



# Sharing the Power of Passive Building

Enabling Distributed District Energy  
Six First Principles

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PhiusCon Chicago 2022

**Shift the frame from  
conservation to sharing  
surplus.**

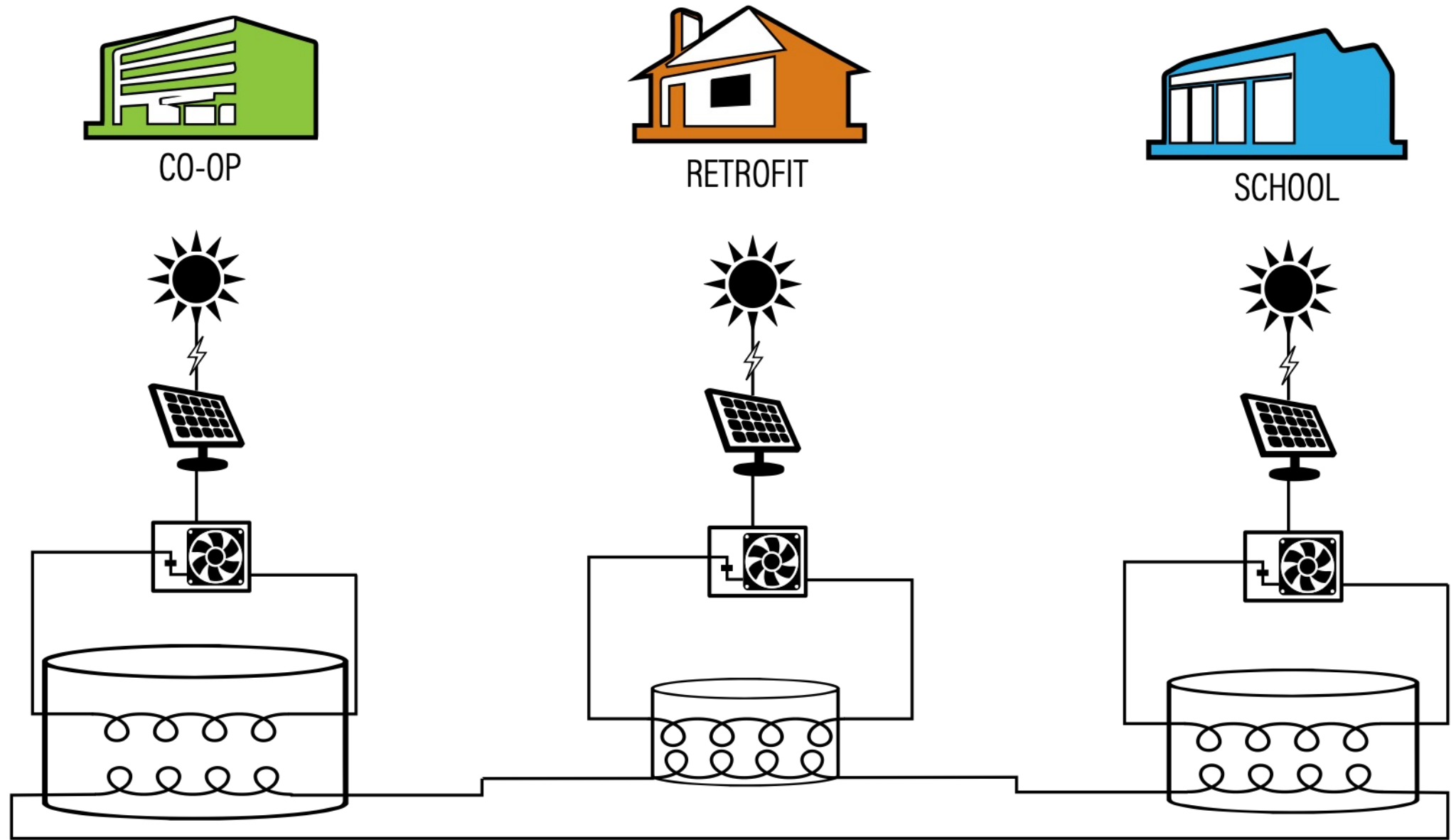
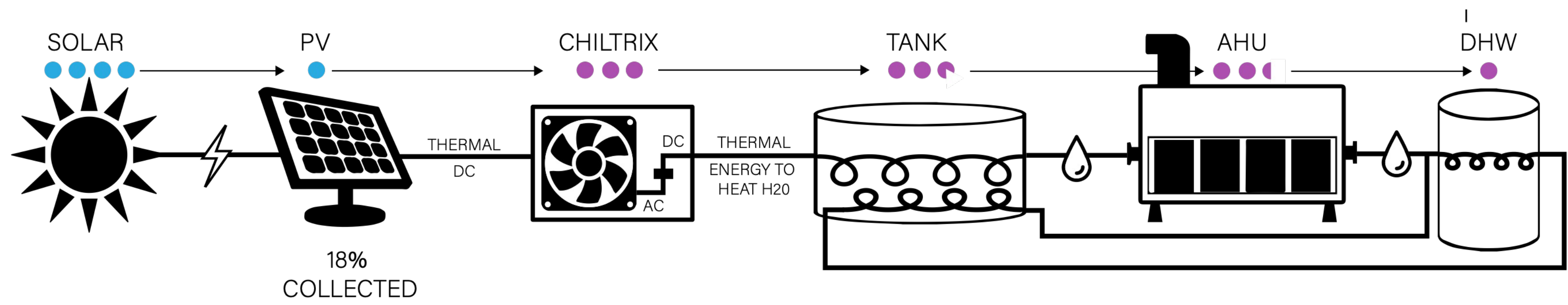
**Tune thermal storage  
strategies to climate.**

**Prefer thermal to  
chemical energy storage.**

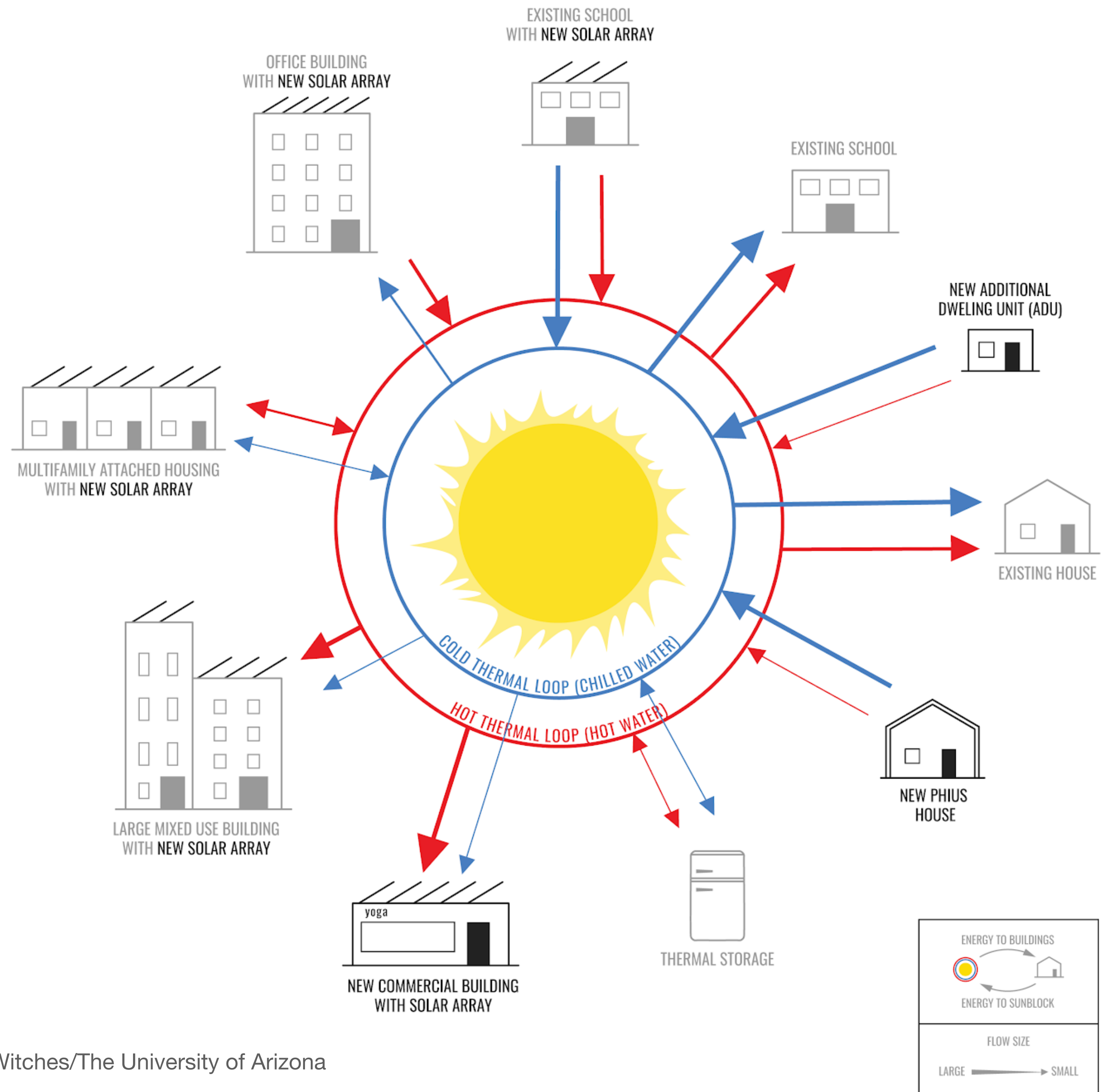
**Reduce use of  
refrigerant.**

**Make it compatible with  
existing technologies  
and systems.**

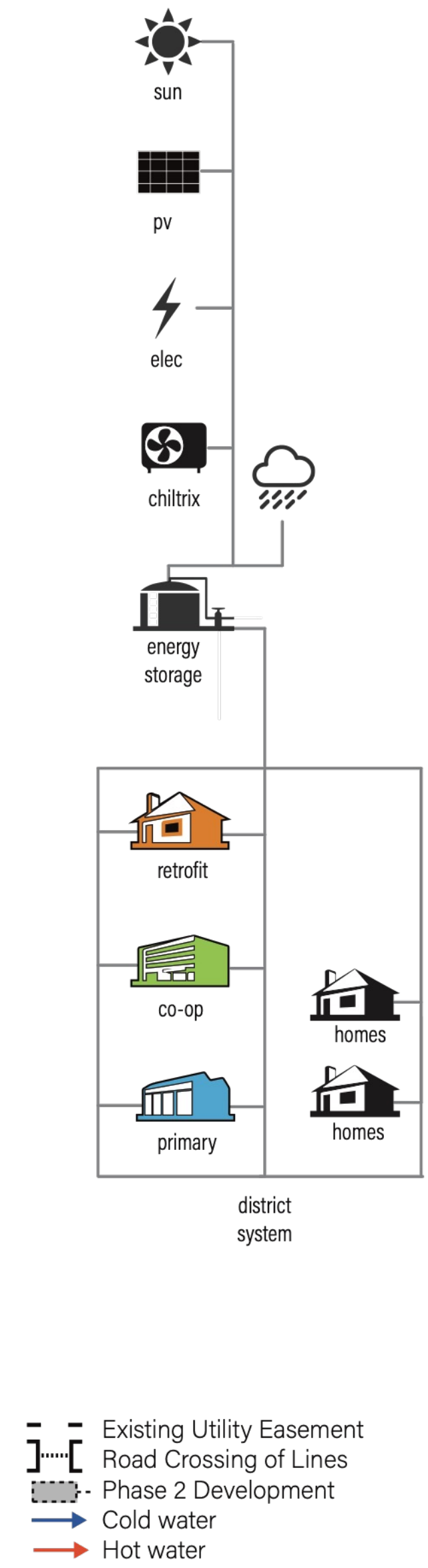
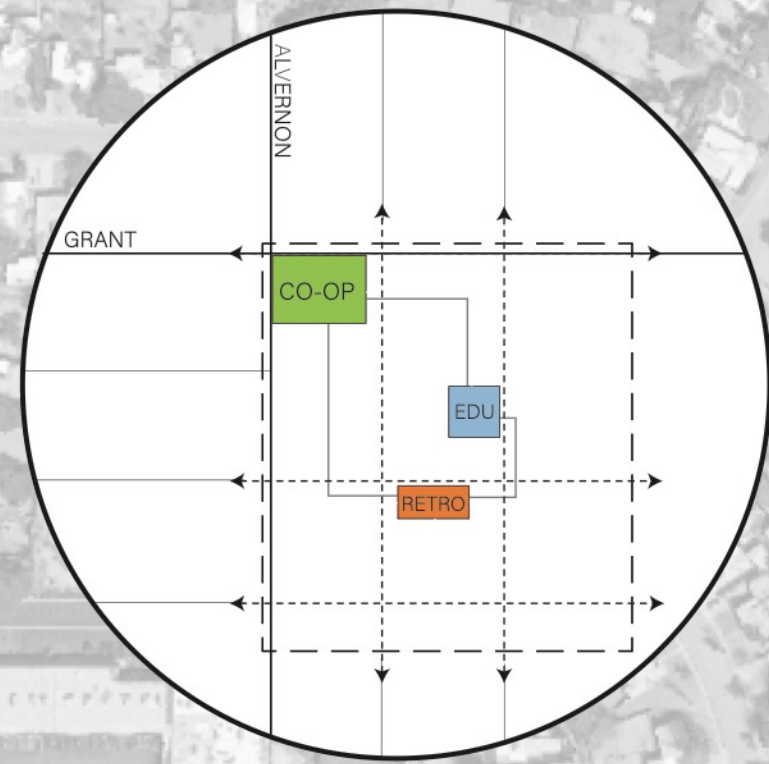
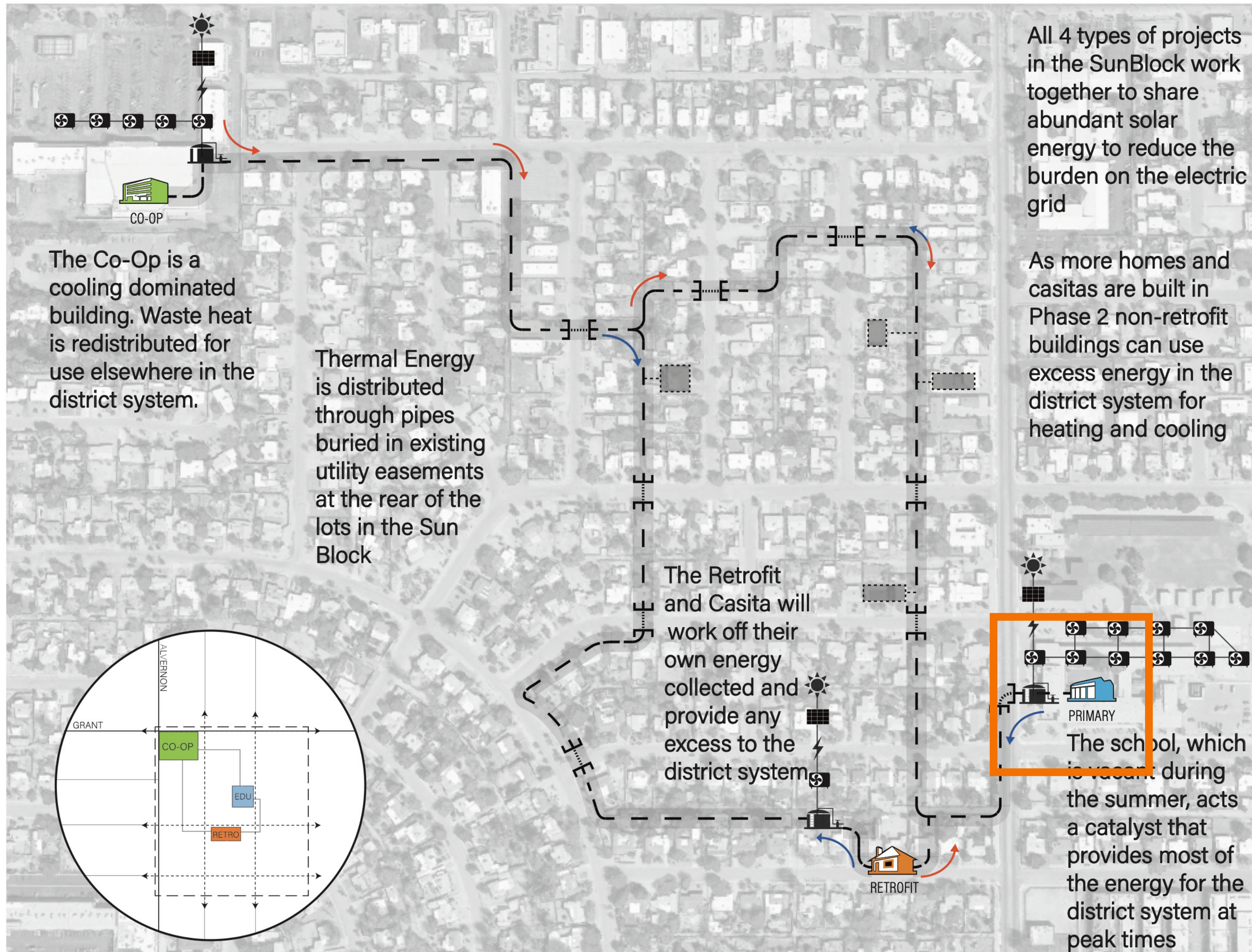
# Case study: SunBlock







Graphic: Dusty Witches/The University of Arizona









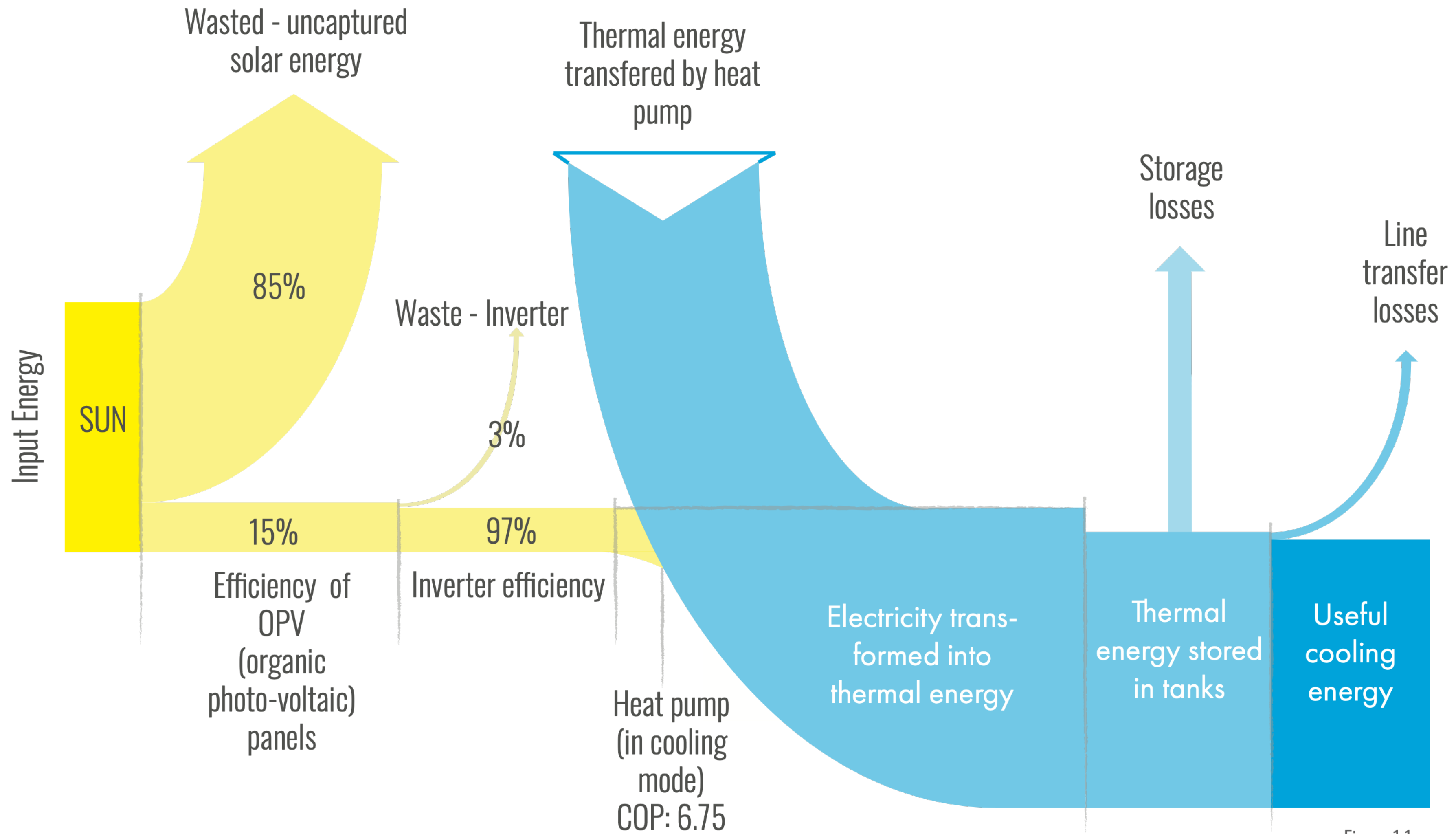
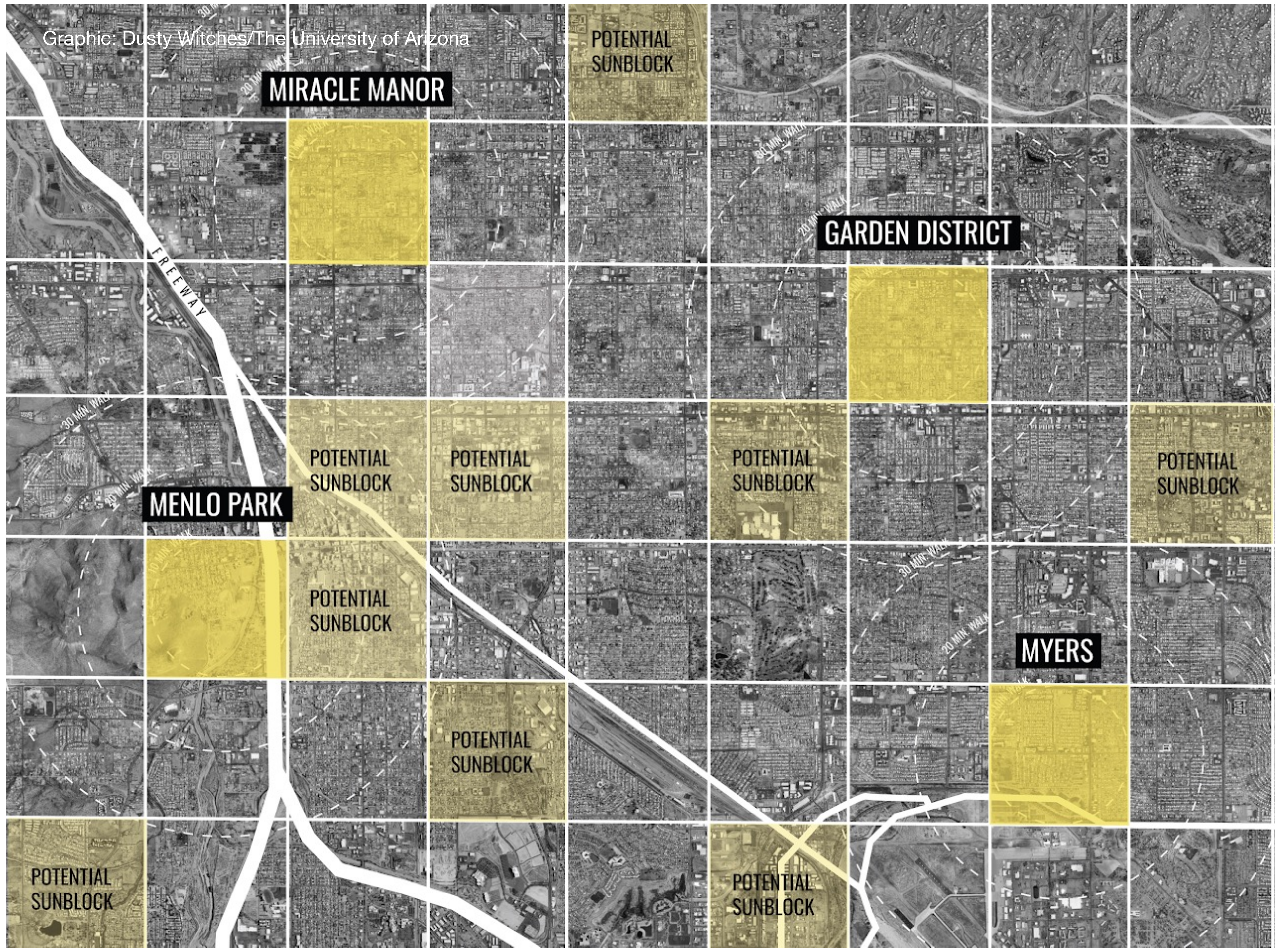


Figure 1.1

Graphic: Dusty Witches/The University of Arizona



**MIRACLE MANOR**

POTENTIAL  
SUNBLOCK

**GARDEN DISTRICT**

**MENLO PARK**

POTENTIAL  
SUNBLOCK

POTENTIAL  
SUNBLOCK

POTENTIAL  
SUNBLOCK

POTENTIAL  
SUNBLOCK

POTENTIAL  
SUNBLOCK

POTENTIAL  
SUNBLOCK

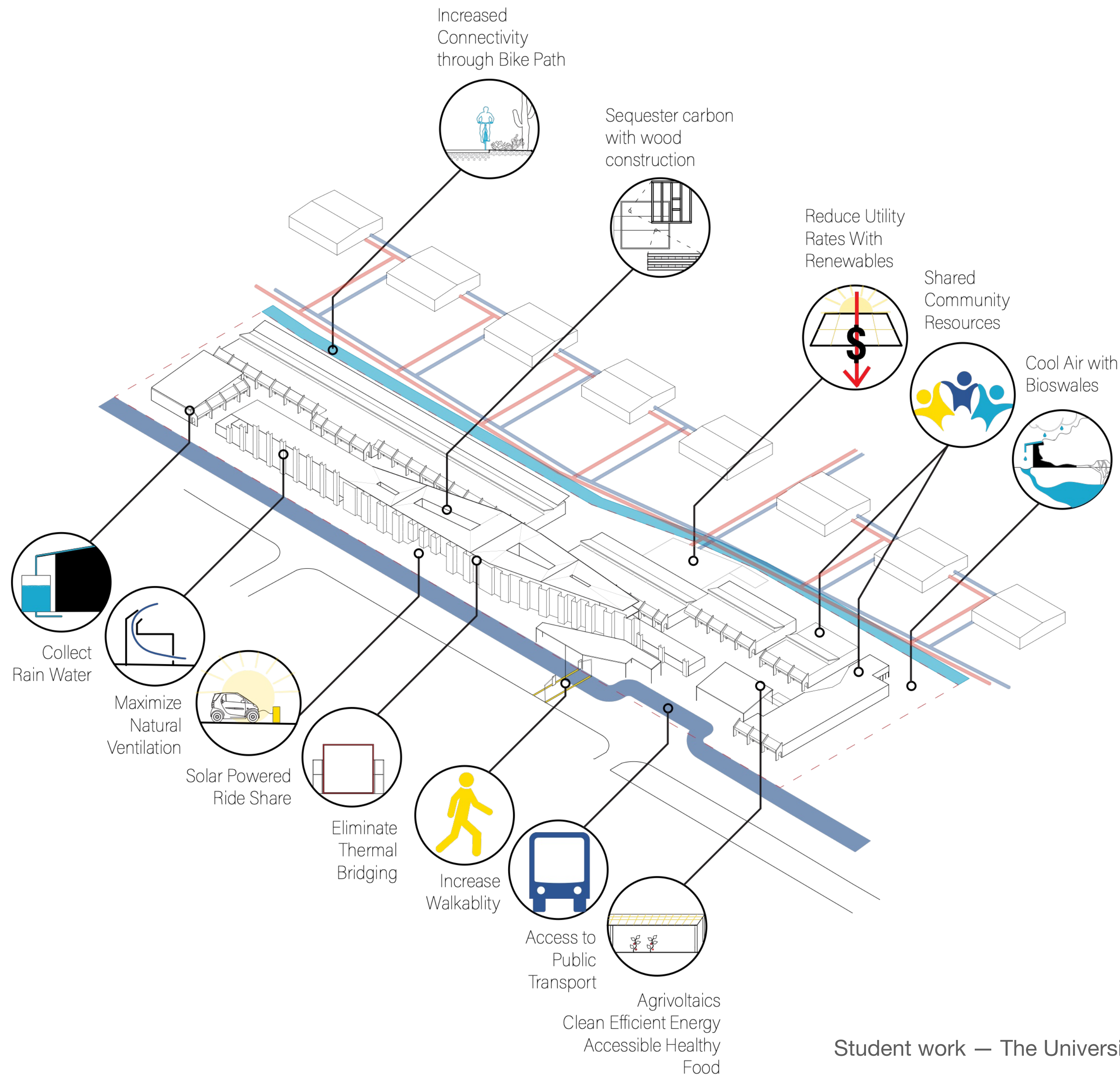
**MYERS**

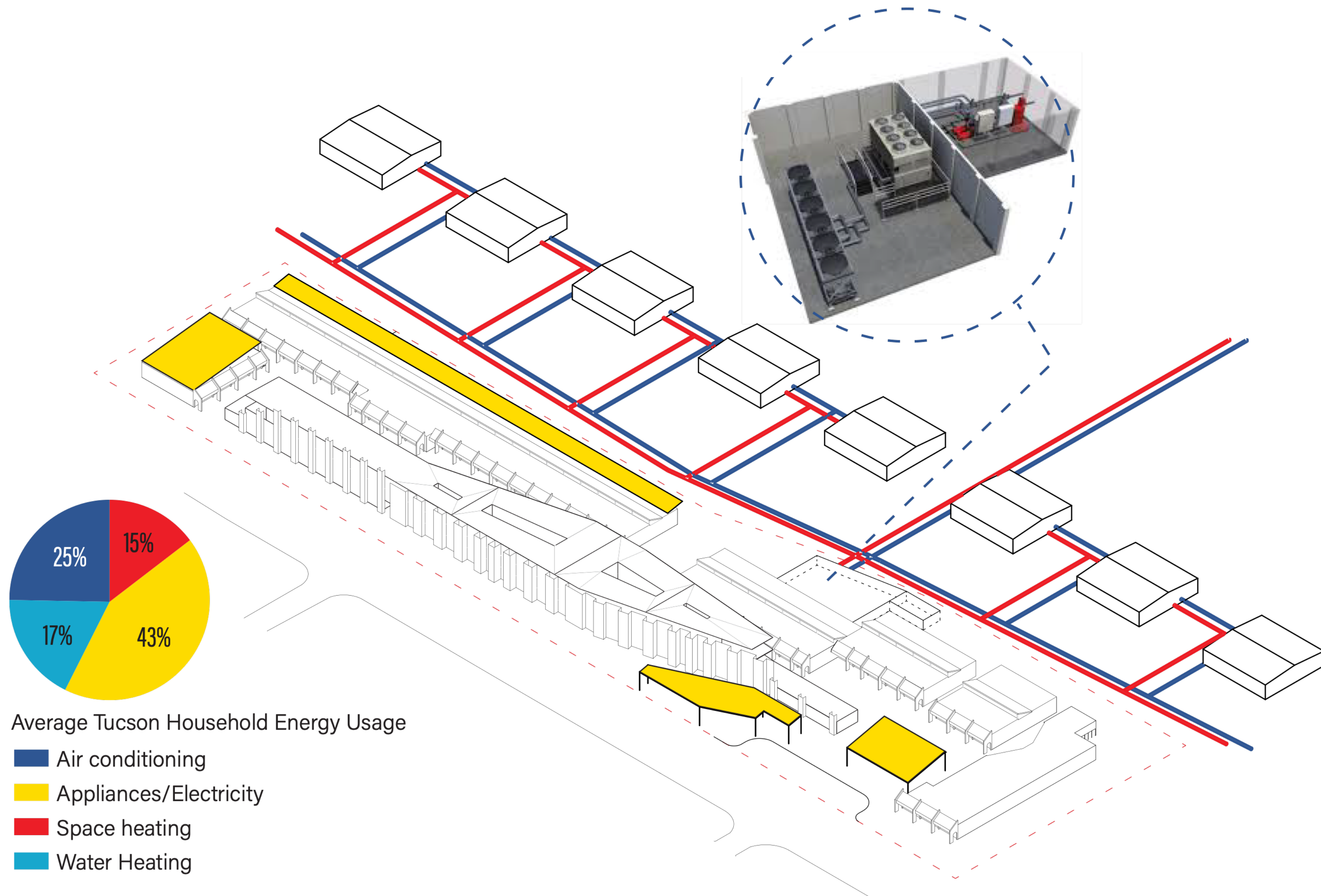
POTENTIAL  
SUNBLOCK

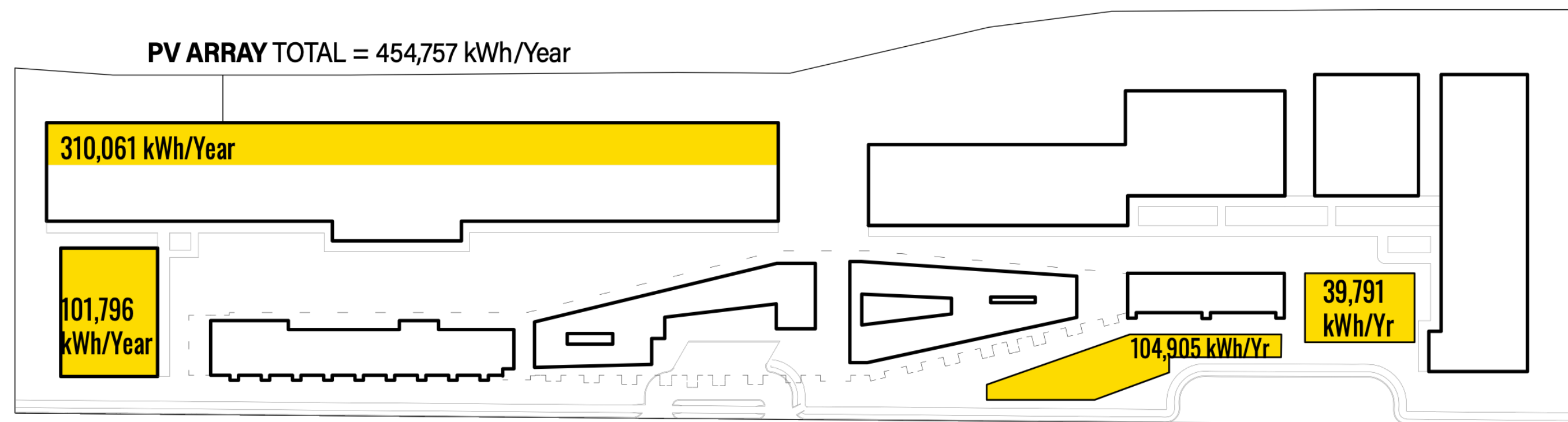
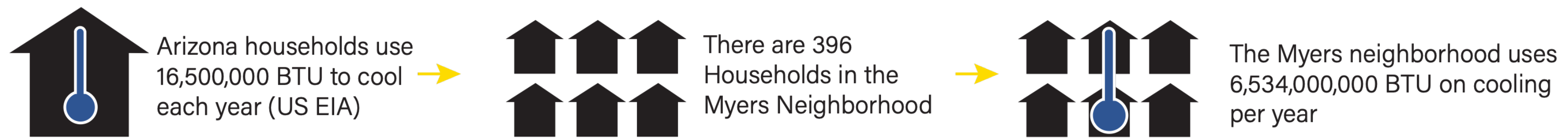
POTENTIAL  
SUNBLOCK

**More than affordable  
housing: providing  
cooling as a service**





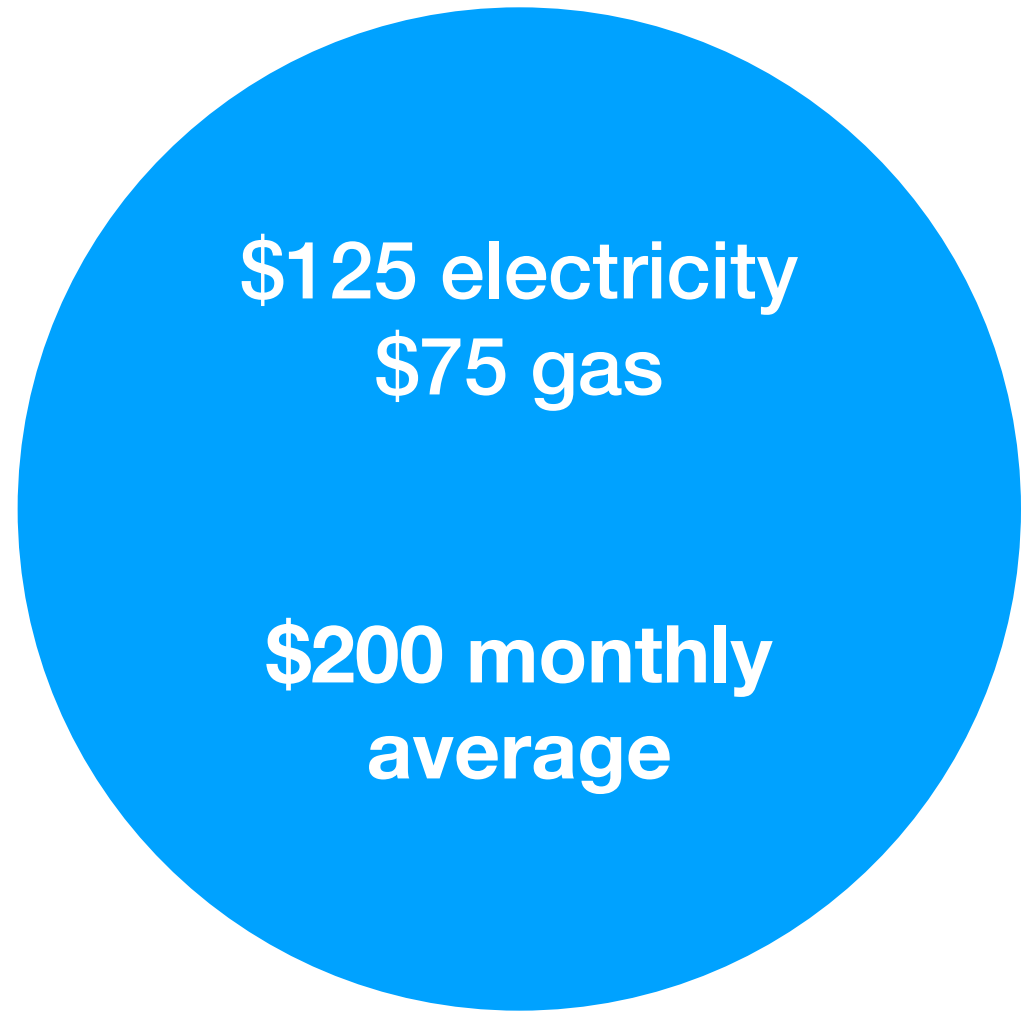




$$\begin{aligned}
 &556,553 \text{ kWh/Year} \quad \text{Projected EUI } 19.46 \text{ kBTU/ft}^2/\text{yr} \\
 &1 \text{ kWh/year} = 3412.14 \text{ kBTU/year} \quad \text{X sqft} \quad = \quad \mathbf{1,897,006,744.6 \text{ BTU/Year}} \\
 &1,899,036,753.42 \text{ kBTU/Year} \quad \text{Projected Energy Use per year} \quad \mathbf{\text{EXCESS}} \\
 & \quad \quad \quad 2,030,008.82 \text{ kBTU}
 \end{aligned}$$

The Myers neighborhood 100% Cooled by Sun-Block's The Loop

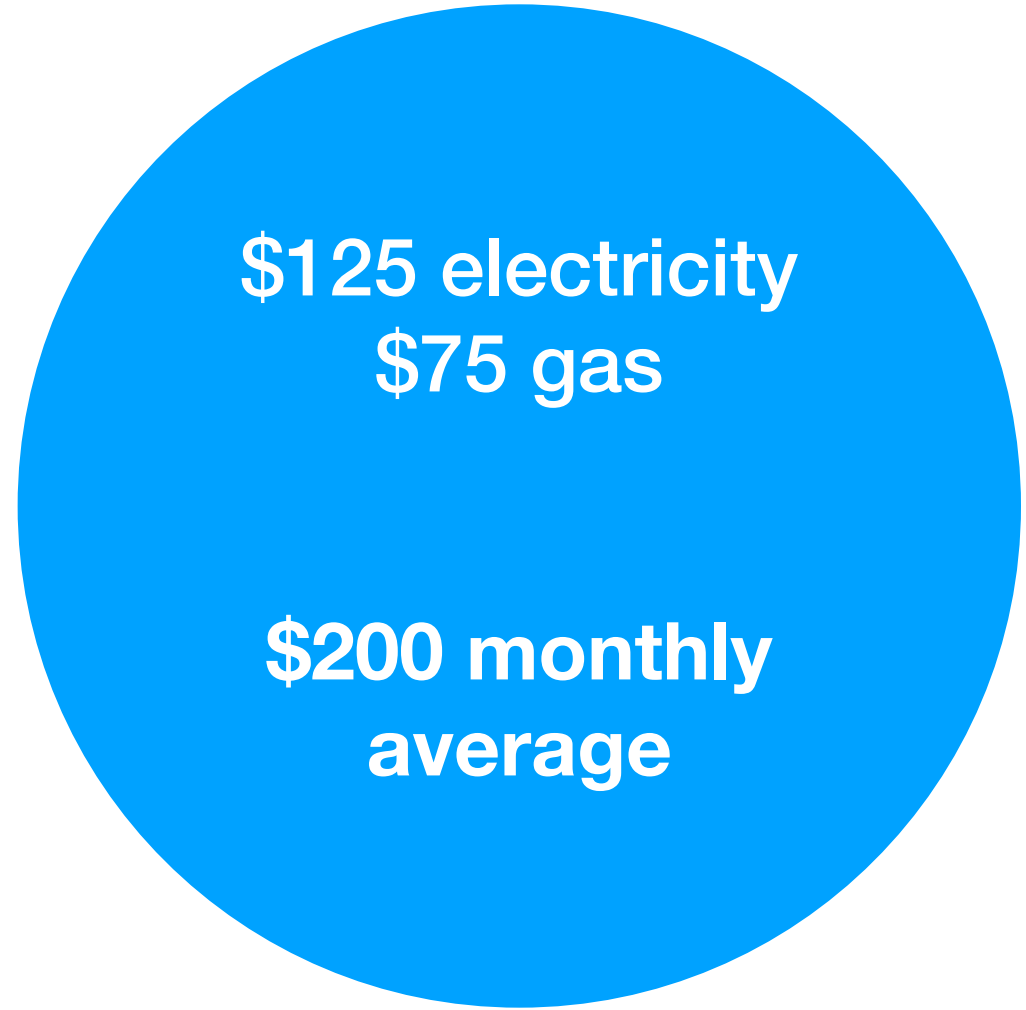
**Enabling a scalable  
subscription model for  
district energy retrofit**



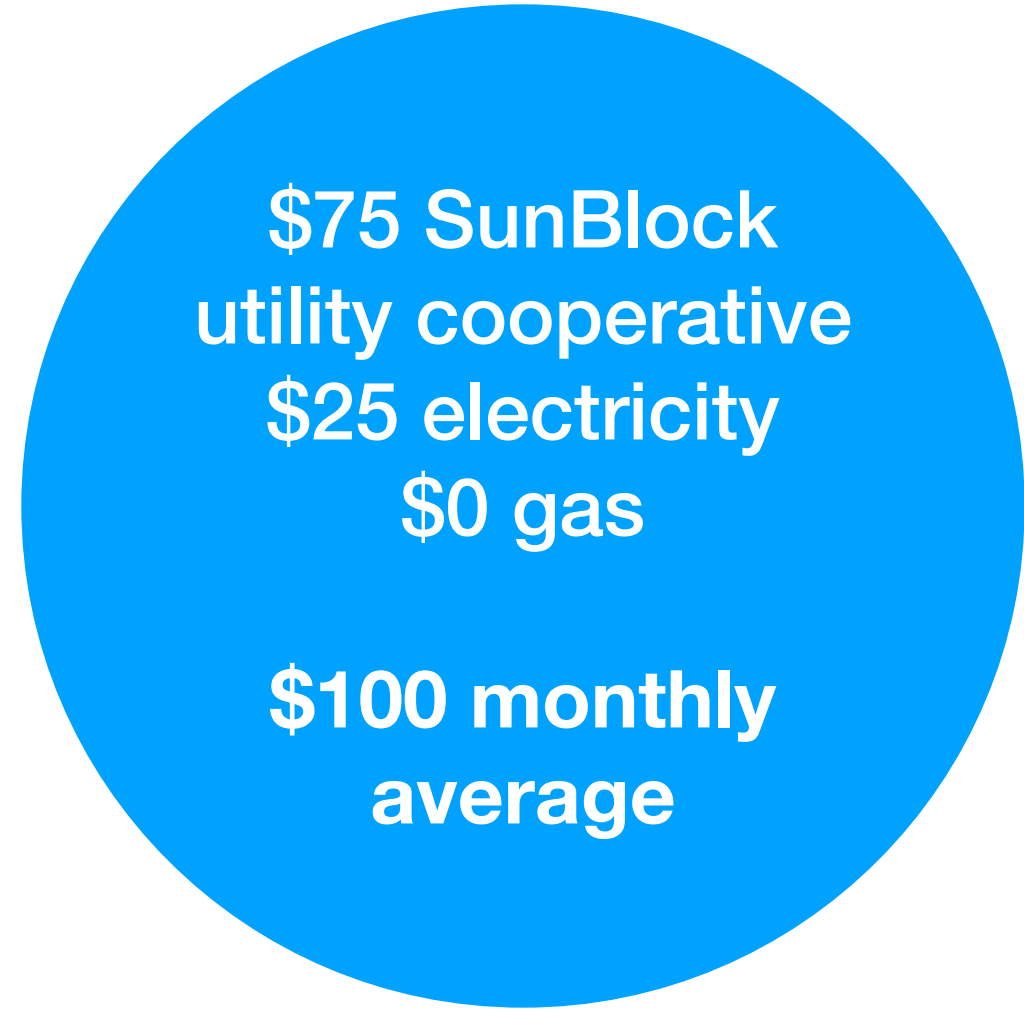
\$125 electricity  
\$75 gas

\$200 monthly  
average

**Now**



**Now**



**with  
SunBlock  
Co-op**

**\$125 electricity**  
**\$75 gas**

**\$200 monthly average**

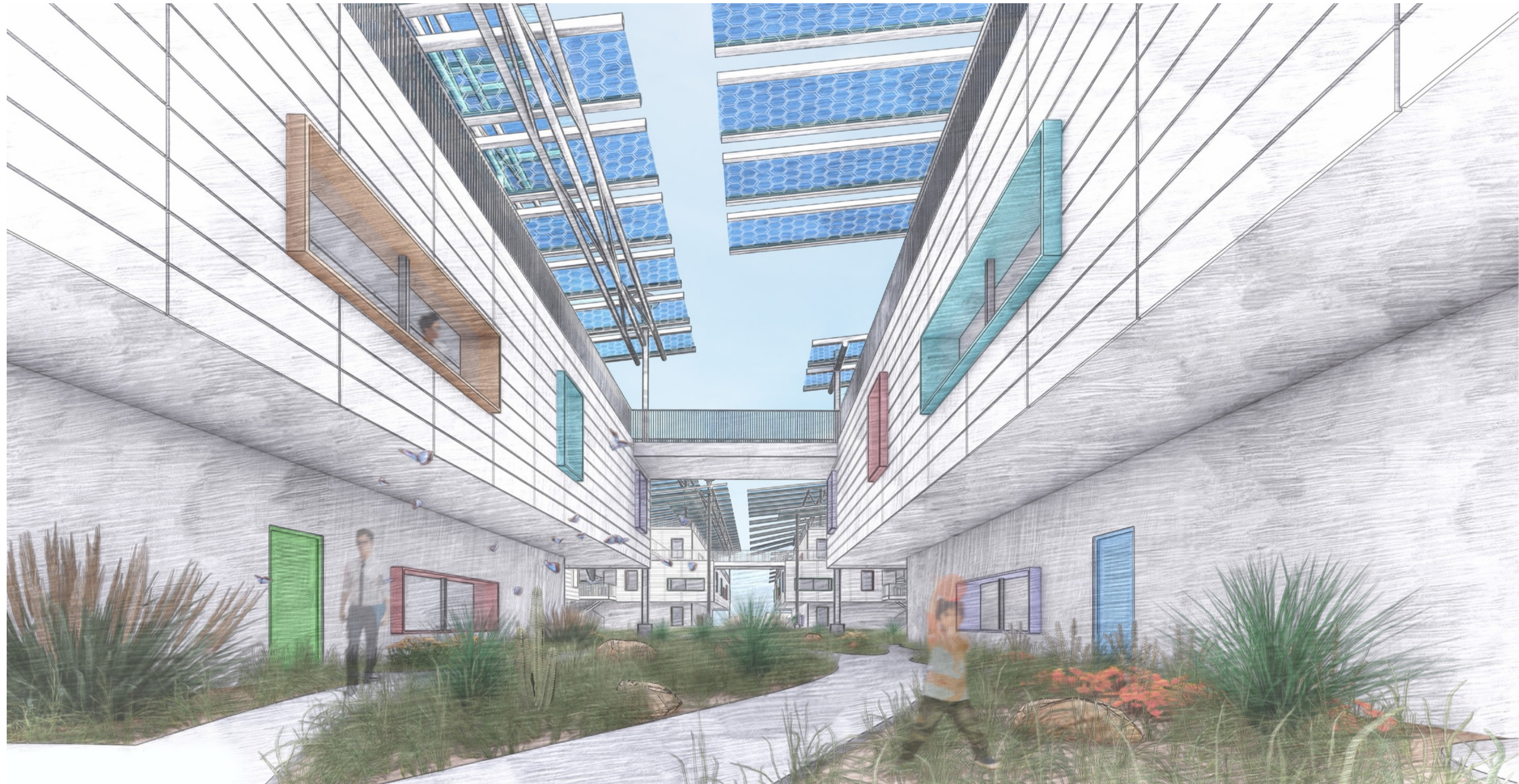
**\$75 SunBlock utility cooperative**  
**\$25 electricity**  
**\$0 gas**

**\$100 monthly average**

**SunBlock Co-op**  
**subscription model:**  
**AC, Heat, Hot Water**  
**&**  
**Twice-annual system service and filter change**

# **Creating a market for local innovation in Advanced Building Construction**

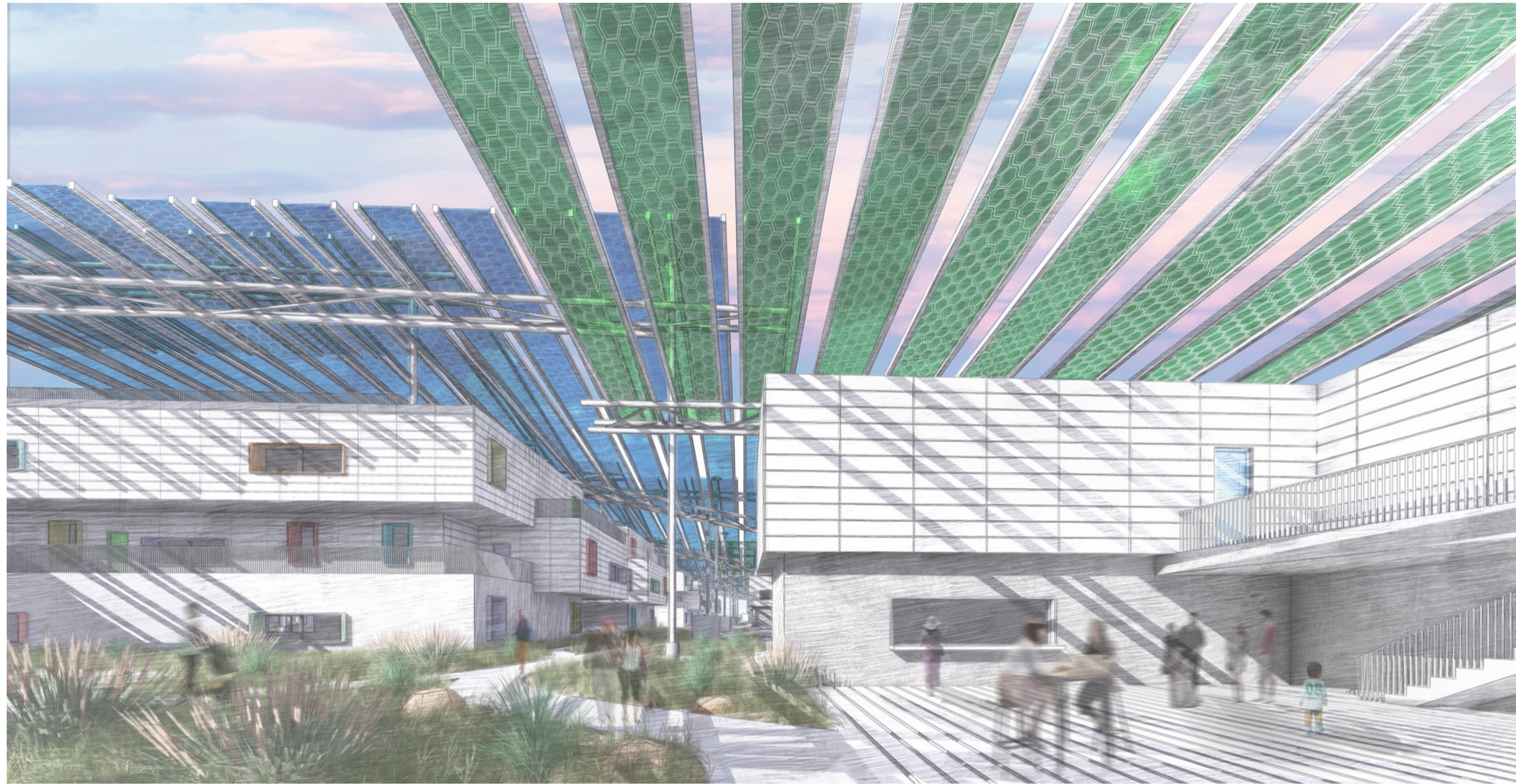




Student work — The University of Arizona



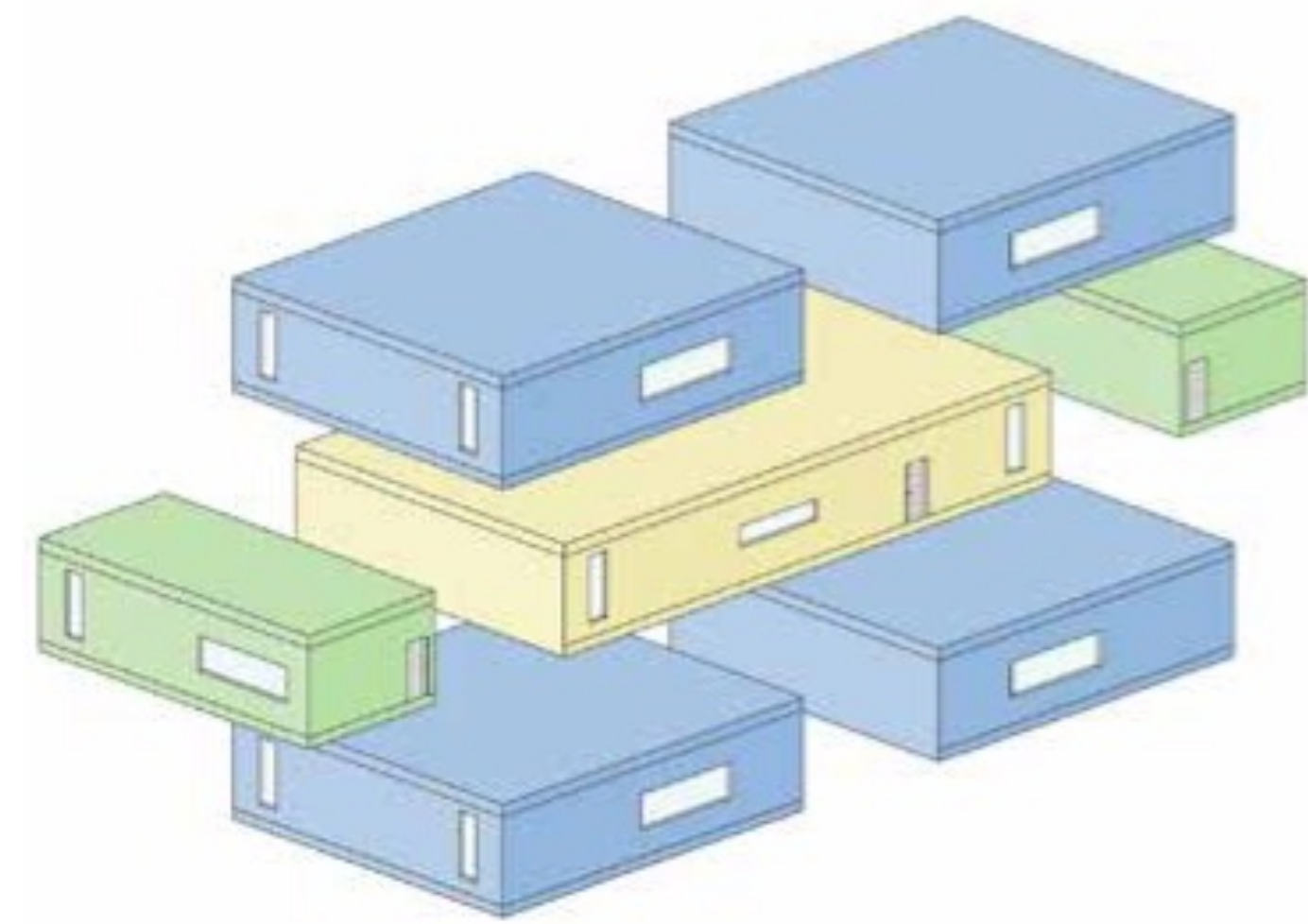
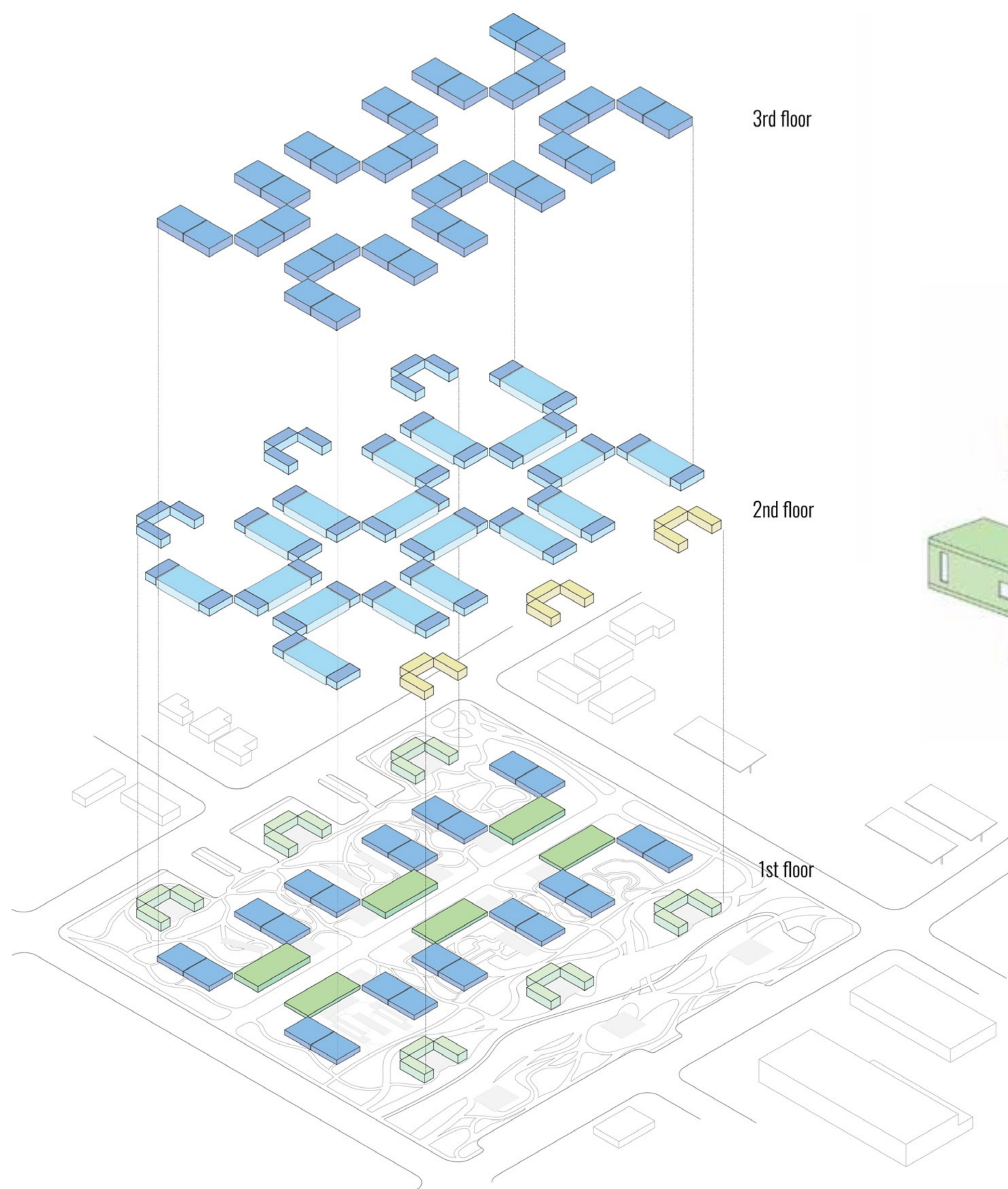
Student work — The University of Arizona



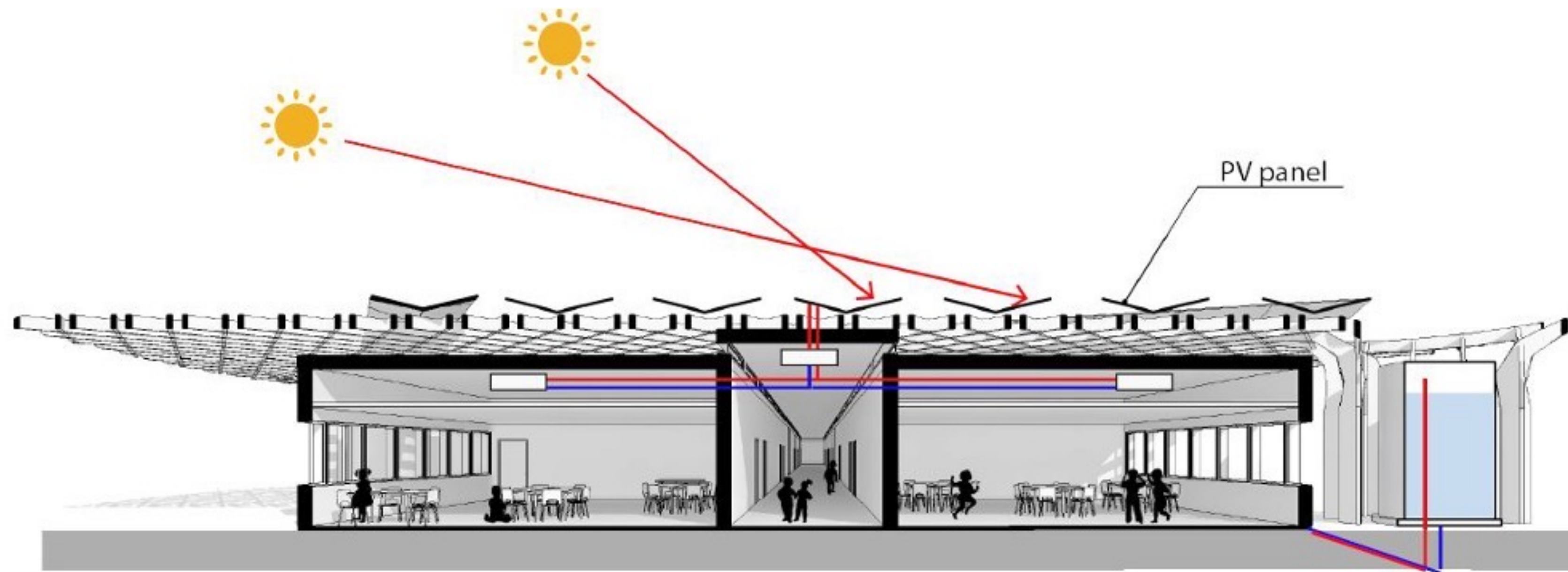
Student work — The University of Arizona



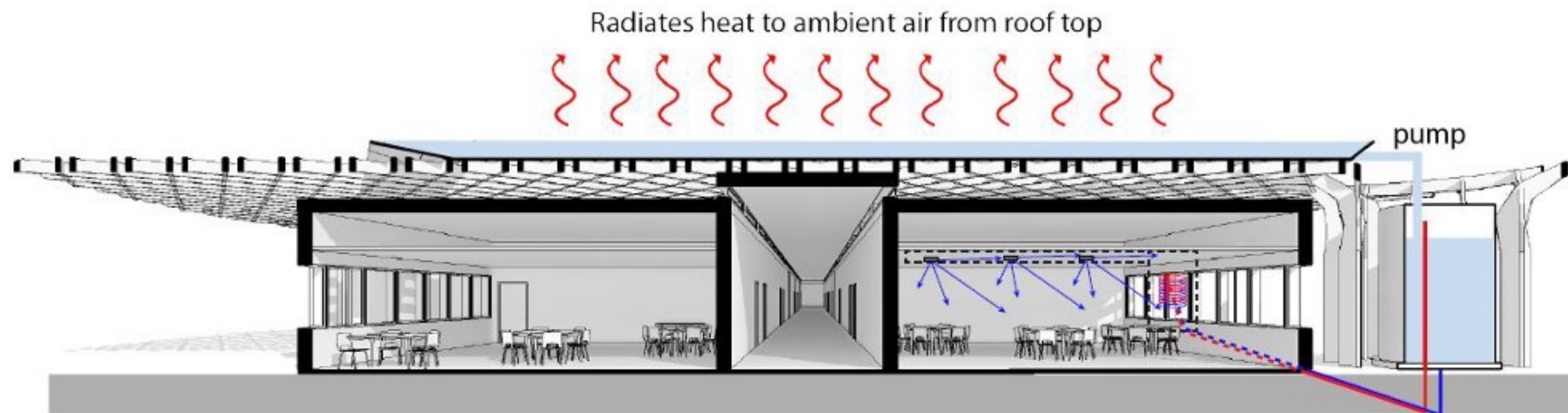
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**Demonstrating  
alternative methods of  
cooling and construction**



Day time



Night time

### Wooden Superstructure's Carbon Sequestration

- 39,737.87 cubic feet of Douglas Fir.
- Carbon Content Per 1000kg = 519kg
- Carbon Volume = 3.8%
- 308 Ton of Carbon Sequestered.

Equivalent to Carbon dioxide  
emissions from:



**52** homes' electricity use for 1 year.



**35** homes' energy use for 1 year.

Equivalent to Carbon Sequestered by:



**402** Acres of U.S. forest land over a year



**5,093** tree seedlings grown for 10 years

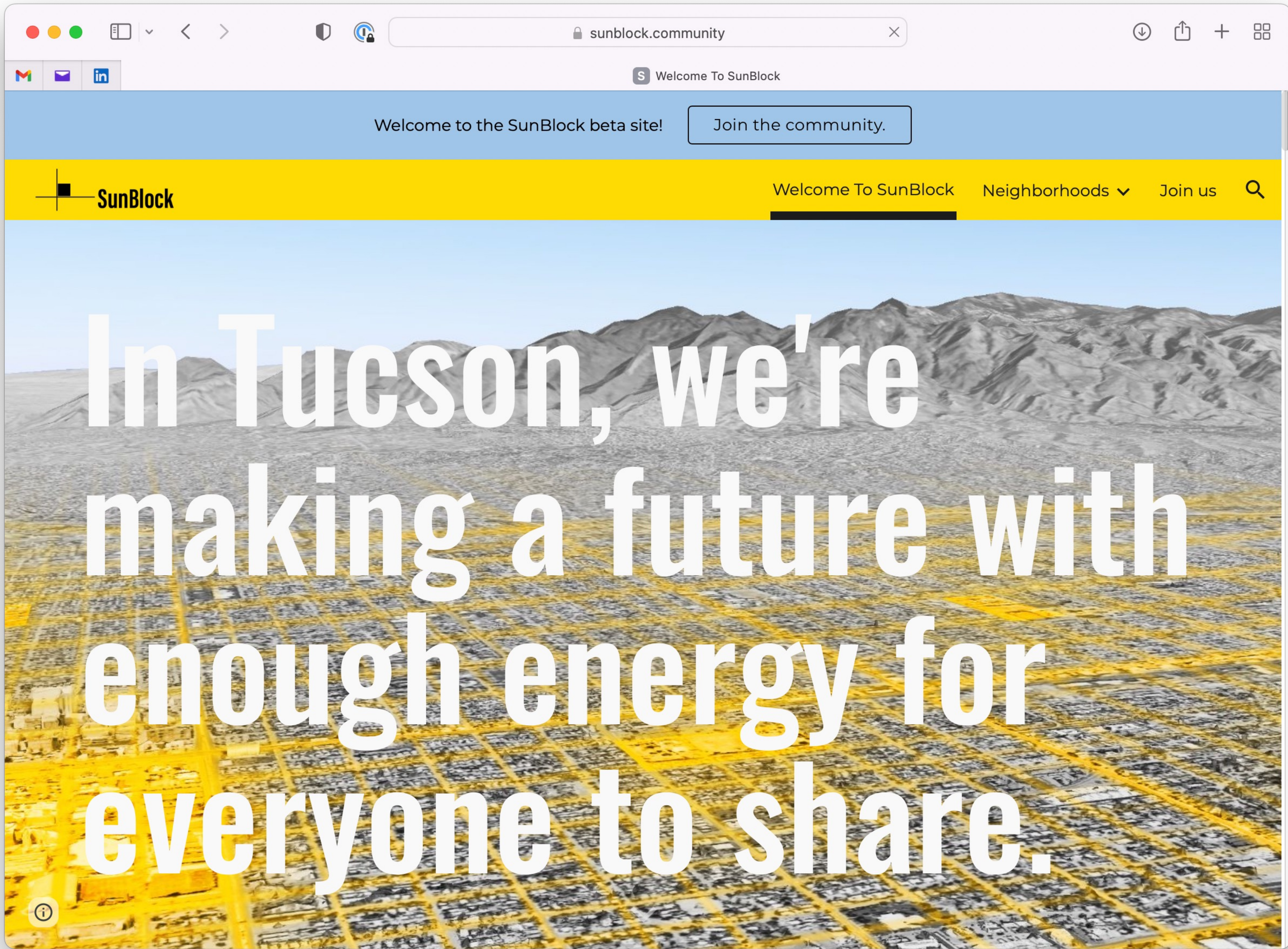






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**Conclusion:  
Post conservation**



Welcome to the SunBlock beta site!

Join the community.



Welcome To SunBlock

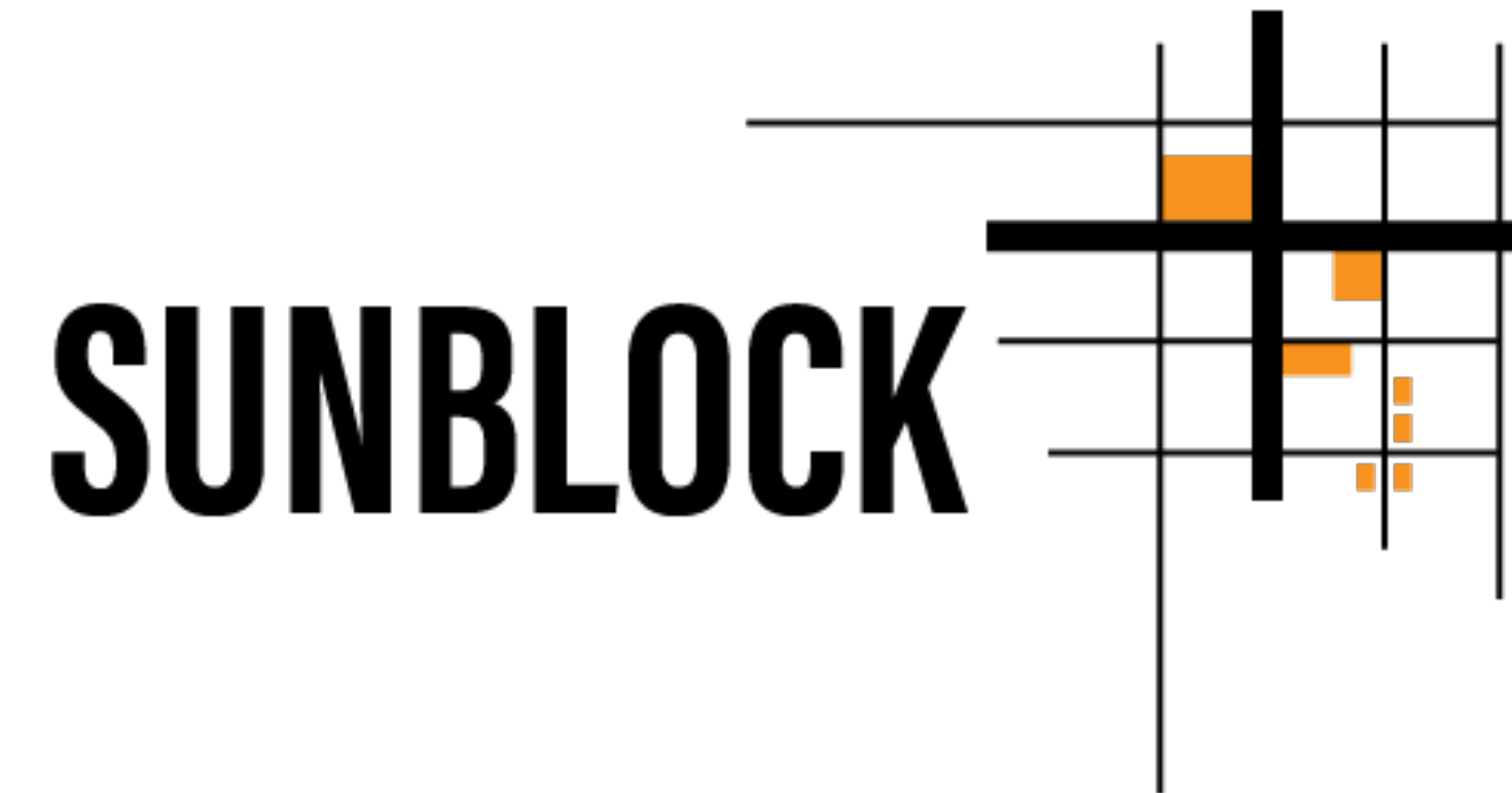
Neighborhoods

Join us



In Tucson, we're making a future with enough energy for everyone to share.





<https://sunblock.community>

Insta sunblock\_tucson



Climate-Positive Neighborhood Lab  
Prof. Jonathan Bean, PhD CPHC 520-203-1268