FAMU-FSU COLLEGE OF ENGINEERING

Team 306:

Leon County Energy Sustainability

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EEL 4911C
Senior Design 2020-2021
Instructors: Jerris Hooker and Oscar Chuy

Our Team

Jacob Moore
Major: EE
Role: Team Lead

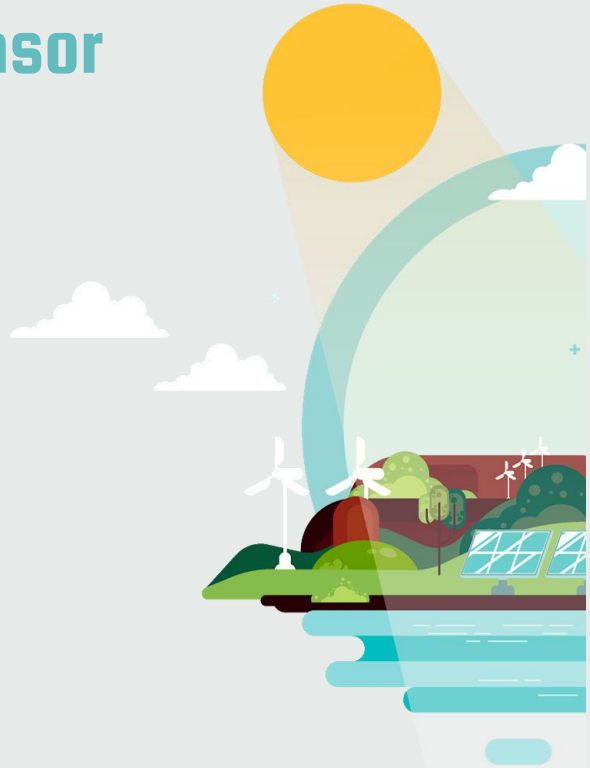
Samantha Lafrance
Major: CpE
Role: Co-Lead ECE
Secretary

Chris Gibson
Major: EE
Role: Lead ECE

Sean Fisher
Major: EE
Role: Co-Lead ECE

Marwan Kamleh
Major: EE
Role: Financial Advisor

Sponsor



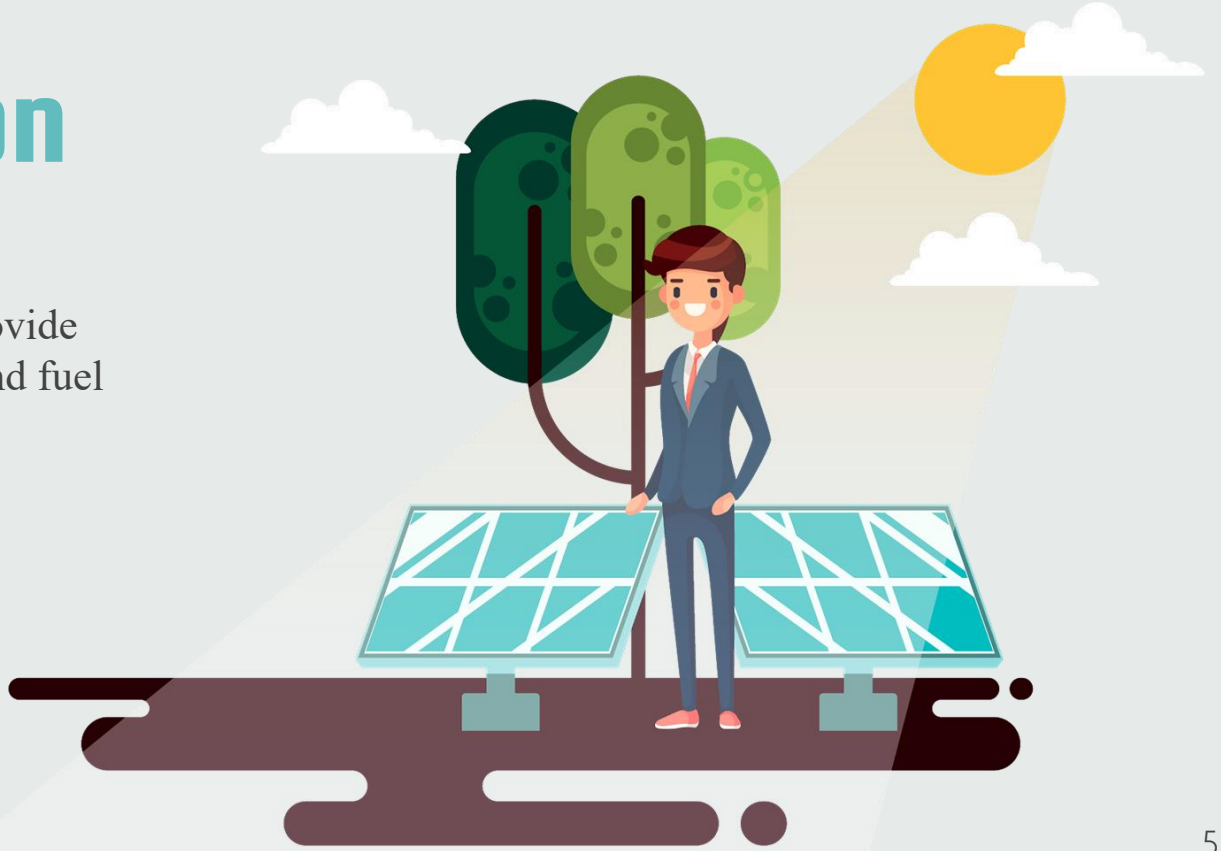
Shelby Green

Sustainability Analyst

Leon County Government

Motivation

Find different ways to provide reliable power supplies and fuel diversification



Project Scope

Implement sustainability initiatives that could benefit for greater renewable integration

Targets

1

Reduce Leon County's Gas Emissions by 30% by 2030

2

Promote environmental awareness

REQUIREMENTS

Analyze renewable systems

REQUIREMENT 1

Determine the most beneficial solution

REQUIREMENT 2

Create a finalized analysis

REQUIREMENT 3

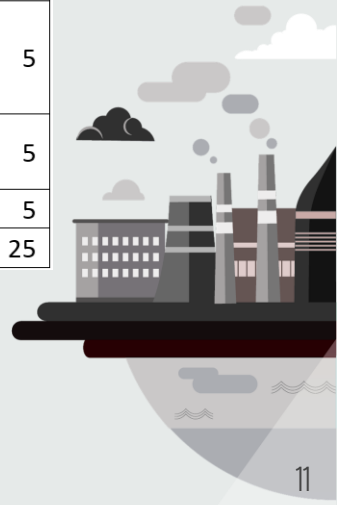
Design Analysis

Design (Device) Concept Generation

No.	Concept Description	Feasibility
1	Pavilion charging station	5
2	Interactive renewable “instructable”	5
3	Hydroelectric powered water testing lake Munson	5
4	Irrigation controller	5
5	Hydroelectric charging station lake Munson	5
6	Renewable benches w/ charging station and Wi-Fi	5
7	Solar power trash cans	5
8	Solar power county events bulletins	5
9	Solar on county owned lakes	1
10	Windmills on city owned lakes	0
11	Workout station powered by renewables	3
12	Integrated solar panels on courthouse	2
13	Building material replacement	0
14	County fleet replace w/ electric	0
15	Window replacements on county bldgs.	0
16	HVAC regulators on facilities	3
17	Population sensor for HVAC	2
18	Population sensor for lighting	2
19	PV cell upgrades for park lighting	4
20	LED replacements for park lighting	3
21	Solar power net garbage collector for lakes	2
22	Solar powered porta-potties at park	2
23	Complete renewable rebuild of park restroom	0
24	Solar power fire/smoke detector	3
25	Solar power air quality detector	3

High / Medium fidelity AHP matrix

	Pavilion charging station	Interactive renewable instruction	Hydroelectric powered water testing	Irrigation controller	Hydroelectric charging station	Renewable benches with charging station and Wi-Fi	Solar powered trash cans	Solar powered county event bulletin
Budget	5	3	2	2	1	5	5	5
Sustainable	5	3	3	2	3	4	5	5
Promotes renewable energy	5	5	3	2	4	5	5	5
Public exposure	5	5	1	3	5	5	5	5
Public use	5	5	0	0	5	5	5	5
Score	25	21	9	9	18	24	25	25



Pugh comparison matrix

Pavilion Charging station Reference

	Pavilion Charging Station (ref)	Solar Power Trash Cans	Solar Powered Event Board	Solar benches w/ charging and Wi-fi
Budget	-	0	0	0
Sustainable	-	+1	-1	0
Promotes renewable energy	-	0	0	+1
Public exposure	-	-1	+1	0
Public use	-	+1	-1	+1
Score	-	+1	-1	+2

Solar Trash Cans Reference

	Solar Power Trash Cans (ref)	Solar Powered Event Board	Solar benches w/ charging and Wi-fi	Pavilion Charging Station
Budget	-	-1	-1	-1
Sustainable	-	0	-1	0
Promotes renewable energy	-	0	0	+1
Public exposure	-	+1	0	0
Public use	-	-1	+1	0
Score	-	-1	-1	0

Pugh comparison matrix cont.

Event Bord Reference

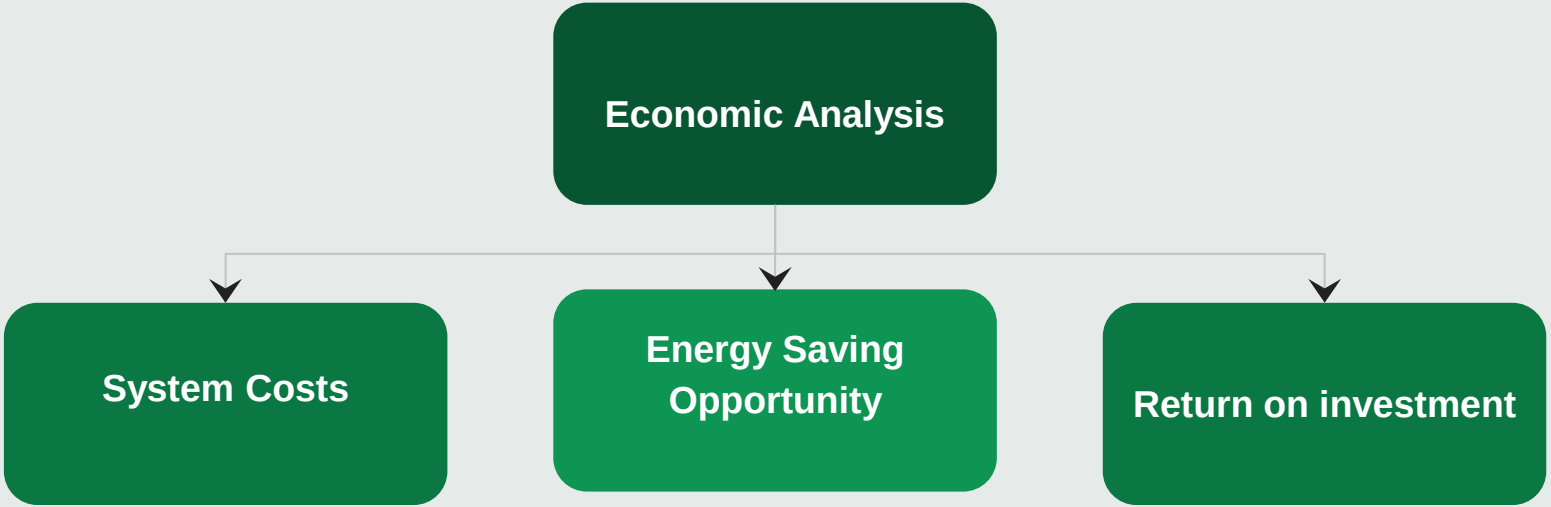
	Solar Powered Event Board (ref)	Solar benches w/ charging and Wi-fi	Pavilion Charging Station	Solar Power Trash Cans
Budget	-	0	+1	+1
Sustainable	-	0	-1	-1
Promotes renewable energy	-	+1	+1	0
Public exposure	-	-1	-1	-1
Public use	-	+1	+1	0
Score	-	+1	+1	-1

Wi-Fi and Charging Benches Reference

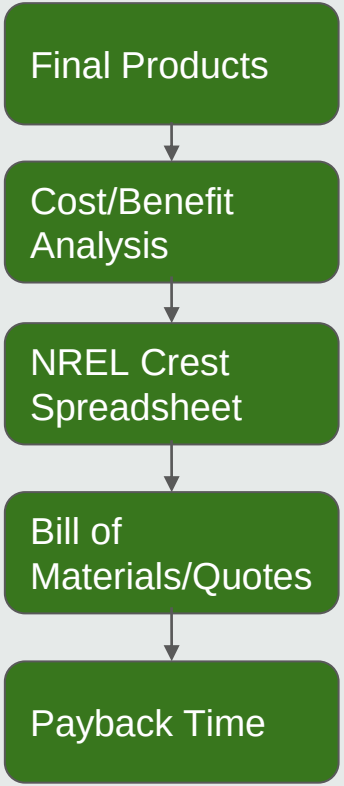
	Solar benches w/ charging and Wi-fi	Pavilion Charging Station	Solar Power Trash Cans	Solar Powered Event Board
Budget	-	+1	+1	+1
Sustainable	-	+1	+1	0
Promotes renewable energy	-	0	0	-1
Public exposure	-	-1	-1	+1
Public use	-	+1	0	-1
Score	-	+2	+1	0

Economic Analysis

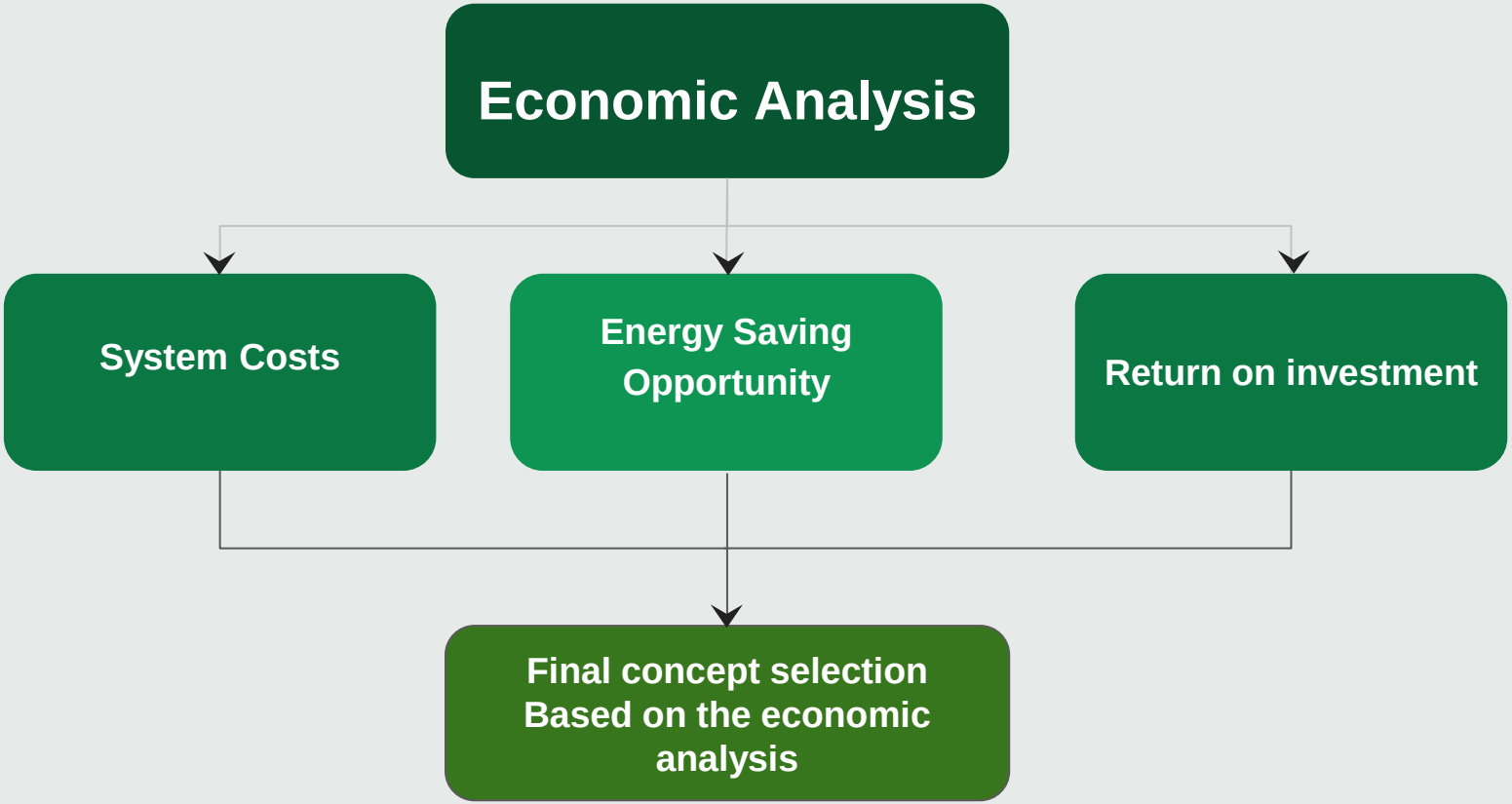
Economic Analysis Concept generation Selection



Economic Analysis Concept generation Selection



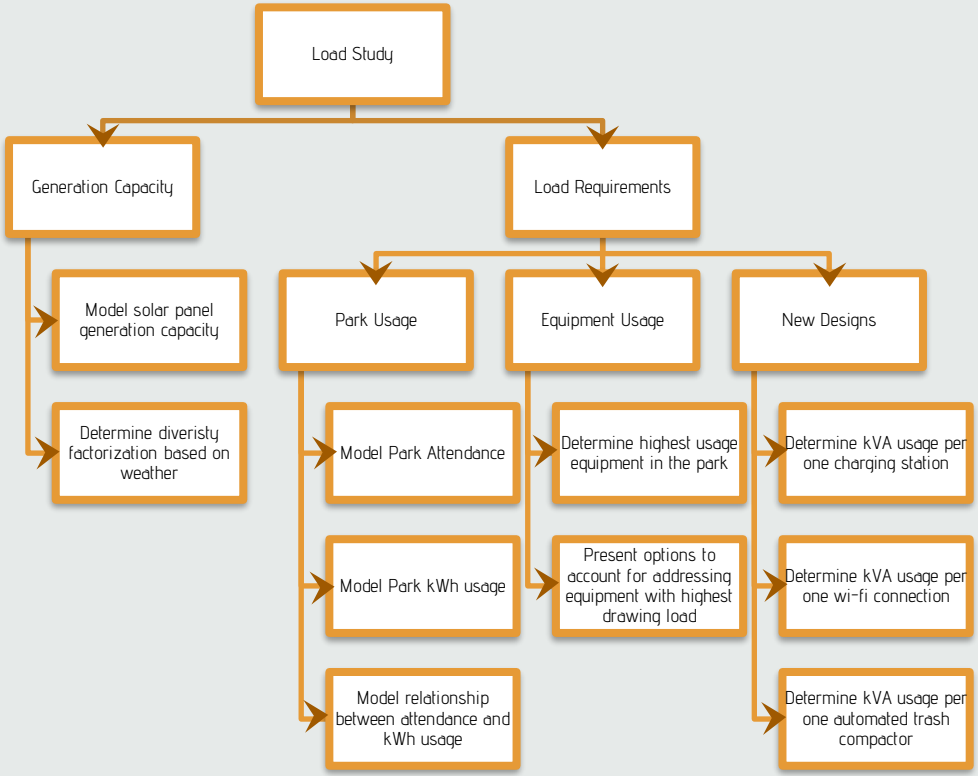
Economic Analysis Concept generation Selection



Load Study Concept Gen/Selection

Jacob

Load Study: Functional Decomposition



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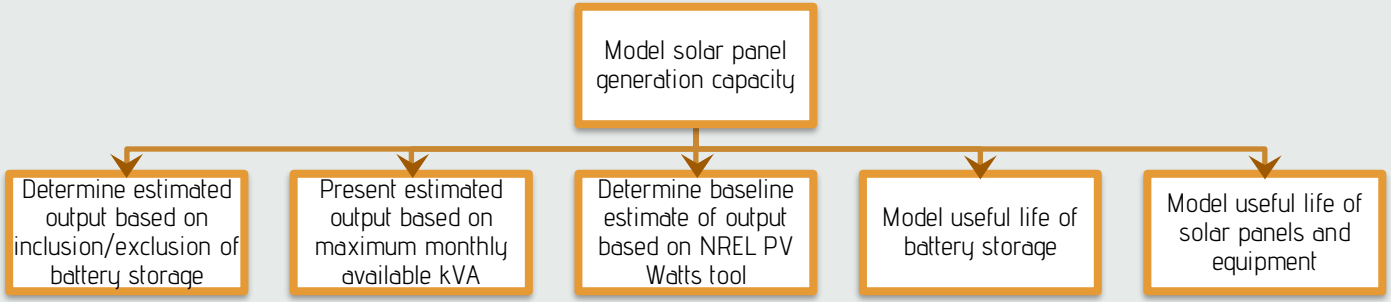

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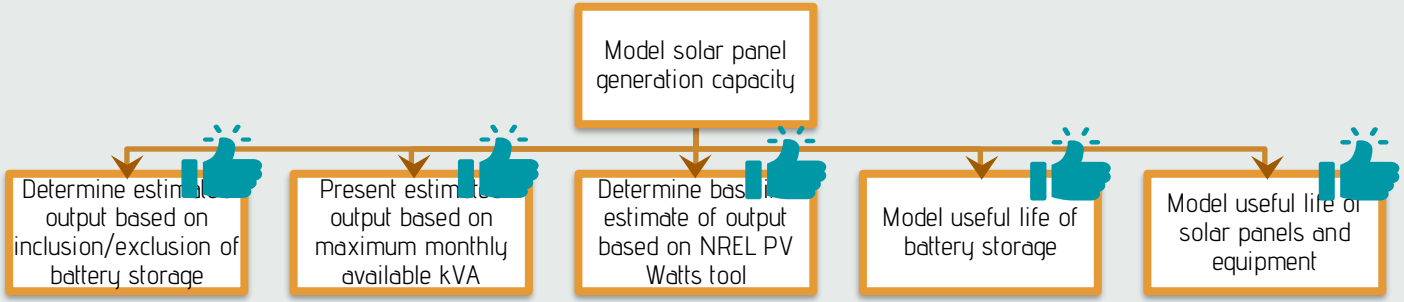

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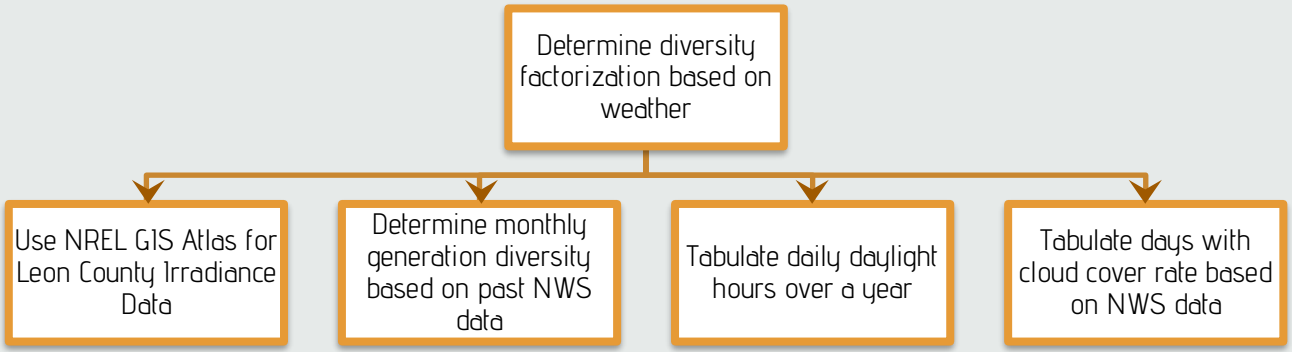

Jacob

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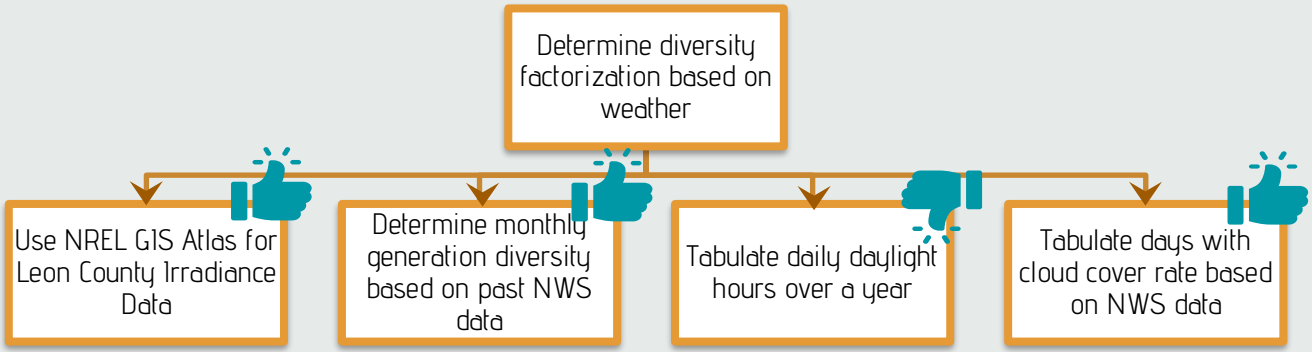

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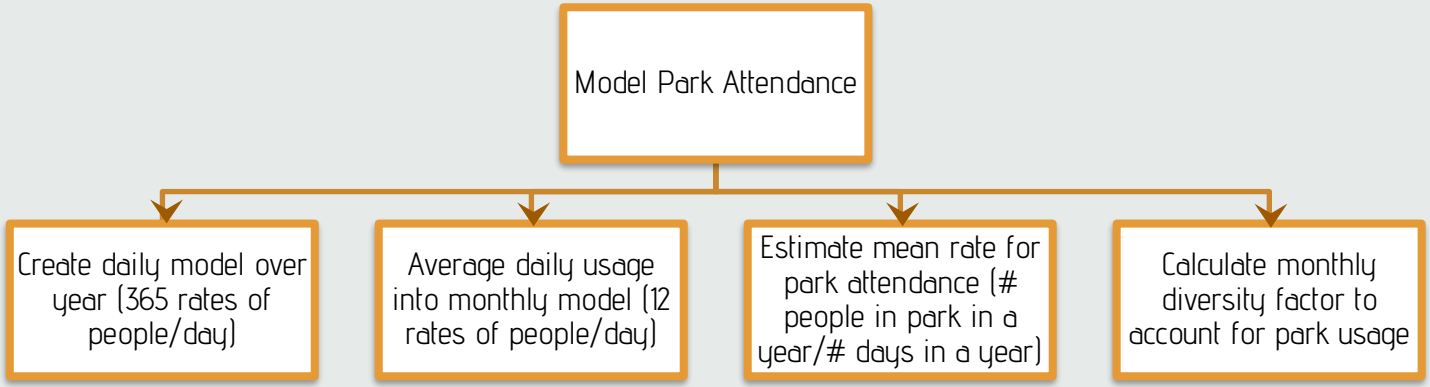

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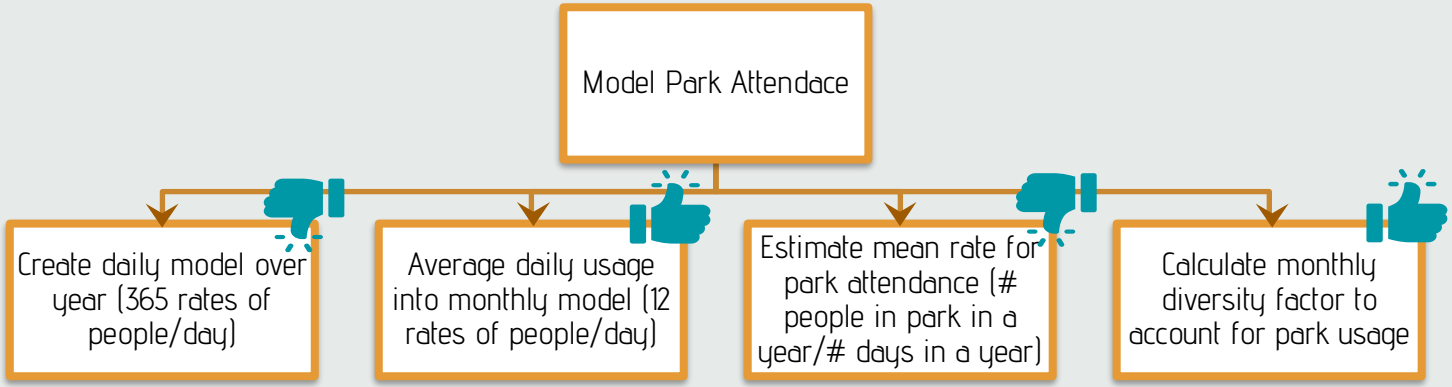

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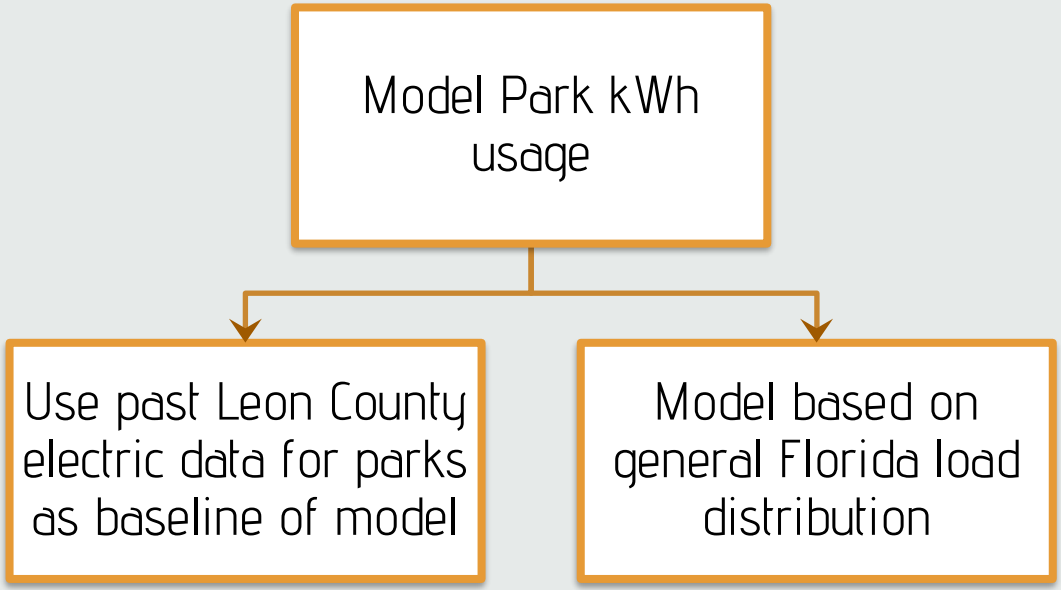

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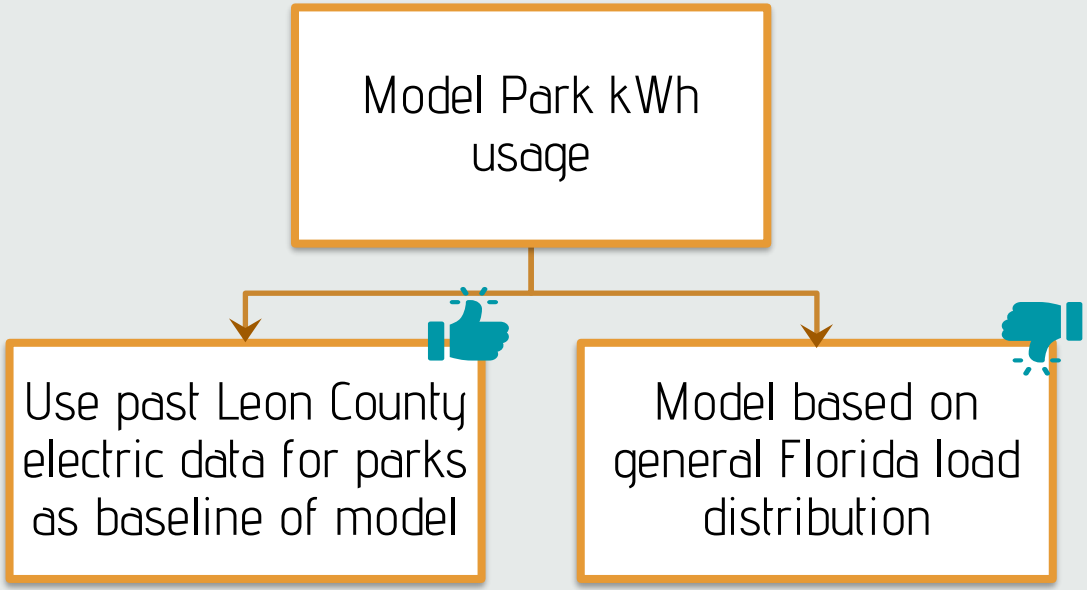

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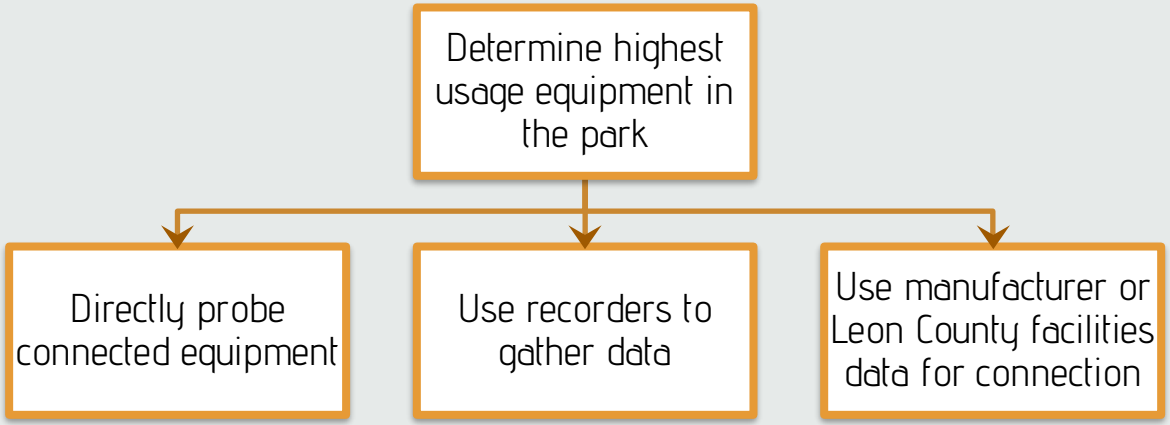

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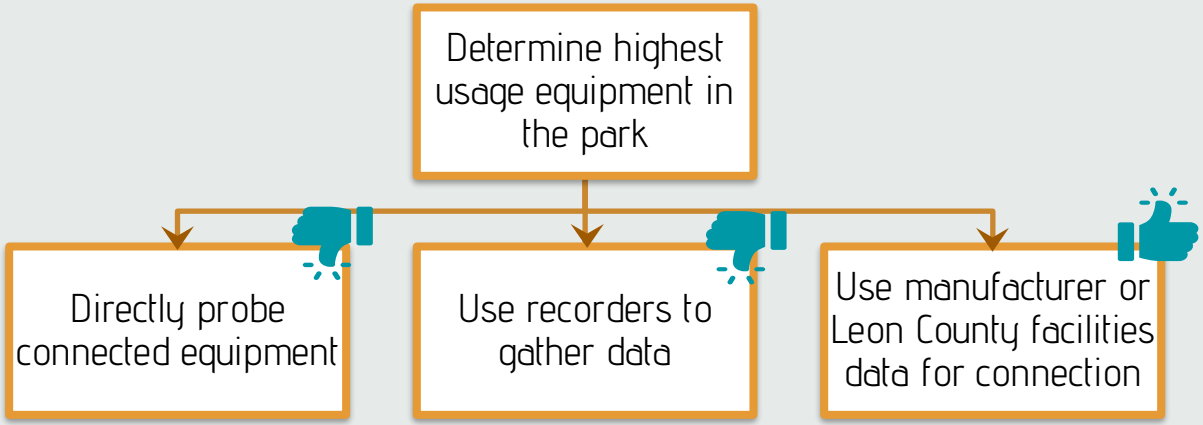

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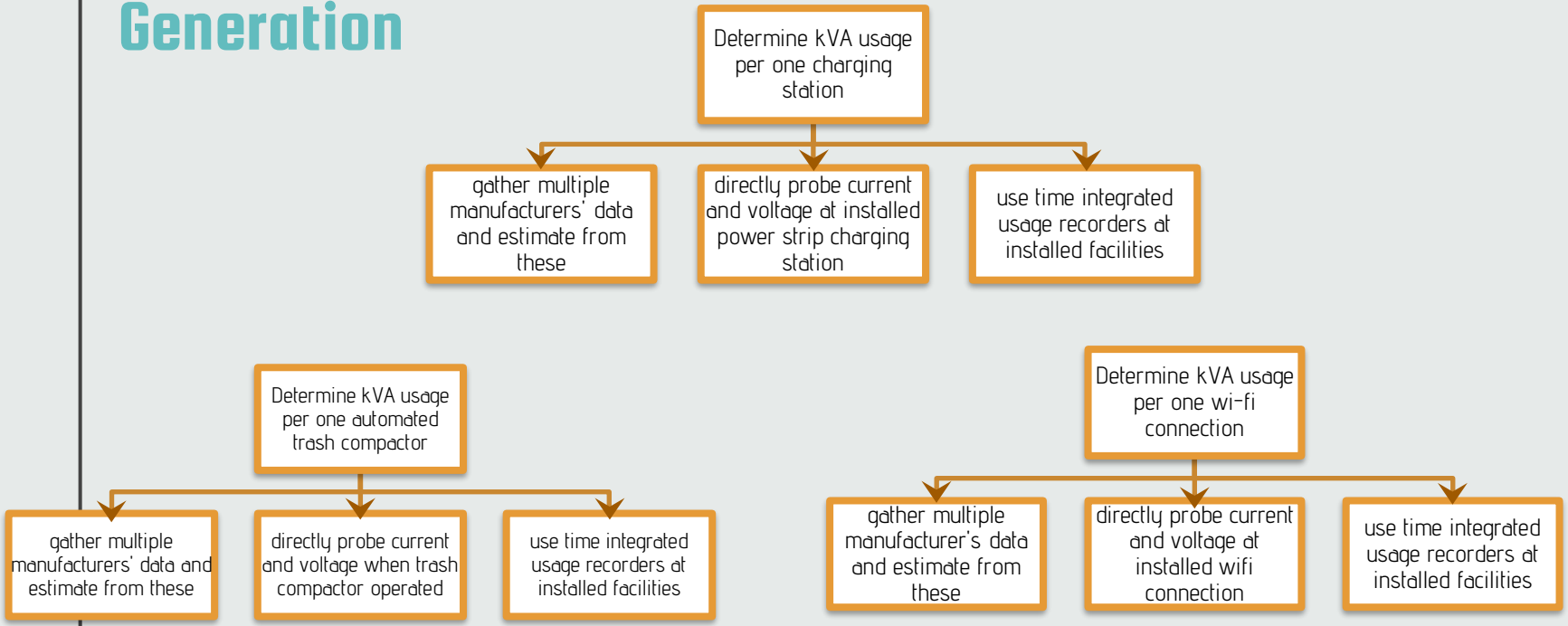

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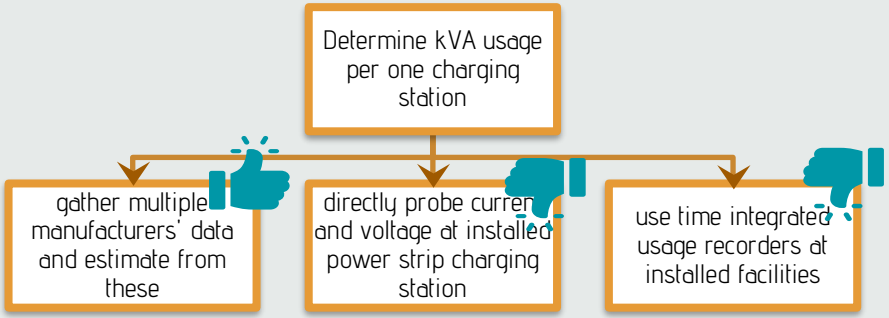
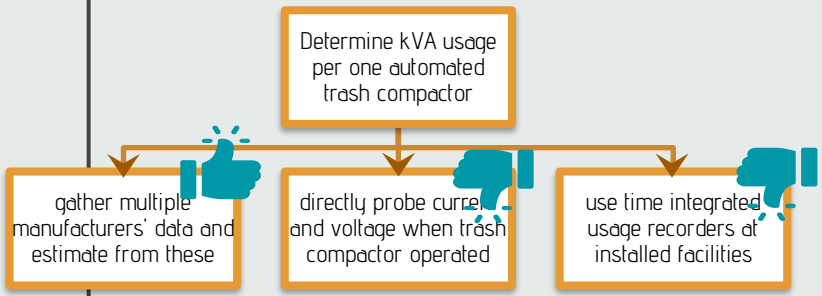
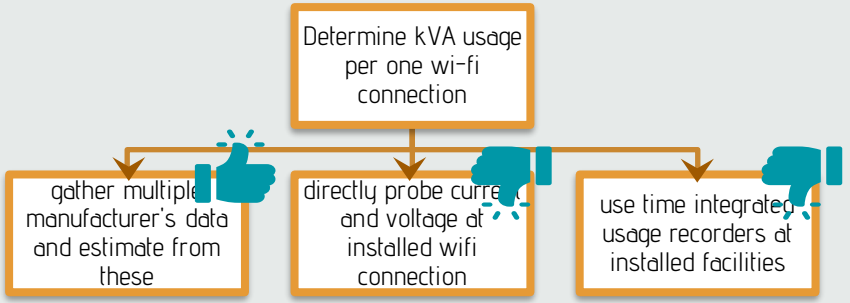






Final Selected Concept

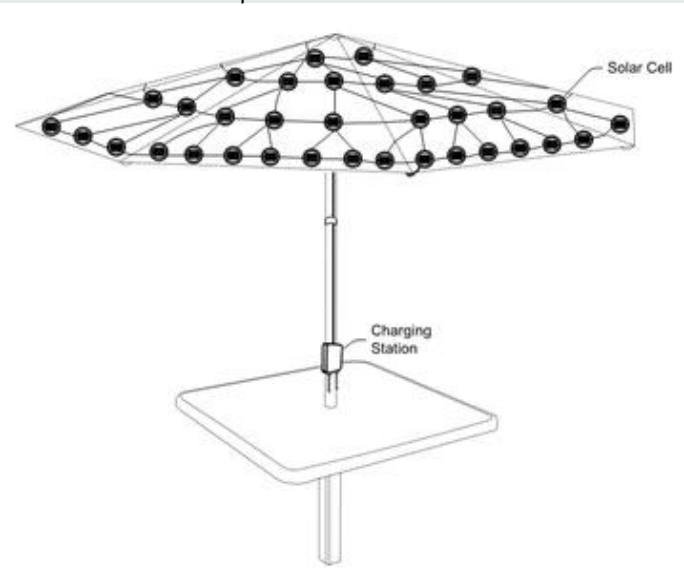
Woodville Park

Woodville Park

Woodville Park

After Careful Consideration and Analysis...

Pavilion Concept



Solar Powered Trashcan

Sean

After Careful Consideration and Analysis cont...

Solar Powered Bench

Sean

Summary

- We have a site and area for planning
- Plans for an interconnected system
- More studies need to be performed
- We are gathering data from Leon County

Moving Forward

- We have to construct a plan for Leon County
- How will the design be implemented?
- Load analysis studies
- Search for the best devices
- Delve more into Economical Analysis

Sean

Questions?