



## IEA SHC Task 66: Solar Energy Buildings

Integrated solar energy supply concepts for climate-neutral buildings and communities for the "City of the Future"

IEA SHC Task 66: Solar Energy Buildings – Presentation of Final Results

**Solar energy buildings with advanced solar thermal and photovoltaic-thermal (PVT) collectors**

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Limassol Cyprus



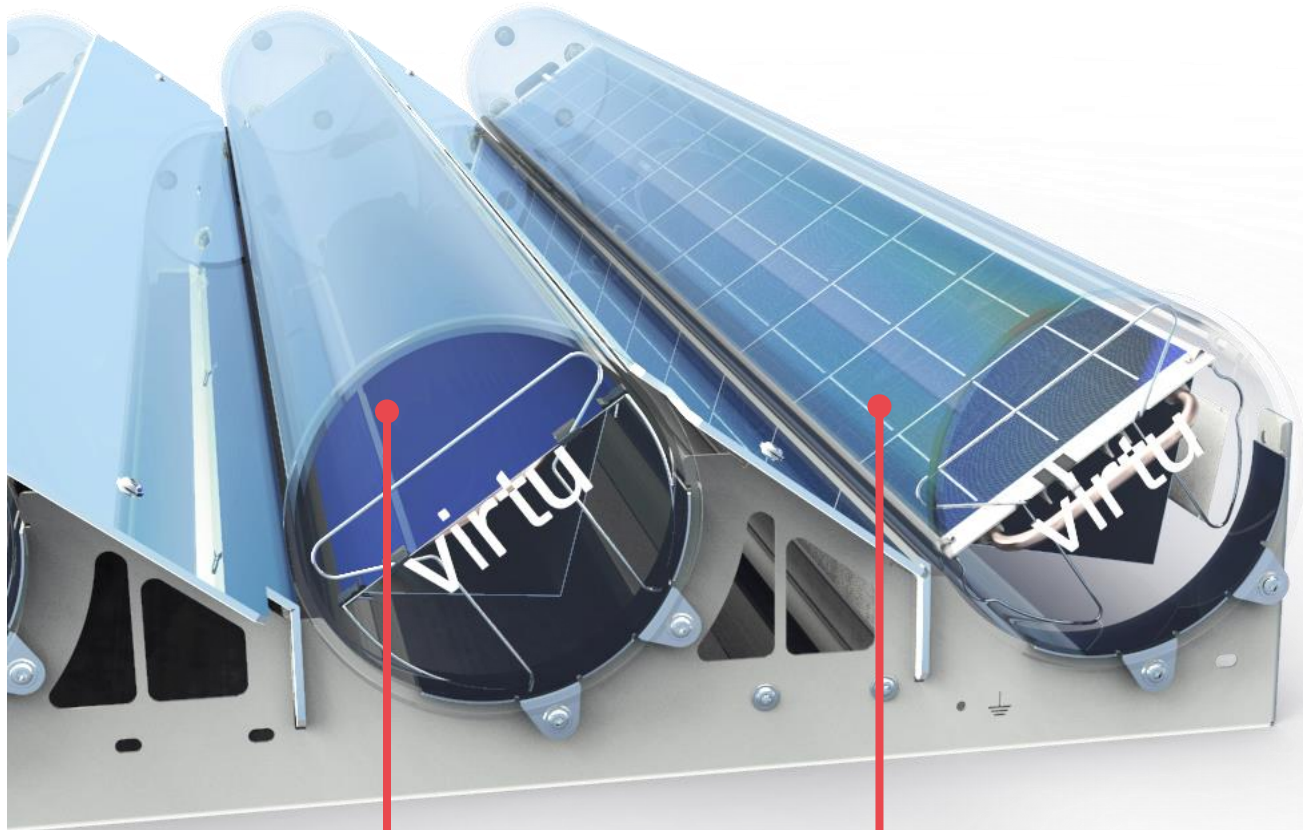
**EuroSun2024**

August 27, 2024

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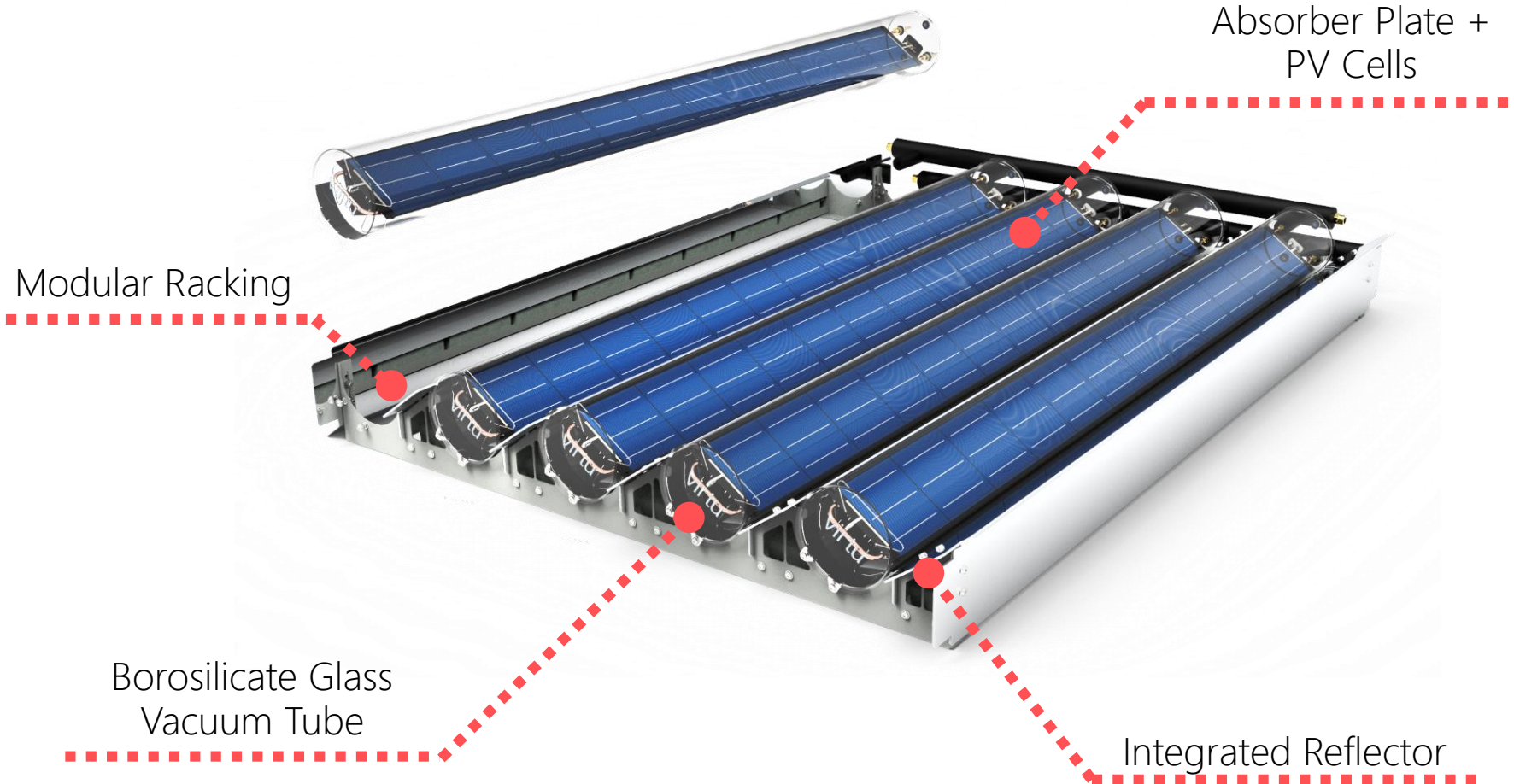
# Introduction to Virtu



**virtu**<sup>HOT</sup>  
Solar collector producing  
heat up to 120 °C / 248 °F

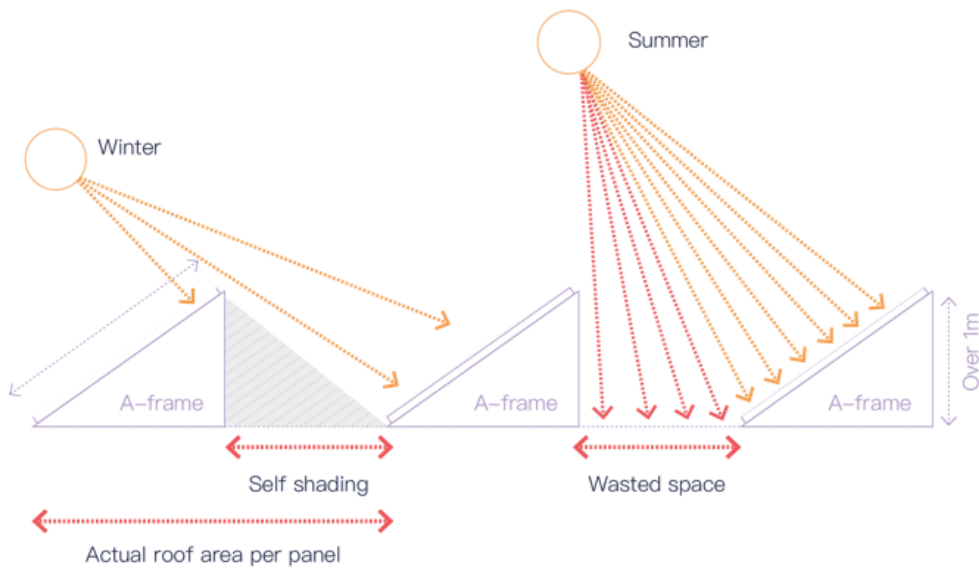
**virtu**<sup>PVT</sup>  
Globally unique hybrid solar collector producing  
power and heat up to 75 °C / 167 °F

# Virtu Key Technology Elements

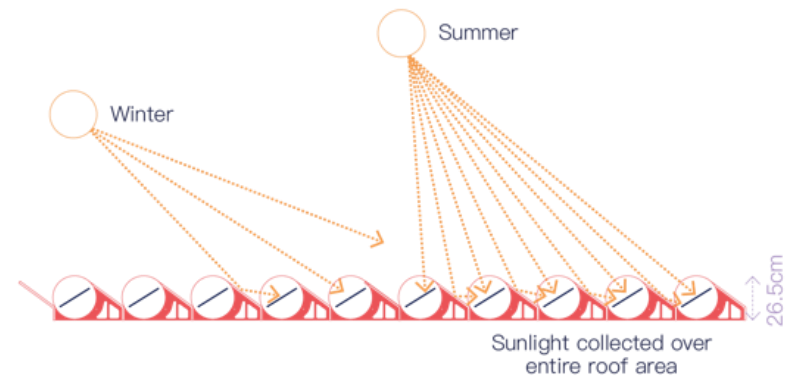


# Virtu: More Impact

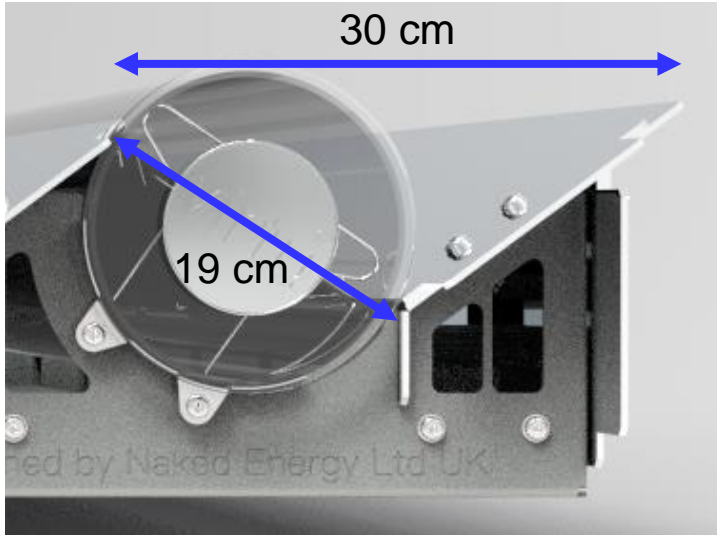
Standard flat panels waste space



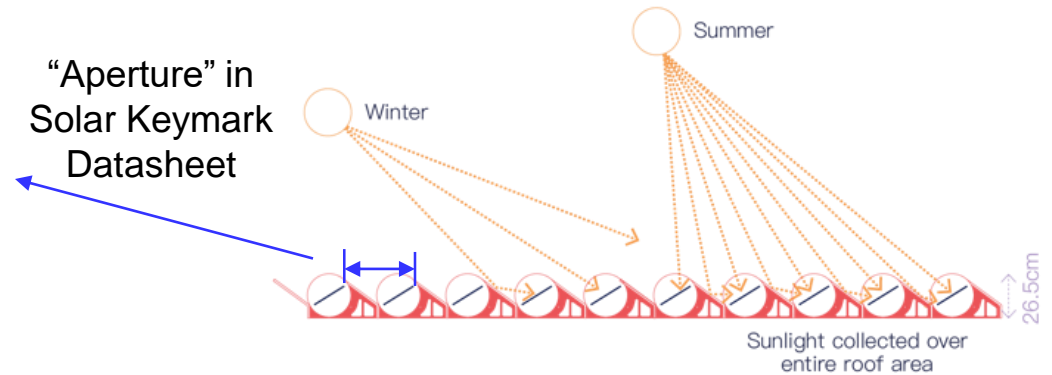
No wasted space with Virtu



# Virtu: More Impact



No wasted space with Virtu



Fluid temperature

ATHENS			DAVOS			STOCKHOLM			WÜRZBURG		
25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C

Flat roof (0° inclination) – Virtu<sup>HOT</sup>

kWh per tube

567	474	381	439	355	277	314	244	183	353	277	208
857	717	575	675	547	426	484	375	281	544	426	320
54%	45%	36%	50%	41%	32%	49%	38%	29%	50%	39%	29%

kWh per m<sup>2</sup> gross area

Annual efficiency (%)

Flat roof (0° inclination) – Virtu<sup>PVT</sup>

Thermal kWh per tube

362	217	106	238	132	59	177	92	37	203	107	47
556	334	164	366	203	91	272	141	57	312	165	73
103	94	86	91	83	76	63	58	52	70	64	58
158	145	132	140	128	116	97	89	81	108	99	90

kWh per m<sup>2</sup> gross area

Electrical kWh per tube

Electrical kWh per m<sup>2</sup> gross area

# Case Study 1 – British Library Key Facts

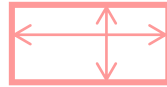
Location: London, UK



710 VirtuHOT + 240 VirtuPVT



617 m<sup>2</sup>



366 kW<sub>th</sub> + 17 kW<sub>el</sub>



212 MWh<sub>th</sub>/year



13 MWh<sub>el</sub>/year

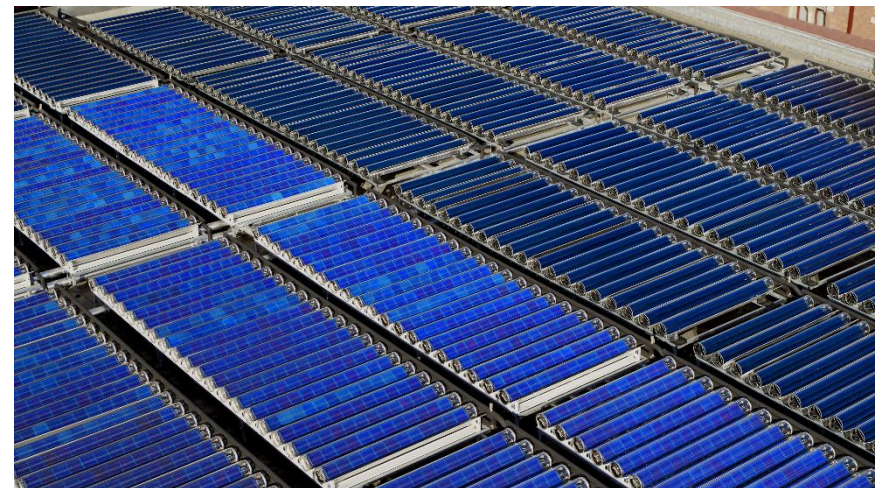
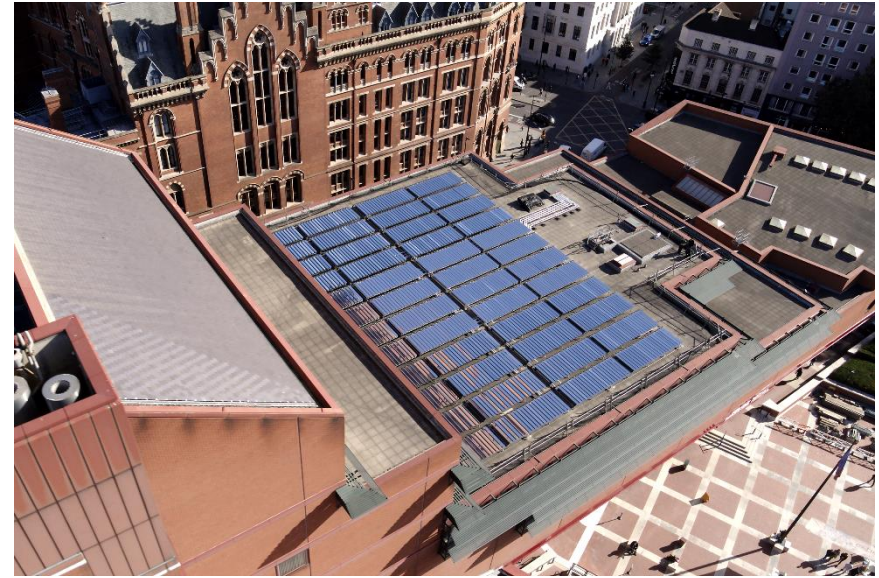


46 tCO<sub>2</sub> saved per year



343 kW<sub>th</sub>/m<sup>2</sup>/yr

21 kW<sub>el</sub>/m<sup>2</sup>/yr



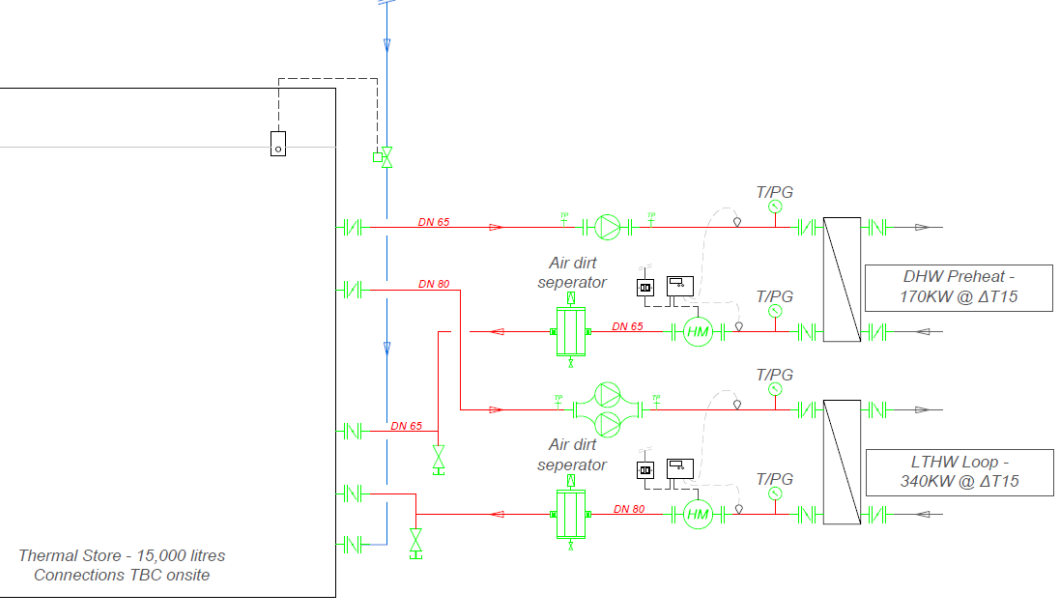
# Case Study 1 – British Library Integration and Use



Heat injected in parallel to main boiler

Priority 1: LTHW Loop for  
Dehumidification

Priority 2: DHW Loop





# Case Study 1 – British Library Results

## Energy

Thermal energy today  
295 kWh

Electrical energy today  
21.9 kWh

Thermal energy last 12 months  
128.0 MWh

Electrical energy last 12 months  
8.52 MWh

Thermal energy since installation  
132.0 MWh

Electrical energy since installation  
8.52 MWh

## Carbon

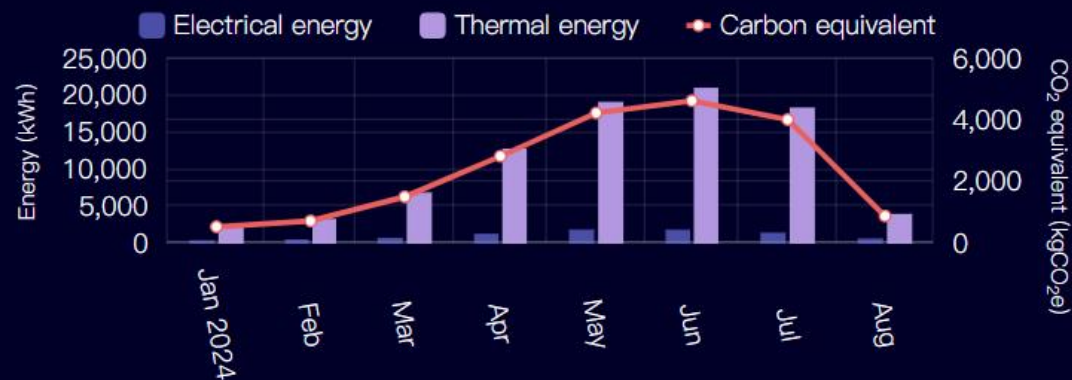
CO<sub>2</sub> saved this year  
28.2 t CO<sub>2</sub>e

CO<sub>2</sub> saved since installation  
28.9 t CO<sub>2</sub>e



## Energy and carbon

This year



# Case Study 2 – Westminster Uni Key Facts

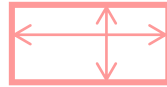
Location: Harrow, UK



135 VirtuHOT + 60 VirtuPVT



146 m<sup>2</sup>



70.5 kW<sub>th</sub> + 4.4 kW<sub>el</sub>



25 MWh<sub>th</sub>/year



3.6 MWh<sub>el</sub>/year



6 tCO<sub>2</sub> saved per year

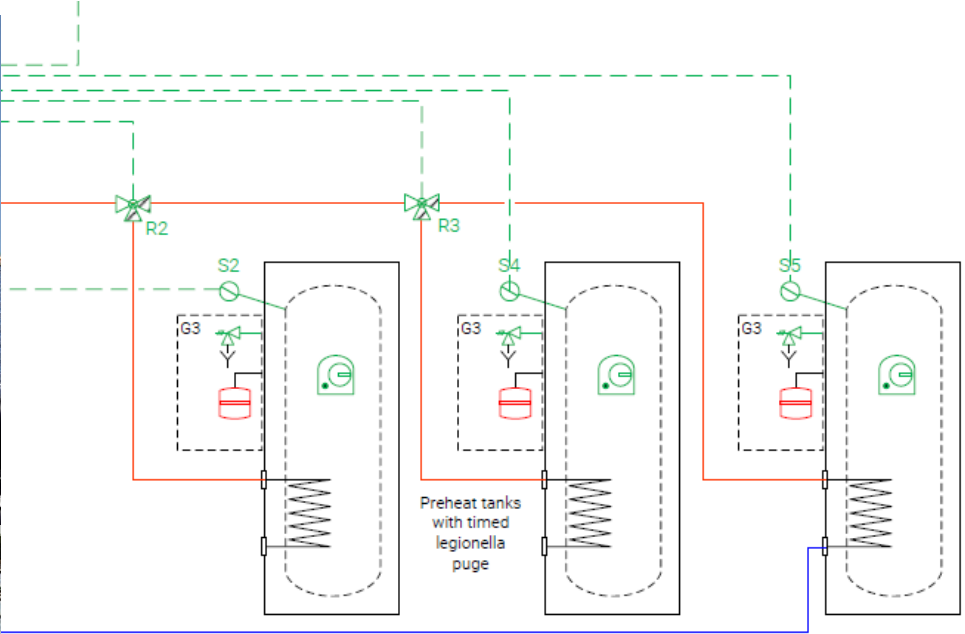
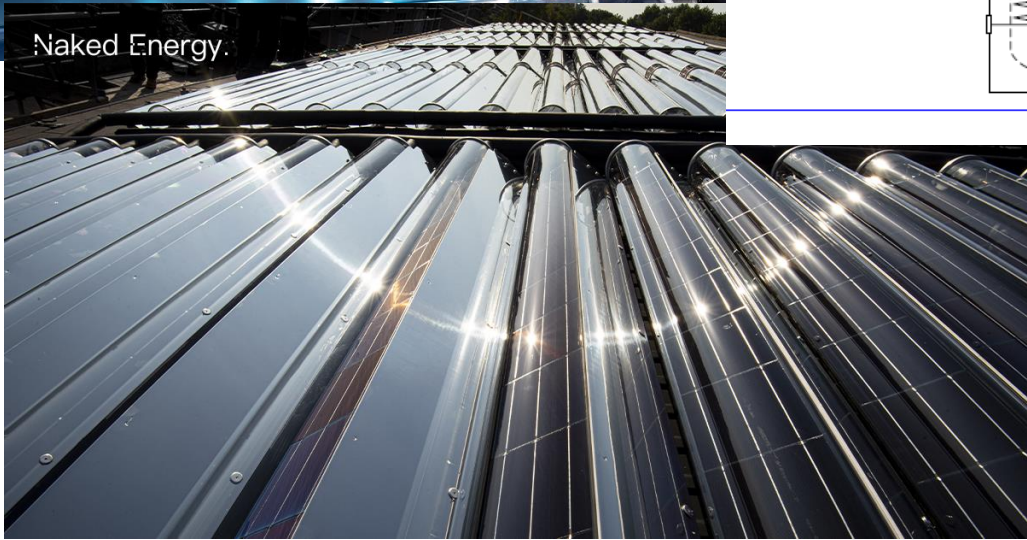


171 kW<sub>th</sub>/m<sup>2</sup>/yr

25 kW<sub>el</sub>/m<sup>2</sup>/yr



# Case Study 2 – Westminster Uni Integration and Use



Installed across a range of student accommodation blocks on campus for Domestic Hot Water production

# Case Study 2 – Westminster Uni Results

## System name

Westminster Block G  
Solar thermal

## Installed Capacity

Total thermal capacity  
24.0 kW peak

Virtu Tube Counts  
60 Virtu<sup>HOT</sup>

## Power

Live thermal power  
8.04 kW

## Energy

Thermal energy today  
10.4 kWh

Thermal energy last 12 months  
5.06 MWh

Thermal energy since installation  
25.5 MWh

## Carbon

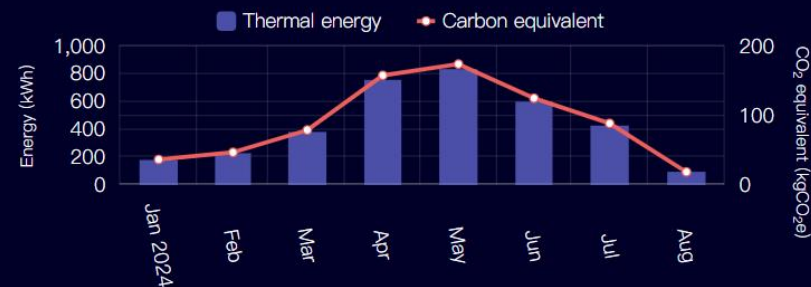
CO<sub>2</sub> saved this year  
1.06 t CO<sub>2</sub>e

CO<sub>2</sub> saved since installation  
5.35 t CO<sub>2</sub>e



## Energy and carbon

This year



**Thank you for  
your attention**

**[www.iea-shc.org](http://www.iea-shc.org)**



**SOLAR HEATING & COOLING PROGRAMME  
INTERNATIONAL ENERGY AGENCY**

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