
NSG
GROUP

Expanding the Vision

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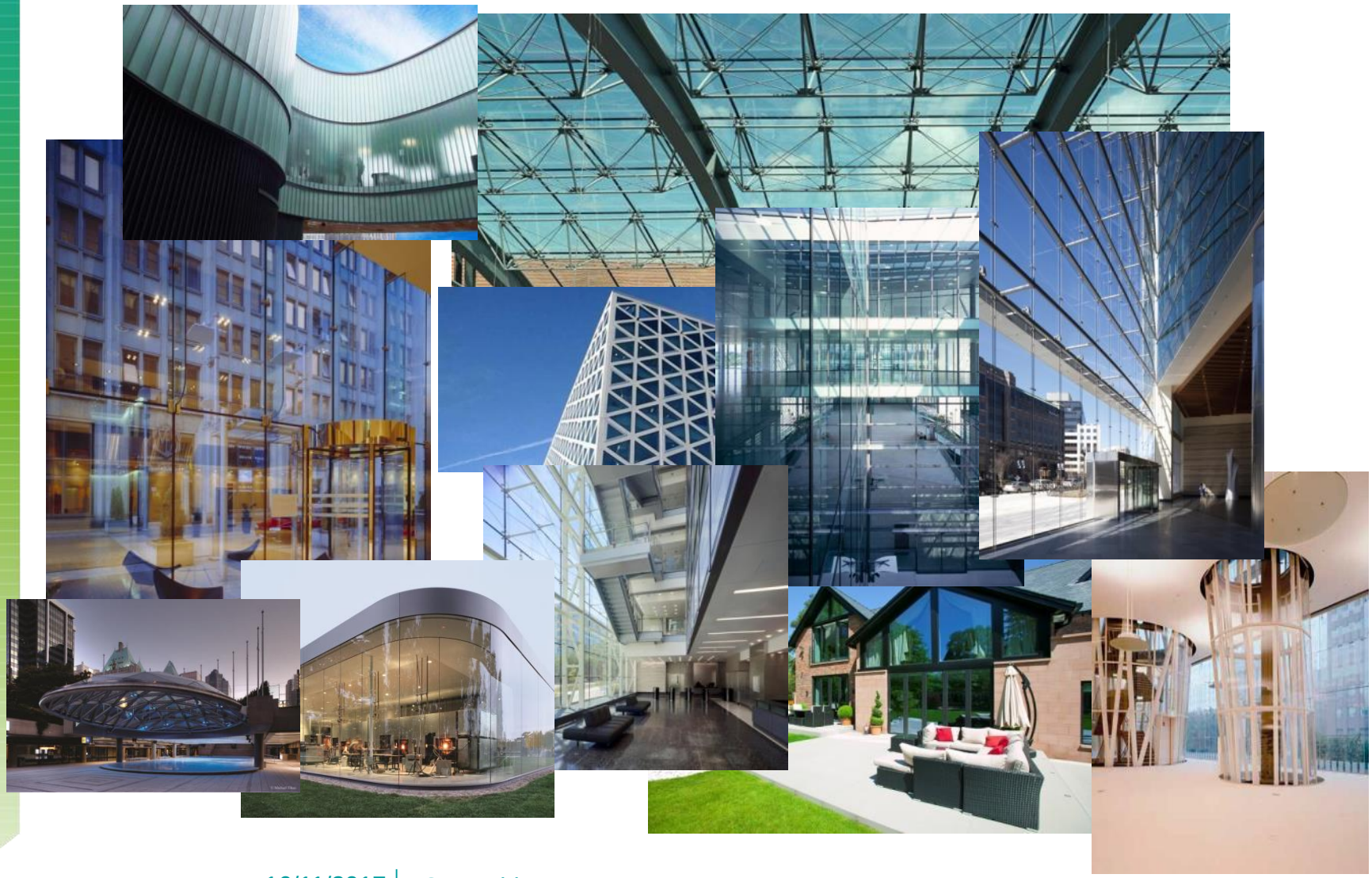
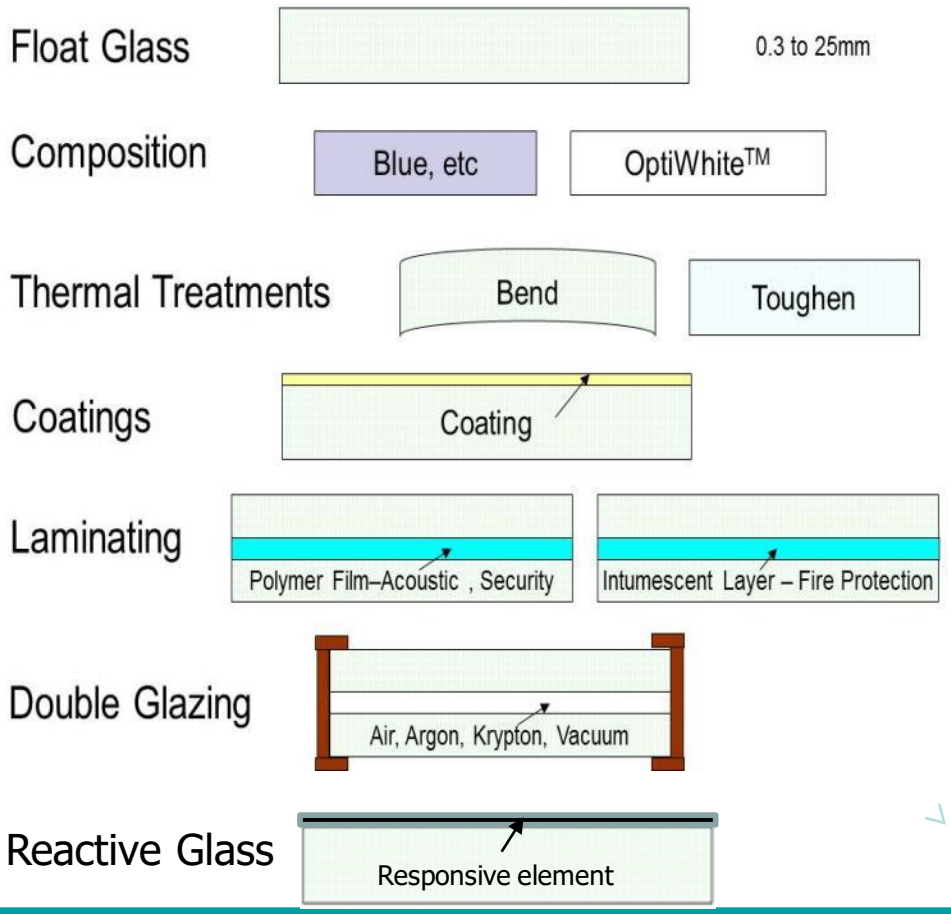
Glass is Truly Unique

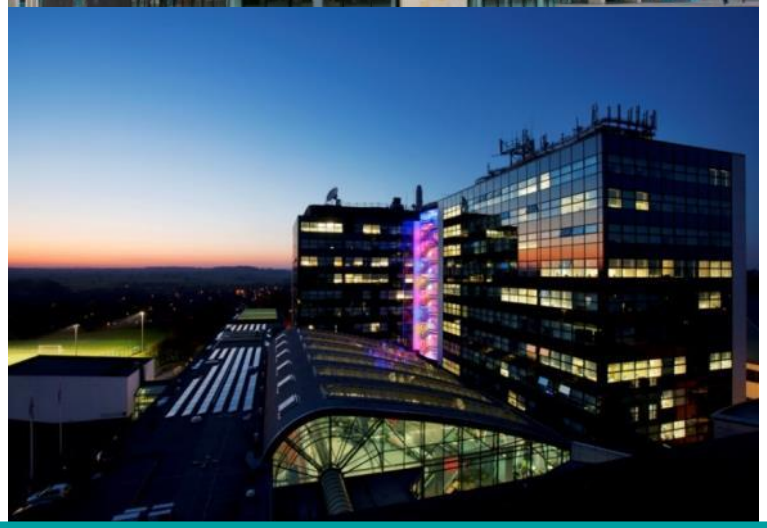


Glass Needs to Keep Evolving



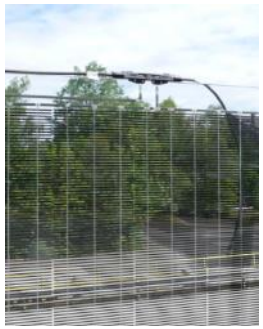
Need to meet our societies changing demands

Moving from Passive to Dynamic



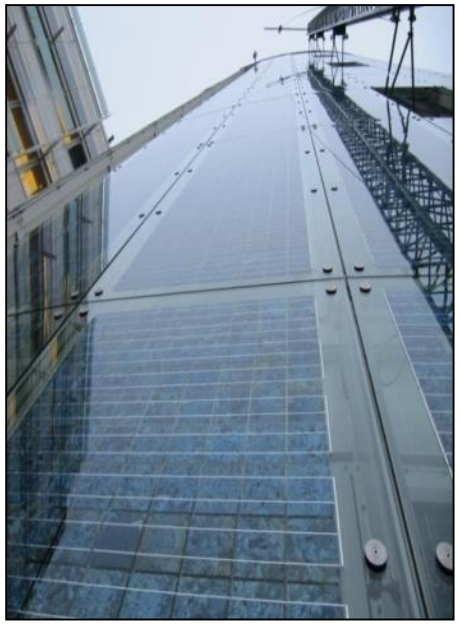
Buildings need to dynamically work with their environment

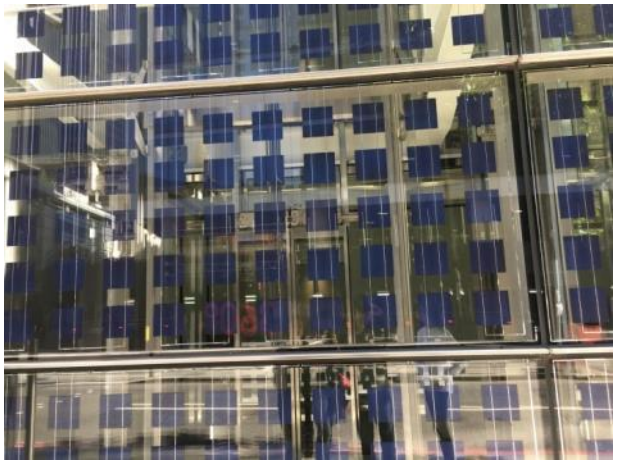
Dynamic Buildings

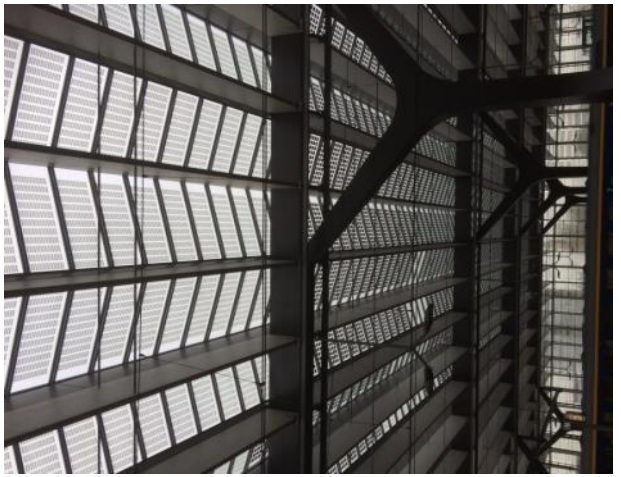


- **Energy Generation**
- Display
  - Entertainment Advertising
- Switchable
  - Privacy Shading
- **Dynamic Facade**
- Lighting
  - Aesthetics Functional
- Heat Generation
  - Comfort De-misting

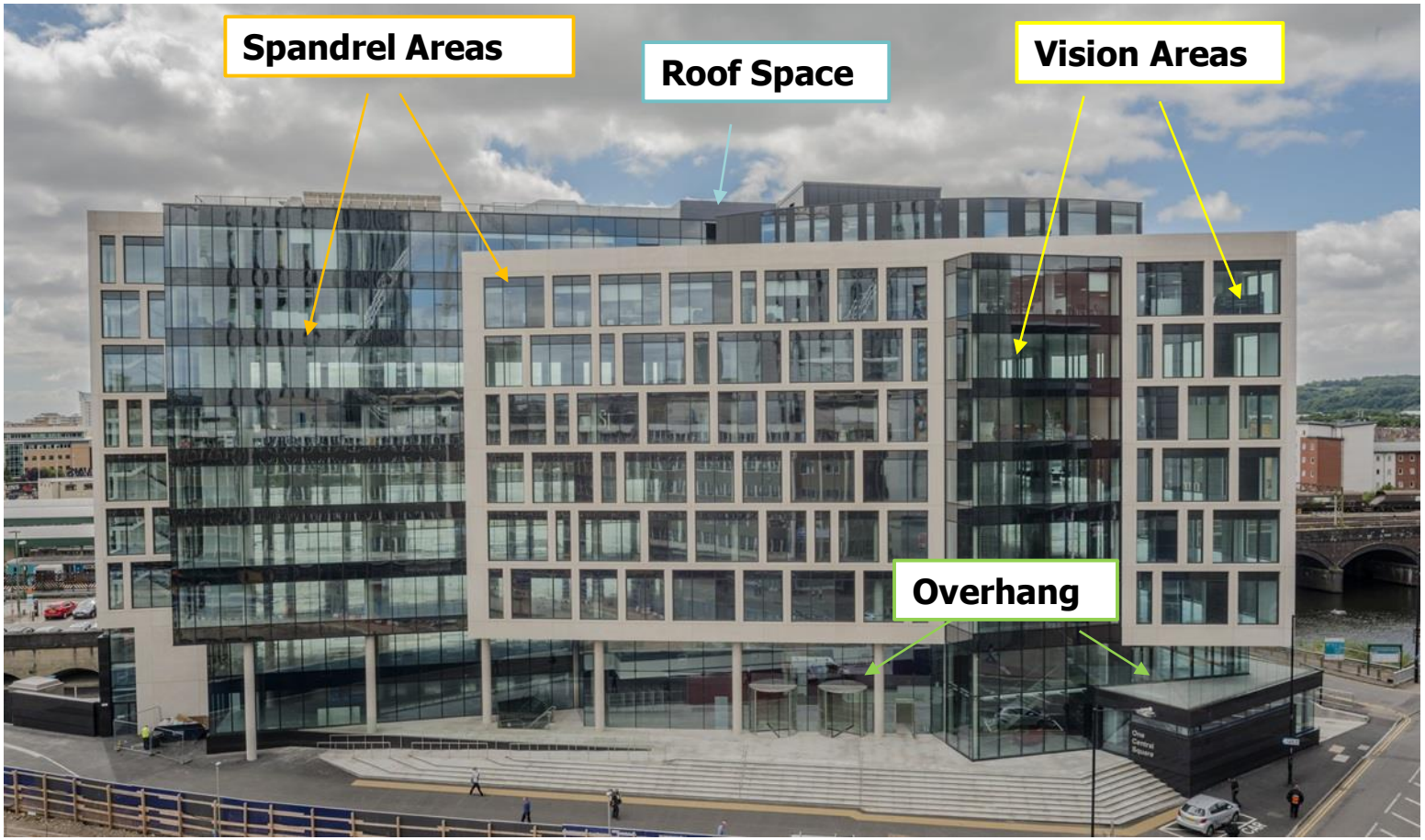
Harvesting the Sun's Energy





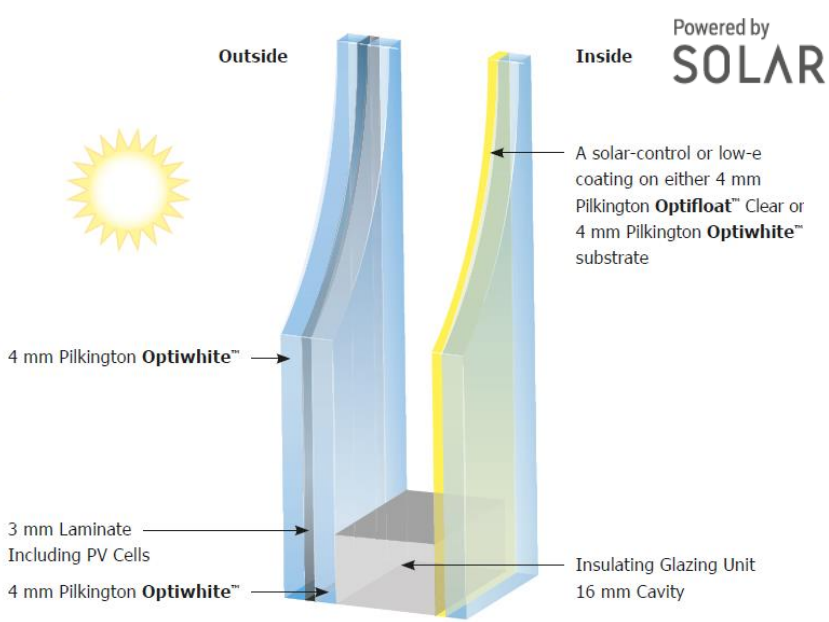


Style without Compromise



Semi-Transparent Architectural Solar

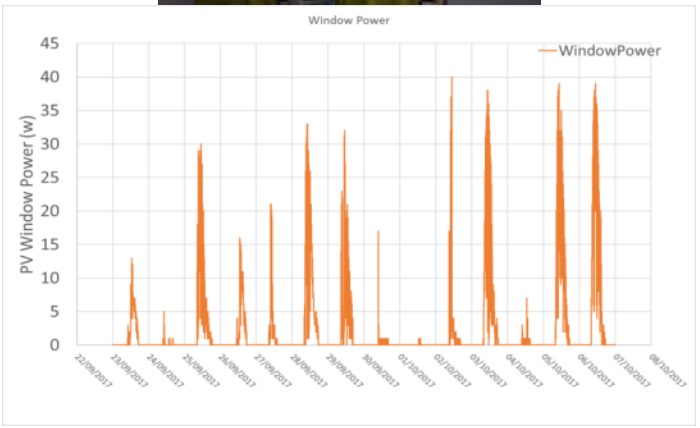
PV Coverage	43%
Power P_{max} (1 m^2)	60W
Efficiency	6.1 %



Product	g-value	ER	LT	LR out
Pilkington **Sunplus™** BIPV	0.54	0.09	0.5	0.09
Pilkington **Sunplus™** BIPV in IGU				
Pilkington **Optitherm** S1 Plus (4 mm)	0.31	0.16	0.43	0.12
Pilkington **Optitherm** S1(4 mm)	0.28	0.17	0.39	0.13
Pilkington **Optitherm** S3 t (4 mm)	0.36	0.13	0.45	0.10
Pilkington **Suncool** One 60/40 (6 mm)	0.34	0.14	0.34	0.11
Pilkington **Suncool** 70/40 (4 mm)	0.31	0.15	0.40	0.10
Pilkington **Optifloat** Clear (4 mm)	0.44	0.10	0.46	0.11

Optical modelling using different Pilkington energy-efficient products. Calculations are made according to EN410/EN673.

SPECIFIC's Energy Positive Class Room-Swansea University in Wales



PILKINGTON

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Pilkington **Sunplus**™ BIPV
Powered by Solaria

Pilkington **Sunplus**™ BIPV, provides power-generating, architectural glass solutions for both vertical and horizontal applications; allowing building proprietors and developers to turn buildings into power generating assets. Pilkington **Sunplus**™ BIPV combines the proven reliability and efficiency of crystalline silicon technology with the world's leading glass brand.

Pilkington **Sunplus**™ BIPV can be customised to offer optimum values in light transmission in the visible and g-values. By combining the PV laminate with both thermal and solar control coatings in an IGU, architects and façade engineers can create a pleasant indoor environment whilst adding a power-generation feature to the building.

Current Power (W) | Energy today (KWh)
Energy Last 7 days (KWh) | Energy This month (KWh)
Energy This Year (KWh)
Total Energy(KWh)

Indicative Technical Data

Electrical Specifications	
Power P_{max}	150 W
Efficiency	6.5%
Open Circuit Voltage (V_{oc})	24.5 V
Short Circuit Current (I_{sc})	7.8 A
Max Power Voltage (V_{mp})	20.9 V
Max Power Current (I_{mp})	7.2 A
Temperature Performance	
Coefficient of P_{max}	−0.40% /°C
Coefficient of V_{oc}	−0.30% /°C
Coefficient I_{sc}	+0.05% /°C
Materials Specification	
PV Type	Monocrystalline Silicon
PV Strip	2.5×156 mm
PV Gap	3.2 mm
PV Coverage	43%
Interlayer	PVB
Junction Box	Edge Mounted

Indicative data depending upon module design.
Electrical specifications for a module size 1725 mm × 1350 mm.

Dimensions

PV Module	
Max Length	2000 mm
Max Width	2000 mm
Thickness single PV laminate	11 mm
Min Thickness IGU*	31 mm
Weight	23 kg/m²
Junction Box	
Length	105 mm
Width	13 mm
Height	16 mm

* Value corresponding to a typical value for 4 mm for glass 2.

Panel Power Draw (W)
Power to Sink (W)
Battery Charge (%)

Swansea University Prifysgol Abertawe

specific

Individual Projects

Considerations:

- Location
- Orientation
- Building Design
- Vision/spandrel area
- Shading

Support

- Performance Prediction
- Specification assistance and glazing design
- Manufacture
- Integration

Simple Modelling of Real World Situation

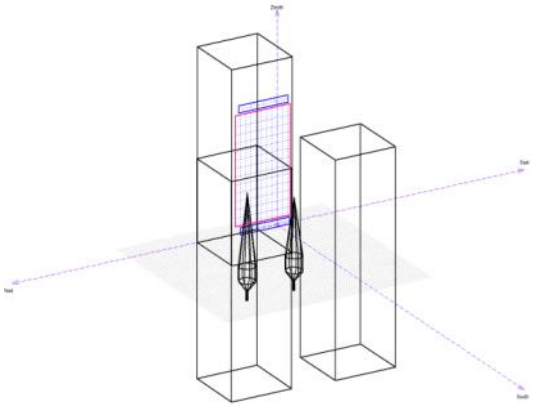
Location: London
Orientation: South facing

- PV vision modules
  - Dimensions: 1.7 m x 1.3 m
  - Number of modules: 100
  - Array nominal power: 15 kWp
- PV spandrel modules
  - Dimensions: 1.5 m x 1.3 m
  - Number of modules: 48
  - Array nominal power: 16.8 kWp

PV system	Module Area (m2)	Annual Energy Yield (kWh/yr)
PV Vision	233	9,225
PV spandrel	97	10,332
Total	330	19,557

Including shading elements

PV system	Module Area (m2)	Annual Energy Yield (kWh/yr)
Total	330	10,580



Shading Effects from objects around the building need to be considered

We need to think Differently?

Heated windows for comfort

Heated wall panels

Radiators from glass

Is feeding this Energy into the grid the best use of this power?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