FLORIANÓPOLIS

WORKSHOP MIT - Model Cities Anywhere - Pathways towards a Net-Zero Building Stock

January 2021

labEEE

Massachusetts Institute of Technology

CBCS Conselho Brasileiro de Construção Sustentável

CIDADES EFICIENTES

PREFEITURA DE FLORIANÓPOLIS

Team

CIDADES EFICIENTES

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Realização

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Apoio

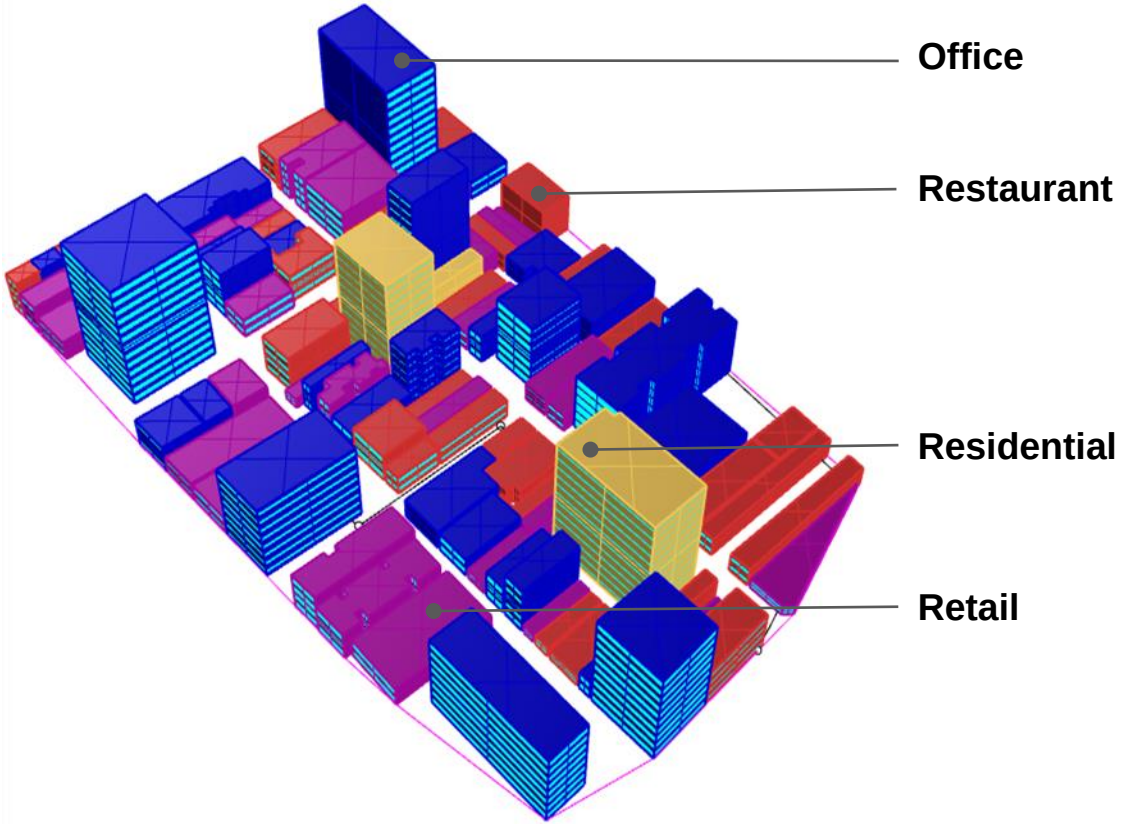
Massachusetts Institute of Technology

PREFEITURA DE FLORIANÓPOLIS

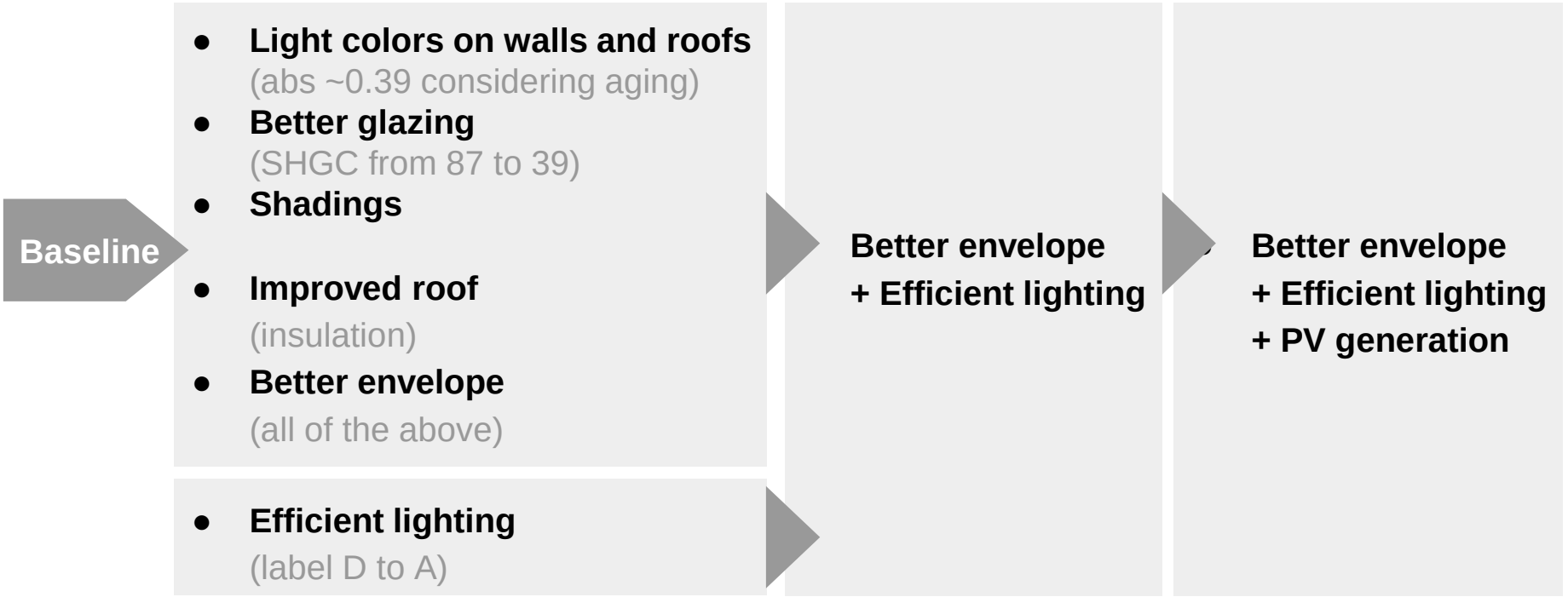
iCS instituto CLIMA e SOCIEDADE

Downtown area

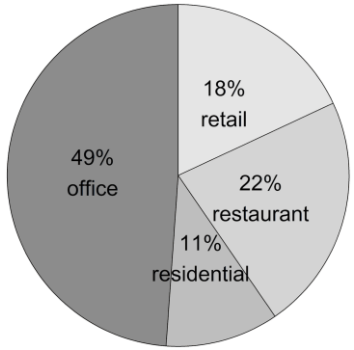
UMI model (93 buildings)



Upgrades

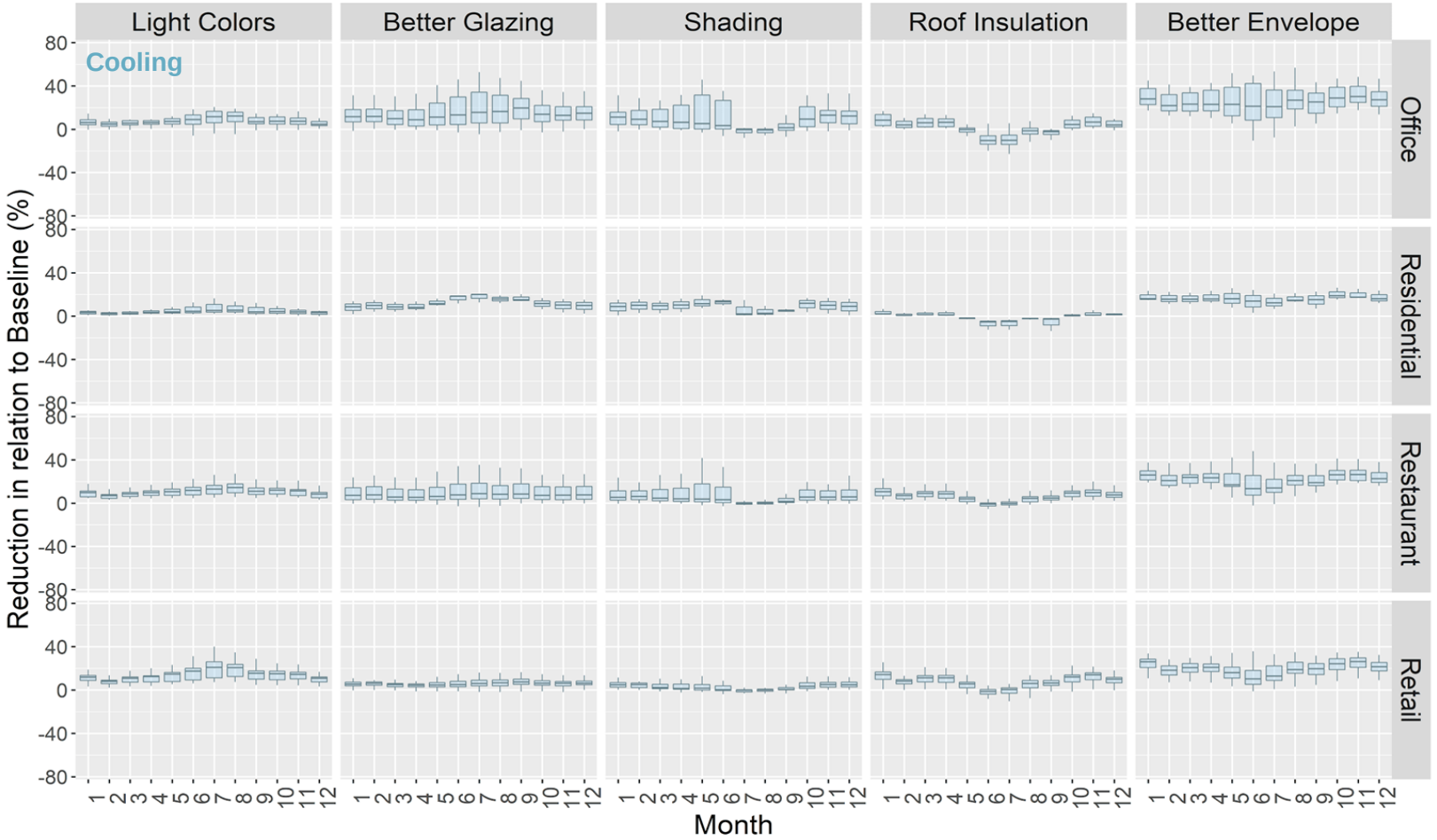

Baseline
Light colors on walls and roofs
(abs ~0.39 considering aging)
Better glazing
(SHGC from 87 to 39)
Shadings
Improved roof
(insulation)
Better envelope
(all of the above)
Efficient lighting
(label D to A)
Better envelope
+ Efficient lighting
Better envelope
+ Efficient lighting
+ PV generation

Baseline results

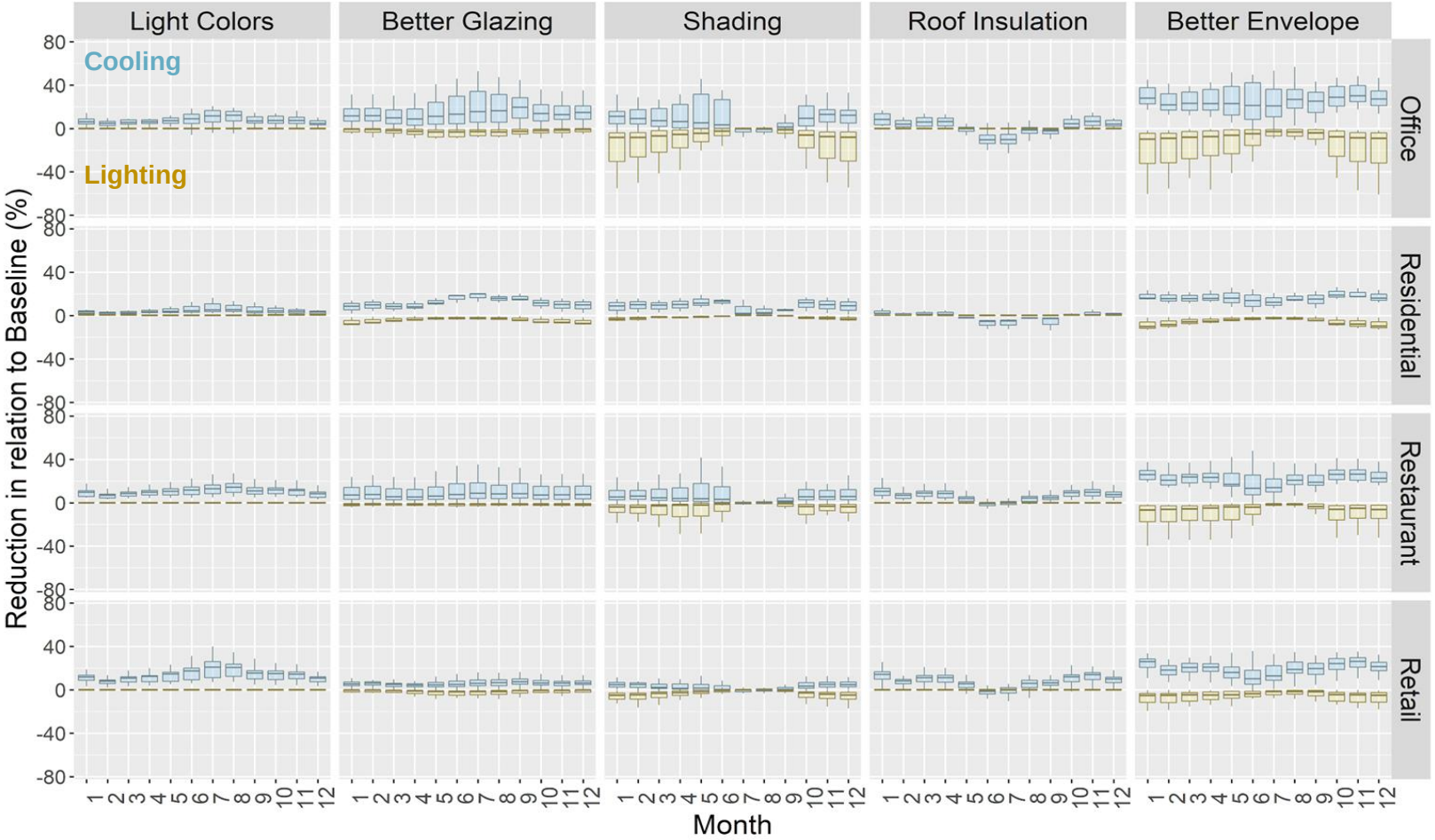


Operational energy
(Annual)

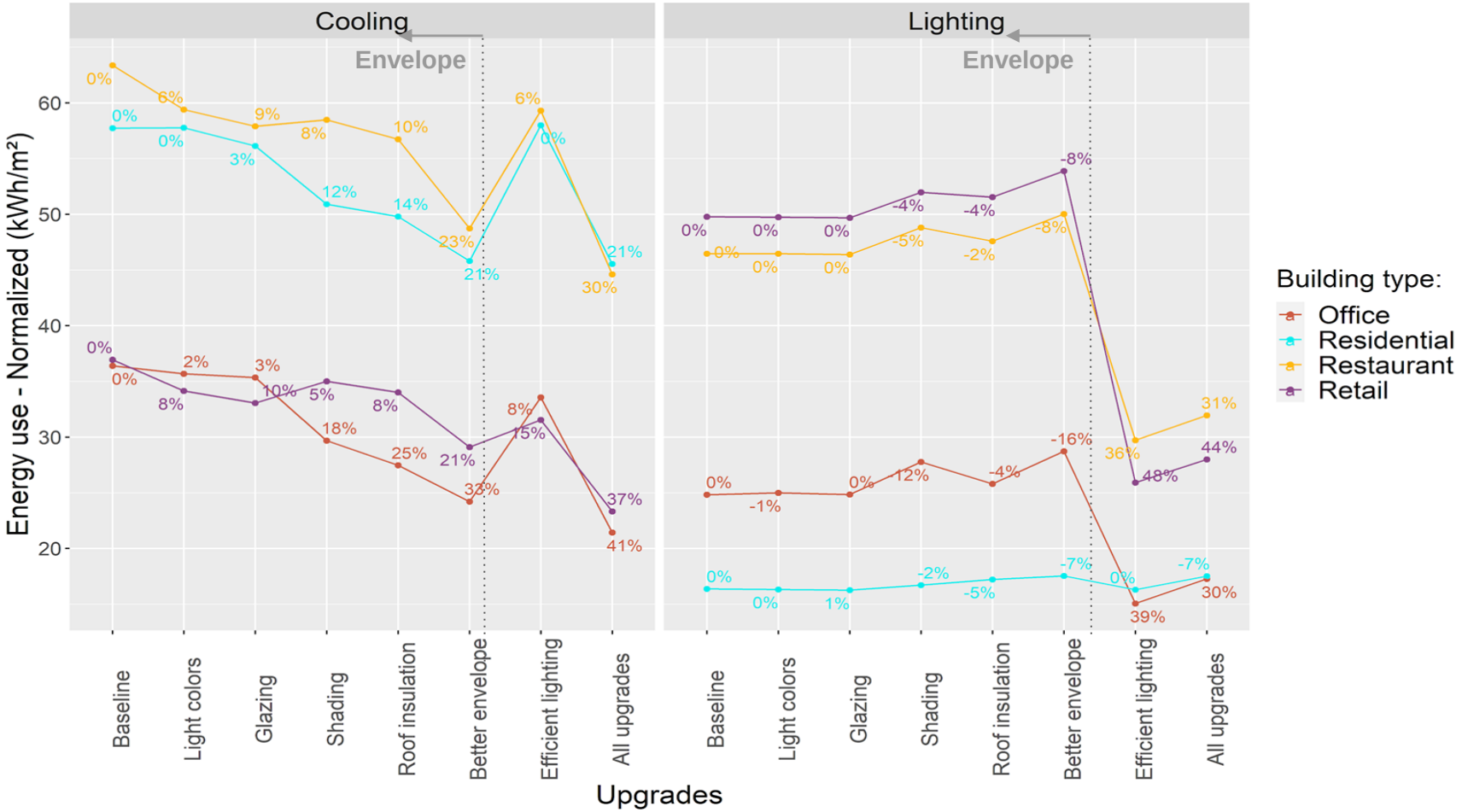
Baseline vs. Envelope Upgrades (cooling)



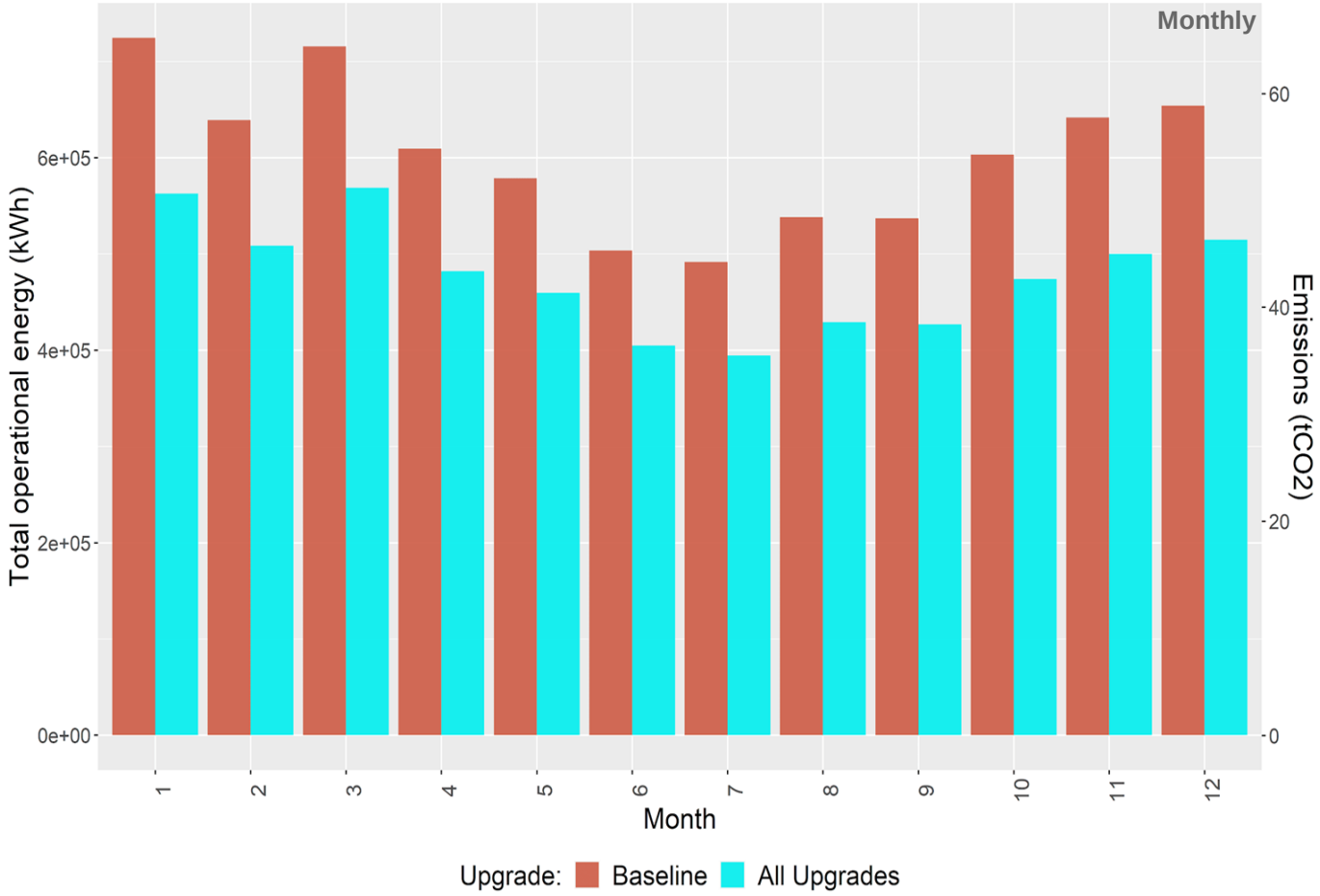
Baseline vs. Envelope Upgrades (cooling and lighting)

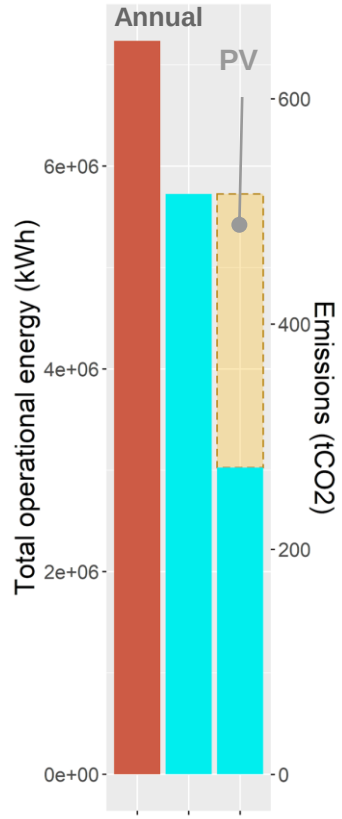


Baseline vs. Upgrades (cooling and lighting)

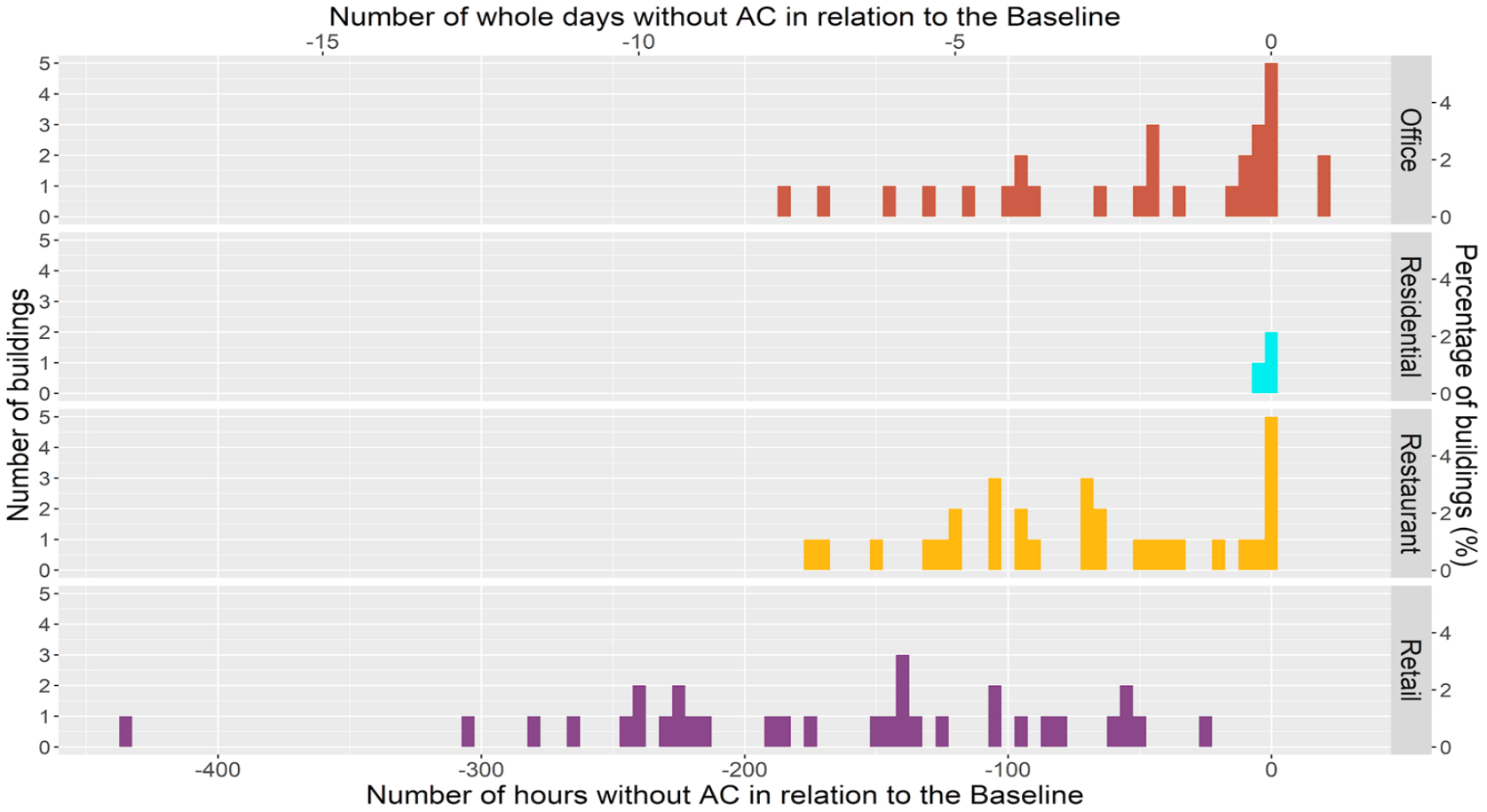


Baseline vs. All Upgrades (total op. energy, emissions and PV)





Baseline vs. All Upgrades (hours without AC)



Conclusions

- **Passive strategies (retrofitting):** reduced cooling loads up to 33%

- **Retrofitting + improving lighting:**
  - Cooling: - Up to 41%
  - Lighting: - Up to 44%

*Trade-off between some retrofitting strategies (shading and glazing) and energy consumption for lighting

- **Total operational energy:**
  - -21% after all envelope and lighting upgrades
  - Emissions: 136 tCO_2 avoided

- **With photovoltaics generation**
  - Total operational energy: -58%
  - Emissions: 379 tCO_2 avoided

- **It’s necessary to improve equipments efficiency**