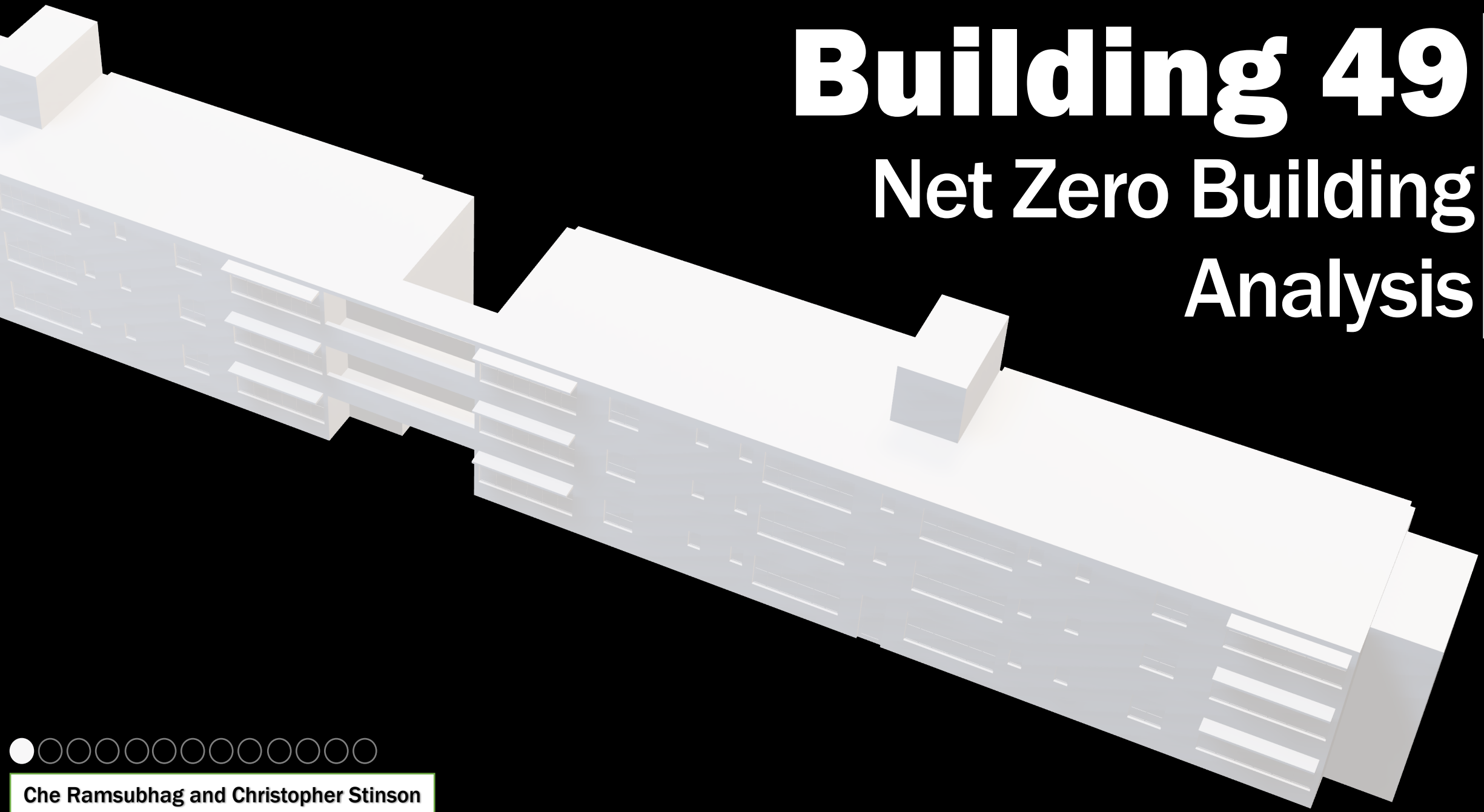
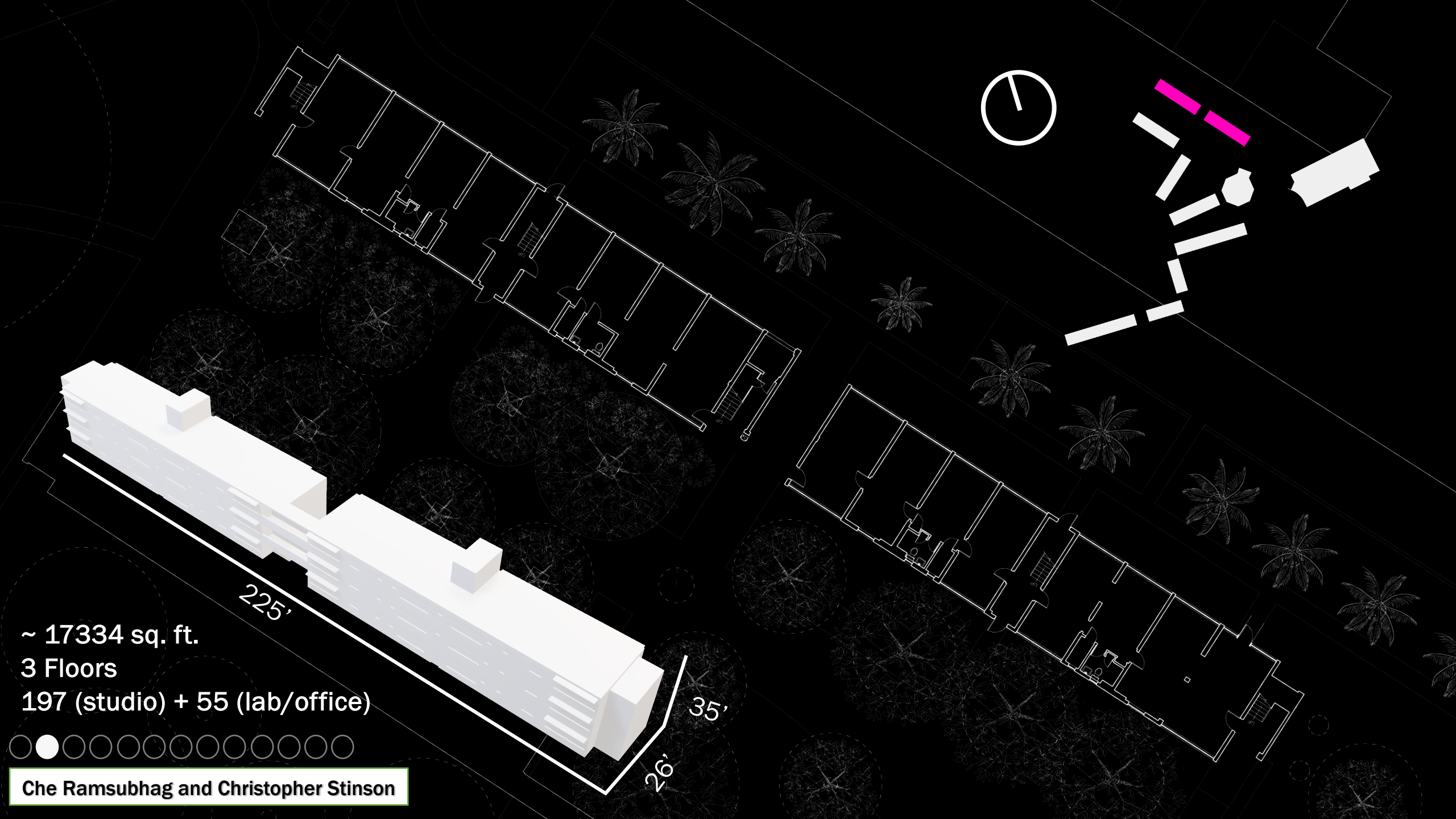
Building 49

Net Zero Building Analysis

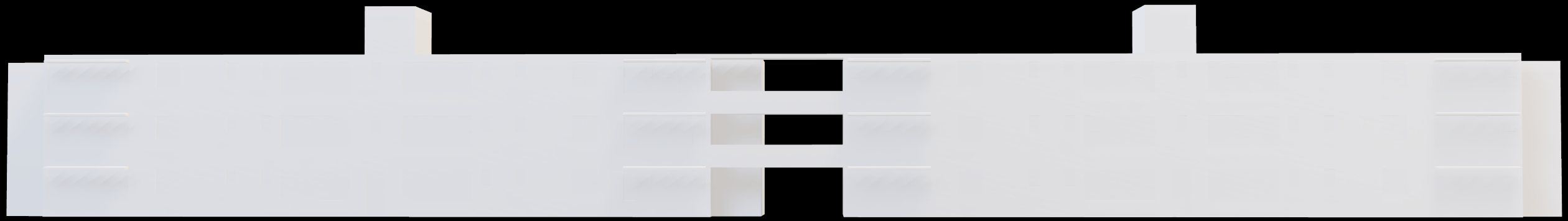


Che Ramsubhag and Christopher Stinson



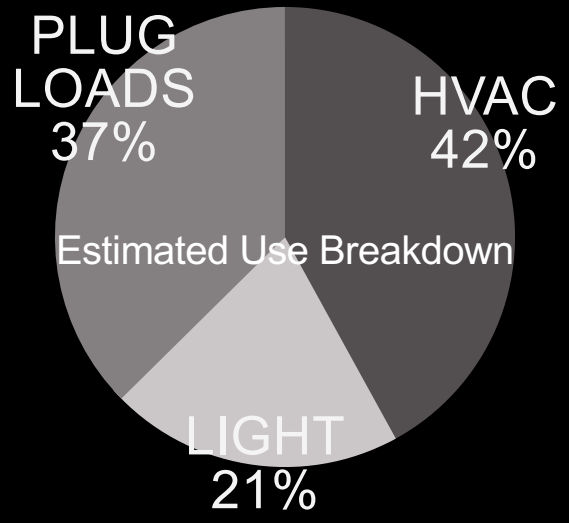
~ 17334 sq. ft.
3 Floors
197 (studio) + 55 (lab/office)

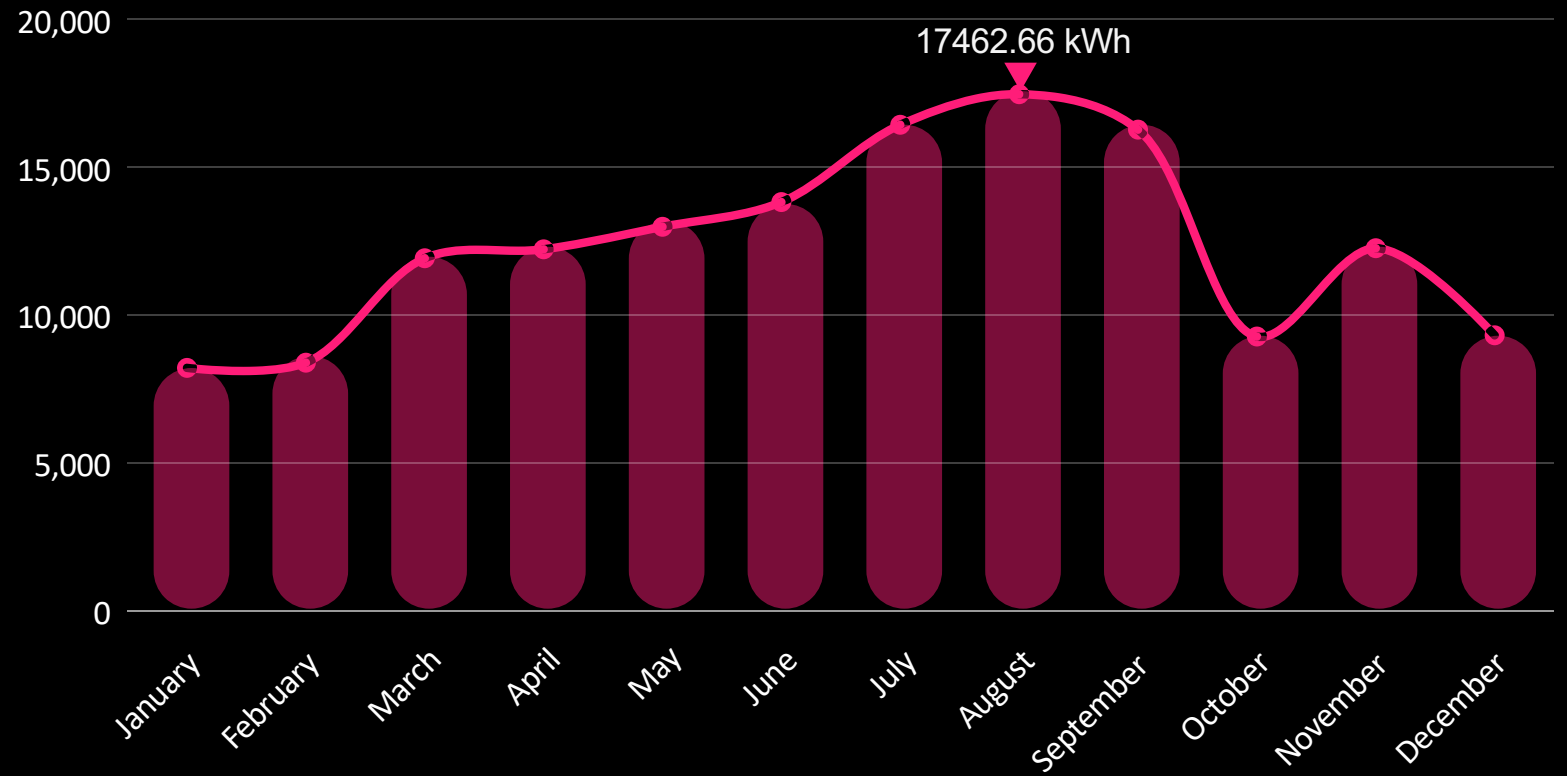
Che Ramsubhag and Christopher Stinson



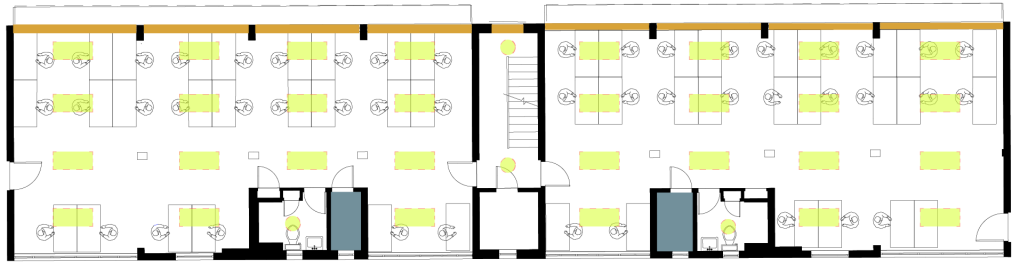
2022 TOTAL ANNUAL ENERGY USE

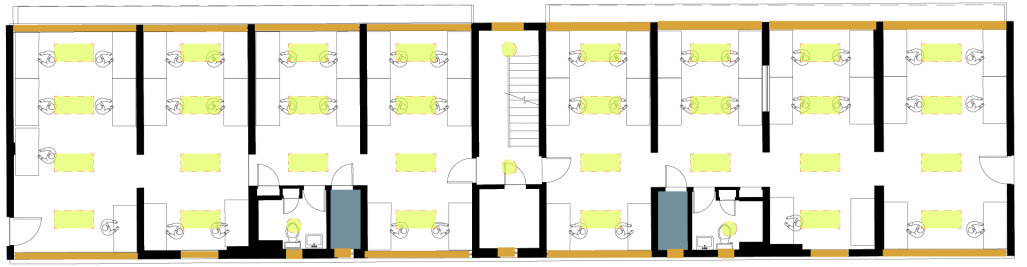
152, 407.1334 kWh



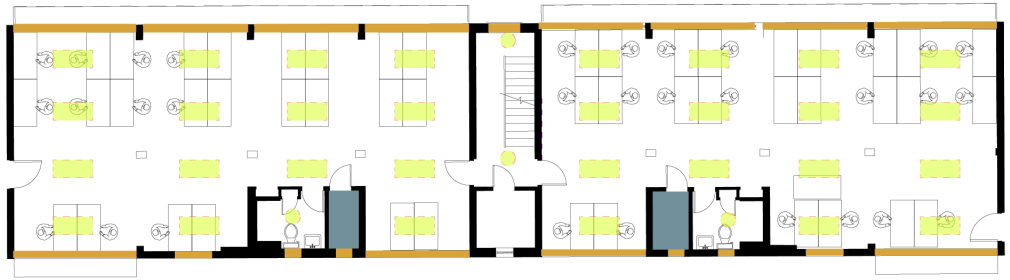


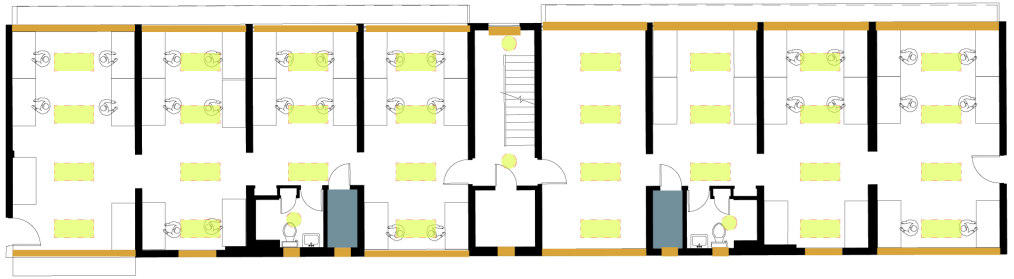
Che Ramsubhag and Christopher Stinson



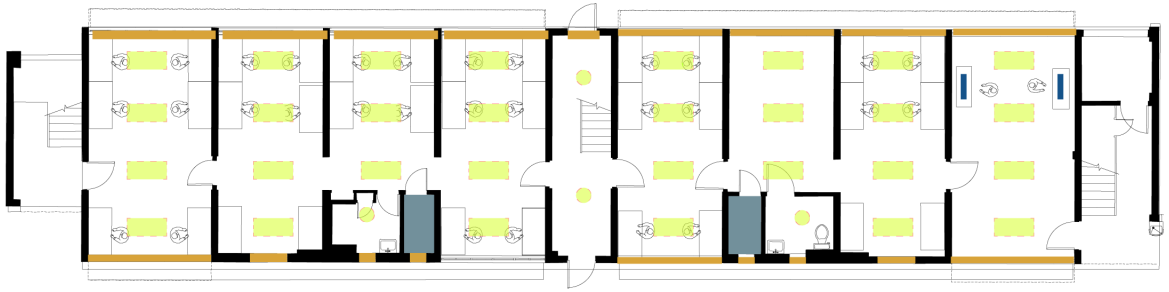


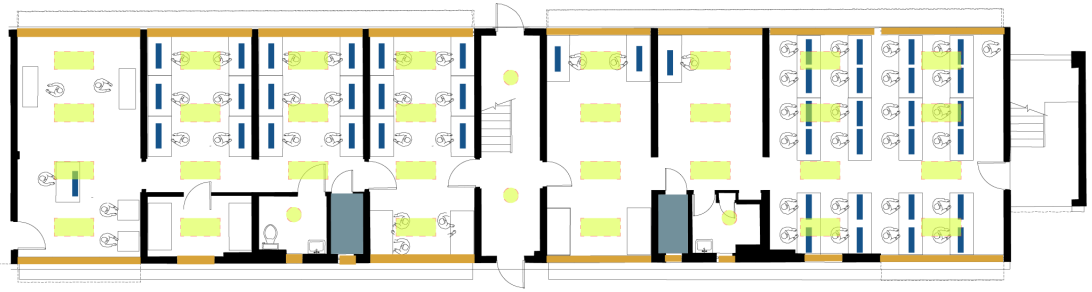
Third Floor





Second Floor





First Floor

CFL Lights

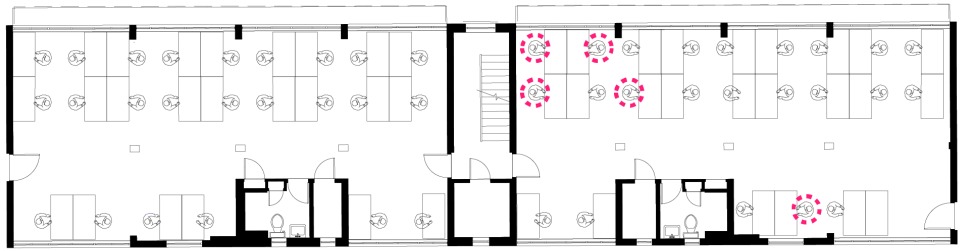
Fixed Windows

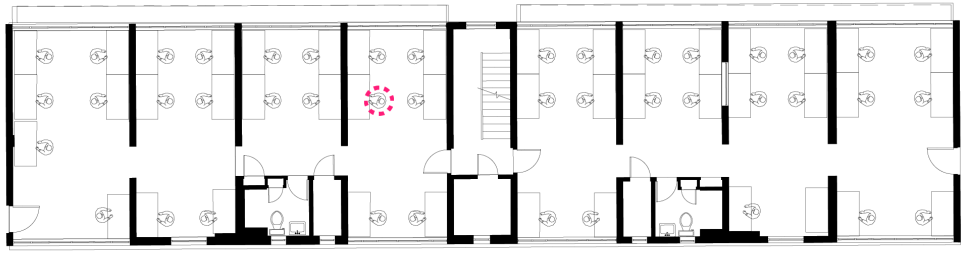
Building 49
End Users

Air Handlers

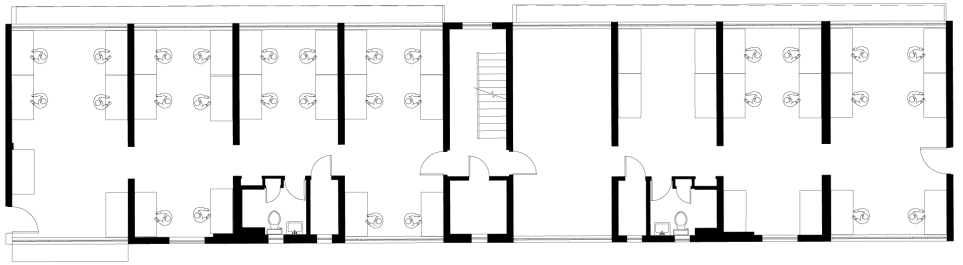
Desktop computers

Che Ramsubhag and Christopher Stinson

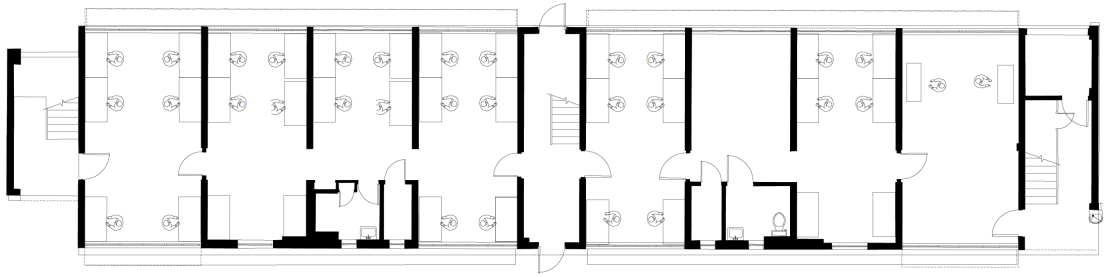


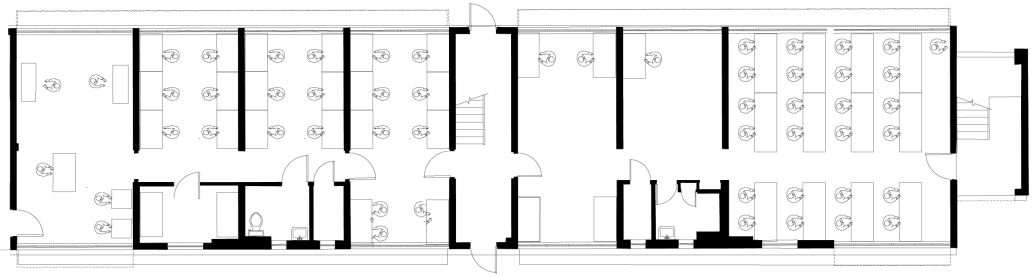


Third Floor



Second Floor





First Floor

Occupancy
6

Building 49
Users
252

Time
12:00am

Che Ramsubhag and Christopher Stinson

(S) Strength

Building orientation maximizes solar exposure on east/west

Weakness (W)

Poor Window Condition with poor passive strategies and energy waste

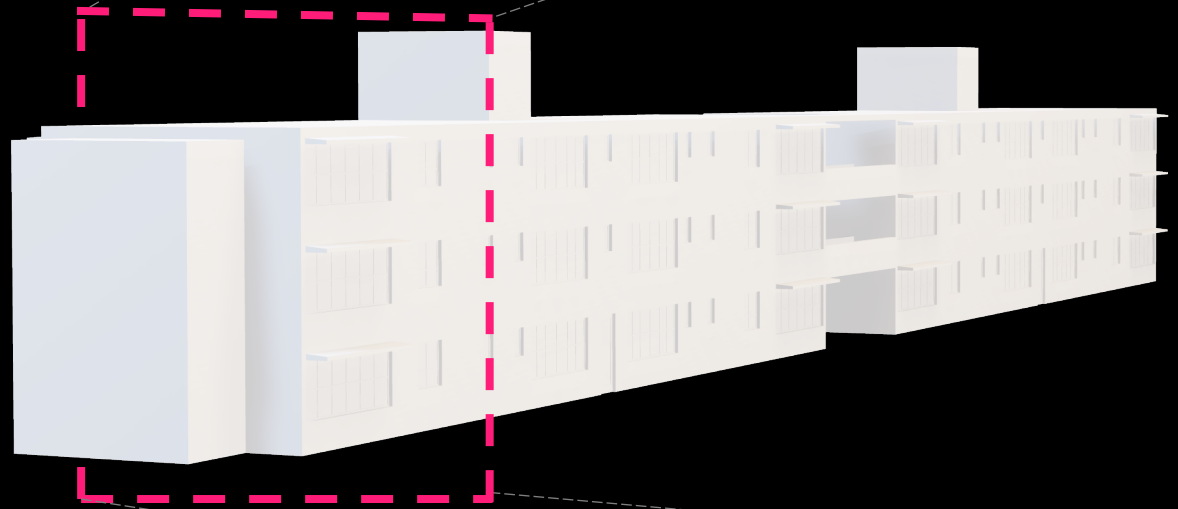
SWOT

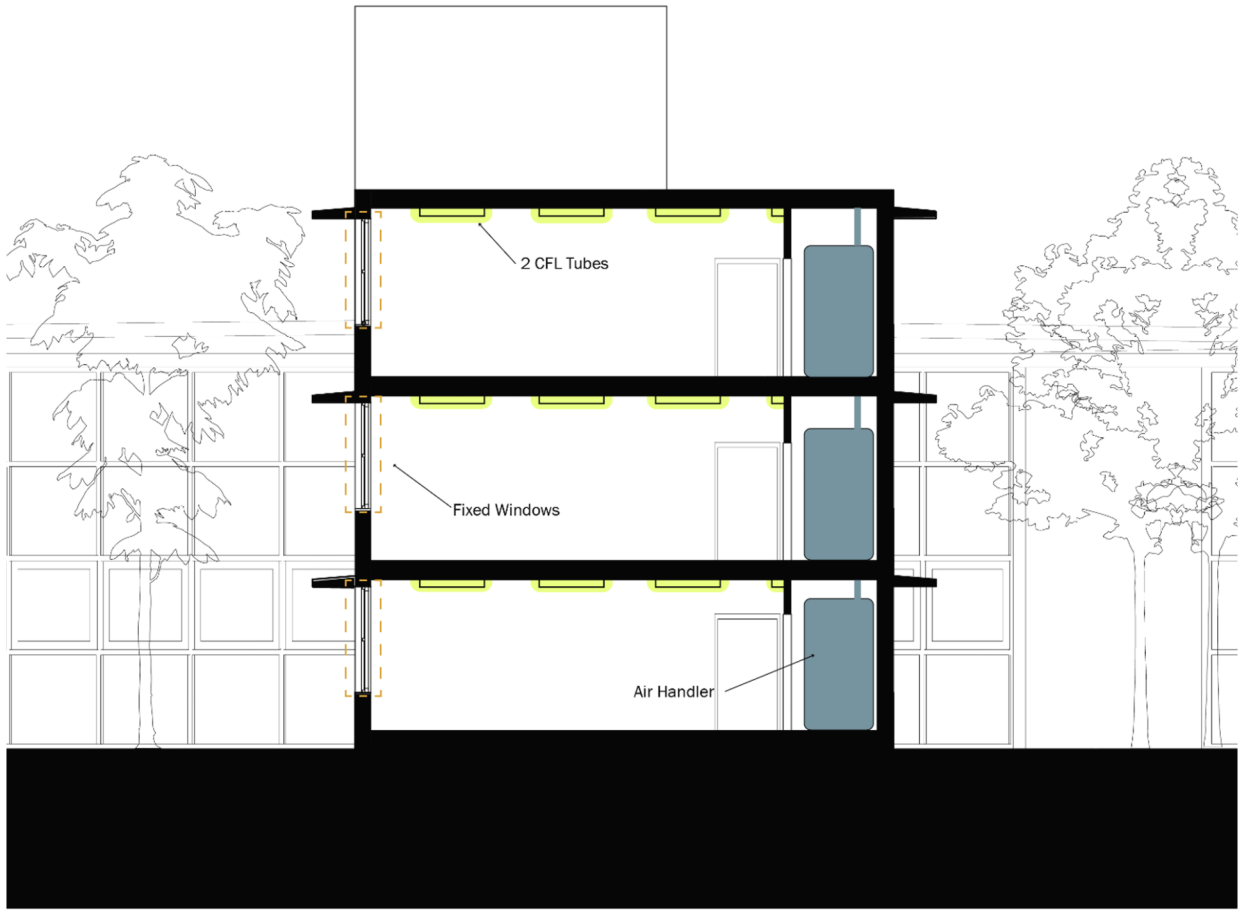
There are a lot of inefficient energy systems that can be replaced, and renewable energy can be generated

(O) Opportunity

Safety issue in controlling mold if the use of passive cooling is implemented through windows

Threats (T)

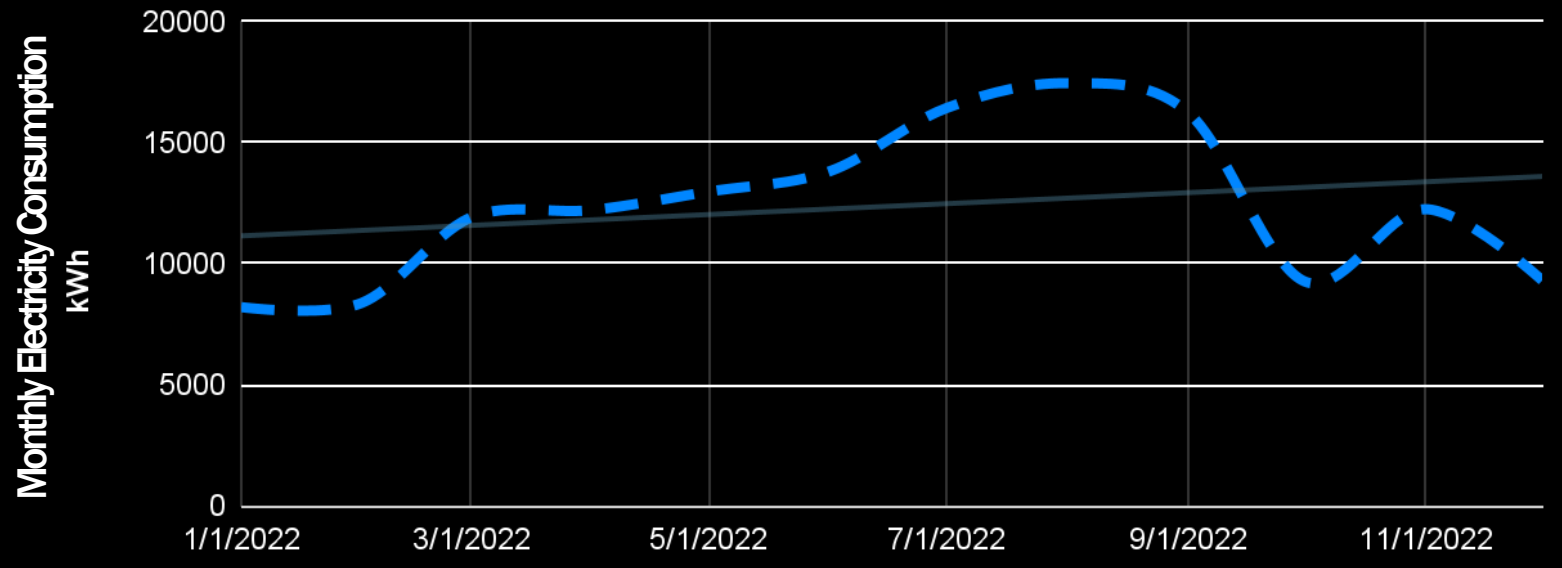




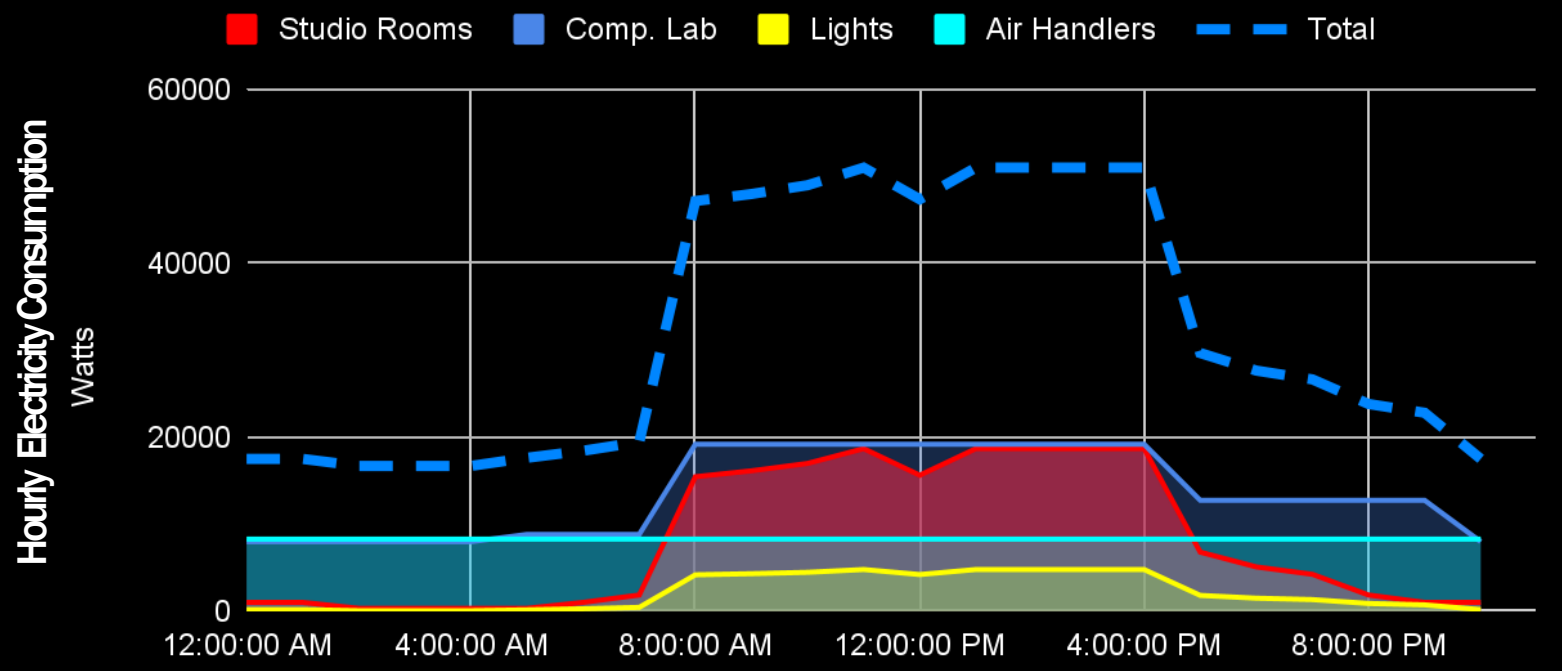
Che Ramsubhag and Christopher Stinson

User Load

- Peak load near the beginning of the fall semester

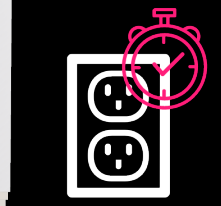


- Peak load during studio times
- Largest loads are the computer lab and studio load



Che Ramsubhag and Christopher Stinson

Biggest 3 Energy Savers



PLUG TIMERS

X 200 Devices

30 kWh/device/year

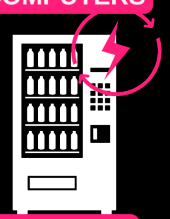
5,997 kWh/year Saving

ADJUSTING COMPUTERS

X 51 Devices

1,100 kWh/device/year

56,098 kWh/year Saving

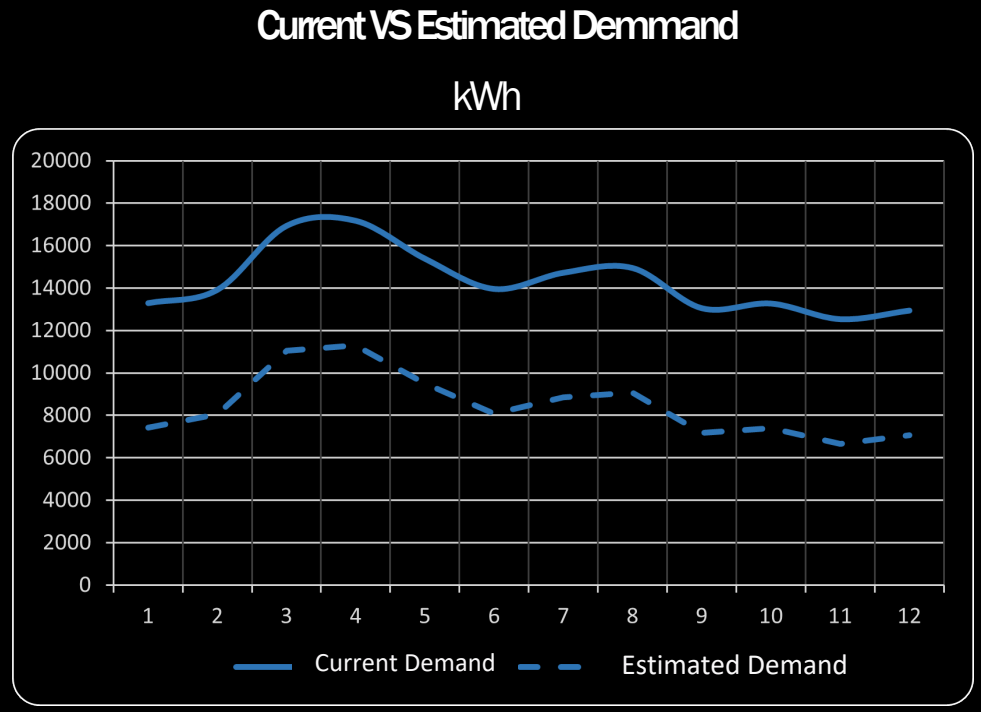


REPLACE VENDING MACHINES

X +1/-1 Devices

6,600 kWh/device/year

6,600 kWh/year Saving



Estimated Total Annual Energy Savings	***70,565 kWh/year***
Estimated Total Annual Energy Savings	***$7,056 /year***

Plug Load

Che Ramsubhag and Christopher Stinson

Strategy

SMART POWER STRIPS

These are power strips that automatically turn off power to devices that are not in use, eliminating standby power consumption.

OCCUPANCY SENSORS

These sensors detect when a room is empty and turn off power to devices, such as lights and fans, that are not needed.

TIMERS

These can be used to schedule devices, such as lights or appliances, to ensure they are only used when needed.

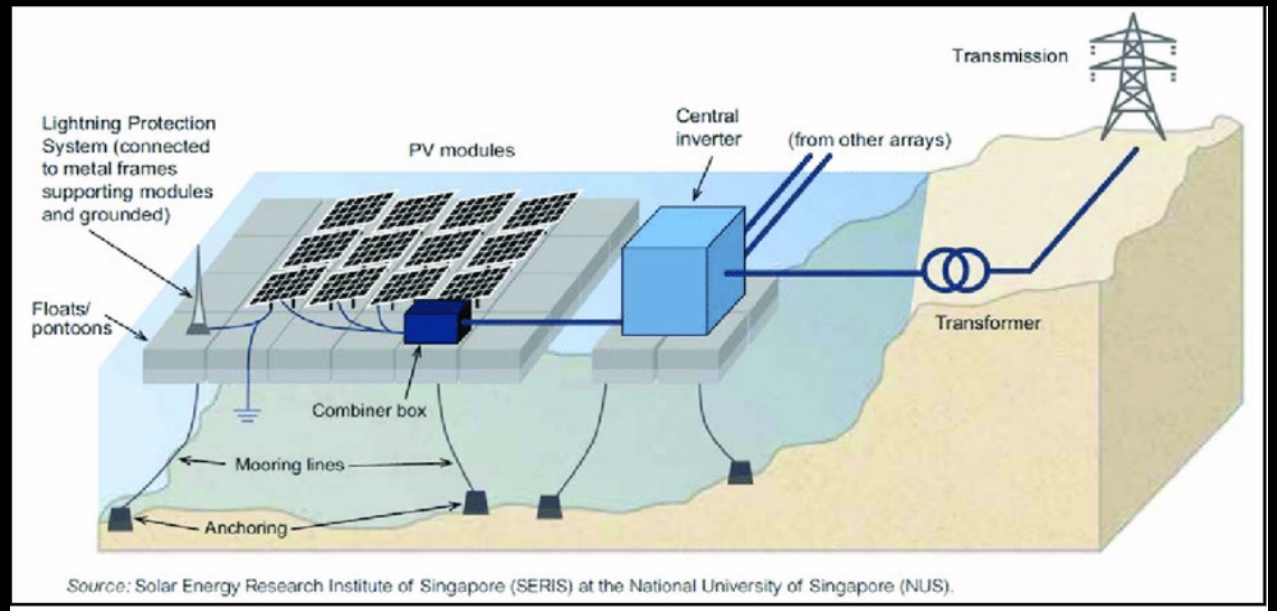
ENERGY MONITORING SYSTEMS

These systems track energy usage in real-time and provide feedback to users on how to reduce energy consumption

Che Ramsubhag and Christopher Stinson

Strategy

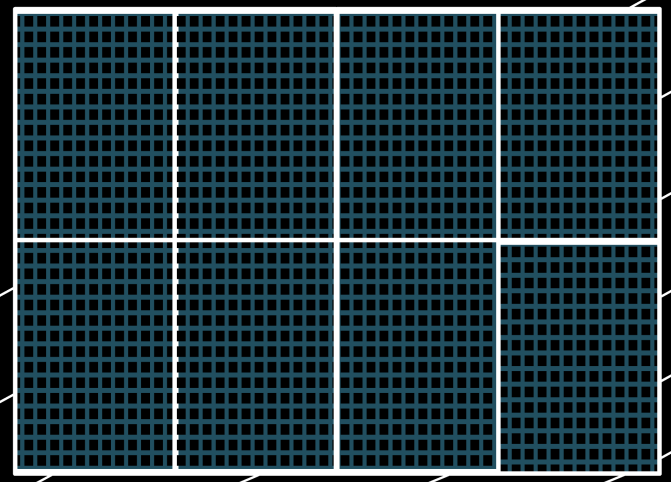
Implementation of Solar Panels on Lake (Floatovoltaics)



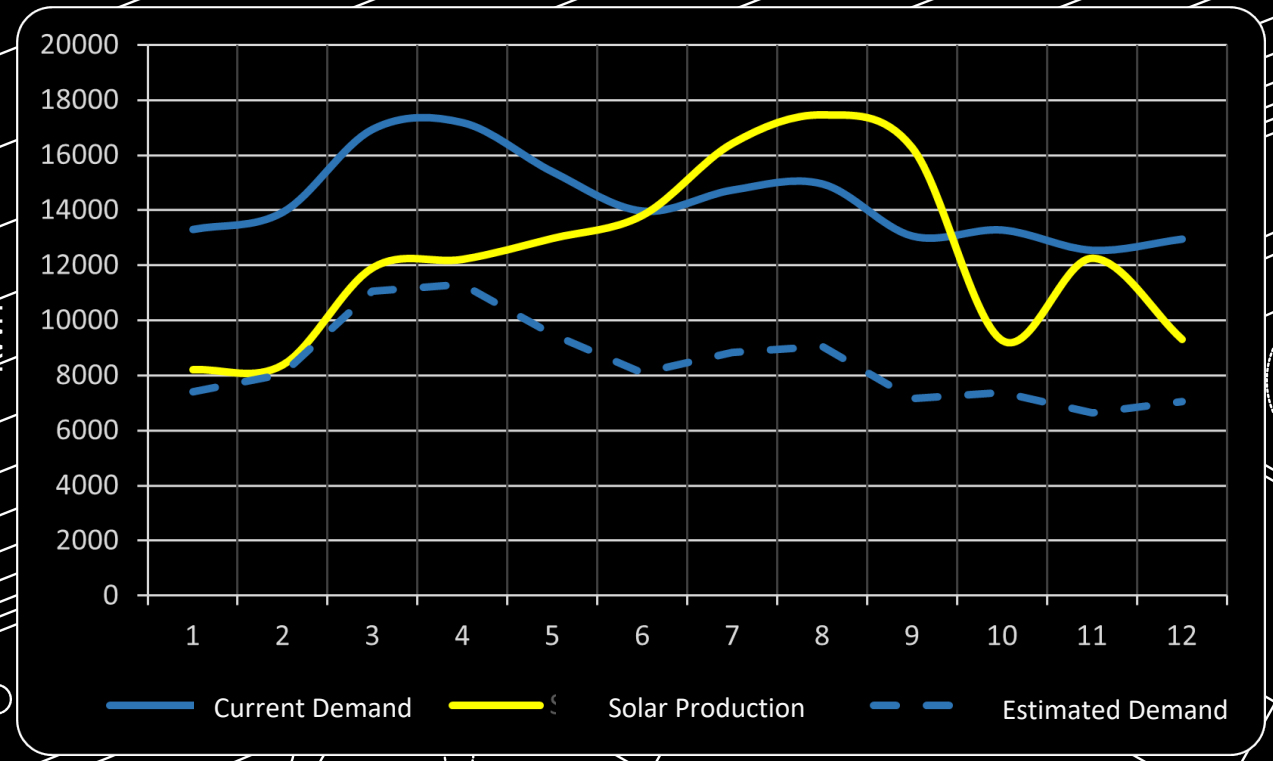
Source: TERI

Miami experiences approximately 3154 sun hours annually

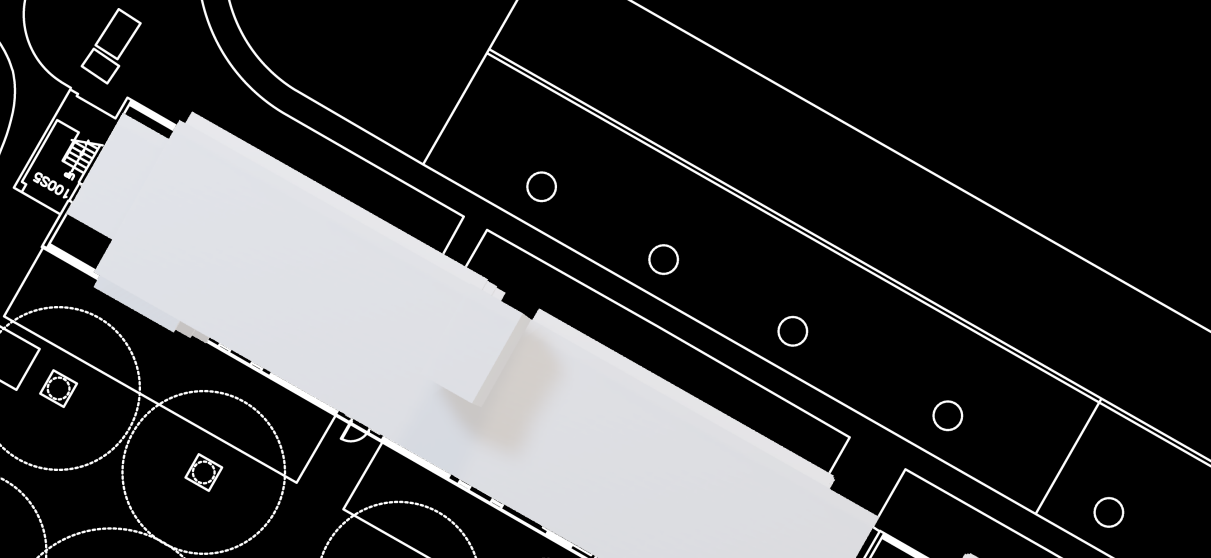
- A “Sun-Hour” is “1000 watts of energy shining on 1 square meter of surface for 1 hour”



7800 sqft



168,665 kWh/Year

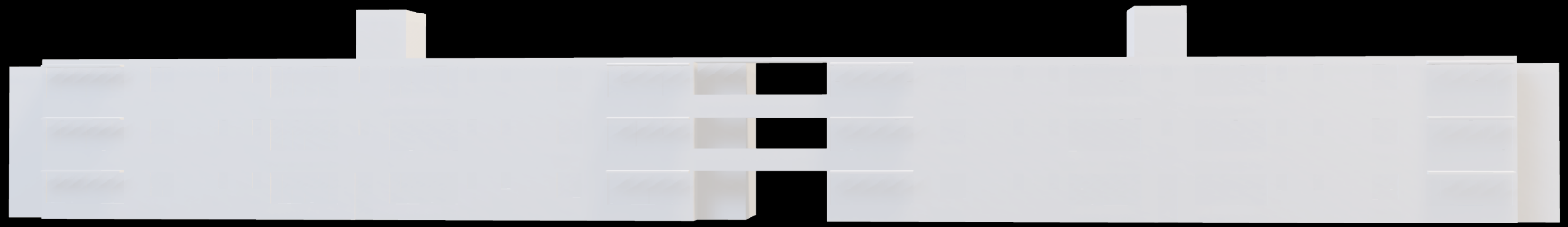


Che Ramsubhag and Christopher Stinson

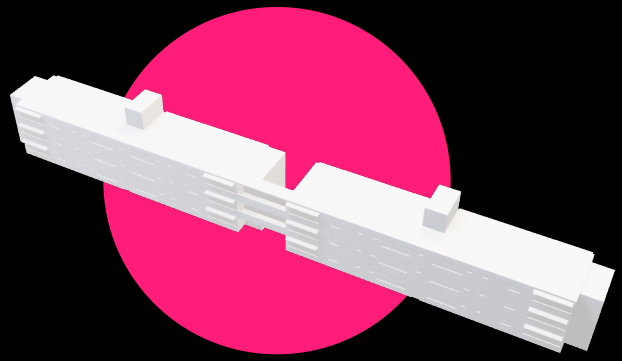
Strategy

Window Replacement

- All windows are currently fixed
- Operable windows can be used to naturally ventilate a space removing warm air and providing comfort, reducing the need for mechanical ventilation
- U-Value of 0.4 or less
- SHGC of 0.25 or less



Che Ramsubhag and Christopher Stinson



Thank You

Che Ramsubhag and Christopher Stinson