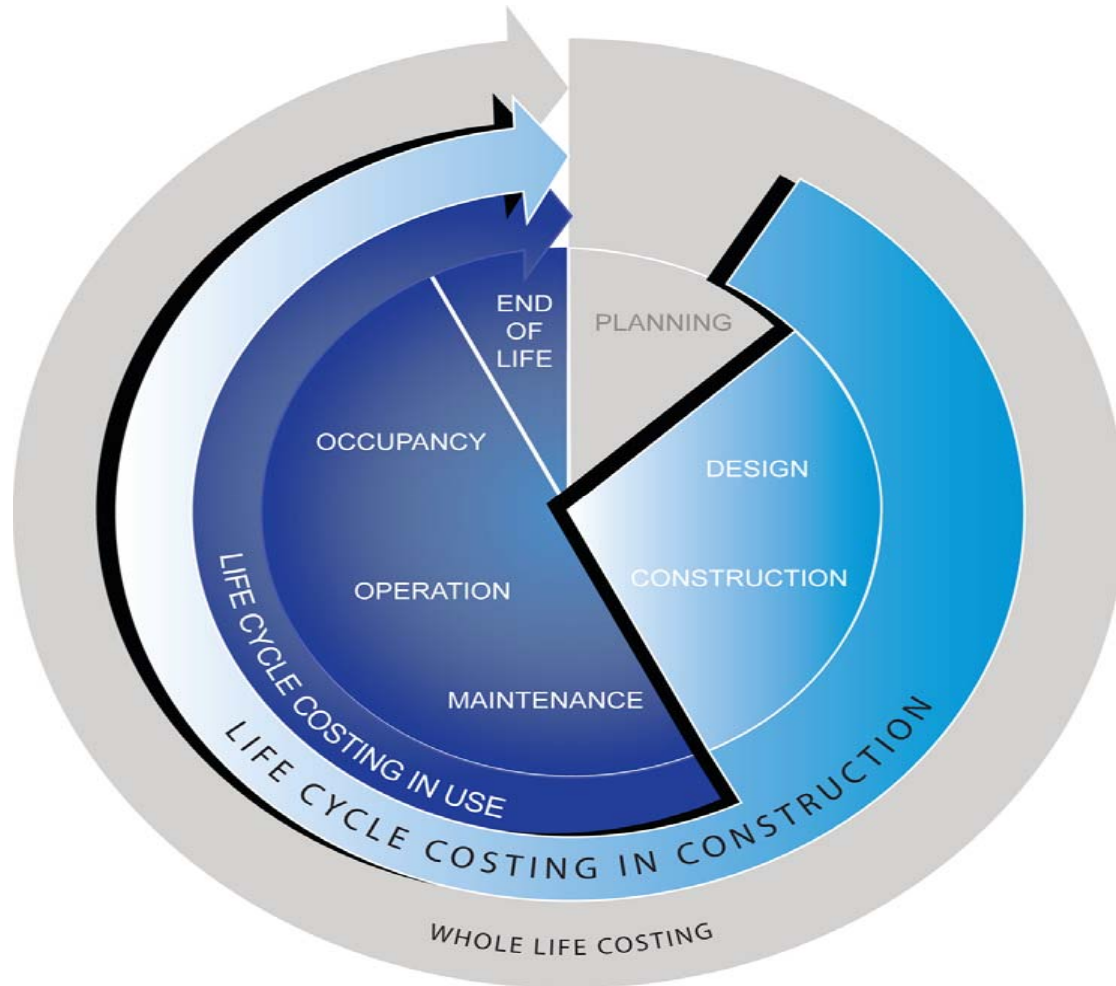
- **Private Finance Initiative**
 - **Best value**
- **Economically most advantageous tender**
 - **Sustainability**



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BCIS/BSi SMLCC

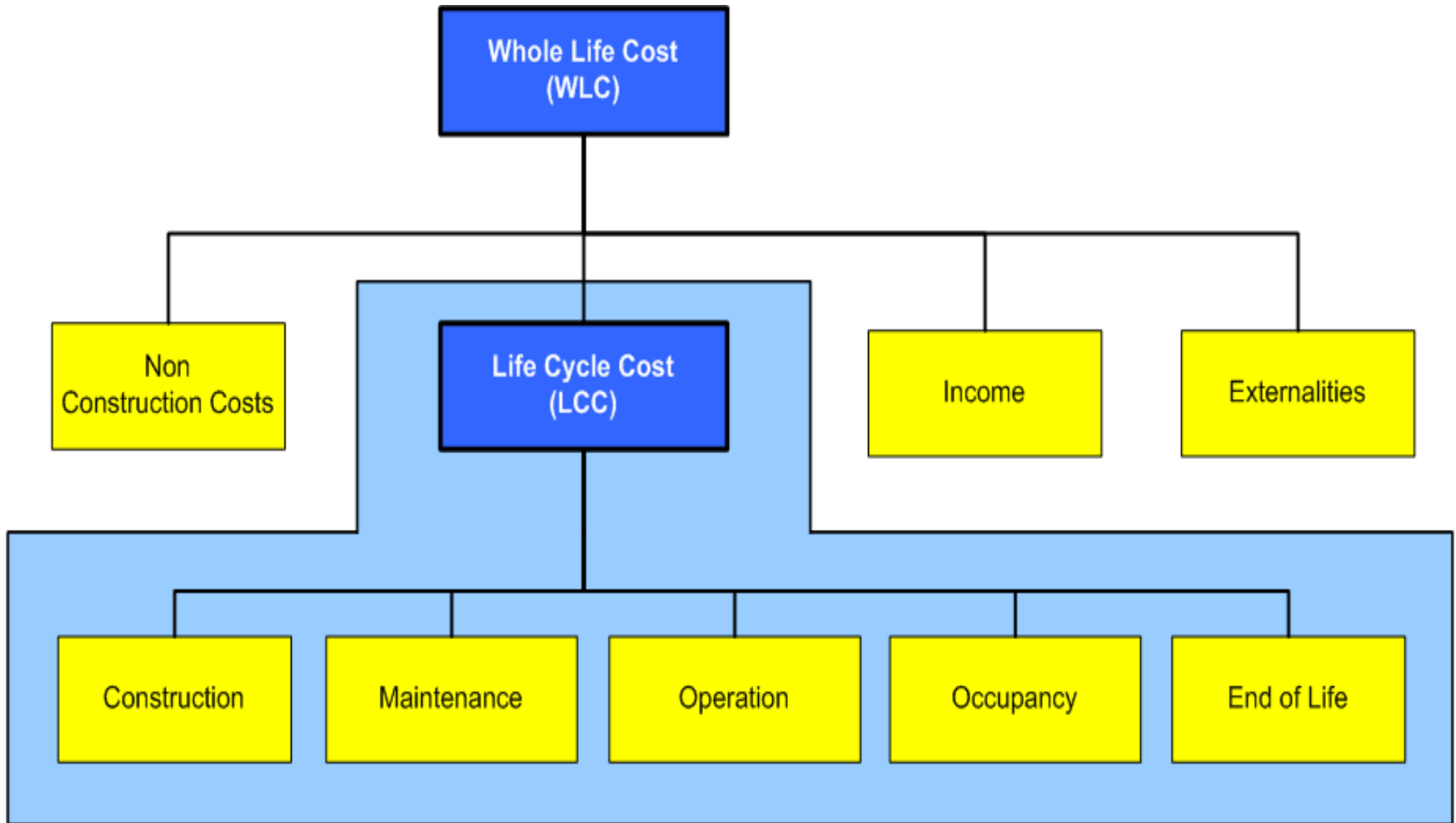




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Three requirements:

1. **relevant costs**
2. **time horizon**
3. **discount rate**



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What to include

- **Construction costs (year zero costs)**
 - Construction, fees, decanting etc
- **Maintenance costs and cycles**
 - Major replacement, minor replacement, redecorations etc
- **Operation costs and cycles**
 - Cleaning, energy, administration etc
- **Occupancy costs**
 - Reception, catering, occupants security etc
- **End of life costs**
 - Disposal, reinstatement, continued value etc

- **Externalities ie Other peoples costs**
eg Occupiers costs if the client is a developer
- **Intangibles ie Other impacts that do not have a directly measurable cost**
eg Carbon emissions
or Quality of life
- **The LCC may well form part of a larger study that will incorporate these things but the LCC should represent the cost to the investor only.**

- **The period for which the investor has an interest in the building's life**
 - the use period
 - PPP/PFI period
 - portfolio management/asset management
 - cradle to grave
 - investment period with ongoing intent to occupy
- **Building life**



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Life expectancy and obsolescence

- **Physical**
- **Economic**
- **Functional**
- **Technological**
- **Social & Legal**

How do you compare future costs with current costs?

Net Present Value (NPV)

Defined as:

The amount to be invested in the bank today to pay for all future costs at a given interest rate over a known time horizon.

Example:

How much is required to be invested in the bank today at 3.5% to pay for a replacement pump costing £400 which is anticipated to fail in year ten.

Answer = £284

If

$$A = P \times (1 + i)^n$$

then

$$P = \frac{A}{(1 + i)^n}$$

Where A =future amount, P =amount invested, i = discount rate

Interest rate net of inflation

- Treasury discount rate currently 3.5%
- Calculated rate
- Using the rate of return on an investment
- Interest rate net



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Discount Rate

***‘The selection of a suitable discount rate is crucial
as it can overwhelm all other decisions’***

RICS Guidance Note (isurv)

Net savings

- net savings – the difference between the total investment and the total present value of all savings

Savings/Investment Ratio

- **S.I.R. - $\frac{\text{the total present value of all savings}}{\text{investment} - \text{salvage} + \text{replacements}}$**

Internal rate of return

- I.R.R. - % rate of return on investment

Payback period

- payback – how long before the investment pays for itself

Life Cycle costing is an economic evaluation method

It is about the ‘for money’ in the ‘best value for money’ equation



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Exclude

- **Externalities ie other people's costs**
eg Occupiers' costs if the client is a developer

- **Intangibles ie other impacts that do not have a directly measurable cost**
eg Carbon emissions
or Quality of life



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Include

- **Actual savings that accrue to the client**
- **Tax savings**
- **Grants**
- **Value of tradeable benefits**
- **Income from energy generation**

- **Only include legislation that has been enacted**
- **Possible or even probable future legislation should be part of risk assessment**



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- **The LCC may well form part of a larger study that will incorporate these things but the LCC should represent the cost to the investor only**

Life Cycle Analysis

- **Enables decisions to be made on the basis of potential environmental impacts by scoring and rating on environmental criteria. Whilst costs can be firmly attributed to some environmental factors there is currently no widely agreed methodology for others and some cannot be quantified at all in cost terms.**



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**How much will you pay to reduce your carbon
footprint by x%?**

Fair trade coffee



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The Cost Plan and the LCC Cost Plan



Microsoft Excel
Worksheet



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BCIS Building Running Costs *Online*

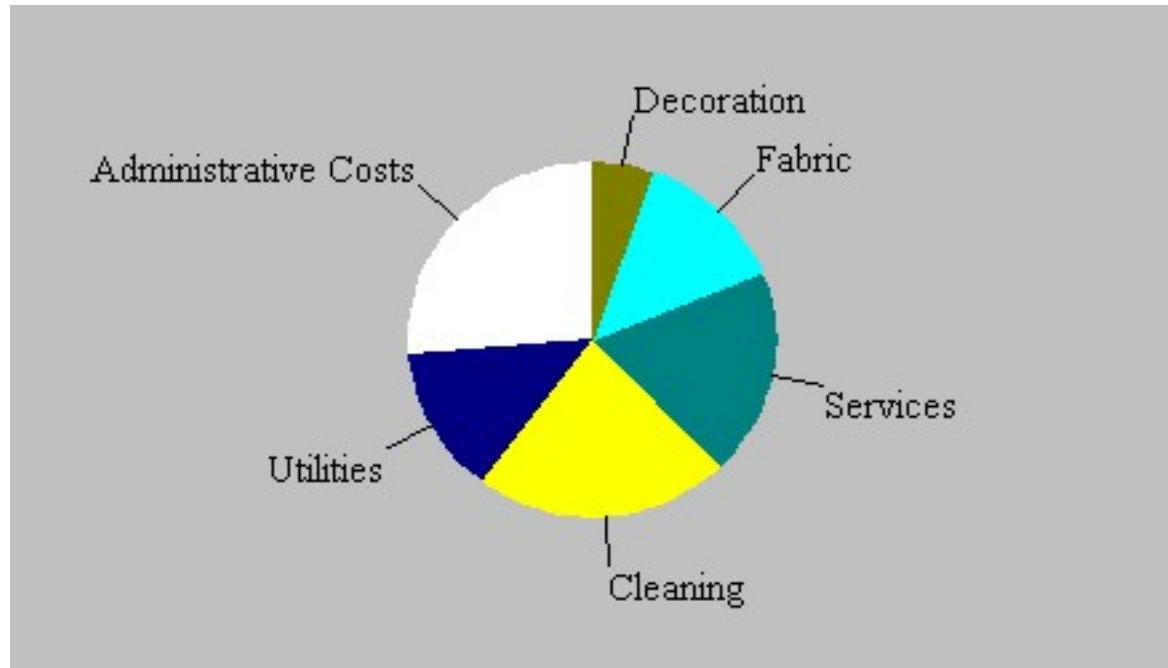


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Average annual expenditure

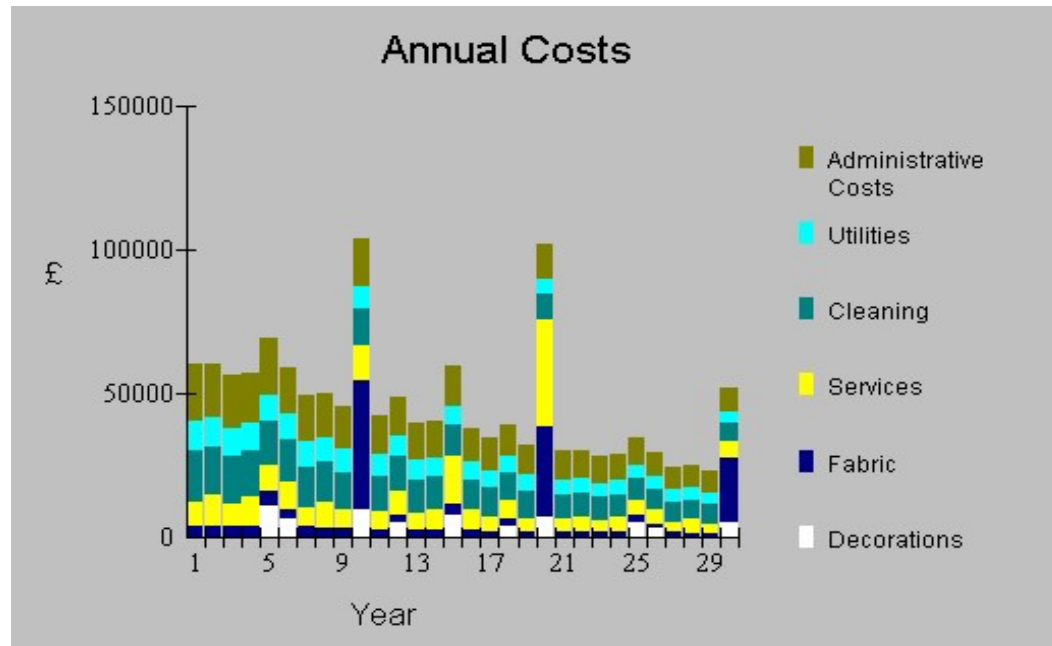
Primary School (total cost £6650/100m2 per annum)





Annual running costs: NPV

Primary school (1500m², 30years, 3.5%)





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http://service.bcis.co.uk/?login=indirect - BCIS Online - Windows Internet Explorer

Joe Martin, BCIS - logged on at 9:50AM on 11 June 2007 (service.bcis.co.uk / BCIS2000_4)

Function | Average | **Calculate** | Rebase | Sources | Definitions | Back | Download | Print | Help

BCIS online

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- Average Prices
- Life Cycle Costs**
- Component Life
- Rebuilding
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Building Function
712. Primary schools

Calculation Options

Running cost Life cycle cost

Years: 30
Area: 1200 m²

Default capital cost: £ 1120 / m²
 Manual capital cost: £ / m²
Total capital cost: £ 1,344,000

Price Basis

Current cash Future cash NPV

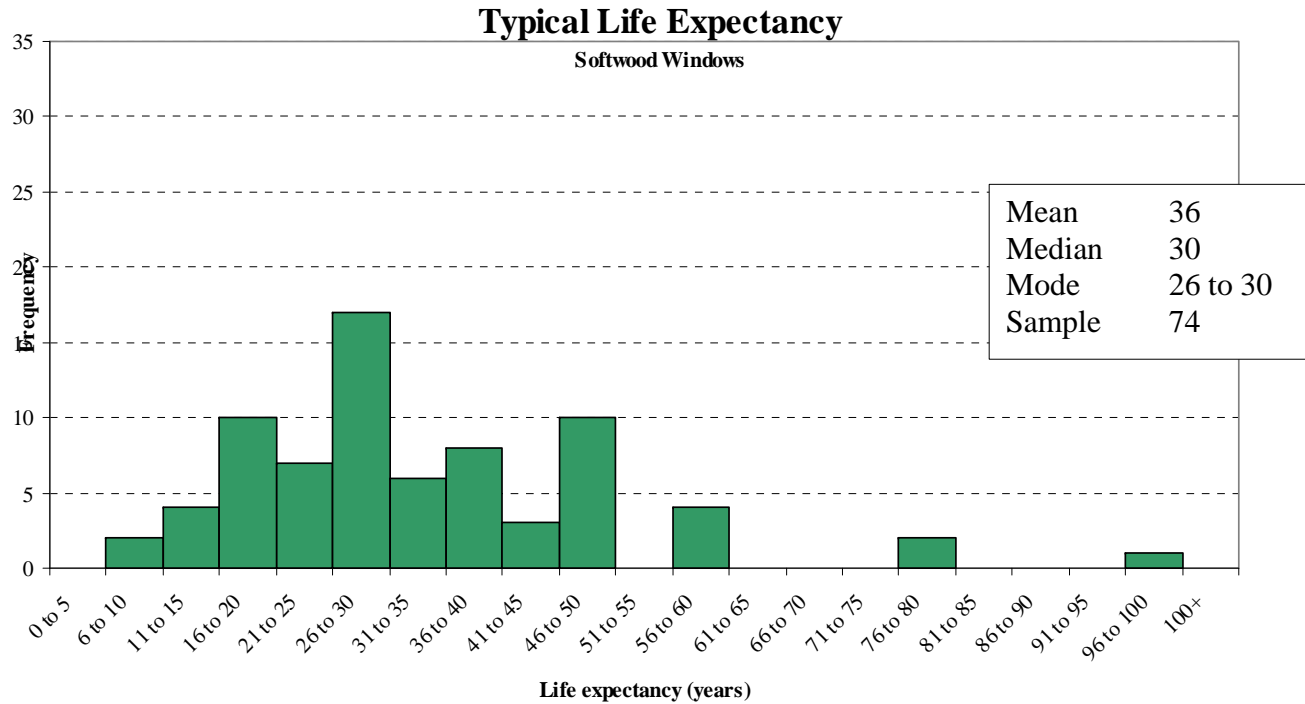
Discount rate: 3.5%

Element Specification

Maintenance			Operation		
Decorations	Fabric	Services	Cleaning	Utilities	Administrative Costs
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Calculate

start | Scot RICS LCC... | Microsoft Power... | 2 Internet Ex... | Jasc Paint Shop... | Document1 - Mi... | EN | 10:07





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