Leon County Energy Sustainability

Team 306:

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Christopher Gibson
Sean Fisher
Marwan Kamleh

Project Recap

01
Increase Renewable Generation Capacity 30% by 2030 in County parks and facilities

02
Reduce kWh usage 2% annually, resulting in 30% net reduction by 2030

03
Increase public awareness of Renewable Energy

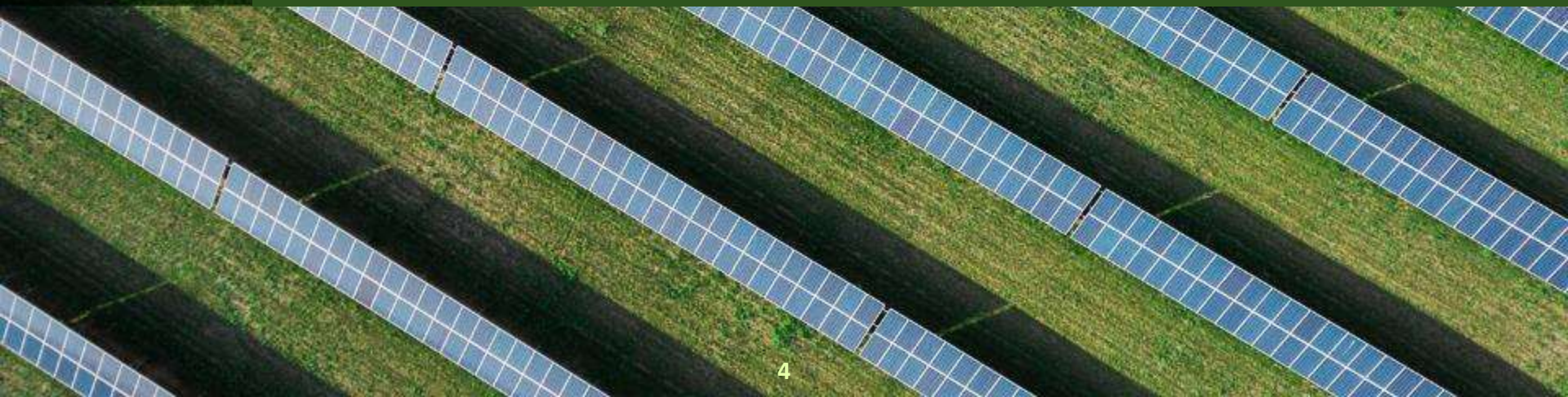
Speaker: Samantha Lafrance

J. Lewis Hall Woodville Park

1. Accessibility and Utility
2. High Sunlight Penetration
3. Savings Potential

Speaker: Sean Fisher

Vendor Data



Big Belly Trash Compactor

- Wi-Fi capable
- Covered maintenance
- Custom wrapping
- Cost: $200-$400/month
- Uses 40-W panel

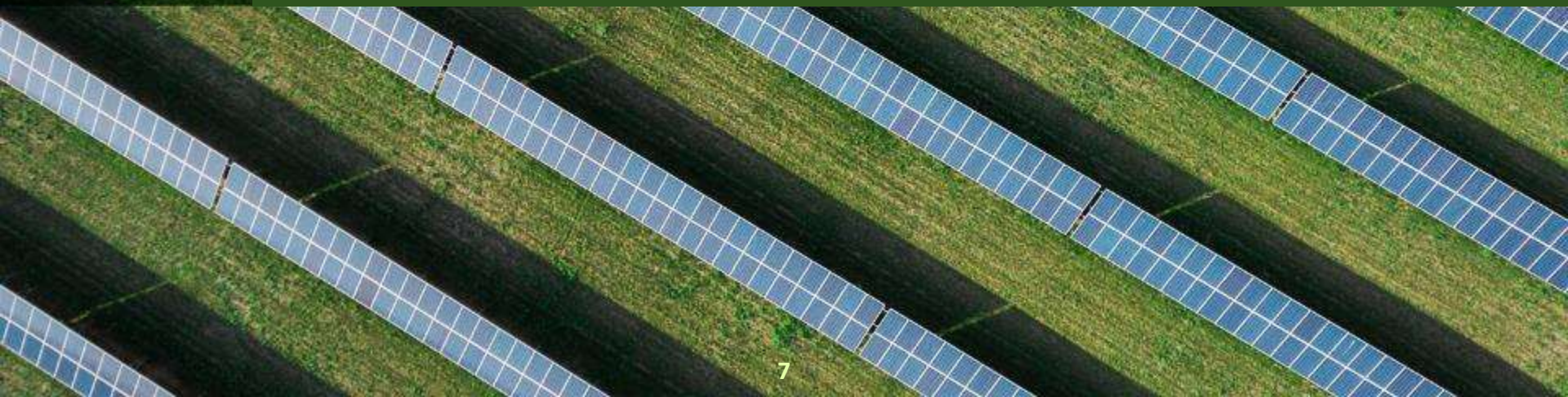
Speaker: Sean Fisher

Enerfusion Charging Station

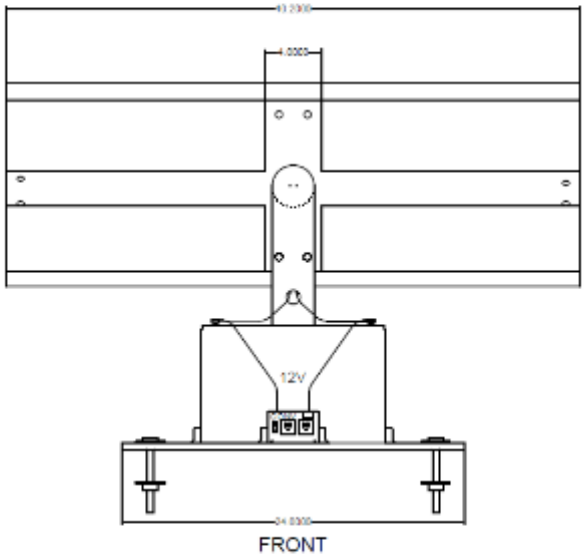
- Wi-Fi capable
- Picnic Table with covered canopy
- 4 USB and 4 GFI outlets
- Cost: $14,174.59
- Uses 3-65 W panels and 1-100 W panel

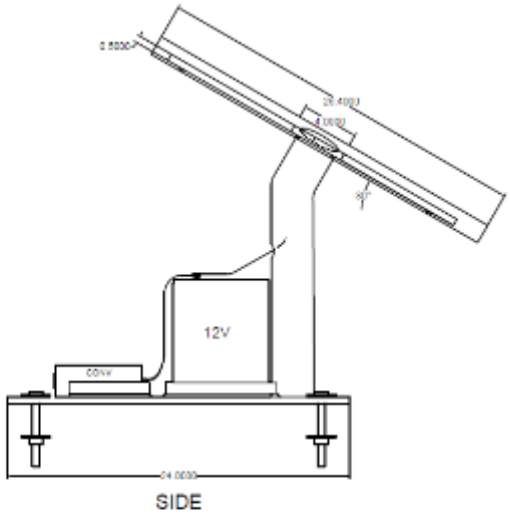
Speaker: Sean Fisher

Prototype



Prototype Design: Preliminary Work



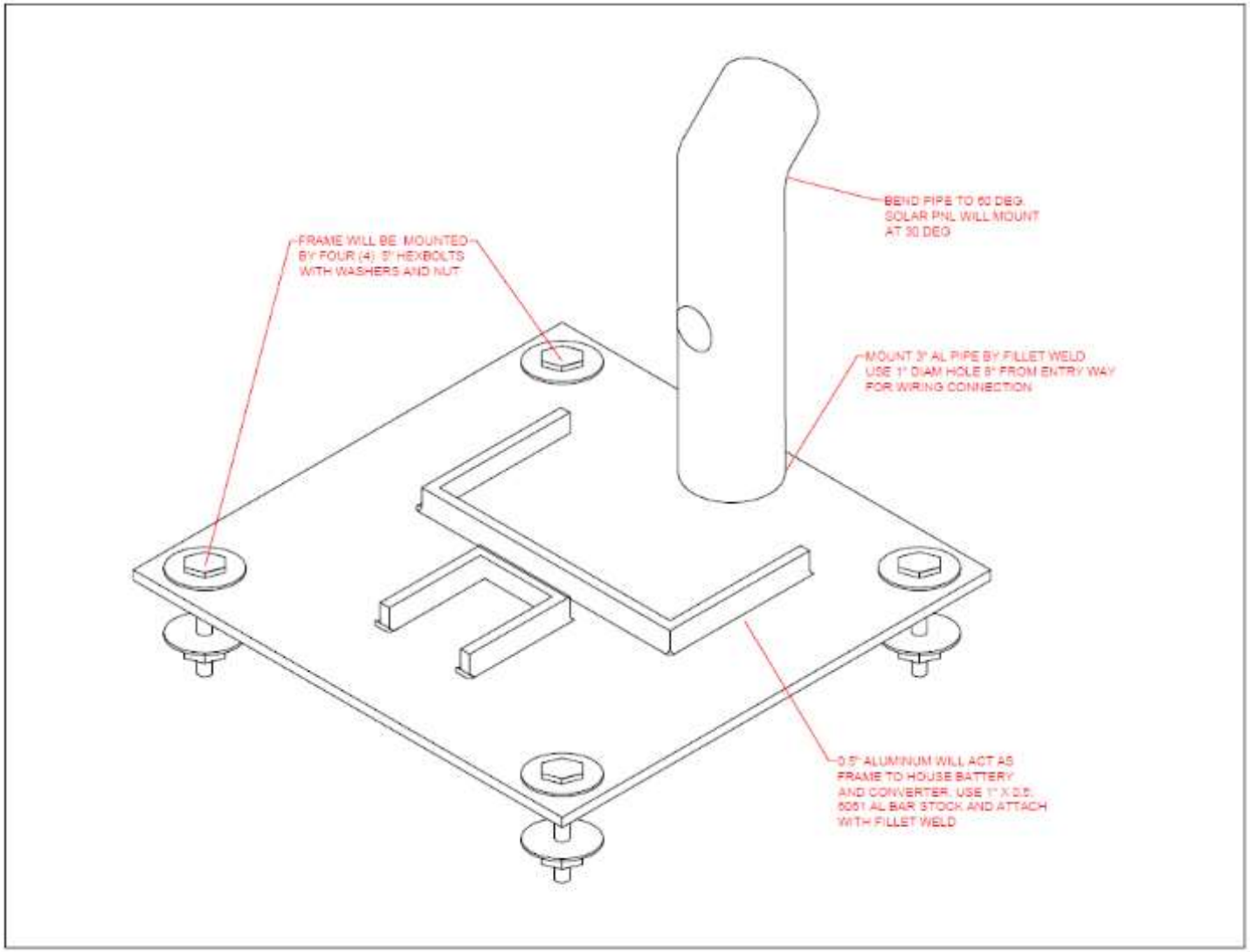


Speaker: Jacob Moore

Prototype Cost and Spec Details

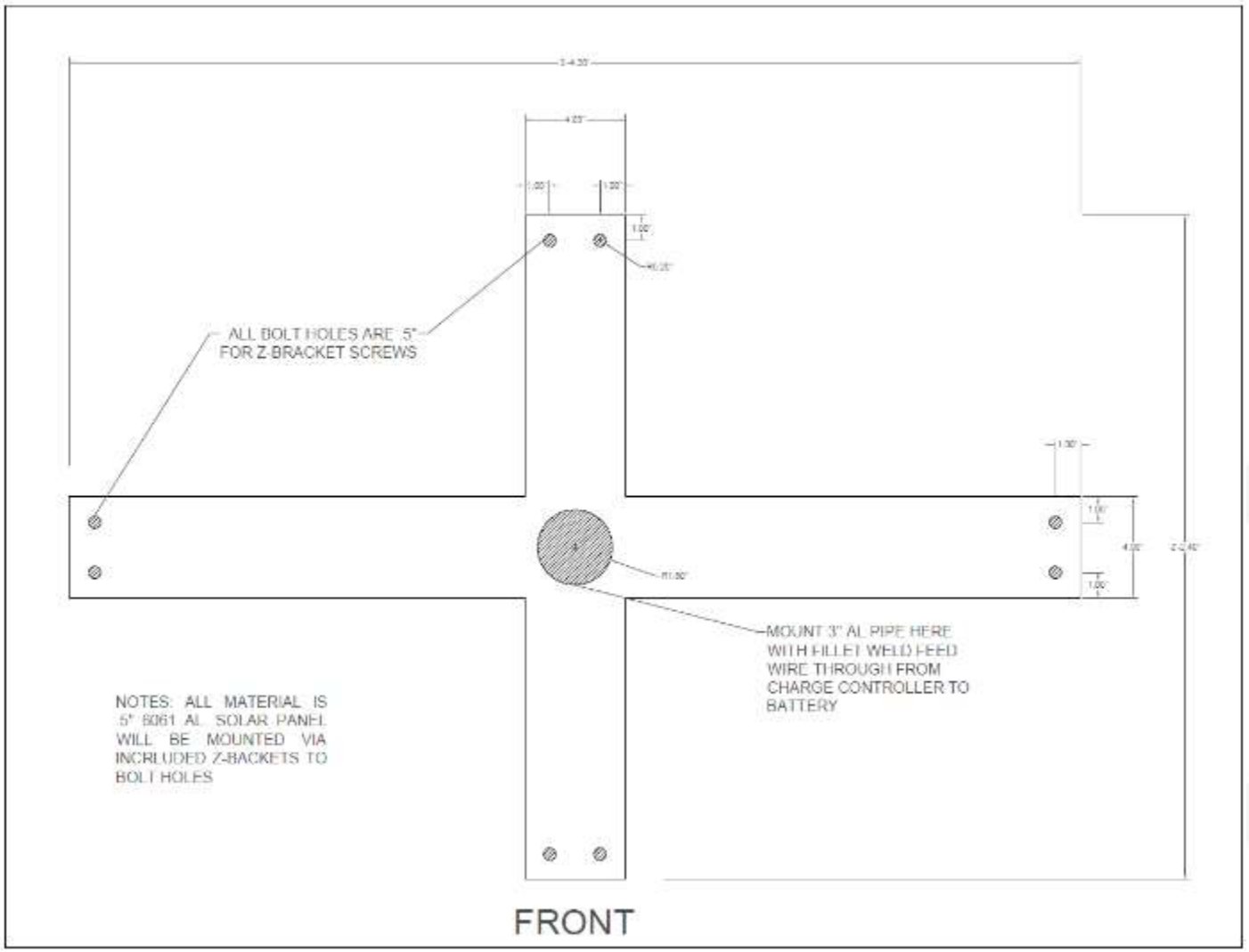
Speaker: Marwan Kamleh

Prototype Design: Base Frame



Speaker: Jacob Moore

Mounting Bracket Mechanical



Speaker: Jacob Moore

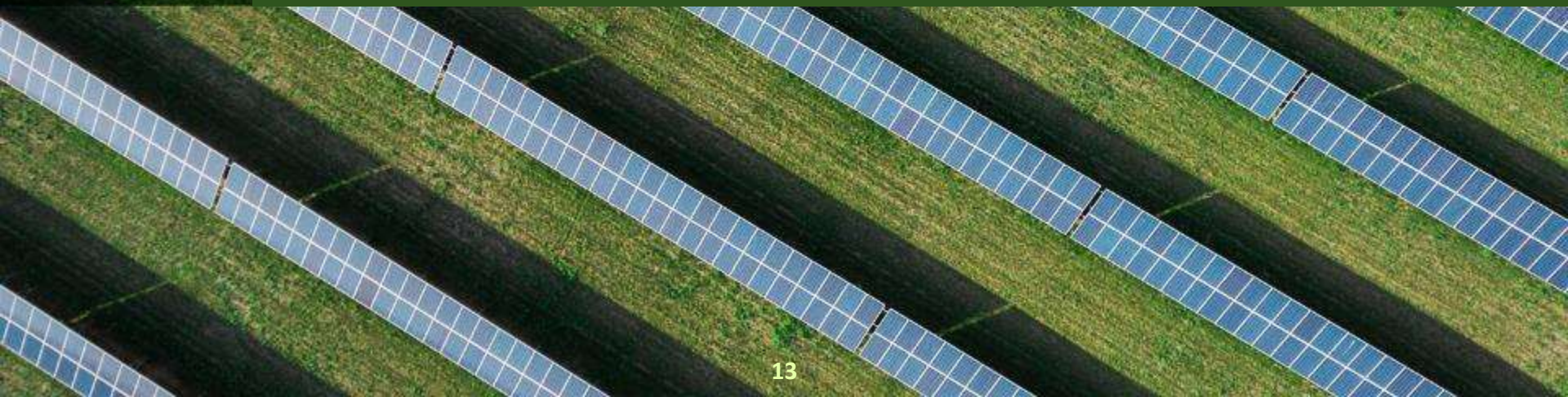
Bill of Materials: Prototype

Part #	Vendor/Supplier	Description	Qty	Units	Picture	Unit Cost	Cost
53110	Nature Power	110W Panel kit w/ Charge Controller, Panel, mounting z-brackets, and inverter	1	1		$ 220.00	$ 220.00
RBT100G	Renogy	Hybrid GEL battery 12V, 100Ah	1	1		$ 246.00	$ 246.00
2HGR7	GRAINGER	Aluminum Plate 24"x24"	1	1		$ 295.80	$ 295.80
5GUL0	Rigid	Aluminum Conduit 3" Diam 10' length	1	1		$121.28	$ 121.28
67312	Hillman	1/2" x 5" Hex Bolt	4	1		$2.07	$ 8.28
67342	Hillman	1/2" Hex Nut	4	1		$0.41	$ 1.64
63449	Hillman	0.531" Flat Washer	4	1		$0.36	$ 1.44
61817	Hillman	1/2" Split Lock Washer	4	1		$0.28	$ 1.12
20670	Aluminum Bar	1/2" x 8" Aluminum Rectangle Bar 3'	1	1		$87.00	$ 87.00
1171	Aluminum Bar	1/2" x 4" Aluminum Rectangle Bar 6'	1	1		$ 76.49	$ 76.49
	Total		**22**				**$ 1,059.05**

FAMU-FSU College of Engineering

Speaker: Marwan Kamleh

SAM Modeling



What is SAM

- Free Modeling Software from NREL
- Compares different renewable options
- Build financial models
- Show effects of implementing vendor technology and prototype

NREL
Transforming ENERGY

Load Assumptions: Charging Station

- *Charging Station assumes to provide power for 1 laptop charger (rated at 19V and 3.42A) and 2 cell phone chargers (rated at 5V and 1A). We are assuming 4 hours operation for the Laptop charger and 3 hours for the cell phone charger:*

$$P_{LAPTOP} = 19\ V_{DC} * 3.42\ A_{DC} = 64.98\ W$$

$$E_{LAPTOP} = 64.98\ W\ * 4\frac{hr}{day} = 260\frac{Wh}{day}$$

$$P_{CELL} = 5\ V_{DC} * 1\ A_{DC} = 5\ W$$

$$E_{CELL} = 5\ W\ * 3\frac{hr}{day} * 2 = 30\frac{Wh}{day}$$

$$E_{TOTAL} = E_{LAPTOP} + E_{CELL} = 260\frac{Wh}{day} + 30\frac{Wh}{day} = 290\frac{Wh}{day} \approx 8.7\frac{kWh}{month}$$

Speaker: Jacob Moore

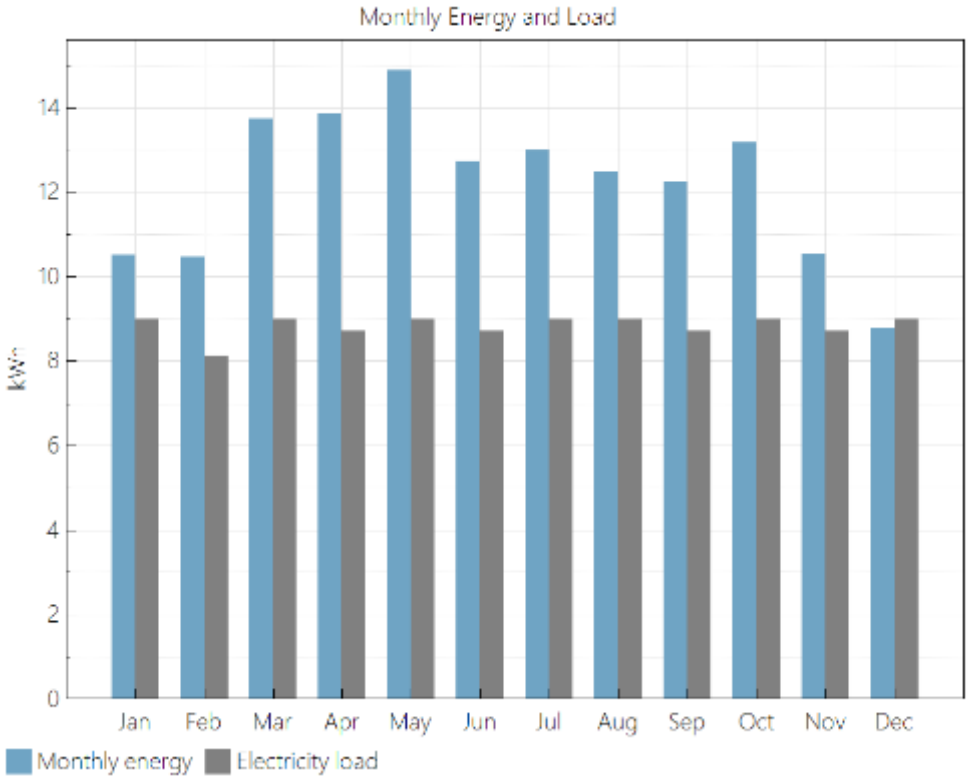
Load Assumptions: Trash Compaction

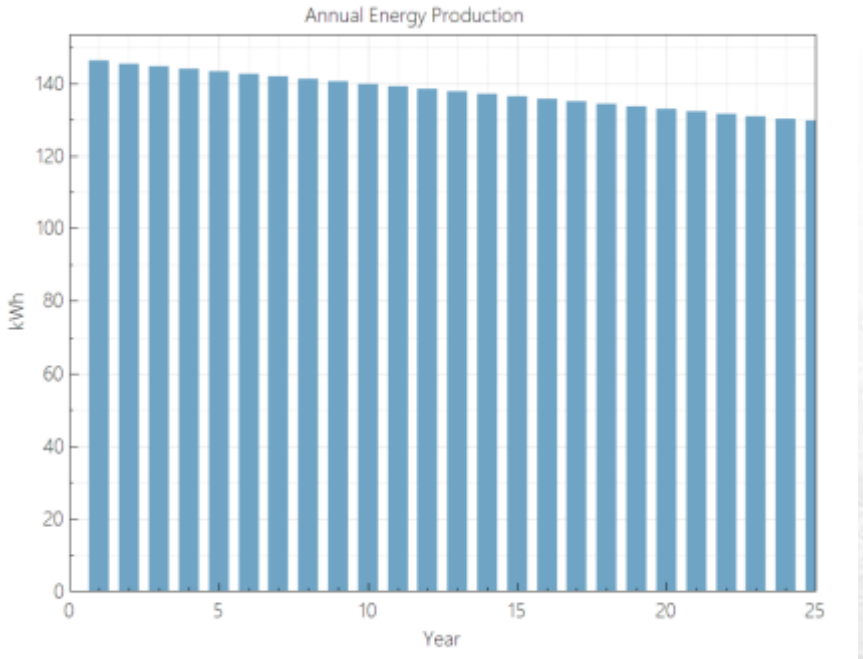
- *The trash compactor operates using a 20W motor. According to case studies done, the typical operation shows to be about 1 compaction per day or about 1 hour a day.*

$$E_{COMP} = 20\frac{W}{day} * 1\ hr = 20\frac{Wh}{day} \approx 0.62\frac{kWh}{mo}$$

Speaker: Jacob Moore

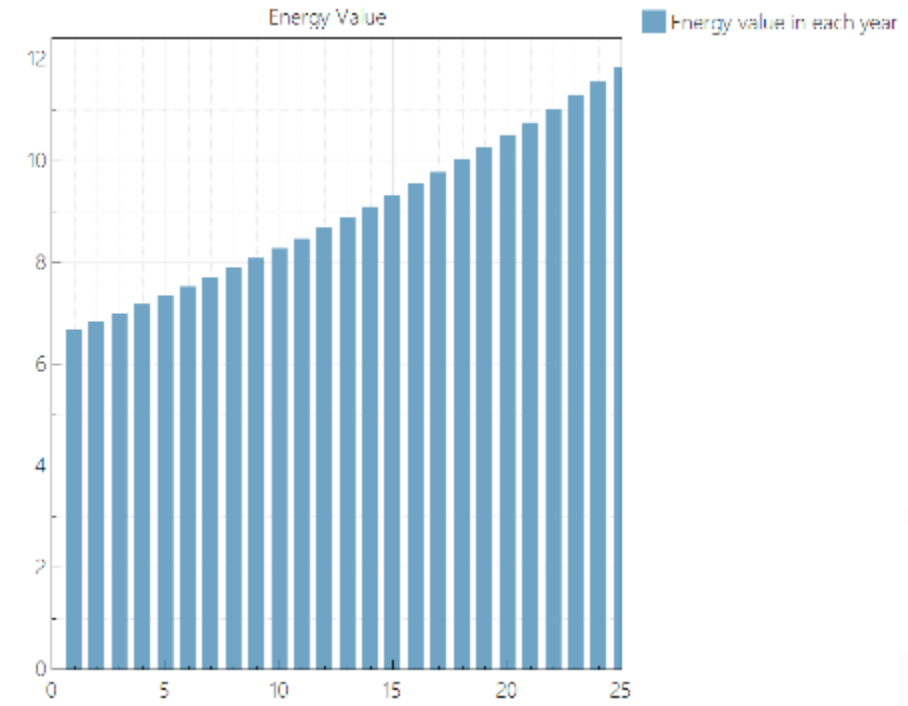
SAM Modeling (Prototype)

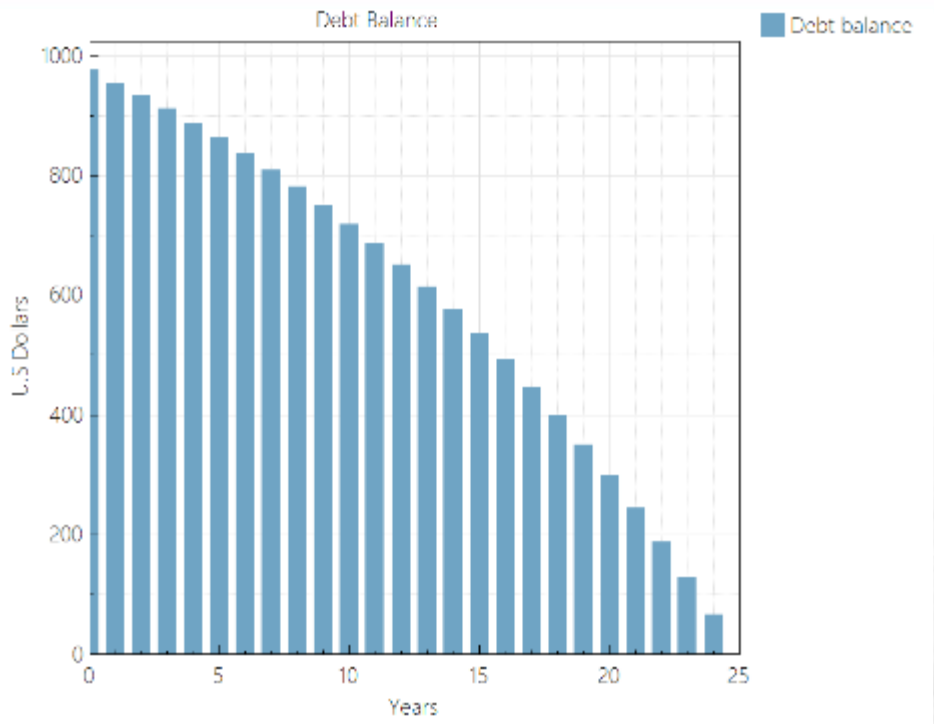




Speaker: Marwan Kamleh

SAM Modeling (Prototype)

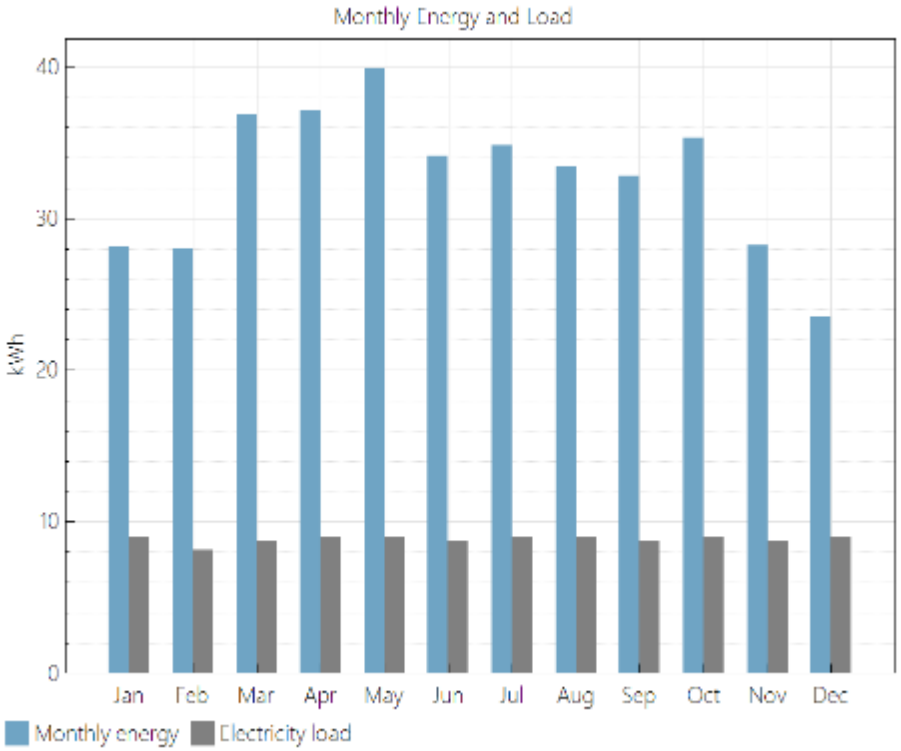


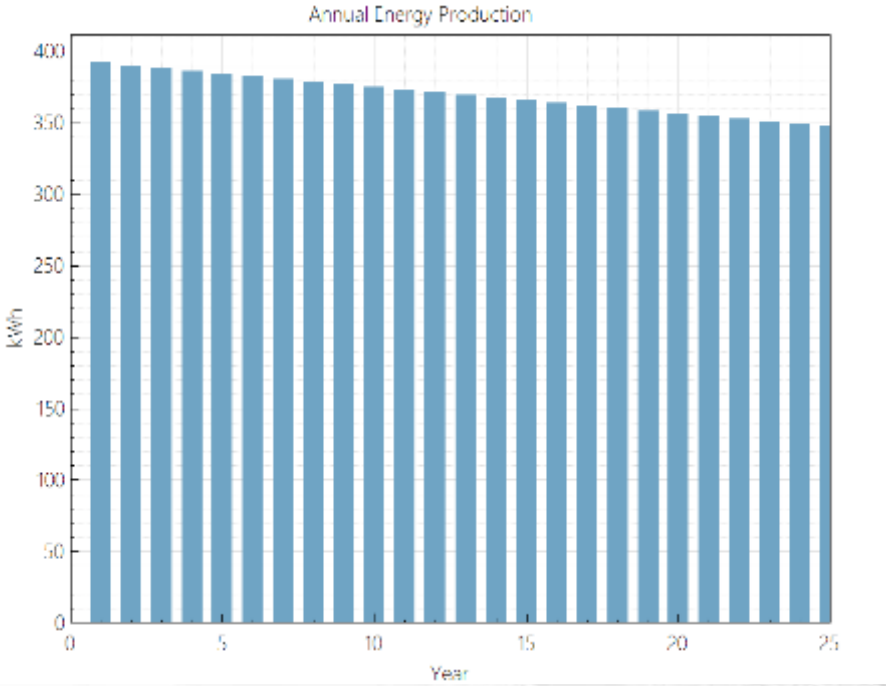


Total Direct cost (Price of system, materials, and install price): $1059.05
Total Indirect cost (taxes): $174.32
Total Install cost: $1233.37

Speaker: Marwan Kamleh

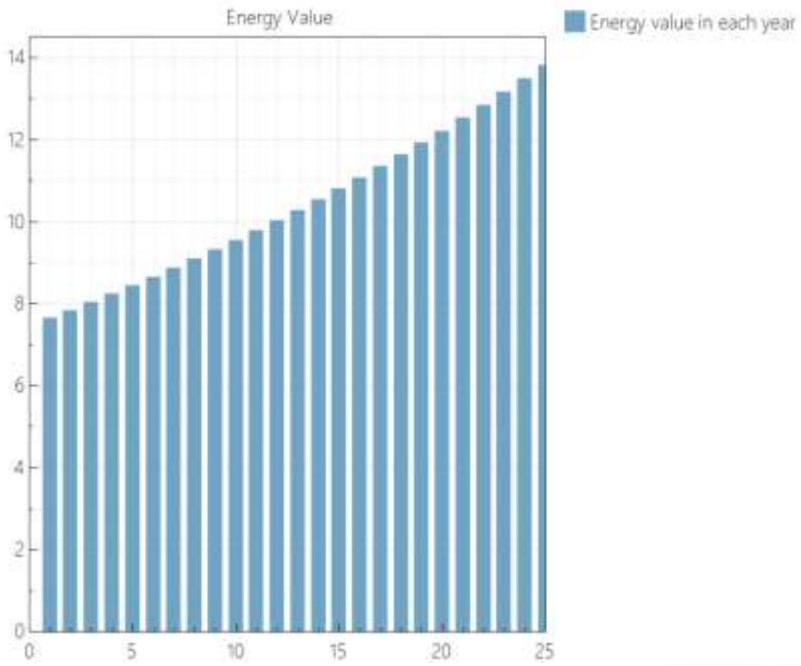
SAM Modeling (Enerfusion)

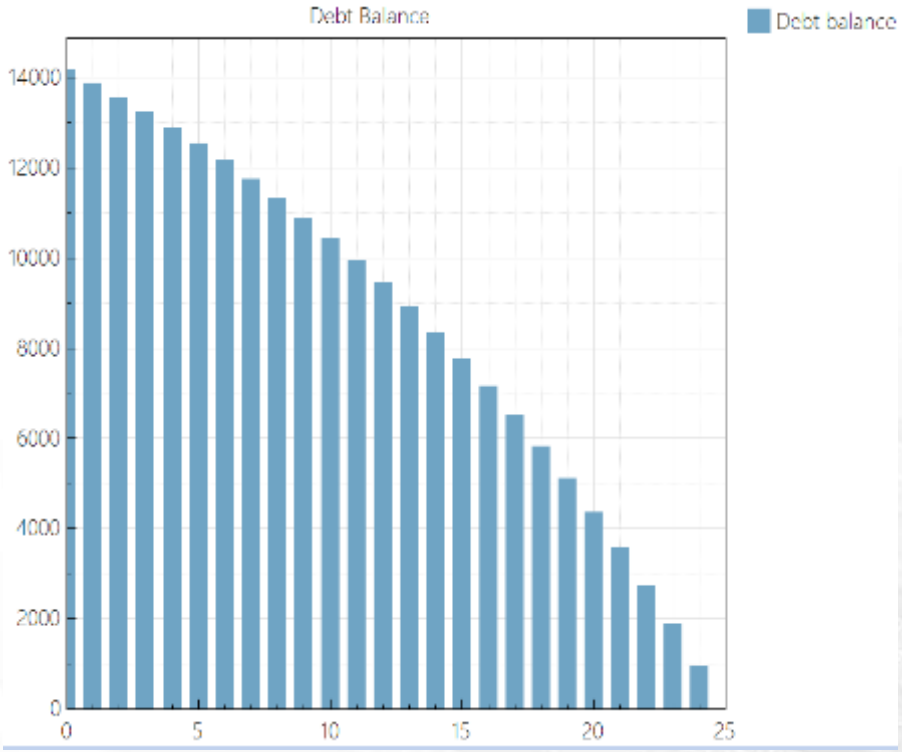




Speaker: Sean Fisher

SAM Modeling (Enerfusion)

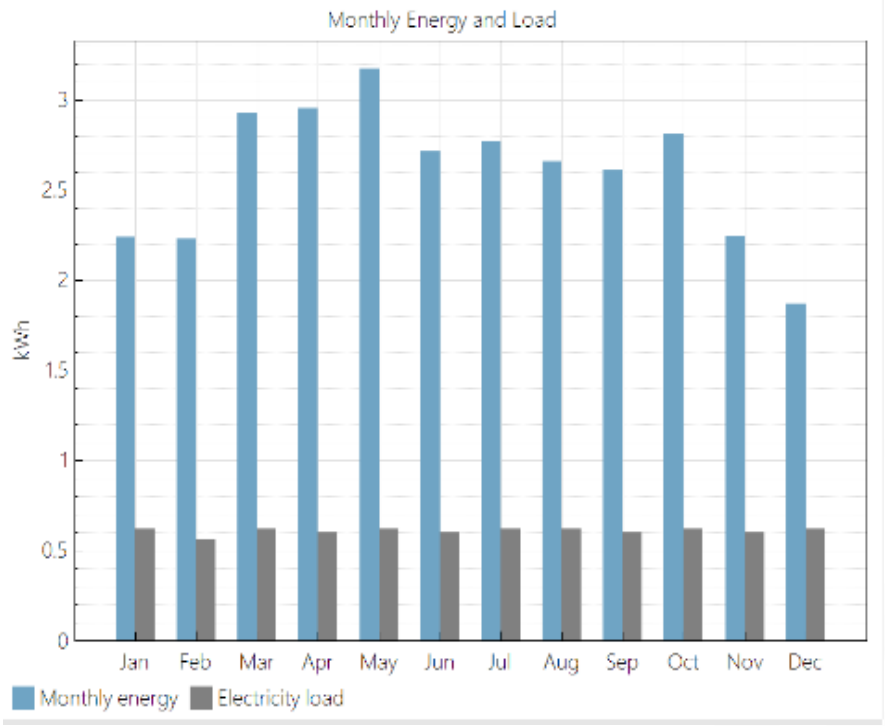


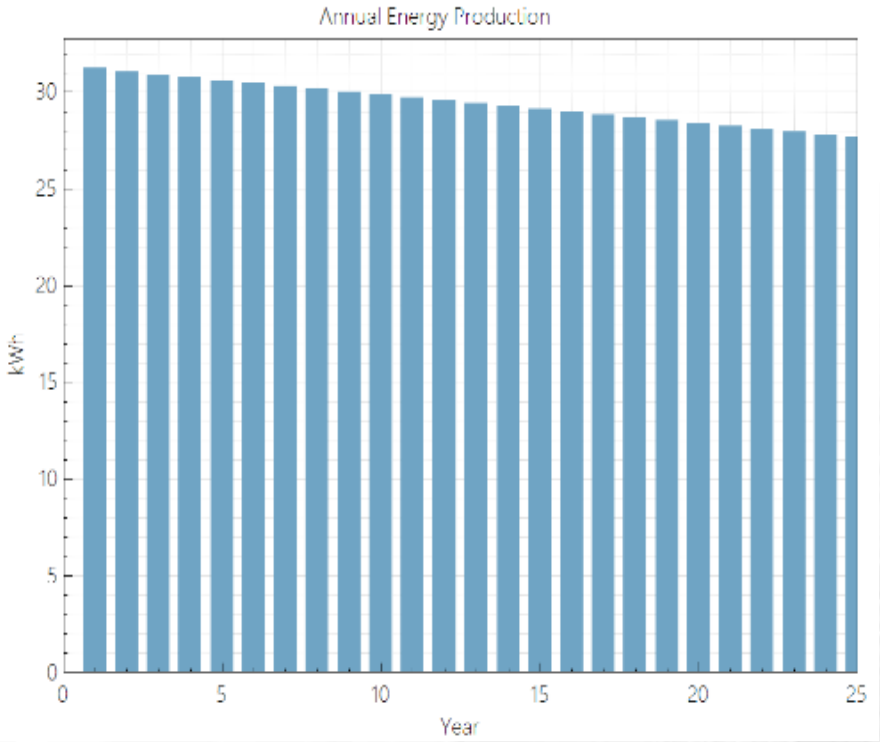


Total Direct cost: $ 13,156.85
Total Indirect cost: $ 1,017.74
Total install cost:$ 14,174.59

Speaker: Sean Fisher

SAM Modeling (Big Belly)

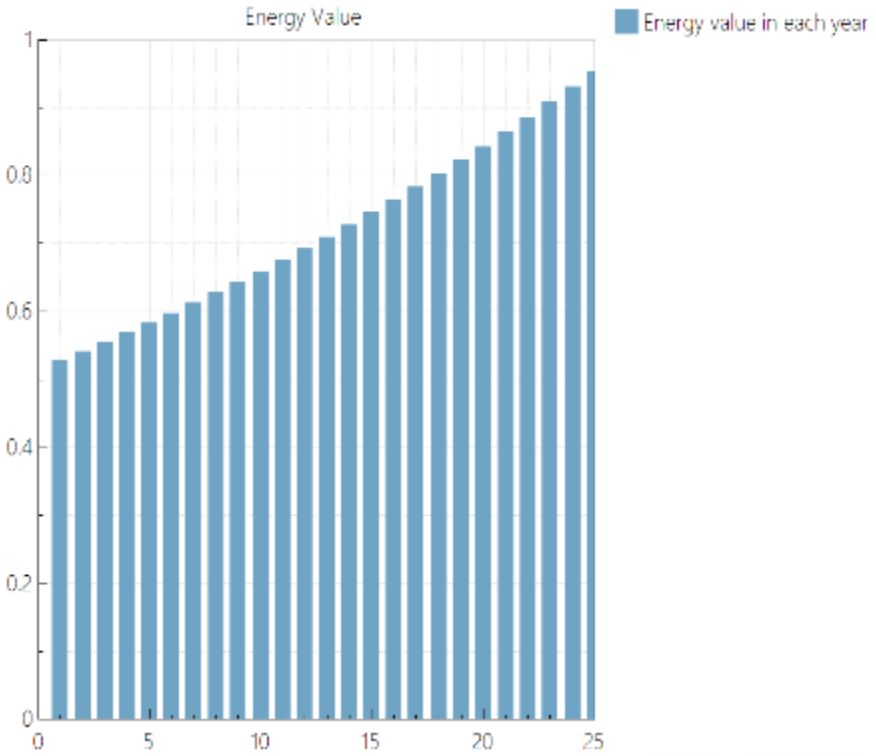


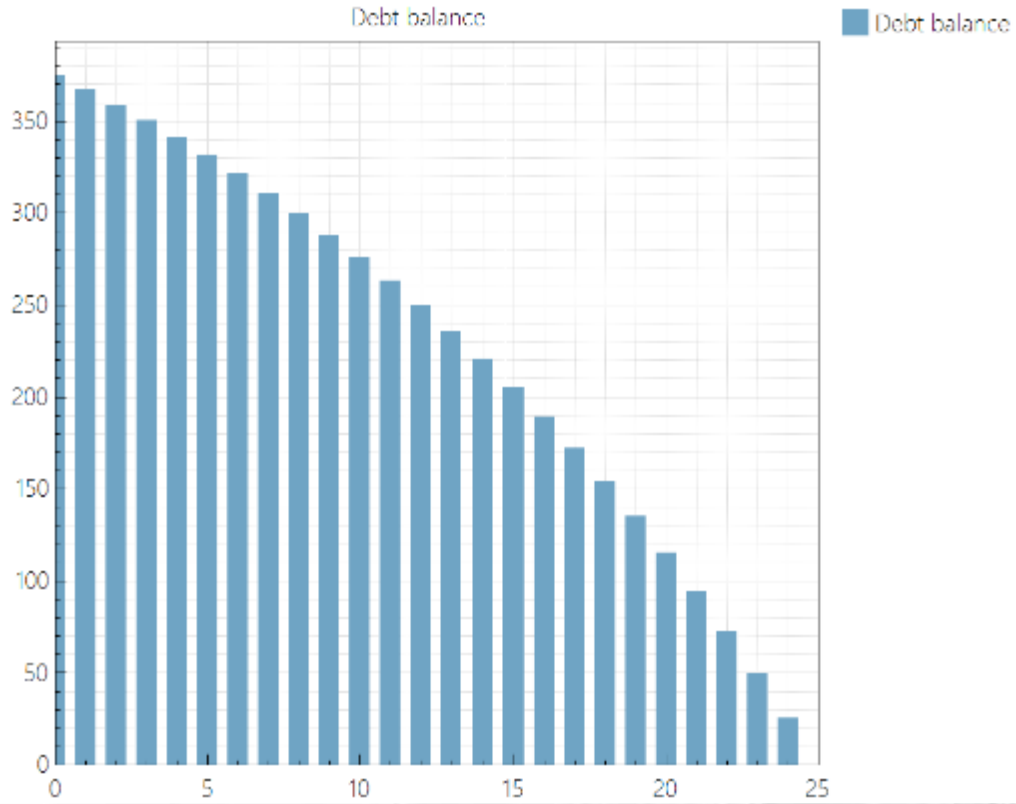


Load based off 1 compaction / day

Speaker: Sean Fisher

SAM Modeling (Big Belly)

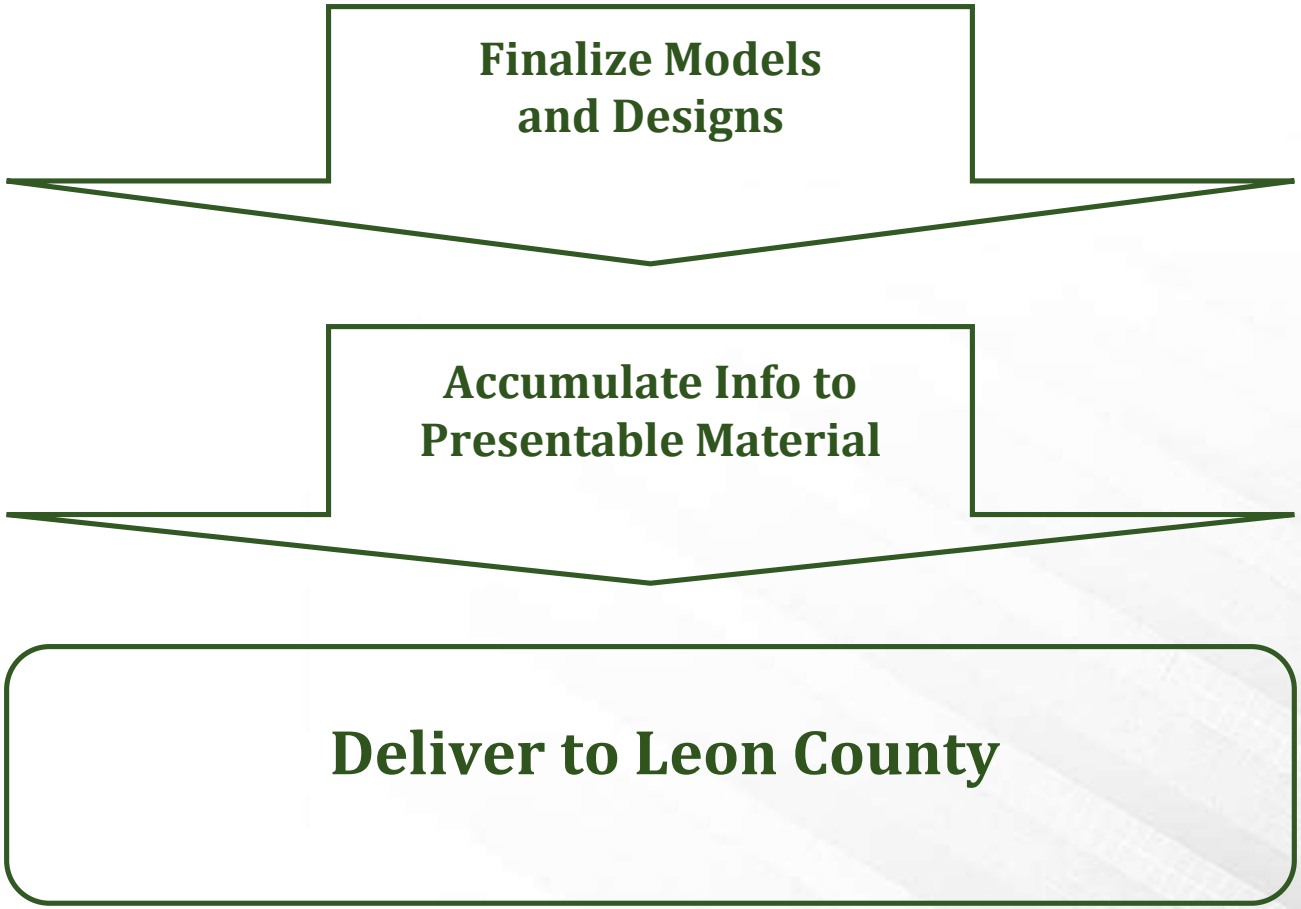




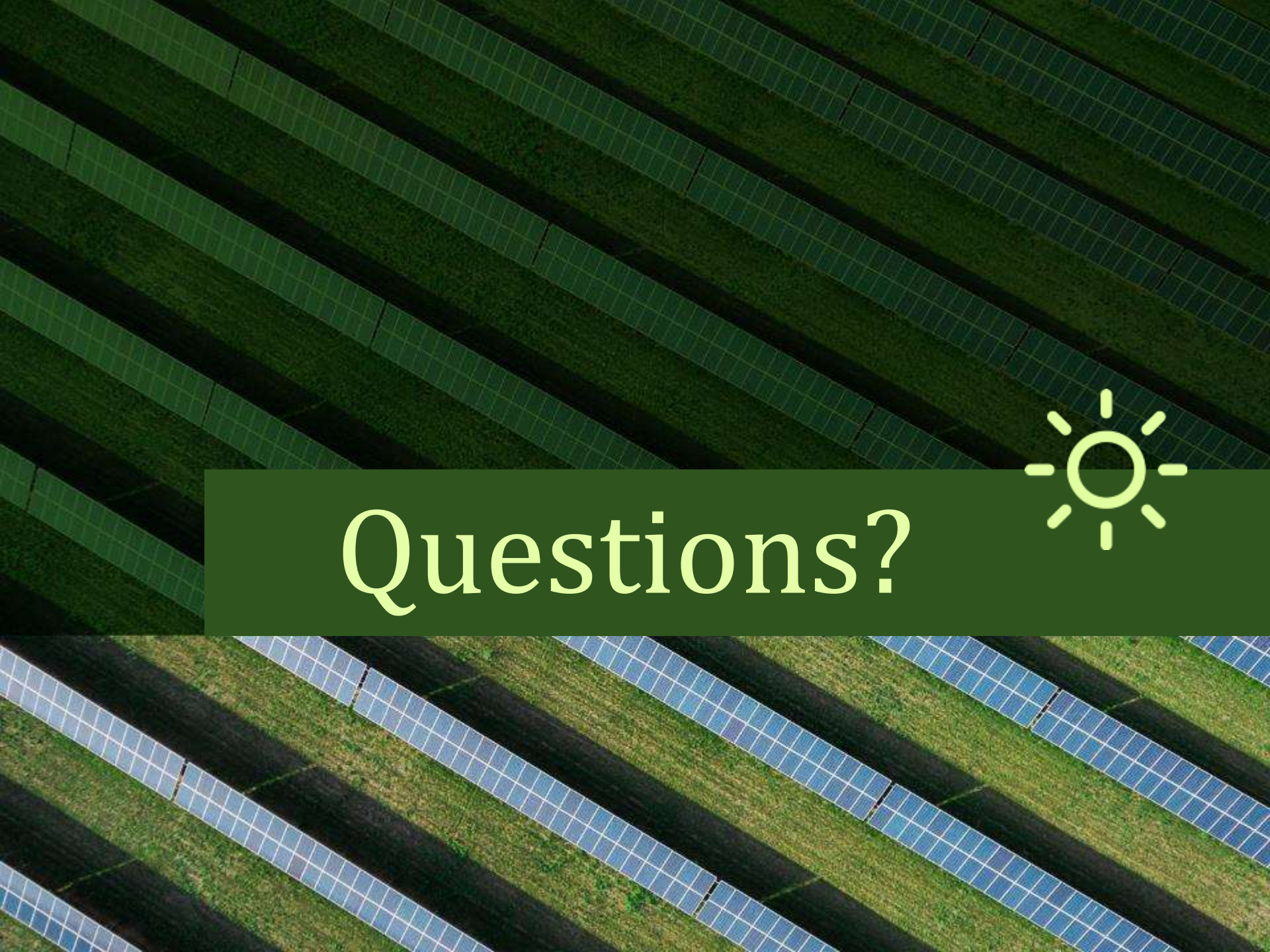
System is leased at $200-$400 / Month

Speaker: Sean Fisher

Work Left To Do



Speaker: Samantha Lafrance


Questions?