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**EVALUATION AND AUDIT OF ENERGY SAVINGS**  
**FOR**  
**NON-DOMESTIC BUILDINGS**  
**USING**  
**IMPROVED METAL CLADDING SYSTEMS**

ABBREVIATED REPORT FROM 14 PAGE MAIN REPORT

|   |   |
|---|---|
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## COMMENTARY

- 1 The cost of energy used for heating and lighting has increased dramatically and looks set to continue increasing for the foreseeable future. The Government has introduced restrictions through Building Regulations on the CO<sub>2</sub> emissions based on predicted energy use from new buildings. The amount of energy used by any given new building can be reduced by selection of better insulated roof and wall cladding systems together with the efficiency of the installed services.
- 2 This report demonstrates the relative energy savings achievable on a typical industrial/warehouse unit when calculated using the Government's National Calculation Methodology against a similar notional building built to the 2002 standards of insulation and performance, comparison to which is a legal requirement of the current Building Regulations.
- 3 Building Sciences have been commissioned by Architectural Profiles to independently evaluate the energy savings available when more thermally efficient metal roof and wall cladding systems are used with rooflights on a typical industrial/warehouse building in the Midlands region of UK. The sample building consists of two 20m wide portal frames x 60m in length giving a total floor area of 2,400m<sup>2</sup>. Daylighting is provided using insulated rooflights covering the equivalent of about 12% of floor area, typical of many such developments.
- 4 There is an increasing trend for improved thermal and reduced carbon emission performances to be part of the Planning approval process e.g. to achieve a particular BREEAM rating before approval.
- 5 Improving the insulation performance of the metal clad roof and walls should be considered as part of the overall improvement process available within the system manufacturer's available specifications including improved rooflights with better insulation and significantly improved light transmission which will materially improve the working environment.
- 6 Current optimum savings achievable are 45% on carbon emissions with a 3.6 years payback and 28.63 % annual energy £ cost savings - at estimated additional 0.67 % to the Build costs - see as system assembly costings etc., Table 1 - 004 summary report.
- 7 Architectural Profiles can provide alternative cost/performance analysis for different product assemblies on request to suit client's requirements.
- 8 The savings for individual projects will vary, however the CO<sub>2</sub> emissions calculation is a legal requirement which has to be carried out for Building Control as a part of UK Building Regulations.
- 9 With energy costs likely to increase on a regular basis the continuing cost effectiveness of better performing insulated roof and cladding systems available from Architectural Profiles against energy savings can be easily evaluated from the results using the stated energy costs per kWh.

A handwritten signature in blue ink, appearing to read "Nick Selves", with a horizontal line underneath.

**NICK SELVES BSc AIOB**

Director  
Building Sciences Ltd.

Table 1

004 - SUM / REP

System Type(s) 004

:Roof-

Twin skin PSL steel + liner + glass mineral fibre insulation

:Wall-

Horizontal laid HR (met silver) +liner + glass mineral fibre insulation

| Item No. | Building performance for typical metal clad 2,400 m <sup>2</sup> warehouse with small office (see figure 1). | AD-L2 Notional Building April 2002 (A) | AD-L2 Typical Compliant. Building April 2006 (B) | EcoClad™ Energi Systems |                        |                        |
|----------|--|--|--|-------------------------|------------------------|------------------------|
|          |  |  |  | System ESR1 + ESW1 (C)  | System ESR2 + ESW2 (D) | System ESR3 + ESW2 (E) |
| 1        | Roof U-value W/m <sup>2</sup> K  | 0.25                                   | 0.25   | 0.20                    | 0.18                   | 0.14                   |
| 2        | Wall U-value W/m <sup>2</sup> K  | 0.35                                   | 0.35   | 0.25                    | 0.20                   | 0.20                   |
| 4        | Rooflights as % of floor area  | 20%                                    | 12%  | 12%                     | 12%                    | 12%                    |
| 8        | CO <sub>2</sub> emissions saving on 2002 Notional Building (TE)  | 0%                                     | 25%  | 34%                     | 43%                    | 45%                    |
| 9        | Estimated energy cost for heating and lighting on 2,400m <sup>2</sup> building @ Oct 2007 prices             |  |  |                         |                        |                        |
| 10       | Estm. cost electricity per annum £   |  | £5,446.08  | £5,387.52               | £4,509.12              | £4,143.12              |
| 11       | Estm. cost gas per annum £   |  | £3,155.76  | £2,209.68               | £2,112.48              | £1,995.84              |
| 12       | Total energy costs £ excluding installed equipment   |  | £8,601.84  | £7,597.20               | £6,621.60              | £6,138.96              |
| 13       | <b>Estm. initial additional costs ref clad areas with EcoClad™ Energi system(s) £</b>                        |  |  | <b>£2,021.33</b>        | <b>£5,920.92</b>       | <b>£8,866.43</b>       |
| 14       | <b>Energy saving per annum £</b>   |  |  | <b>£1,004.64</b>        | <b>£1,980.24</b>       | <b>£2,462.88</b>       |
| 15       | <b>= Payback period - O/A years.</b>   |  |  | <b>2.01</b>             | <b>2.99</b>            | <b>3.60</b>            |
|          |  |  |  | <b>years</b>            | <b>years</b>           | <b>years</b>           |
| 16       | <b>p.a. energy % cost saving on min requirement (B)</b>  |  |  | <b>11.68%</b>           | <b>23.02%</b>          | <b>28.63%</b>          |
| 17       | <b>Estm. O/A build cost (Excl. land) with R + C as 10% of O/A construction value £</b>                       |  |  | <b>£1,247,352.61</b>    | <b>£1,286,348.49</b>   | <b>£1,315,803.59</b>   |
| 18       | <b>Estm. % increase on O/A initial Build Costs for energy saving benefits</b>                                |  |  | <b>0.16%</b>            | <b>0.46%</b>           | <b>0.67%</b>           |

Note: a) Energy costs and the estimated additional costs for improved roof and wall insulated systems are provided by Architectural Profiles Ltd.  
b) Labour & material prices current at November 2007 - Energy prices current at October 2007