

ME 486C Capstone Project

Fall 2025

33% Hardware Update

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Project Overview

Primary Goal

- Install a solar air heating system to provide heat to the RE building during the winter and provide an alternative method of heating contrary to nonrenewable devices.



Figure 1: Air-Based Solar Thermal Panel

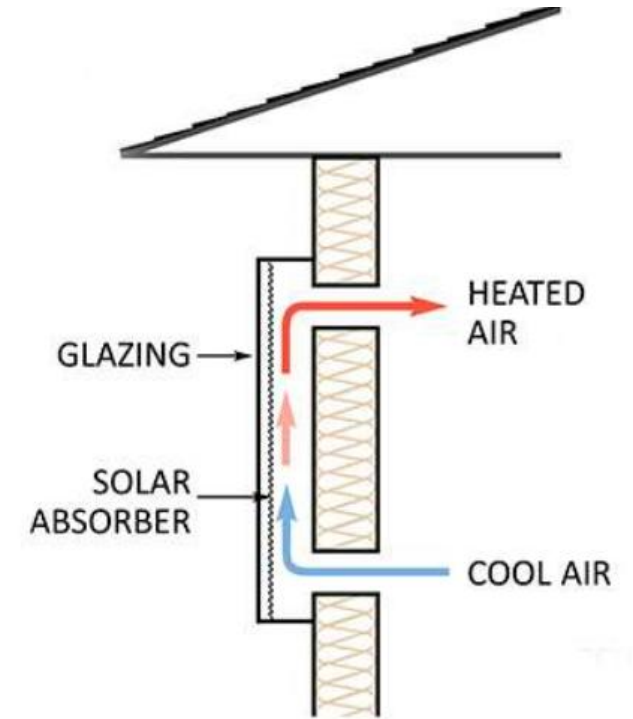


Figure 2: Air Solar Thermal System Diagram

SolidWorks Assembly

- 2 cold air inlets (1 in big room and 1 in smaller room)
- 3 heated outlets (2 in big room and 1 in smaller room)

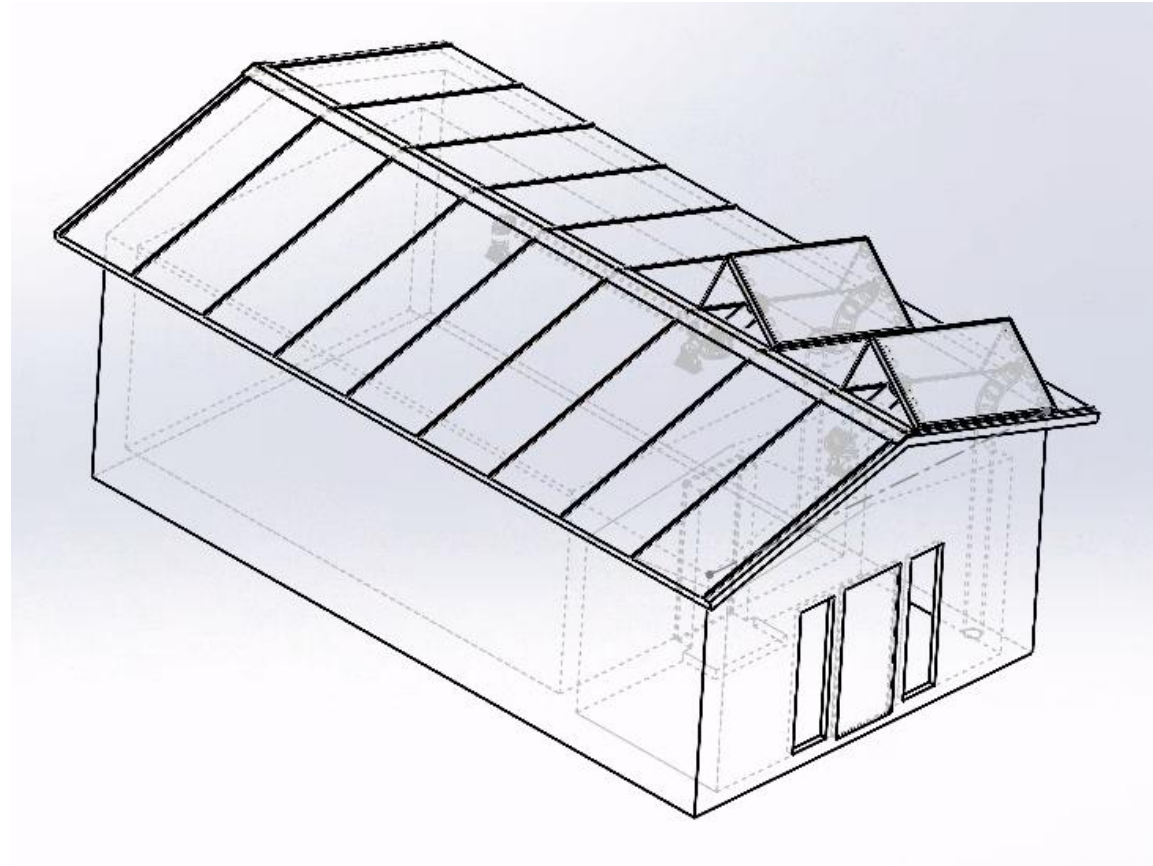


Figure 3: CAD Model

Purchasing Plan

Bill of Materials									
Name	Part Number	Quantity	Cost	Make/Buy	Primary Vendor	Manufacturer	Part Status	Total Cost	Vendor Subtotal
L Bracket	236244	8	3.37	Buy	The Home Depot	Superstrut	13-Oct	26.96	
8x6x6 Wye	643092	1	17.98	Buy	The Home Depot	Master Flow	13-Oct	17.98	
8 inch 90	148768	10	9.98	Buy	The Home Depot	Master Flow	Acquired	99.8	
6 inch 90	148733	2	8.68	Buy	The Home Depot	Master Flow	Acquired	17.36	
8 x 6 adapter	148857	4	14.28	Buy	The Home Depot	Master Flow	Acquired	57.12	
Steel Bar	548932	4	11.81	Buy	The Home Depot	Everbilt	3/4 Acquired	47.24	
6 inch duct	1013032134	1	59.98	Buy	The Home Depot	Master Flow	Acquired	59.98	
8 inch duct	1013032129	1	67.98	Buy	The Home Depot	Master Flow	Acquired	67.98	
Duct Insulation	1002502317	1	27.98	N/A	The Home Depot	Master Flow	Donated	0	
10 x 4 to 6 register box	148962	2	12.49	Buy	The Home Depot	Master Flow	13-Oct	24.98	
14 x 6 to 8 register box	351407	1	14.98	Buy	The Home Depot	Master Flow	13-Oct	14.98	
10 x 4 vent	324411	2	13.98	Buy	The Home Depot	Master Flow	Acquired	27.96	
14 x 6 vent	497808	1	14.98	Buy	The Home Depot	Master Flow	Acquired	14.98	
Super Strut	863322	4	0	Buy	The Home Depot	Superstrut	Acquired	0	
M5 bolts	561380	4	3.75	Buy	The Home Depot	NA	3/4 Acquired	15	
M5 nuts	204801180	1	4.19	Buy	The Home Depot	Hillman	13-Oct	4.19	
16 AWG Wire	80CP1SGHK7	1	17.99	Buy	The Home Depot	NAOEVO	Acquired	17.99	

Henry Roof Sealant	111806	1	10.98	Buy	The Home Depot	Henry	Acquired	10.98	
Roofing Screws	780972	1	9.98	Buy	The Home Depot	NA	13-Oct	9.98	
8x8x4 Junction Box	1007810624	1	40.55	Buy	The Home Depot	Cantex	Acquired	40.55	
4x8 1 inch insulation	624637	1	16.98	Buy	The Home Depot	R-Tech	Acquired	16.98	
Duct Tape	1010742507	1	13.98	Buy	The Home Depot	Everbilt	Acquired	13.98	
Roll Insulation	1003829264	1	11.97	Buy	The Home Depot	Everbilt	Acquired	11.97	
Caulk	362622	1	11.58	Buy	The Home Depot	GE	Acquired	11.58	630.52
PVT panel	NA	1	0	Buy	RE Lab	NA	Donated	0	
Solar air panel	NA	2	0	Buy	RE Lab	Thermix	Donated	0	0
Thermostat	B0DND8PKF	1	23.15	Buy	Amazon	Riseem	13-Oct	23.15	
Conduit	B0B6VGJCNJ	1	47.48	Buy	Amazon	Ansgery	13-Oct	47.48	
Mesh	B0D59XWYQZ	2	17.99	Buy	Amazon	ASHXFSH	13-Oct	35.98	
Fuse	B07K4DV8PV	1	0.5	Buy	Amazon	SIXQJZML	13-Oct	0.5	
Mechanical Relay	39-G2R-1DC5-N	1	5.63	Buy	DigiKey	Omron Electronics	13-Oct	5.63	
Fan	N/A	2	0	Buy	DigiKey	SUNON	Donated	0	5.63
On/Off Switch	Heavy Duty Toggle	1	12.81	Buy	Ebay	Multiservices10	13-Oct	12.81	12.81
DC Power Splitter	219152b7-cf3	2	8.89	buy	amazon	IMIYORE	13-Oct	8.89	
Total								764.96	
Total Budget Used								531.45	

Figure 4: General Bill of Materials

Purchasing Plan

Roofing Bill of Materials									
Name	Part Number	Quantity	Cost	Make/Buy	Primary Vendor	Manufacturer	Part Status	Total Cost	Vendor Subtotal
starter strip	1005592713	1	62.47	Buy	The Home Depot	Owens Corning	9/29/2025	62.47	
roofing	1001187882	28	45.97	Buy	The Home Depot	Owens Corning	9/29/2025	1287.16	
ridge	1001188676	2	83.47	Buy	The Home Depot	Owens Corning	9/29/2025	166.94	
tar paper	1002826267	1	105.00	Buy	The Home Depot	Owens Corning	9/29/2025	105.00	
ice and water	1001189037	2	99.98	Buy	The Home Depot	Owens Corning	9/29/2025	199.96	
stapler	172561	1	34.97	Buy	The Home Depot	Arrow	9/29/2025	34.97	
staples	172669	1	4.97	Buy	The Home Depot	Arrow	9/29/2025	4.97	
Hammer	1010927835	1	35.97	Buy	The Home Depot	Crescent	9/30/2025	35.97	
nails	1007668444	1	53.00	Buy	The Home Depot	Everbilt	9/29/2025	53.00	
D edge	894788	5	7.98	Buy	The Home Depot	Gibraltar	9/29/2025	39.90	
Total								1990.34	
After Tax								2177.233	

Figure 5: Bill of Materials

- Roofing Budget: \$2000
- Currently over budget by \$177
- Quote subject to discount
- Items could be deducted depending on tool and hardware availability

Manufacturing Plan

Table 1: Tentative Installation Schedule

Task	Task Lead	Status	Scheduled Date
PVT panel removal	Brendan	Completed on 9/14	9/22/2025
Applying tarp to roof	Brendan	Completed on 9/16	9/22/2025
Mounting System Assembly	Jacob	In Progress	10/13/2025
Circuitry Diagram	Calvin	Completed	10/12/2025
Building Modifications for Mounting	Brendan	In Progress	10/27/2025
Electrical installation	Tyler	Not Started	11/03/2025
Building Modifications for Ducts	Calvin	Completed on 8/25	11/03/2025
Ductwork Installation	Calvin	Not Started	11/03/2025
Solar Air Panel Optimization	Joseph	Not Started	11/10/2025

Demonstration



Figure 6: Current Mounting System



Figure 7: Hardware for Ductwork Installation

Demonstration



Figure 8: Solar Shack on Demo Day



Figure 9: PVT Panel Removal

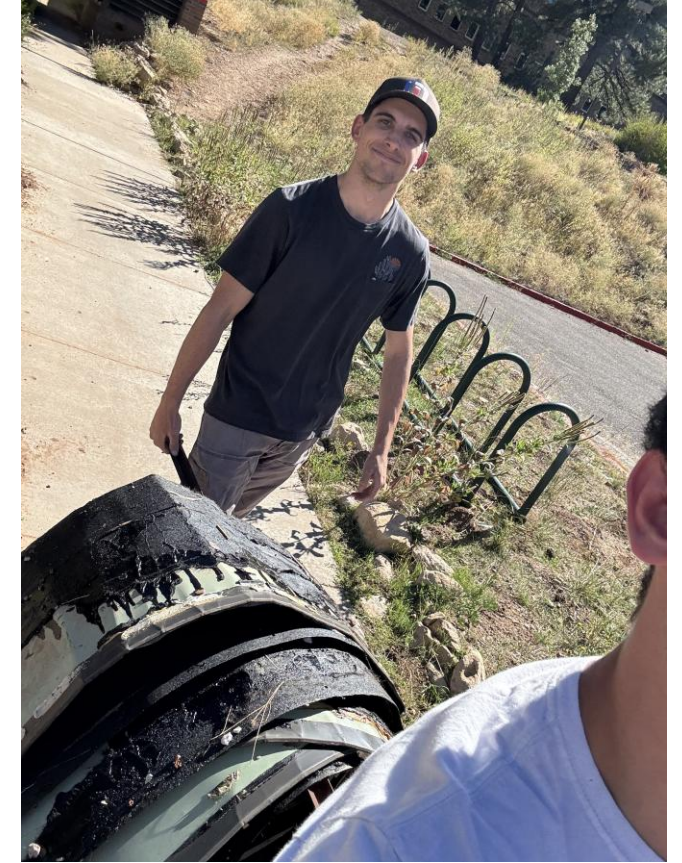


Figure 10: Dumping Old Panels

Demonstration



Figure 11: Applying Tarp to the Roof

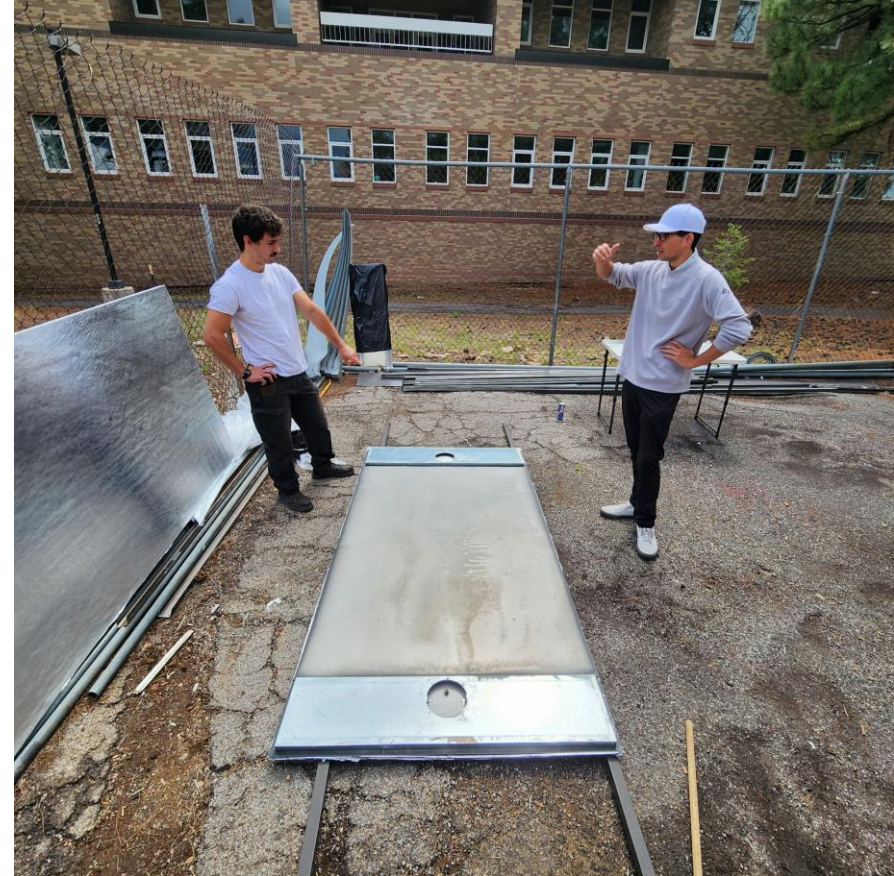


Figure 12: Refurbishing Old Solar Panels

Demonstration



Fig

Gantt Chart

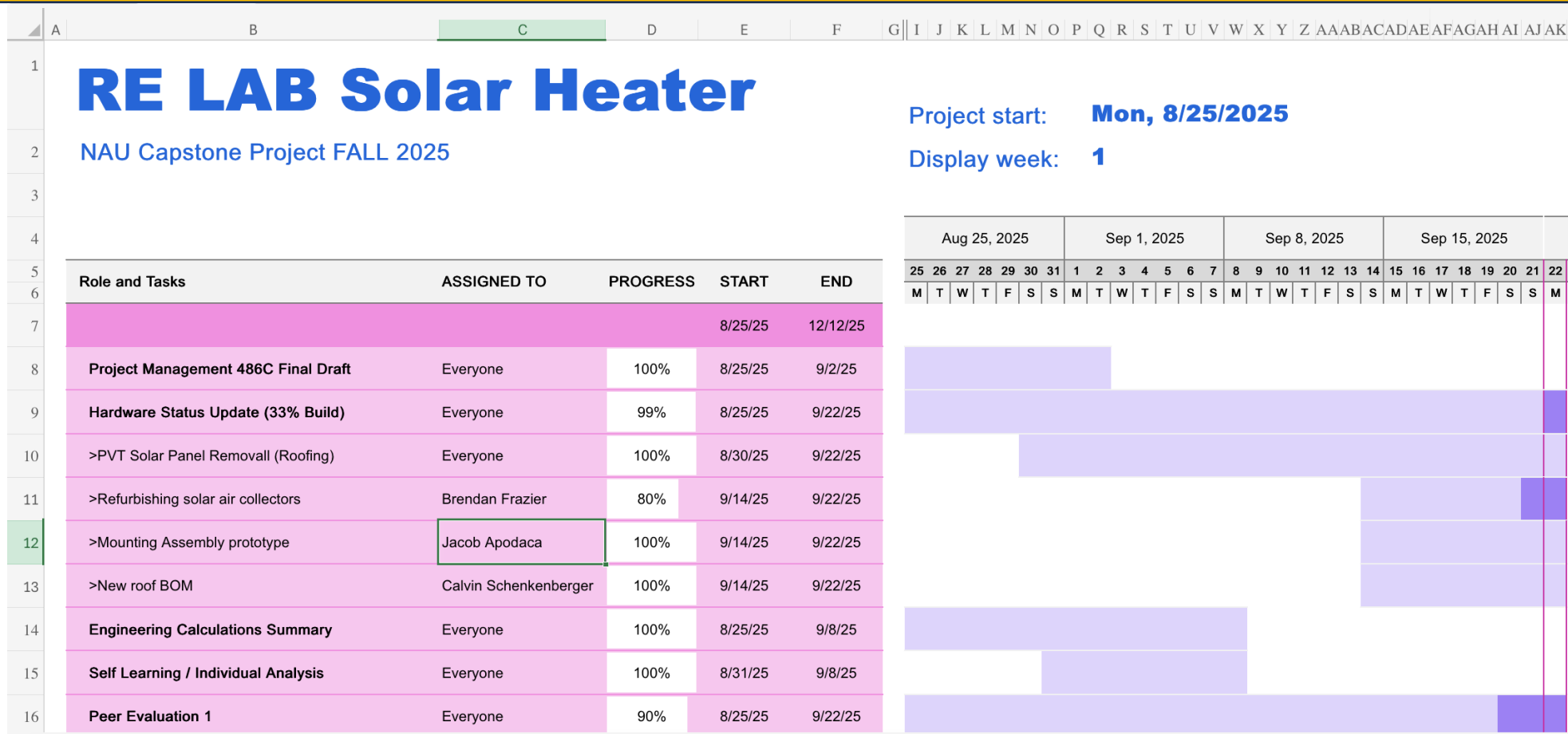


Figure 15: Gantt Chart

Gantt Chart cont.

Website Check #1	Joseph Meza	<div><div></div></div>	30%	9/15/25	10/6/25
Testing Plan (draft)	Jacob Apodaca	<div><div></div></div>	0%	9/8/25	10/3/25
Hardware Status Update (66% Build)	Everyone	<div><div></div></div>	10%	9/15/25	10/13/25
>Purchashed BOM	Calvin Schenkenberger	<div><div></div></div>	35%	9/21/25	10/6/25
>Building modifications	Everyone	<div><div></div></div>	0%	9/28/25	10/13/25
>Install New Roof	Everyone	<div><div></div></div>	0%	9/28/25	10/13/25
>Mounting Assmebly	Jacob Apodaca	<div><div></div></div>	20%	9/22/25	10/13/25
Peer Evaluation 2	Everyone	<div><div></div></div>	0%	10/1/25	10/20/25

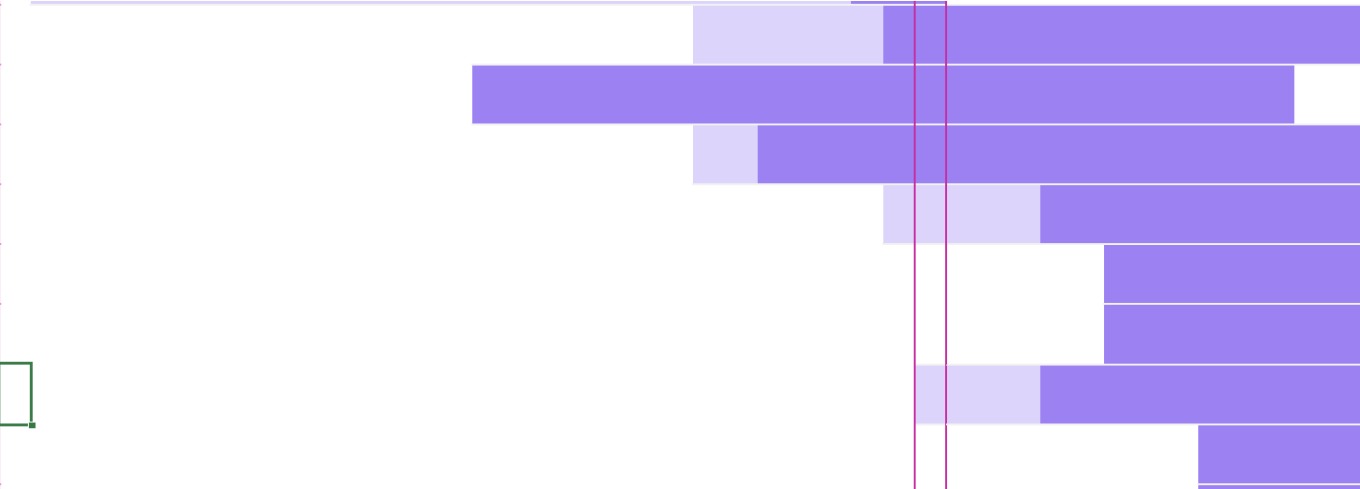


Figure 16: Gantt Chart

- Refurbishing the second
- Finalizing and mounting
- Finalize CAD
- Installing the roofing
- Installing Ductwork



Figure 17: ReLab

Thank You
Questions?