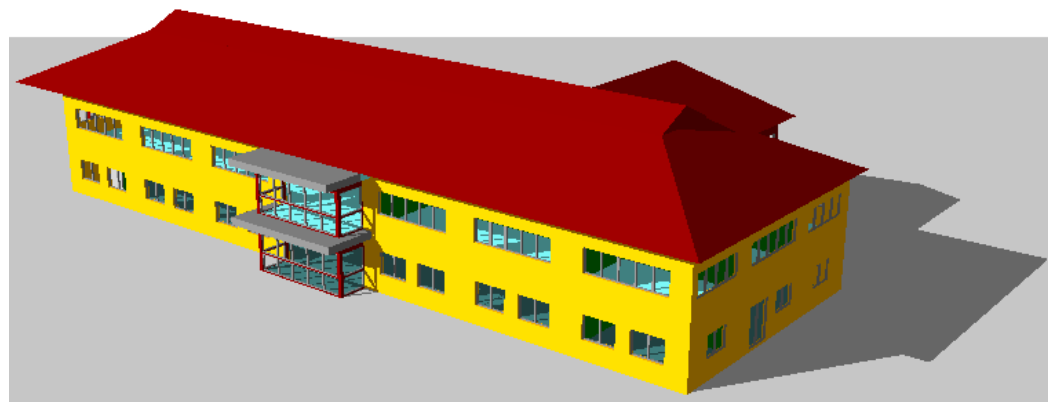


EDSL Tas, working in partnership with Mitsubishi Electric

Bringing Green BIM and Sustainable Design to the construction industry

Validation & Prediction

- UK Chelmsford Office Validation Study
- Currently using 2006 Equipment
- Performance Comparison with 2011 Equipment
- City Multi R2 system vs a fancoil system with heat recovery

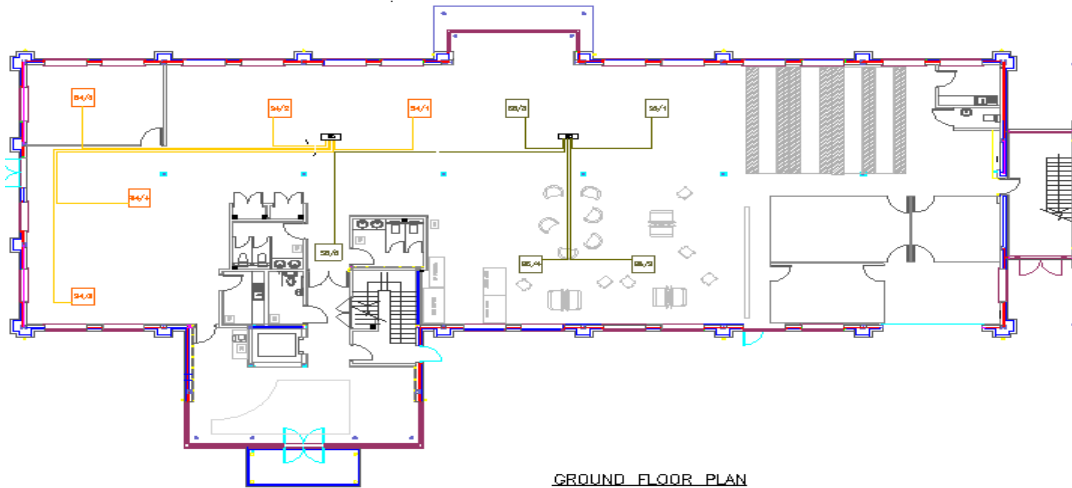


Existing Building



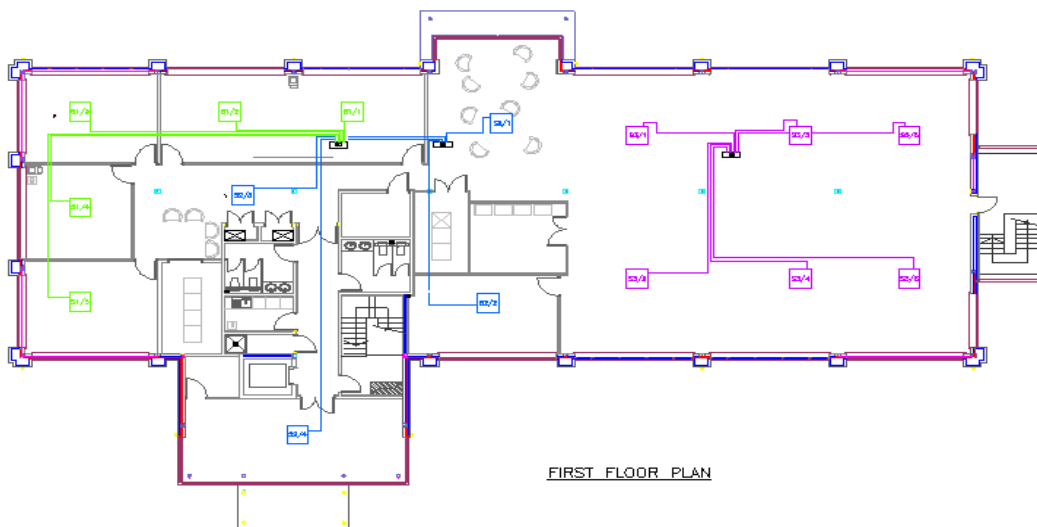
- Purpose built office
- 5 City Multi R2 Outdoor units and 25 indoor units
- 2 Lossnay heat recovery units providing fresh air
- Monitored consumption data for an annual period

System Layout



Ground Floor

- Yellow and Dark Green systems
- Lossnay Fresh Air Heat Recovery Unit



First Floor

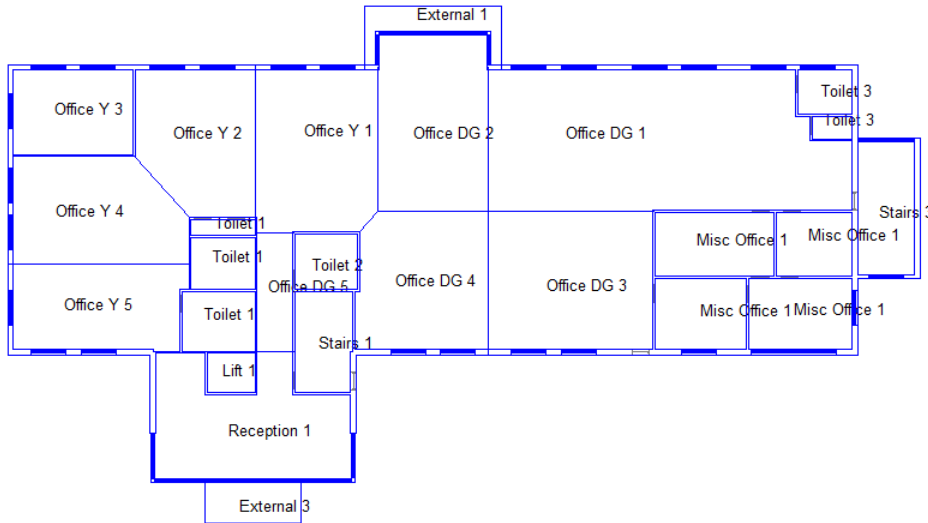
- Pink, Light Green and Blue systems
- Lossnay Fresh Air Heat Recovery Unit

Installed Equipment (2006)

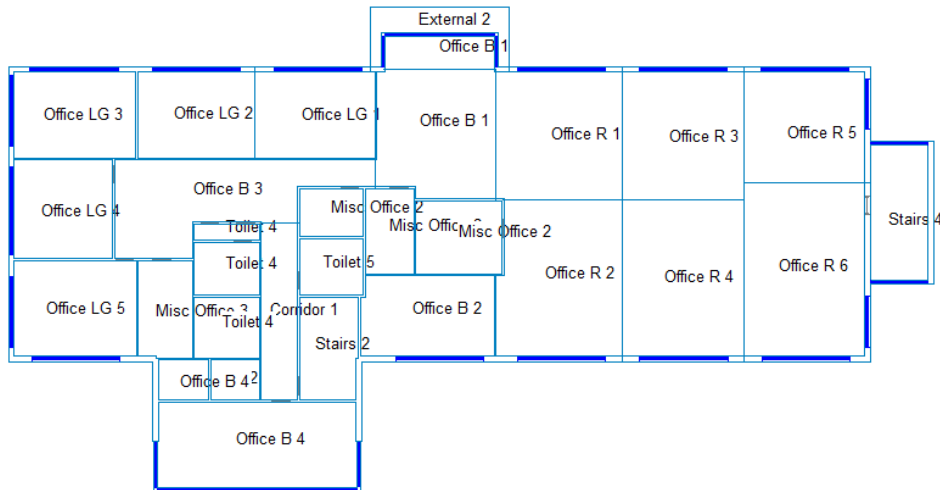


System	Yellow	Dark Green	Red	Light Green	Blue
Outdoor Unit	PURY-250YMF-C	PURY-250YMF-C	PURY-250YMF-C	PURY-250YMF-C	PURY-250YMF-C
BC Controller	CMB-P105V-F	CMB-P106V-F	CMB-P105V-F	CMB-P105V-F	CMB-P105V-F
Indoor Unit 1	PLFY-P63	PLFY-P125	PLFY-P63	PLFY-P63	PLFY-P63
Indoor Unit 2	PLFY-P63	PLFY-P63	PLFY-P63	PLFY-P63	PLFY-P63
Indoor Unit 3	PLFY-P63	PLFY-P63	PLFY-P63	PLFY-P80	PLFY-P125
Indoor Unit 4	PLFY-P63	PLFY-P63	PLFY-P63	PLFY-P80	PLFY-P80
Indoor Unit 5	PLFY-P63	PLFY-P50	PLFY-P63	PLFY-P80	
Indoor Unit 6			PLFY-P50		

Zoning Layout



Ground Floor



First Floor

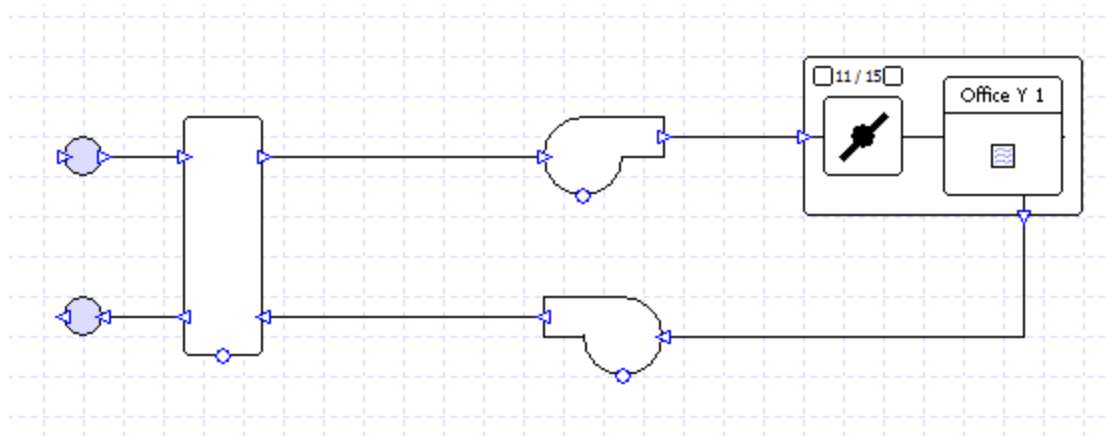
Building Simulation Inputs



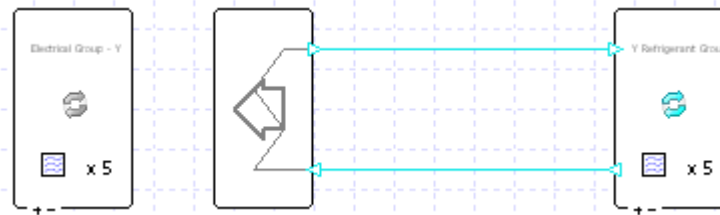
- Weather Data (London)
- Calendar of occupation
- Internal Conditions
 - Infiltration
 - Occupancy Gain
 - Equipment Gain
 - Fresh Air Requirement
- Construction details

Plant Simulation Inputs

- Air Side Schematic



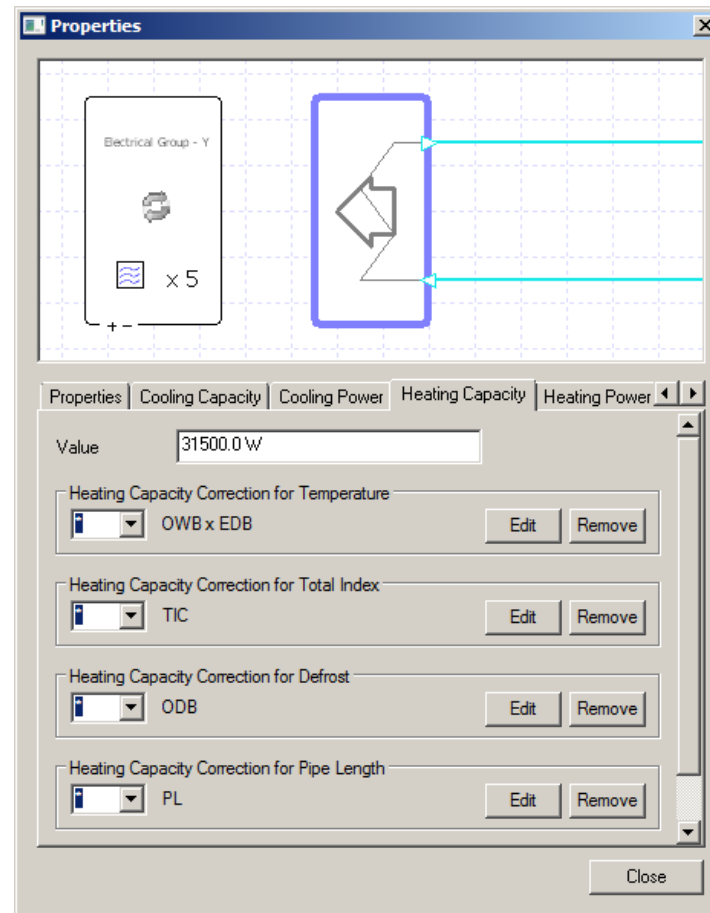
- Plant Side Schematic



Manufacturer Data Import



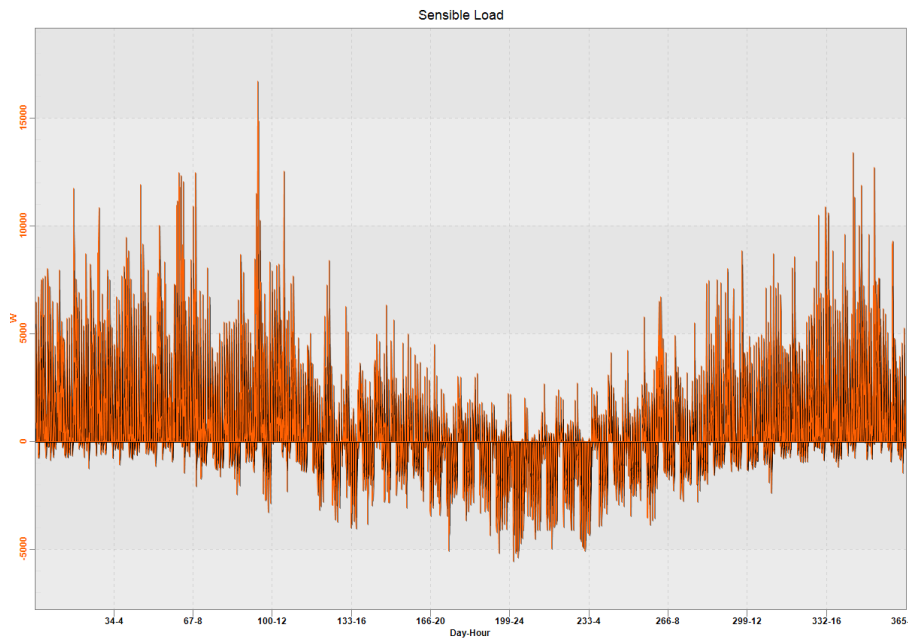
- Dedicated import facility brings manufacturer data into Tas



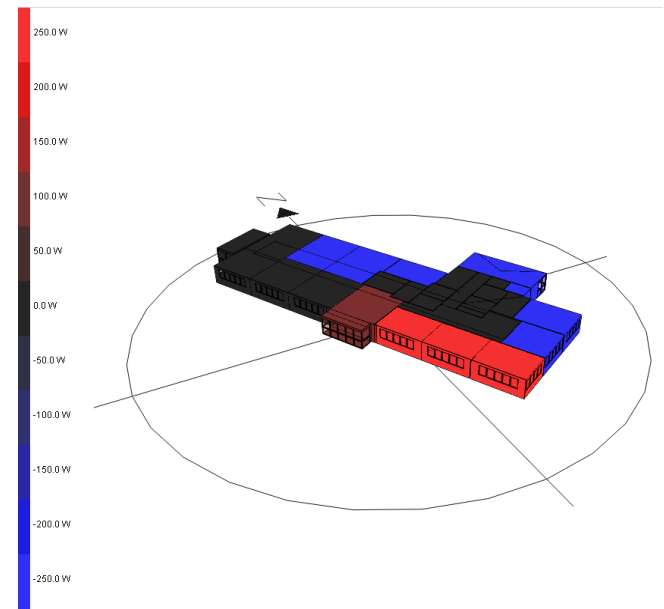
Building Simulation Results



- Hourly Building Demand
- 3D Results Visualisation



First Floor – Hourly Sensible Load Results

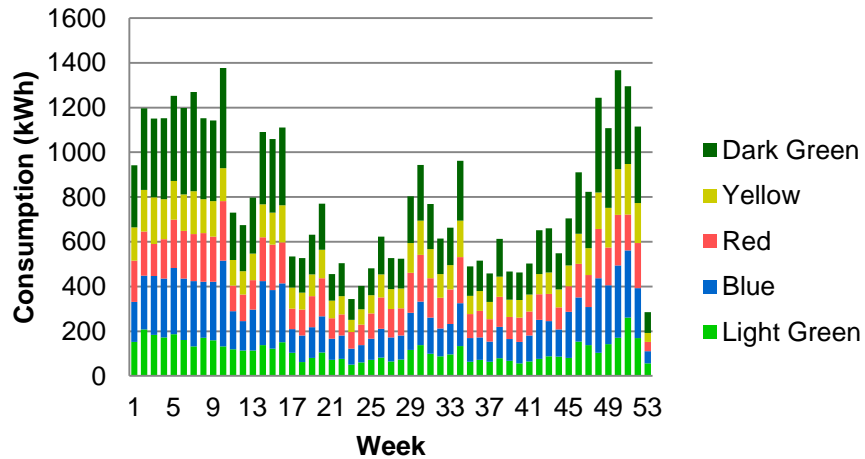


First Floor - Sensible Load - Day 50, Hour 12

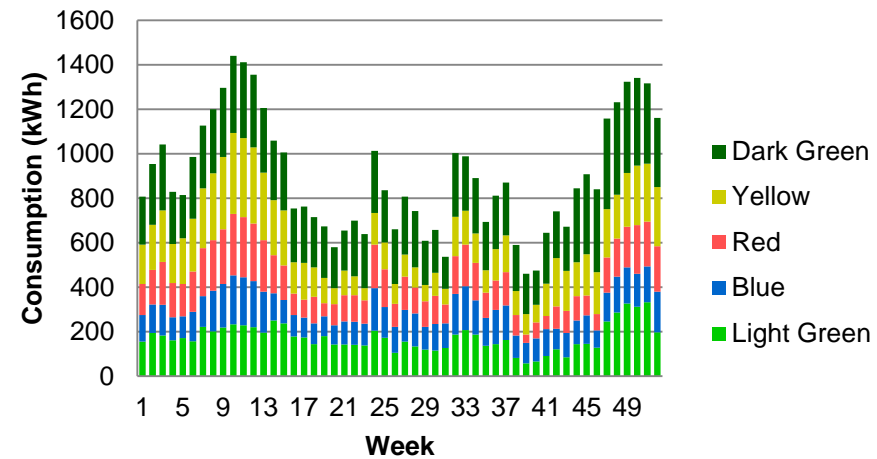
Plant Simulation Results



Simulated Consumption (Installed Models)



Measured Consumption

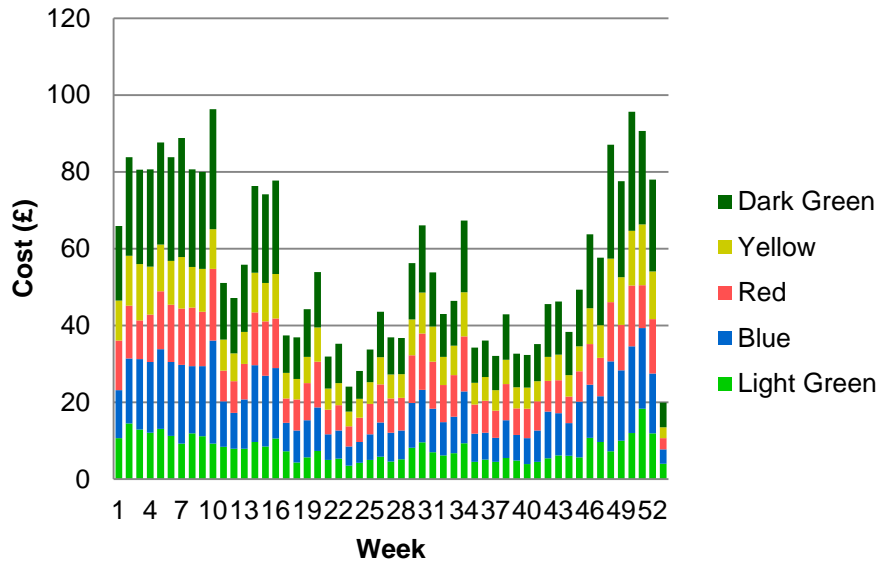


Plant Simulation Results

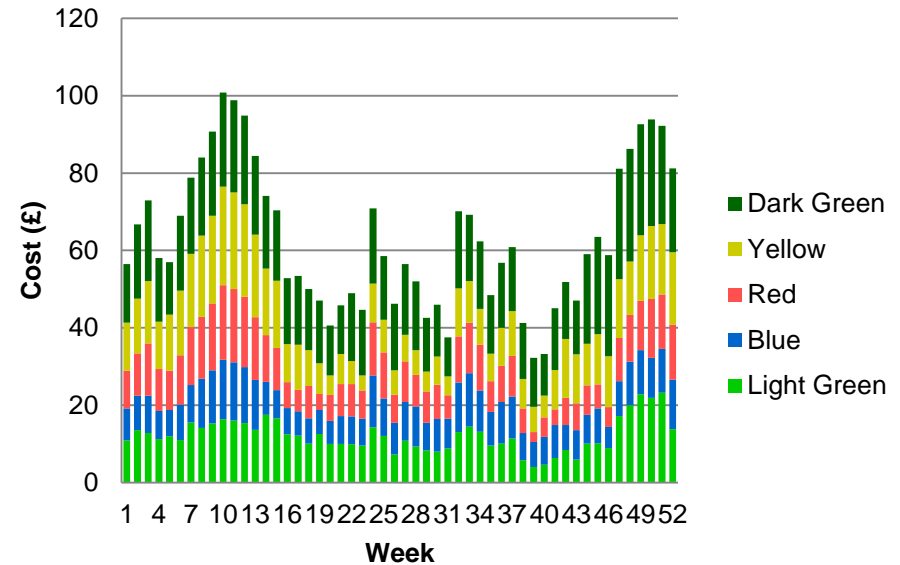


- Time of use tariff £0.07 per kWh

Simulated Cost (Installed Models)



Measured Cost



Plant Simulation Results



- Heat Recovery

System Name	Hours
Dark Green	334
Yellow	407
Red	43
Blue	959
Light Green	956

Validation Conclusion



- Detailed simulation of building and plant leads to simulation consumption figures indicative of those seen in the real world application.
- Good enough qualitative agreement between the predicted & measured data to make sound future predictions

Replacement with 2011 Equipment

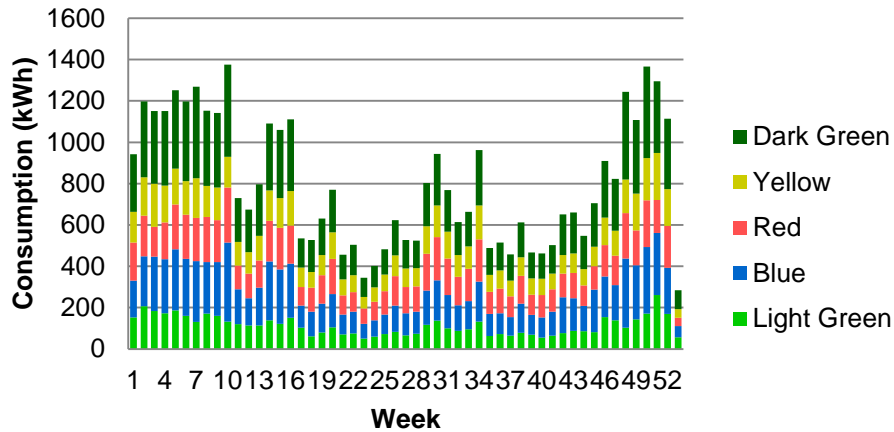


System	Yellow	Dark Green	Red	Light Green	Blue
Outdoor Unit	PURY-P250YJM-A	PURY-P250YJM-A	PURY-P250YJM-A	PURY-P250YJM-A	PURY-P250YJM-A
BC Controller	CMB-P105V-F	CMB-P106V-F	CMB-P105V-F	CMB-P105V-F	CMB-P105V-F
Indoor Unit 1	PLFY-P63VBM-E	PLFY-P125VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E
Indoor Unit 2	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E
Indoor Unit 3	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P80VBM-E	PLFY-P125VBM-E
Indoor Unit 4	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P63VBM-E	PLFY-P80VBM-E	PLFY-P80VBM-E
Indoor Unit 5	PLFY-P63VBM-E	PLFY-P50VBM-E	PLFY-P63VBM-E	PLFY-P80VBM-E	
Indoor Unit 6	PLFY-P63VBM-E		PLFY-P50VBM-E		

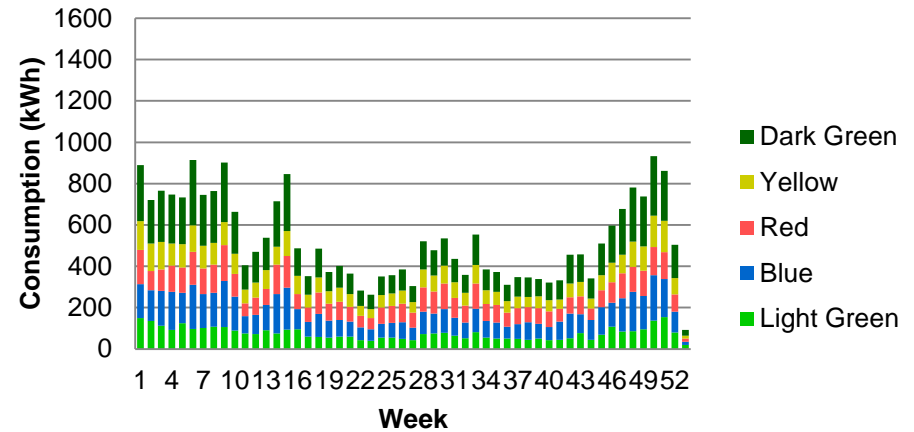
2011 Equipment Consumption



Simulated Consumption (Installed Models)



Simulated Consumption (2011 Equipment)

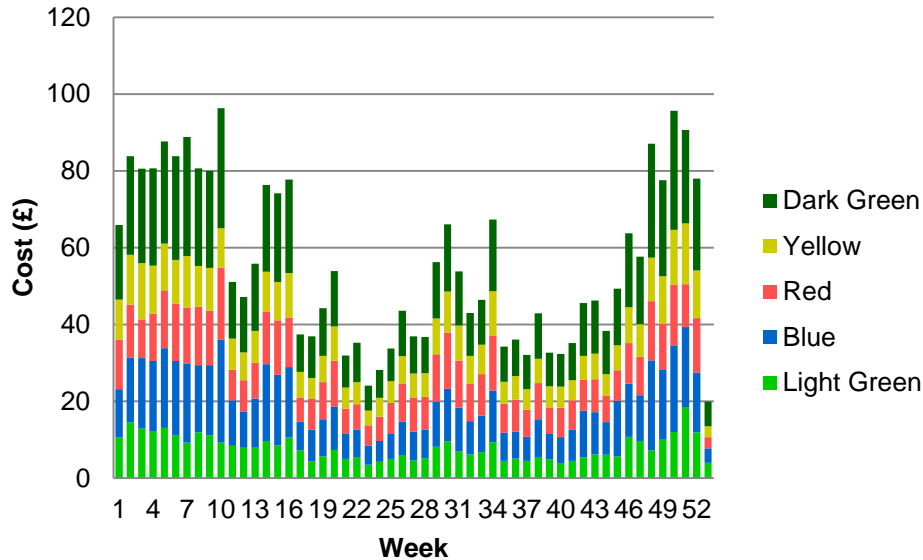


2011 Equipment Cost

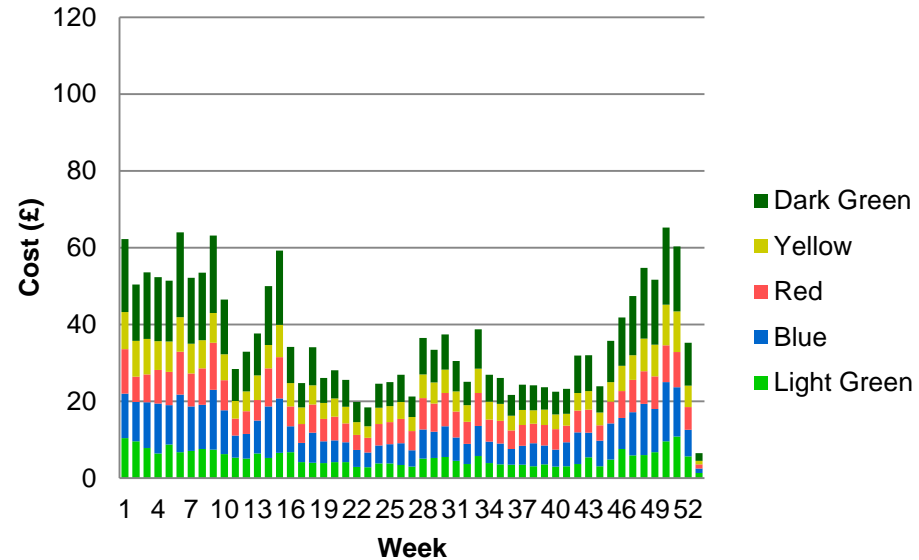


- Time of use tariff £0.07 per kWh

Simulated Cost (Installed Models)



Simulated Cost (2011 Equipment)



2011 Equipment Summary



- The 2011 equipment shows a 34.6% improvement on simulation of the installed 2006 equipment.

	Annual Consumption (kWh)	Annual Cost (£)	Improvement (%)
Measured	46,821	3,277	-
Simulation (Installed Models)	42,494	2,982	-
Simulation (2011 Equipment)	27,810	1,947	34.6%