



# Quick Energy Savings Estimate Oxford Instruments



Installing solar control window film at the Oxford Instruments building could realize several benefits, including:

1. Lower energy bills – due to reduction of solar radiated heat load and reduced consumption of all HVAC system components.
2. Improved comfort - quicker cooling of interior spaces to desired temperature, reduction of hot spots and glare, complete block of harmful UV radiation.

This report provides a quick reference for the HVAC savings potential, based on annual solar radiation figures and shading coefficients.

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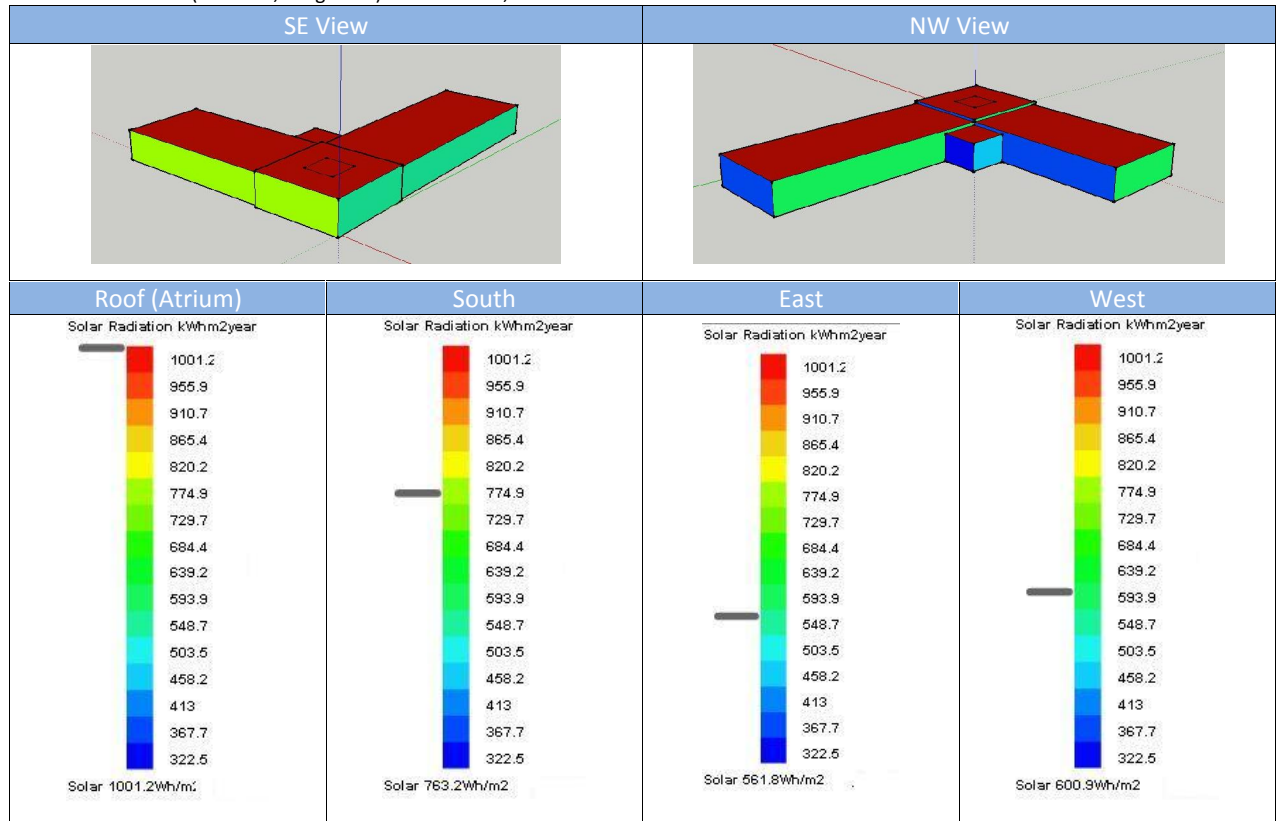
**Input Data:**

Location	Tubney Woods, Abingdon ,Oxfordshire OX13 ,5QX ,UK			
Potential glazing surface for film application	744 sqm, in orientations:			
	Atrium	South	East	West
	173	204	238	129
Glazing type	Atrium (Skylight)	IGU 6mm Clear Glass		
	Vertical Windows	IGU 6mm Tinted Glass		
Hanita film type(s)		Vertical Windows	Atrium (Skylight)	
	Option 1	Titan 35 Xtra		Silver 20 Xtra
	Option 2	Titan 35 Xtra		SkyLite Silver 20 XTRM
Annual insolation* (kWh/sqm)	Roof (Atrium)	South	East	West
	1001.2	763.2	561.8	600.9
SHGC of glass	IGU 6mm Clear	0.683		
	IGU 6mm Tinted	0.461		
SHGC of glass + film	Silver 20 Xtra on IGU 6mm Clear			0.141
	XTRM SkyLite Silver 20X on IGU 6mm Clear			0.150
	Titan 35 Xtra on IGU 6mm Tinted			0.232
COP of entire HVAC system	2.7			
Average value of savings	£ 0.10/kWh			

\* Calculated from Energy plus Weather (epw) files, using VirVil SketchUp plugin (see diagram below).

**Solar Radiation Data (London, UK)**

Model Geo-Location ( Latitude, Longitude ) : 51.695699N,1.353635W



Hanita Coatings

**Calculation with Hanita Titan 35 Xtra:**

South Façade	
Solar heat gain coefficient reduction	$\Delta\text{SHGC} = 0.461 - 0.232 = 0.229$
Solar heat gain reduction annual	$\Delta\text{SHG} = 763.2 * 0.229 = 174.77 \text{ kWh/sqm}$
Potential THERMAL energy savings (max.)	174.77 kWh/sqm
Estimated ELECTRIC energy savings	$174.77 / 2.7 = 65 \text{ kWh/sqm}$
Estimated MONETARY savings/sqm of film	$65 * 0.10 = \text{£ } 6.5$
East Façade	
Solar heat gain coefficient reduction	$\Delta\text{SHGC} = 0.461 - 0.232 = 0.229$
Solar heat gain reduction annual	$\Delta\text{SHG} = 561.8 * 0.229 = 128.65 \text{ kWh/sqm}$
Potential THERMAL energy savings (max.)	128.65 kWh/sqm
Estimated ELECTRIC energy savings	$128.65 / 2.7 = 48 \text{ kWh/sqm}$
Estimated MONETARY savings/sqm of film	$48 * 0.10 = \text{£ } 4.8$
West Façade	
Solar heat gain coefficient reduction	$\Delta\text{SHGC} = 0.461 - 0.232 = 0.229$
Solar heat gain reduction annual	$\Delta\text{SHG} = 600.9 * 0.229 = 137.60 \text{ kWh/sqm}$
Potential THERMAL energy savings (max.)	137.60 kWh/sqm
Estimated ELECTRIC energy savings	$137.60 / 2.7 = 51 \text{ kWh/sqm}$
Estimated MONETARY savings/sqm of film	$51 * 0.10 = \text{£ } 5.1$

**Calculation with Hanita Silver 20 Xtra (Option 1):**

Roof (Atrium)	
Solar heat gain coefficient reduction	$\Delta\text{SHGC} = 0.683 - 0.141 = 0.542$
Solar heat gain reduction annual	$\Delta\text{SHG} = 1001.2 * 0.542 = 542.65 \text{ kWh/sqm}$
Potential THERMAL energy savings (max.)	542.65 kWh/sqm
Estimated ELECTRIC energy savings	$542.65 / 2.7 = 201 \text{ kWh/sqm}$
Estimated MONETARY savings/sqm of film	$201 * 0.10 = \text{£ } 20.1$

**Calculation with Hanita XTRM SkyLite Silver 20X (Option 2):**

Roof (Atrium)	
Solar heat gain coefficient reduction	$\Delta\text{SHGC} = 0.683 - 0.150 = 0.533$
Solar heat gain reduction annual	$\Delta\text{SHG} = 1001.2 * 0.533 = 533.64 \text{ kWh/sqm}$
Potential THERMAL energy savings (max.)	533.64 kWh/sqm
Estimated ELECTRIC energy savings	$533.64 / 2.7 = 198 \text{ kWh/sqm}$
Estimated MONETARY savings/sqm of film	$198 * 0.10 = \text{£ } 19.8$



Summary – Option 1		
Estimated Annual ELECTRIC energy savings	South	65 kWh/sqm * 204 sqm = 13,260 kWh
	East	48 kWh/sqm * 238 sqm = 11,424 kWh
	West	51 kWh/sqm * 129 sqm = 6,579 kWh
	Roof	201 kWh/sqm * 173 sqm = 34,773 kWh
	<b>Total</b>	<b>66,036 kWh</b>
Estimated Annual MONETARY savings	66,036 * £0.10 = <b>£6,603.6</b>	
Project Cost	£37,480	
Payback (years)	<b>£37,480 / £6,603.6 = 5.7</b>	

Summary – Option 2		
Estimated Annual ELECTRIC energy savings	South	65 kWh/sqm * 204 sqm = 13,260 kWh
	East	48 kWh/sqm * 238 sqm = 11,424 kWh
	West	51 kWh/sqm * 129 sqm = 6,579 kWh
	Roof	198 kWh/sqm * 173 sqm = 34,254 kWh
	<b>Total</b>	<b>65,517 kWh</b>
Estimated Annual MONETARY savings	65,517 * £0.10 = <b>£6,551.7</b>	
Project Cost	£40,940	
Payback (years)	<b>£40,940 / £6,551.7 = 6.2</b>	