

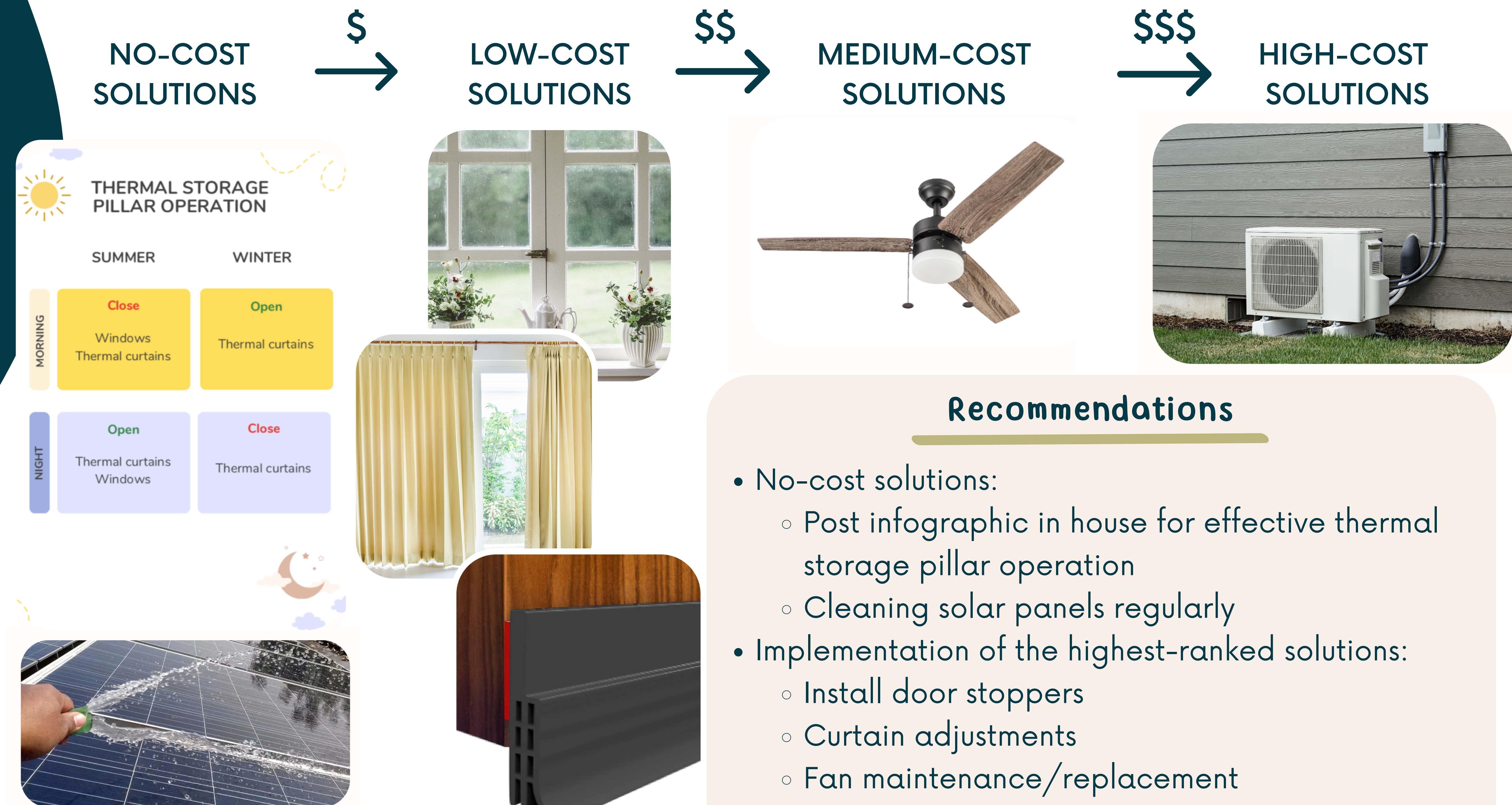
# Sunwise Cooperative Affordable Thermal Comfort

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## Proposal

### Problem Statement

The Sunwise Cooperative is a passive solar home; it is built to store, reflect, and distribute heat to keep the house warm in the winter and cool in the summer without a central heating or cooling system. However, the residents of the Sunwise Cooperative are too cold in the winter and much too hot in the summer.



Thermal storage tubes



Poor insulation



Thermal curtains

### Objective

The authors will propose potential solutions to increase the thermal comfort of the Sunwise residents. This proposal will include the predicted efficacy, cost of installation, and cost of maintenance for each solution. It will evaluate these solutions in consideration of the clients' specifications for the present and future (including a current budget of \$500 and a more flexible budget for future retrofits).

### Methodology

#### IDENTIFY

- Site visit
- Resident survey
- Analyze utility bills

#### RESEARCH

- Literature review
- Consultation with passive solar architects

#### ANALYSIS

- Evaluation of potential solutions' efficacy and cost with an evaluative matrix

### Evaluative Matrix

		CRITERIA																
		F1	W1	F2	W2	F3	W3	F4	W4	F5	W5	F6	W6	F7	W7	F8	W8	TOTAL
<b>RECOMMENDATIONS</b>	L1	5	7	10	8	8	5	9	7	10	10	10	9	10	8	10	8	568
	L2	9	7	10	8	9	5	10	7	10	10	10	9	10	8	10	8	608
	L3	1	7	10	8	3	5	9	7	7	10	7	9	7	8	7	8	410
	M1	3	7	7	8	5	5	10	7	8	10	10	9	8	8	8	8	470
	H1	1	7	3	8	2	5	9	7	10	10	10	9	10	8	10	8	454

#### Factors

F1	Product and installation cost
F2	Increased utility bill/maintenance cost
F3	Ease of installation
F4	Ease of regular use
F5	Thermal comfort: personal room (cooling)
F6	Thermal comfort: communal space (cooling)
F7	Thermal comfort: personal room (heating)
F8	Thermal comfort: communal space (heating)

#### LOW-COST SOLUTIONS

L1	Curtain repair and/or replacement
L2	Door stoppers
L3	Upgrade window replacement: double- to triple-pane

#### MEDIUM-COST SOLUTIONS

M1	Fan maintenance and/or replacement
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#### HIGH-COST SOLUTIONS

H1	Mini-split heat pump
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### References

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