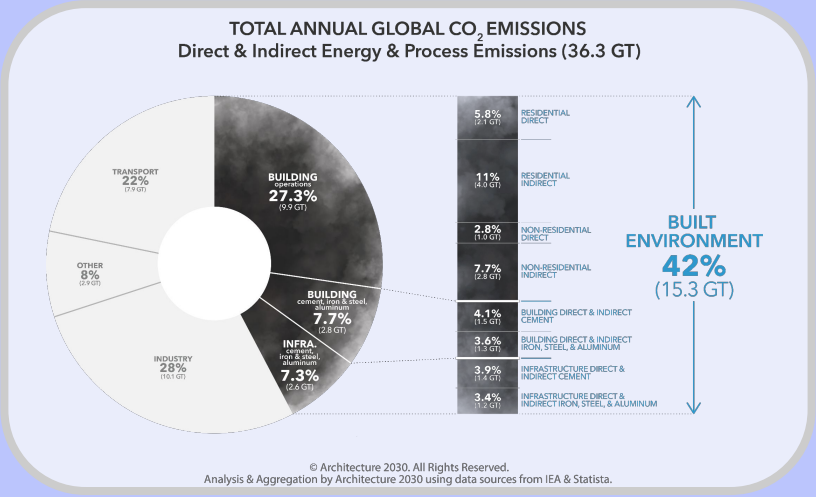
Air Conditioning Empty Rooms is Costing Everyone



Opportunities in Buildings

ENERGY STAR

- Commercial buildings and industrial facilities generate about **50 percent** of U.S. carbon dioxide emissions.
- **30 percent** of energy consumed in commercial and industrial buildings is wasted.
- Reductions of **10 percent** in energy use can be possible with little or no cost.

EPA

The cost

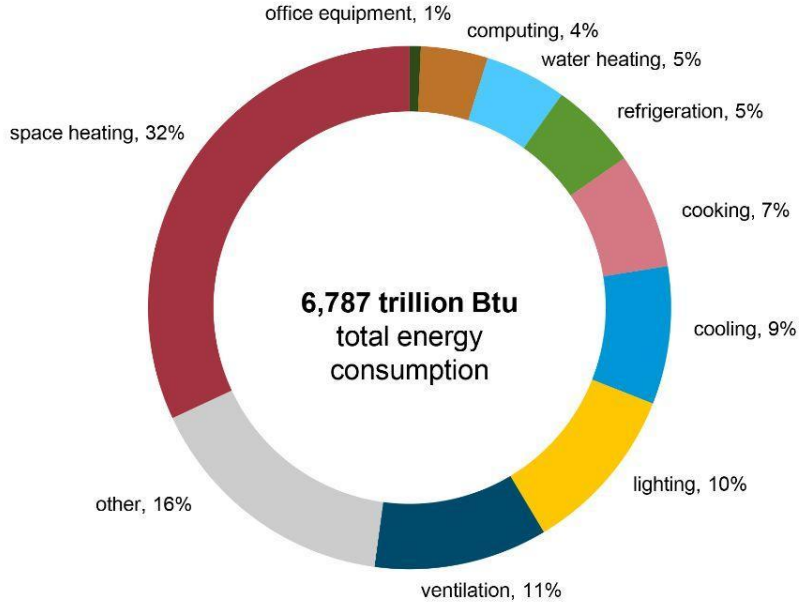
01 Commercial buildings consume 42% of energy globally

02 30% of energy in buildings is wasted due to inefficiencies

03 HVAC is responsible for 40% of all energy use in commercial buildings

Space heating accounted for close to one-third of end-use consumption in 2018

Major fuels consumption by end use, 2018
share of total



- Space heating was the most common end use in commercial buildings. About 32% (2,167 TBtu) of energy was consumed for space heating.
- Other, ventilation, and lighting each accounted for 10% or more of total energy consumption. Other end uses can include miscellaneous plug loads, process equipment, motors, air compressors, and natural gas dryers.

Data source: U.S. Energy Information Administration, *Commercial Buildings Energy Consumption Survey*
Note: Btu = British thermal units

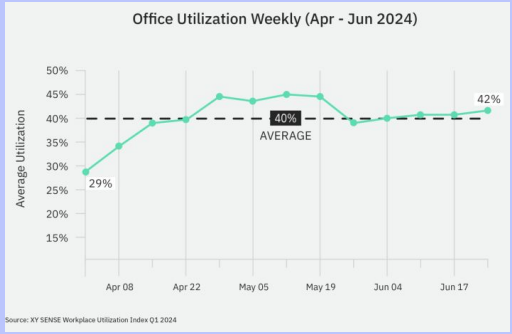
Working with specialist financiers, potential energy savings can be harnessed to effectively subsidise the investment, meaning buildings conversion can often be achieved at zero net cost.

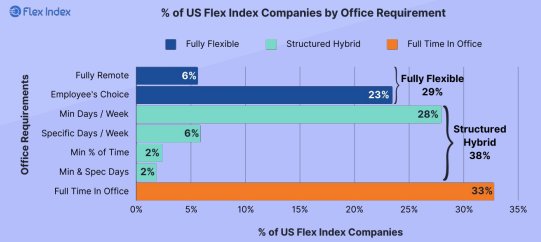
The resulting estimates are as follows:

Commercial property value at risk by sector
(F- & G-rated properties in industrial, retail, offices)

(Sector in England, Scotland, Wales)	£ million Total Capital Value
Industrial	**£25,334**
Offices	**£28,588**
Retail	**£31,644**

***£93 billion** commercial property value at risk in Great Britain*





Source: Flex Index (FlexIndex.com) employer-provided policy data and publicly available data on company office requirements for companies with headquarters in the US, N = 6,362 companies. Flex Index data has been re-weighted using the Current Population Survey industry data to better approximate the US working population.

Times are changing

01 Regulatory pressure: Local Law 97

02 Average workplace utilization: 35%

02 Most companies are going hybrid

What can we do?

Capture real-time occupancy data

Add context

Take action

Capture real-time occupancy data

Add context

Calendar Systems

Cameras

Active directory

Sensors

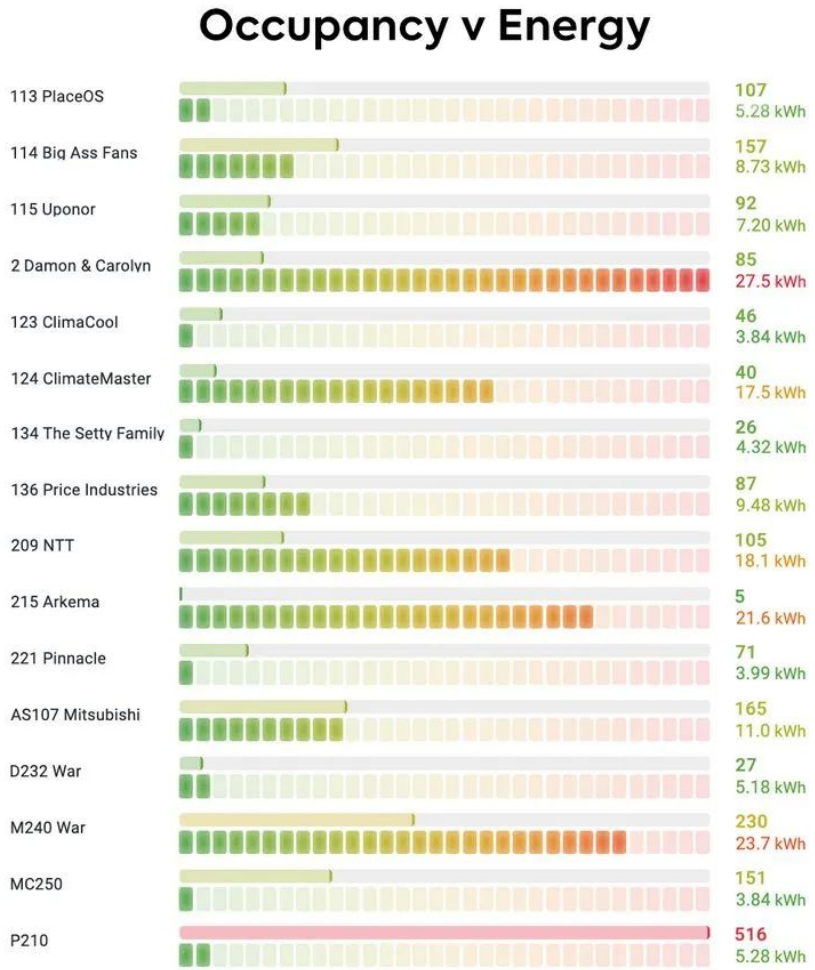
Combine with energy data

Building Management Systems

- BACnet Secure Connect
- Johnson Controls Metasys
- Siemens Desigo
- Delta Controls

Energy

- Igor
- Leviton



Combine with energy data

Comparison between different types of spaces with different technology efficiencies

Breakdown of energy usage per person, offset, intensity and energy over time provides more context to raw energy data

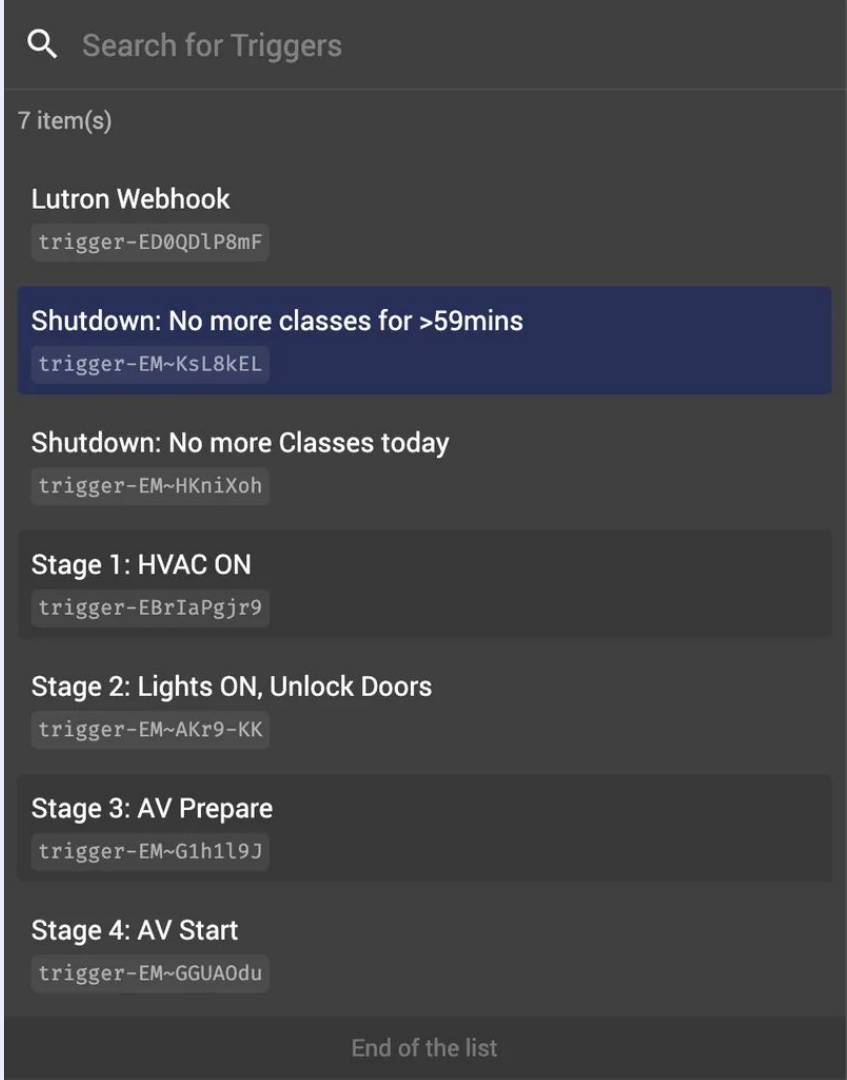
Report colours change based on the organisation's score compared to the benchmark (green = good, red = not good)

Take action

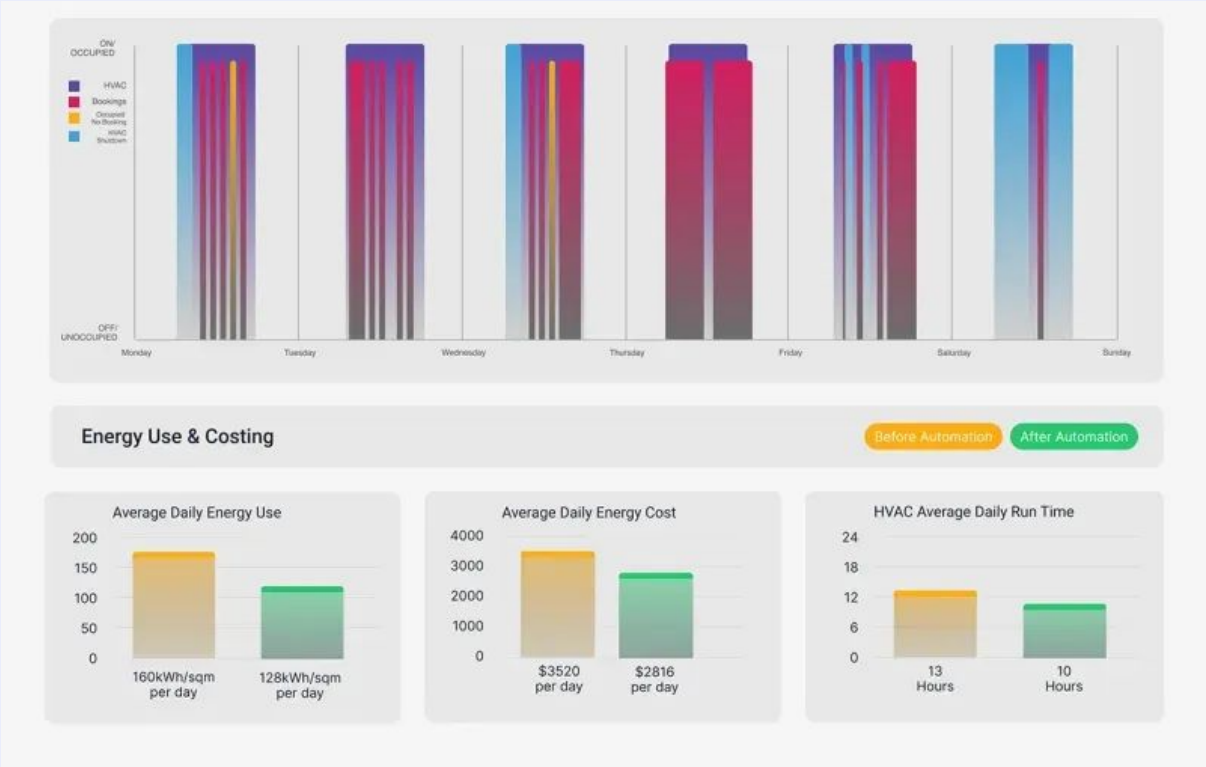
If: *No more classes for > 59 Minutes*

Then: Shutdown

- *Lighting*
- *HVAC*
- *AV*
- *Lock Doors*



Reduce energy

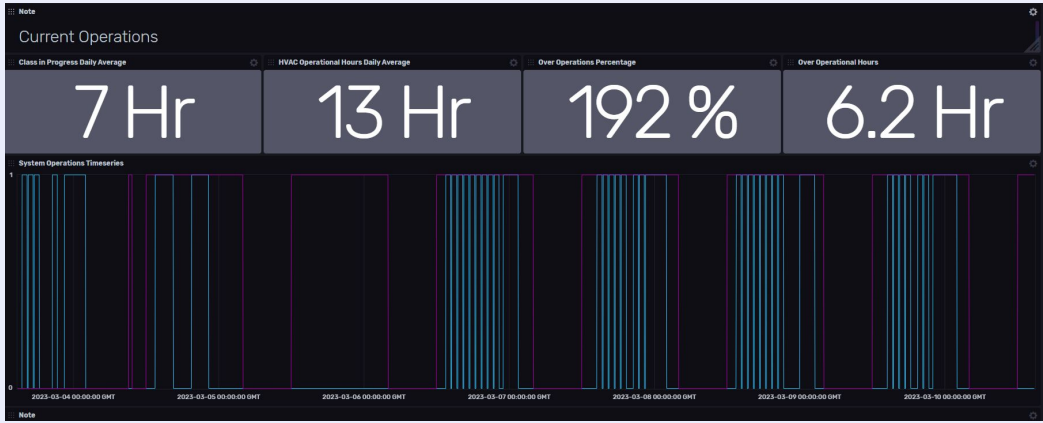


Before

Class Rune Time: 7 Hours a Day
HVAC Run Time: 13 Hours a Day
HVAC Over Operation: 6.2 Hours a day

Electricity: 198 kWh/sqm
Natural Gas: 45.7 m3/sqm

Campus size: 180,000 sqm
Average room size: 200 sqm



After

Class Rune Time: 7 Hours a Day
HVAC Run Time: 10 Hours a Day
HVAC Over Operation: 3 Hours a day

SAVINGS - Room (200 sqm)
Electricity: ~6 MWh/year
NG: ~20 MWh/year
Total: ~26 MWh/year

SAVINGS - Room (200 sqm)
Electricity: ~$220/year
NG: ~$735/year
Total: ~$955/year

*The values are as follows: 23.0333 ¢/m3 for gas and 10.9 ¢/kWh electricity (an average of off-peak, Mid-Peak and On-Peak).

Sustainability & Emissions

40,400 ton
CO^2/per year

180,000 sqm

45 ton
per room