Evaluating the economic & other benefits of green roofs

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Today

- Introduction
- Living roofs & sustainability
- Convincing clients and contractors of their value
- Demonstrating long term value
Economic benefits

- What does economic benefit mean?
- Is it just £’s or is it more?
- Whole life costs / value
- A significant element of Sustainability
- Is there a definition of WLC?
- Several – Whole Life Cost Forum WLCF
Definition of WLC

Whole Life Cost is the analysis of all relevant and identifiable cashflows regarding the acquisition and use of an asset.

*The Whole Life Cost Forum*
Other terms

- WLC
- LCA Life Cycle Analysis (assessment)
  - Environmental burden
  - Not financial
  - Usually weighted less robust
- WLV combination of the two
- Life cycle - meaningless
Sustainability

- Economics
- Environmental
- Social
- Performance
- WLC
- Profitability
- Protection
- Improvement
- Stakeholders
- Improvements
- Deliver requirement
- Exceed requirement
Sustainability

- Focusing on one or two aspects
  - Inefficient
  - Ineffective
  - Ultimate failure
Selling the benefits of living roofs

• Deliver the message that will excite the listener.
• Profit it’s not a dirty word
• Profit is vital and it applies to different aspects;
  – Economic - £’s
  – Environmental - gains
  – People – benefits
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To build the solution, first define the problem

Financial relationships

1 : 5 : 200

- Capital Cost 1
- Revenue Cost 5x
- Business Cost 200x
The economic benefits

• The way to demonstrate this is

Whole Life Costs

• Confusion over what it is
• The answer is a number not anything else
• WLC is a comparison technique
• There are problems that you need to address and work with
What is WLC?

- Sum of all relevant inflows and outflows
- NPV net present value
  - Discount rate
- IRR internal rate of return
- TWLC total whole life cost
- AWLC annualised whole life cost
- Non financial
- www.wlcf.org.uk
Non financial relationships 1

- Provide bio diversity
- Reduce energy use in the building
- Reduce CO2 emissions
- Regulate temperatures
- Reduce heat island effect
- Aids rainwater attenuation - which means fewer soakaways, which means less aggregates (normally primary) need to be used, and the aquifer is more stable, reducing flood risk
Non financial relationships 2

- Provide improved views from higher windows
- Can be used to study wildlife by scientists and students
- Can help your development achieve planning permission, saving you time and effort
- Can be used as outdoor space (if designed for access)
- Give occupants a “warm & fuzzy” feeling (that’s a technical term)
- Can be used as a smoking area
Living roof Bridgewater

- Case study for SWRDA / Kier / Sarnafil
- Available from www.livingroofs.org
Why do the study?

• The SWRDA thought it was a “good idea” & wanted economic justification for Government funding
• An independent case study
• We provided a complete WLV analysis
Why are there ‘boundary conditions’?

- All research or analysis has
  - Limits of the calculations
  - Assumptions
- These need to be identified for other researchers to understand your results
- Common elements ignored
- Ignored sequestration of CO2
- No effect on drainage
The format of the results

• NPV net present value
• TWLC total whole life cost
• AWLC annualised whole life cost
• We could also have included
  – IRR internal rate of return
  – Payback
### WLC results for Bridgewater

<table>
<thead>
<tr>
<th>Conditions</th>
<th>NPV</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed only</td>
<td>-49,160</td>
<td>3</td>
</tr>
<tr>
<td>Sedum covered</td>
<td>-21,268</td>
<td>2</td>
</tr>
<tr>
<td>Bio diverse covered</td>
<td>7,453</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions</th>
<th>TWLC</th>
<th>Ranking</th>
<th>AWLC</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed only</td>
<td>51,500</td>
<td>3</td>
<td>1,716</td>
<td>3</td>
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<tr>
<td>Sedum covered</td>
<td>-132,000</td>
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<td>-2,640</td>
<td>2</td>
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<tr>
<td>Bio diverse covered</td>
<td>-175,800</td>
<td>1</td>
<td>-3,516</td>
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</table>
Non-Financial results for Bridgewater

• Using TSO’s MCA approach
• Non weighted, but subjective
• Repetition will provide different scores

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
<th>Ranking</th>
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<tbody>
<tr>
<td>Exposed only</td>
<td>69</td>
<td>3</td>
</tr>
<tr>
<td>Sedum covered</td>
<td>80</td>
<td>2</td>
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<tr>
<td>Bio diverse covered</td>
<td>94</td>
<td>1</td>
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</tbody>
</table>

The maximum score was 105
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To build the solution, first define the problem.

Combining Financial & Non-Financial results

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Roof type</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Bio diverse covered</td>
</tr>
<tr>
<td>2</td>
<td>Sedum covered</td>
</tr>
<tr>
<td>3</td>
<td>Exposed only</td>
</tr>
</tbody>
</table>

The possible CO2 savings were 245t
Wildlife Review for Bridgewater

- Varies with location and type of roof
- Birds
- Bees
- Butterflies
- Insects
Conclusions of the study

• Living roofs are a better solution than exposed single ply.
• Bio diverse offers economic and non economic advantages
But really

• All this does matter
• But it does not matter
• Its almost irrelevant
• Why????

YEILD
Developers love yield

• Developers make money through yield
• Yield is the inverse
• So it’s the opposite to expectation
• Yield = 100/Years purchase
• So 5% yield is better than 10%
• 20 years purchase vs 10 years
• Reduce yield = happy developer
Developers hate voids

- The void is the time from completion to occupation
- There is also a rent free period
- Reduce void = happy developer
- Reduce rent free = happy developer
- Reduce both = very happy developer
Ecstatic developer

- Increase Yield
- Reduce void
- Reduce rent free
What can do that?

Green Roof
How to deliver ecstasy

- A green roof can add 0.5% to Yield
- 10k sq ft @ £10 @ 8% = £1.25 M
- 10k sq ft @ £10 @ 7.5% = £1.33M
- £80,000 profit
- Reduce void by 1 month = £8,333 in rent
- Reduce rent free by 1 month = £8,333
- Nearly £100,000
Sustainability

- I Save the wildlife
- I Save energy
- I Improve the lot of the common man
- I Save the World
- But I make money as well!!!
How to make it happen

• Decide on a living roof as early as possible
• The designers need to work together to ensure maximum benefit
• Use WLC to show the comparison with alternative roof solutions
• Use non financial analysis as well
• Talk Yield and void
Tools available to help

- Asses assets at facility & component level
- WLCF on-line information & WLC tool
  - [www.wlcf.org.uk](http://www.wlcf.org.uk)
- Balanced value Toolbox & Framework
  - [www.balancedvalue.com](http://www.balancedvalue.com)
- DQIs (Design Quality Indicators)
  - Develop brief
  - Define objectives for project
  - [www.dqi.org.uk](http://www.dqi.org.uk)
Summary

• Living roofs key element in Sustainability
• Sustainability means different things to different folks
• Living roofs are economically viable
• Bridgewater case study
• Methods to convince decision makers
• Adjust the message to the audience
• Just talk about Profit – all of them.
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