

**City of Fairfield
Minutes
Regular Meeting of City Council
April 22, 2024**

Council-Manager Briefing

Miami University Student Sustainability Presentations

Mayor Rhodus called the briefing to order at 6:00 PM. Councilmembers present: Leslie Besl, Debbie Pennington, Tim Meyers, Matt Davidson and Gwen Brill.

Staff members present: Scott Timmer, Alisha Wilson, Steve Wolterman, Greg Kathman, Adam Sackenheim, Mandi Brock, Tom Lakamp, Erin Lynn, Laurie Murphy, Chris Hacker, Greg Valandingham, Ben Mann and Carol Mayhall.

City Council heard presentations from Miami University graduate students regarding sustainability initiatives concerning electric or hybrid vehicles and solar energy solutions. See attached slides.

Business Meeting Call to Order

Mayor Rhodus called the Regular Meeting to order at 7:08 PM.

Prayer/Pledge of Allegiance

Councilmember Gwen Brill led in prayer and Pledge of Allegiance.

Roll Call

Councilmembers present included:

Attendee Name	Title	Status	Arrived
Tim Meyers	Councilmember, At-Large	Present	
Matt Davidson	Councilmember, At-Large	Present	
Gwen Brill	Councilmember, At-Large	Present	
Leslie Besl	Councilmember, 1st Ward	Present	
Dale Paullus	Councilmember, 2nd Ward	Excused	
Debbie Pennington	Councilmember, 3rd Ward	Present	
Adam Kraft	Councilmember, 4th Ward	Excused	
Mitch Rhodus	Mayor	Present	

Councilmember Pennington, seconded by Councilmember Meyers, moved to excuse Councilmembers Paullus and Kraft. Motion carried 5-0.

Agenda Modifications

None.

Executive Session Requests

Councilmember Besl, seconded by Councilmember Davidson, moved for executive session to discuss negotiations with other political subdivisions regarding requests for economic development assistance and pending or imminent litigation. Roll call vote, motion carried 5-0.

Special Presentations

a. Arbor Day Proclamation

Mayor Rhodus presented the annual Arbor Day Proclamation to Donna Faulk, Chair of the Environmental Commission.

Citizen Comments

Michael Ryan, Hamilton City Councilmember

Miami Conservancy District assessment fees have been increased and will be devastating to business and residents. People could be forced out of homes and businesses and future development is at risk. MCD failed to recognize businesses and residents are already facing increases for daily life. This is taxation without representation. He requested that City Council join Hamilton and consider supporting a resolution in support of a 2 year moratorium on raising these fees. Hamilton City Council asked for a meeting and MCD was confronted by Hamilton residents at a special meeting last week. They have asked for another meeting to try to negotiate a middle ground. Next meeting will be May 3 at 5 PM with the full board. This is a direct result of recent property tax increases of 40% and when the businesses leave, there won't be any money for the MCD to get. The increase will devastate the City of Hamilton and surrounding communities.

Joel Lauer, Hamilton City Councilmember

Remains concerned and frustrated and quite frankly disgusted by the proposed MCD increases. He is a teacher in the Hamilton School District and sees the devastating effect on his students and the struggle some of the families already face to provide for them. We have already seen what happens when Hamilton loses all of its industry. We need the safety blanket of MCD, but also need a healthy Hamilton. Hospitality industry is at highest risk, because if Spooky Nook leaves, it will devastate that industry in Hamilton and will affect Fairfield, as well. He has hope after the meeting last week and even more if neighboring communities join in to support Hamilton's efforts to fight against this increase. A healthy Hamilton makes a healthy Fairfield and vice versa.

Phil Lucenhoff, 6146 River Road

Stated he has lived here for 14 years and the dark side of the proposed senior living facility is not being discussed. He stated that there will be human waste, medical waste and food waste as a result of this facility. He said there is a lot of wildlife in the gravel pit and river area that will get into those dumpsters and make a mess and present more danger. He feels this is a biohazard, as well as a wildlife and safety concern. He feels we need updated traffic studies, because the most recent one was done during Covid and is not an accurate reflection of the amount of traffic in this area. He feels that this business does not belong in the middle of a village of houses and said neighbors are talking about moving out of Fairfield because of this project.

Barb Sheyer, 1042 Gail Avenue

National Association of Letter Carriers

Second Saturday of May is Letter Carrier Food Drive Day. The organization has collected 1.9 billion pounds of food since the inception and all of the food collected in this area goes to Shared Harvest Food Bank. This year's date is Saturday, May 11. If you would like to participate, just leave a donation in or next to mailbox and letter carriers or volunteers will stop by to pick it up. Items most needed are non-perishables like canned goods and macaroni & cheese.

Council Reports

Public Hearing(s)

None.

Approval of Minutes

The Regular Meeting Minutes of April 8, 2024 were approved as written and submitted.

OLD BUSINESS

Development Services

Councilmember Matt Davidson

Ordinance amending Ordinance No. 166-84, the Codified Ordinances of Fairfield, Ohio, Section 1141.02, the City of Fairfield, Ohio, Zoning Map by approving the concept and final development plan for the Optimized Senior Living Planned Unit Development on approximately 5.6 acres of land on three parcels located at 6131 and 6151 River Road.

Recommendation:

It is recommended that City Council have the first reading on this item at the March 25, 2024 meeting, set the joint public hearing for April 8, and await the written recommendation from the Planning Commission.

Councilmember Davidson presented the second reading of this ordinance.

RESULT:	SECOND READING	Next: 5/13/2024 7:00 PM
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Motion to amend per Planning Commission recommendation

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Matt Davidson, Councilmember, At-Large
SECONDER:	Tim Meyers, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

NEW BUSINESS

Councilmember Besl, seconded by Councilmember Davidson, moved to read all New Business by title only. Motion carried 6-0.

Community & Public Relations

City Manager Scott Timmer - Report

Councilmember Tim Meyers

Simple Motion: Motion to approve the 2024 Summer Meeting Schedule for City Council Meetings to meet the second Monday of each month of June, July and August.

Recommendation:

It is recommended that Council, via simple motion, approve the summer meeting schedule for 2024.

SIMPLE MOTION NO. 11-24. APPROVED 5-0.

RESULT:	APPROVED [UNANIMOUS]
MOVER:	Tim Meyers, Councilmember, At-Large
SECONDER:	Debbie Pennington, Councilmember, 3rd Ward
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Public Safety

City Manager Scott Timmer - Report

Councilmember Dale Paullus

Motion to Suspend Second and Third Readings

Councilmember Meyers presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Tim Meyers, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to authorize the City Manager to execute the FEMA Fire Prevention & Safety Grant Application and Agreement for a virtual reality fire extinguisher training system and a projection screen fire extinguisher training system and declaring an emergency.

Recommendation:

It is recommended that City Council authorize the preparation of legislation, with rules suspension and emergency provision, authorizing the City Manager to execute and file the application for financial assistance, and enter into an agreement for a grant to fund a portion of the fire extinguisher training project.

ORDINANCE NO. 50-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Tim Meyers, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Motion to Suspend Second and Third Readings

Councilmember Meyers presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Tim Meyers, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to authorize the City Manager to execute the Firehouse Subs Public Safety Foundation Grant Application and Agreement for a virtual reality fire extinguisher training system and declaring an emergency.

Recommendation:

It is recommended that City Council authorize the preparation of legislation, with rules suspension and emergency provision, authorizing the City Manager to execute and file the application for financial assistance, and enter into an agreement for a grant to fund a portion of the fire extinguisher training project.

ORDINANCE NO. 51-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Tim Meyers, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Public Utilities

City Manager Scott Timmer - Report

Councilmember Debbie Pennington

Motion to Suspend Second and Third Readings

Councilmember Pennington presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Debbie Pennington, Councilmember, 3rd Ward
SECONDER:	Tim Meyers, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to authorize the City Manager to enter into a contract with RedZone Robotics for professional and technical services related to the multi-sensor robotic inspection of the City's large diameter sanitary sewers.

Recommendation:

It is recommended that City Council authorize the City Manager to enter into a contract with RedZone Robotics and appropriate \$435,000.00 to provide professional services related to the inspection of the City's large diameter sanitary sewers, using advanced robotic equipment and associated data analytics.

ORDINANCE NO. 52-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Debbie Pennington, Councilmember, 3rd Ward
SECONDER:	Tim Meyers, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Finance & Budget

City Manager Scott Timmer - Report

Councilmember Gwen Brill

Motion to Suspend Second and Third Readings

Councilmember Brill presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to amend Ordinance No. 166-23 entitled “An Ordinance to make estimated appropriations for the expenses and other expenditures of the City of Fairfield, Ohio, during a period beginning January 1, 2024, and ending December 31, 2024” - Supplemental Appropriations.

Recommendation:

It is recommended that City Council authorize and direct the preparation of legislation amending the annual operating budget.

ORDINANCE NO. 53-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Motion to Suspend Second and Third Readings

Councilmember Brill presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Tim Meyers, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to amend Ordinance No. 166-23 entitled “An Ordinance to make estimated appropriations for the expenses and other expenditures of the City of Fairfield, Ohio, during a period beginning January 1, 2024, and ending December 31, 2024.”

Recommendation:

It is recommended that City Council suspend the rules requiring a second and third reading of this Ordinance and adopt the appropriations listed above.

ORDINANCE NO. 54-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Motion to Suspend Second and Third Readings

Councilmember Brill presented the first reading of this ordinance.

RESULT:	CARRIED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Ordinance to amend Ordinance No. 166-23 entitled “An Ordinance to make estimated appropriations for the expenses and other expenditures of the City of Fairfield, Ohio, during a period beginning January 1, 2024, and ending December 31, 2024.”

Recommendation:

It is recommended that City Council suspend the rules requiring a second and third reading of this Ordinance and adopt the appropriations listed above.

ORDINANCE NO. 55-24. APPROVED 5-0.

RESULT:	ADOPTED [UNANIMOUS]
MOVER:	Gwen Brill, Councilmember, At-Large
SECONDER:	Matt Davidson, Councilmember, At-Large
AYES:	Meyers, Davidson, Brill, Besl, Pennington
EXCUSED:	Paullus, Kraft

Meeting Schedule

Clerk Wilson read the following meeting schedule:

- A. Monday, May 13 - Council-Manager Briefing, 6:00 PM; Regular Meeting 7:00 PM
- B. Tuesday, May 28 - Council-Manager Briefing, 6:00 PM; Regular Meeting 7:00 PM
- C. Monday, June 10 - Council-Manager Briefing, 6:00 PM; Regular Meeting 7:00 PM

Executive Session of Council (if needed)

Council recessed to Executive Session at 7:51 PM.

16. ADJOURNMENT

The Regular Meeting adjourned at 8:21 PM.

ATTEST:

Clerk of Council

Mayor's Approval

Date Approved _____

Fairfield EV Fleet Feasibility Report

M.En students: Bridget Dougherty, Brennen Testa, Kathryn Yurek, Andreanna Zaverl

Advisors: Dr. Amanda Bentley Brymer, Dr. Jonathan Levy, and Todd Foster

Miami University

Department of Environmental Science (IES)

04/22/24

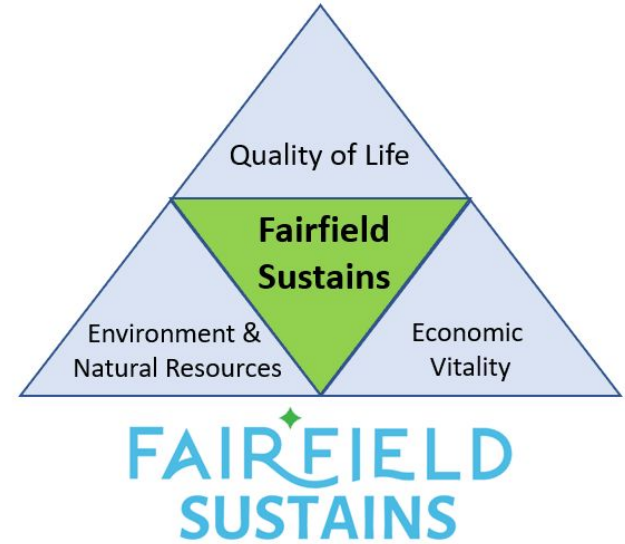
Fairfield Clients: Adam Sackenheim, Erin Lynn, & Brian Rose

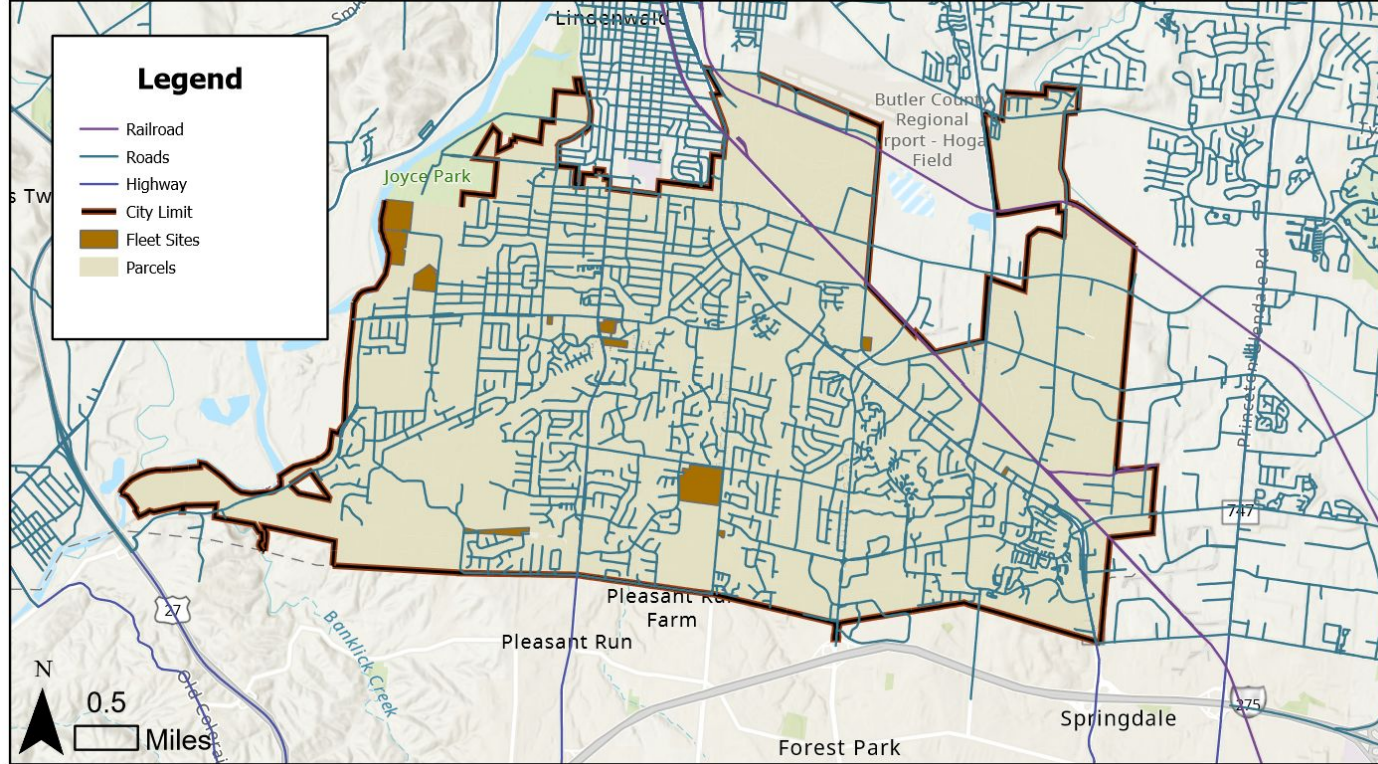
Why the Interest in EV?

Goal: Convert 20% of non-emergency City fleet vehicles to EV, hybrid or clean fuels by 2030

Convert 100% of non-emergency City fleet vehicles to EV, hybrid or clean fuels by 2055

17% of the GHG emissions in Fairfield came from municipal fleet in 2021





Map 1. City of Fairfield and vehicle fleet sites (per CMTA vehicle chargers quote).

Data courtesy of The City of Fairfield. Map produced by Kathryn Yurek.

Goals and Objectives

Goal: Assess the **feasibility** of transitioning the City of Fairfield's fleet to **electric or hybrid vehicles**. This assessment includes recommendations for transitioning **municipal, utility, and emergency response** vehicles.

Case Study
Comparisons

Vehicle
Recommendations

Funding
Opportunities

Charging Capacity

Final Deliverables

→ **Five** Deliverables provided to the client

Final Professional
Service Project
Report

Case Study
Comparison
Spreadsheet

Transition
Schedule

Total Cost of
Ownership Excel
Tool

Electrification
Coalition/Clean
Fuels Ohio Excel
Tool

Chapter 2: Case Studies

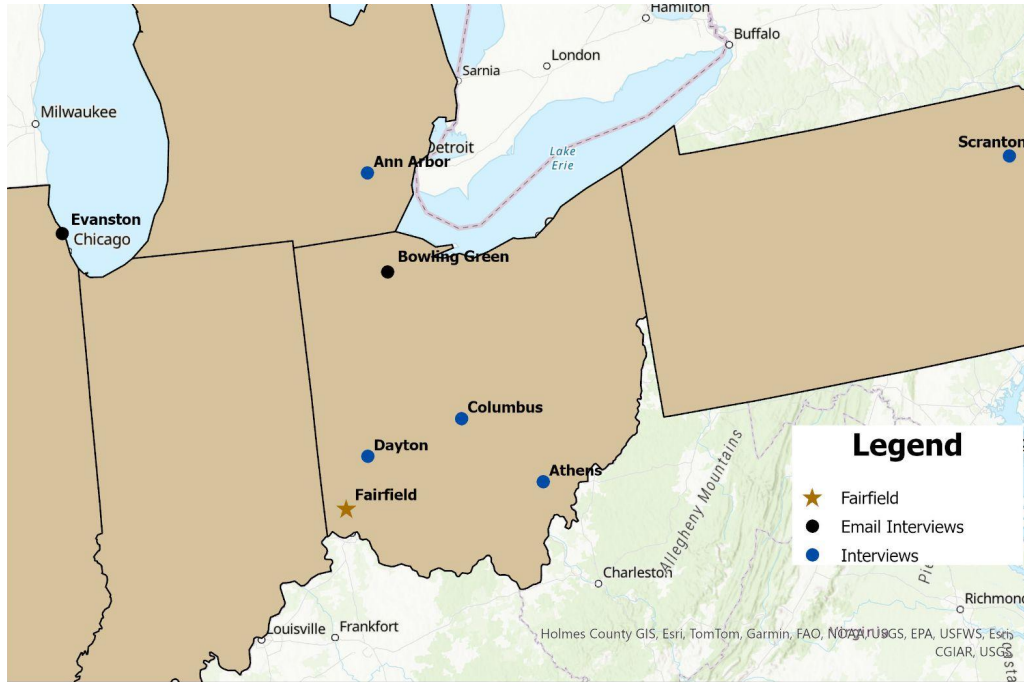
Case Studies

- Semi-structured interviews to gather information on fleet transition from cities of similar size and geography of Fairfield
- Dissect recommendations, lessons learned, and characteristics of a case study city in an Excel document (example below)

	Small City	Medium City	Large City	Utilized IRA Funding	State Funding	<5yr Transition	5-10yr Transition	10-20yr Transition	20+ yr Transition	Similar Climate	Colder Climate	Warmer Climate
City A	x			x					x	x		
City B		x		x				x				x
City C	x				x		x				x	

EV	Hybrid	Light Duty	Heavy Duty	Emergency Response Vehicles	Completed	In-progress	Planned
x	x	x		x			
	x	x	x				
x		x					

Case Studies



- ➔ Reached out to 11 Cities
- ➔ Responses from 7 Cities
 - ◆ 5 face-to-face
 - ◆ 2 email responses

Common Themes

- Motivations for Transition
- Transition Timelines
- Greenhouse Gas Emissions Assessments
- Vehicle Transitions
- Financing Transitions
- Issues Experienced
- Role of Perception
- Accounting for Future Technology
- Benefits
- Lessons Learned

Issues Experienced

- Supply chains issues
- Not establishing charging before purchasing vehicles
- More expensive than internal combustion engine (ICE)
 - ◆ Incentives can make it more comparable
- Shorter range in colder weather

Benefits

- Reduction in fuel, maintenance and operation costs
 - ◆ Haven't observed significant increases in electric bill (Athens)
- Better air quality
- Less GHG emissions and smaller carbon footprint
- Job creation for EV mechanics
- Greater visibility of sustainability

Lessons Learned

- Having supportive policy and local decision makers makes it easier
- Join coalitions
- Address charging infrastructure before purchasing vehicles
- Create EV Policy Committee and procurement framework
- “May be a top down initiative, but it’s always a bottom up sell” - Columbus



**Power A Clean
Future Ohio**
LOCAL COMMUNITIES LEADING THE WAY



Chapter 3: Vehicle Recommendations and Transition Schedule

Vehicle Recommendations



Old Fleet



New Fleet

Vehicle Recommendations

- Total cost of ownership
- Greenhouse gas emission estimation
- Vehicle Recommendation/ Transition Schedule

Vehicle Recommendations - Total Cost of Ownership (Ellram et al., 2023)

- **Net Present Value** = (0.1, Year 1, Year 2, Year 3...) + -Initial Investment
- Sensitivity Analyses: Tax Credit Benefits & Gas Price

	Initial Investment	Discount Rate	Year 1	Year 2	Year 3	Year 4	Year 5	NPV
Chevy Bolt	(\$26,500)	0.1	6424	-1338	-1296	-1796	-1741	(\$33,006)
Nissan Leaf EV	(\$26,500)	0.1	6437	-1167	-1302	-1450	-1566	(\$31,724)

Sedan TCO Top 4 Results Including Tax Credits

	Type	Gas Price \$3.00	Gas Price \$3.50	Gas Price \$4.00
Chevy Bolt	EV	\$33,006	\$33,006	\$33,006
Nissan Leaf	EV	\$31,724	\$31,724	\$31,724
Toyota Corolla Hybrid	Hybrid	\$38,973	\$39,409	\$39,844
Toyota Prius	Hybrid	\$43,521	\$43,900	\$44,279

Sedan & Mower Recommendations



- Chevy Bolt EV
- ◆ Vehicle **continually mentioned by cities** across our interviews
 - ◆ Columbus, Athens, Scranton, Dayton, and Ann Arbor
 - ◆ 15- Year TCO: \$33,000

Image Credit: <https://www.edmunds.com/> & <https://www.greenworkcommercial.com/products/cz60r24x-optimusz-60-24kwh-ride-on-zero-turn-mower>



- Greenworks Commercial OptimusZ Electric Mower
- ◆ All the cities interviewed have not considered the transition of mowers.
 - ◆ Greenworks electric mowers are **less expensive** and have a **larger battery capacity** than Toro mowers
 - ◆ 15- Year TCO: \$30,300

SUV TCO Top 5 Results Including Tax Credits

	Type	Gas Price \$3.00	Gas Price \$3.50	Gas Price \$4.00
Chevy Bolt EUV	EV	\$36,304	\$36,304	\$36,304
Kia Niro EV	EV	\$44,875	\$44,875	\$44,875
Hyundai IONIQ	EV	\$50,557	\$50,557	\$50,557
Toyota bZ4X	EV	\$51,032	\$51,032	\$51,032
Chevy Blazer EV	EV	\$58,893	\$58,893	\$58,893

SUV Recommendations



→ Hyundai IONIQ 5 (AWD)

- ◆ Cheapest SUV option with **All-Wheel Drive**
- ◆ Ann Arbor adapted the Sedan version
- ◆ 15- Year TCO: \$55,500

→ Chevy Bolt EUV

- ◆ More affordable option compared to the Hyundai IONIQ but **does not have All Wheel Drive**
- ◆ 15- Year TCO: \$40,000

→ Chevy Blazer EV

- ◆ Higher price than Hyundai IONIQ 5 and Chevy Bolt EUV but offers All Wheel Drive and adapted by Notre Dame, Athens, and Scranton
- ◆ **Future Police Pursuit Rated**
- ◆ 15- Year TCO: \$58,900

→ Ford Police Interceptor Utility Hybrid

- ◆ Adaptation to the Hybrid Ford Escape
- ◆ **No cities have transitioned to EV police.** Bowling Green transitioned some police vehicle to Hybrid Interceptors.
- ◆ 15- Year TCO: \$57,000

Image Credit: <https://www.edmunds.com/>

Truck and Van TCO Results Including Tax Credits

	Type	Gas Price \$3.00	Gas Price \$3.50	Gas Price \$4.00
Ford F-150 Lightning	EV	\$48,961	\$48,961	\$48,961
Ford F-150	Gas	\$54,287	\$55,406	\$56,526
Ford E-Transit Van	EV	\$55,497	\$55,497	\$55,497
Chrysler Pacifica Hybrid	Hybrid	\$78,279	\$79,399	\$80,519

Truck and Van Recommendations



- Ford F-150 Lightning
- ◆ Every city interviewed that was transitioning trucks opted for the Ford F-150 Lightning
 - ◆ Notre Dame, Scranton, Dayton, and Ann Arbor
 - ◆ 15- Year TCO: \$49,000



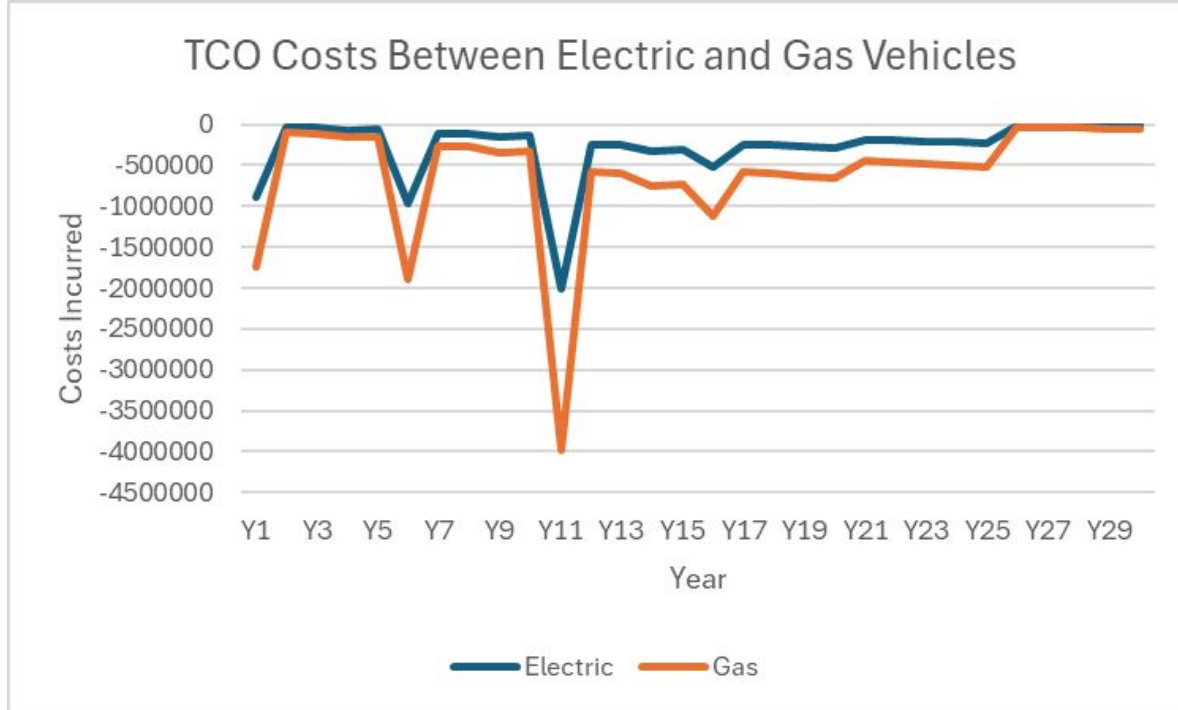
- Chevy Pacifica Hybrid
- ◆ Recommended to replace **passenger vans** by the Electrification Coalition/Clean Fuels Ohio
 - ◆ 15- Year TCO: \$78,300



- Ford E-Transit Van
- ◆ Recommended to replace cargo vans by the Electrification Coalition/Clean Fuels Ohio
 - ◆ Limited range of 108-126 miles per charge
 - ◆ Adopted by the City of Ann Arbor
 - ◆ 15- Year TCO:

Image Credit: <https://www.edmunds.com/>

Costs Savings When Adopting EVs



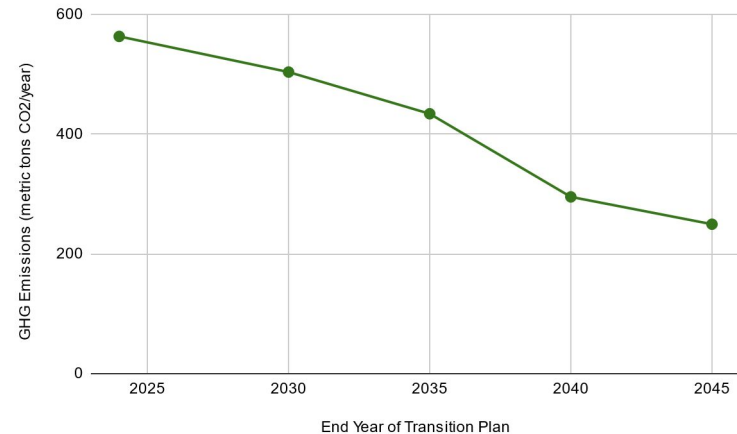
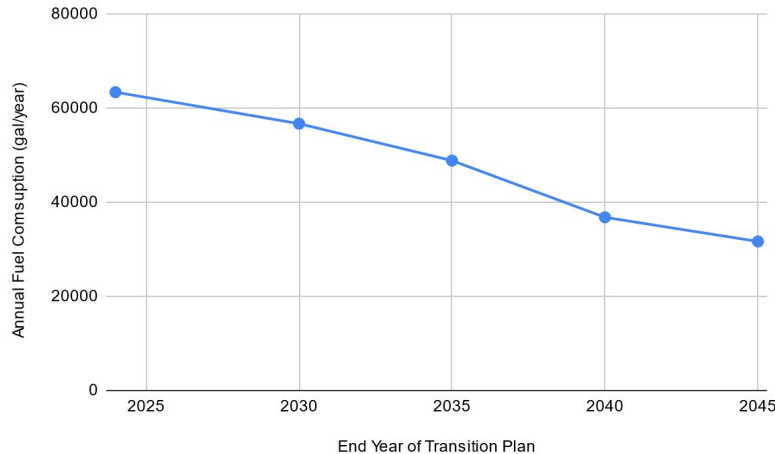
→ Gas Costs: \$9,807,896

→ Electric Costs: \$8,485,025

Total Cost Savings: \$1,322,870

Transition Plan

- Replaces 125 vehicles in Fairfield's fleet with hybrid or EV models by 2045
- 50.1% reduction in fuel consumption
- 55.7% reduction in GHG emissions



Transition Plan

- ➔ Divided into four 5-year periods; Reassess at the end of each 5 year period
- ➔ A look at part of the 2025-2030 phase:

2025-2030					
VIN#	Current Vehicle	Replacement	MSRP	Fuel Consumption Reduction (gal/yr)	GHG Reduction (metric tons CO2/yr)
1GC2KUEG1FZ114500	Chevrolet Silverado 4x4	Ford F-150 Lightning	\$42,000	194	1.72
1GNFK13037J377472	Chevrolet Tahoe 4-Dr 4x4	Hyundai IONIQ 5 (awd)	\$42,000	559	4.97
1GNSKAE08DR183884	Chevrolet Tahoe 4-Dr 4x4	Hyundai IONIQ 5 (awd)	\$42,000	755	6.71
1GC2CVCG5DZ396661	Chevrolet Silverado 2500 excab	Ford F-150 Lightning	\$42,000	224	1.99
1GC0KVCGXDX354495	Chevrolet Silverado 2500 4x4	Ford F-150 Lightning	\$42,000	669	5.95
3B7KF23Z52M307032	Dodge Ram 2500 4x4	Ford F-150 Lightning	\$42,000	503	4.47
NM0LS7AN6CT102400	Ford Transit Connect	Ford E-Transit Cargo	\$43,500	407	3.62
1FADP3E27DL124950	Ford Focus	Chevrolet Bolt EV	\$26,500	210	1.86
1GNSK2E02ER178056	Chevrolet Tahoe 4x4 ls	Hyundai IONIQ 5 (awd)	\$42,000	485	4.31
1C4PJMAK7CW200913	Jeep Liberty 4x4	Hyundai IONIQ 5 (awd)	\$42,000	264	2.35
1GCSGAF46D1174448	Chevrolet Express Van 1500	Ford E-Transit Cargo	\$43,500	775	6.88
1FM5K8ARXEG80139	Ford Explorer AWD	Hyundai IONIQ 5 (awd)	\$42,000	121	1.08
1GNDT13S182262953	Chevrolet Trailblazer	Hyundai IONIQ 5 (awd)	\$42,000	277	2.47
345500	Exmark Viking VH3615KAC	Greenworks Commercial OptimusZ 60" 24kWh Ride-On Zero-Turn Mower	\$27,000	7.08	0.07
1FTSE34LX3HA43833	Ford E350	Chrysler Pacifica Hybrid	\$52,500	12	0.115
1FM5K8AR0EGC61084	Ford Explorer AWD	Ford Police Interceptor Utility (hybrid)	\$33,500	285	2.54
1FM5K8AR8EGB80138	Ford Explorer AWD	Ford Police Interceptor Utility (hybrid)	\$33,500	268	2.38
2G1WS553281352588	Chevrolet Impala	Ford Police Interceptor Utility (hybrid)	\$33,500	88	0.78

Chapter 4: Funding Opportunities

State Funding Opportunities

Charging Infrastructure Grants:

- OKI Regional Council of Governments Carbon Reduction Program
- Community Charging and Fueling Grants (DriveOhio)

EV Acquisition/Procurement Grants:

- Medium- and Heavy-Duty Emissions Reduction Grants

Federal Funding Opportunities

Charging Infrastructure Grants:

- SMART Grants Program

Workforce Development Grants:

- Workforce Opportunity for Rural Communities (WORC) Initiative
- Build to Scale Program

EV Acquisition/Procurement Grants:

- Diesel Emissions Reduction Act Program (EPA)

Tax Credits:

- Up to \$7,500 tax credit
- 12-month open ended lease of EVs get tax credits (Columbus)

Chapter 5: Charging Capacity

Charging Capacity

- CMTA assessment
- Calculate the amount of electricity required to charge recommended vehicles
 - ◆ $(\text{Average annual mileage} / \text{range of EV battery}) * \text{kWh capacity}$

Charging Capacity

- CMTA conducted a charging assessment for the City of Fairfield
- Level 2 and 3 chargers are required; Level 1 chargers are not feasible
- Opt for basic chargers rather than “smart” chargers
- Total cost for infrastructure: \$11.6 million
 - ◆ \$6.6 million for the Justice Center, but we are recommending mostly hybrids

Location Name	Address	Recommended Charger	Amount of Chargers	Amount of Vehicles
Fairfield Municipal Building	5350 Pleasant Ave.	Level 2	4	8
Fairfield City Justic Center	675 Nilles Rd.	Level 2	15	50
		Level 3	10	
Fairfield Public Works Department	8870 N Gilmore Rd.	Level 2	15	29
Fire House 32	6540 Dixie Hwy.	Level 2	2	4
Fire House 33	6118 Winton Rd.	Level 2	2	4
Golf Maintenance Facility	2605 Augusta Blvd	Level 2	1	2
Parks Maintenance Facility	6174 Gray Rd	Level 2	2	8
Fairfield Community Arts Center	411 Wessel Dr.	Level 2	3	6
Fire House 31	375 Nilles Rd.	Level 2	4	7
Fairfield Water Works	5201 Groh Ln.	Level 2	7	13
Wastewater Treatment	4799 Groh Ln.	Level 2	6	10

Charging Capacity

- Given our transition schedule, the following amount of electricity will be consumed annually by the end year of each transition phase to charge the fleet EVs.
- A range is given to account for reduced battery life in cold weather and variation in vehicle models with regular vs long-range batteries.

End Year of Transtion Phase	Charging Capacity Required Annually (kWh)
2030	40,646 - 51,547
2035	84,704 - 106,769
2040	145,629 - 182,635
2045	167,151 - 209,357

Conclusion

→ Key Quotes

"you've got to have data, data, data to drive your decisions"

"I do think that taking your time and making sure you have the infrastructure there and everything is important because you don't want to get the cart before the horse and then create a bad taste in people's mouth"

"One difficult scenario should not prevent you from getting an EV for the everyday tasks"

→ Other factors to consider include community and society impacts beyond the scope of this project

Acknowledgements

City of Fairfield

- **Adam Sackenheim**, Public Utilities Director
- **Erin Lynn**, Planning Manager
- **Brian Rose**, Facilities & Fleet Manager

Our Advisors

- **Dr. Amanda Bentley Brymer**, Assistant Director Institute for the Environment & Sustainability (IES)
- **Dr. Jonathan Levy**, Director of IES
- **Todd Foster**, Professor at Miami University

Other Contributors

- **Dr. Lisa Ellram**, Professor at Miami University



Questions

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April 15h, 2024

1.A.b



RENEWABLE ENERGY INTEGRATION: SOLAR POWER IMPLEMENTATION FOR FAIRFIELD WASTEWATER TREATMENT PLANT

GILLIAN HART, JONATHAN HAUMAN,
ALDEN TROTTER, COLIN VALENTINO

*PROFESSIONAL SERVICE PROJECT FOR THE MASTER
OF ENVIRONMENTAL SCIENCE PROGRAM*

WELCOME

Team Solar

- Gillian Hart
- Jonathan Hauman
- Alden Trotter
- Colin Valentino

City of Fairfield

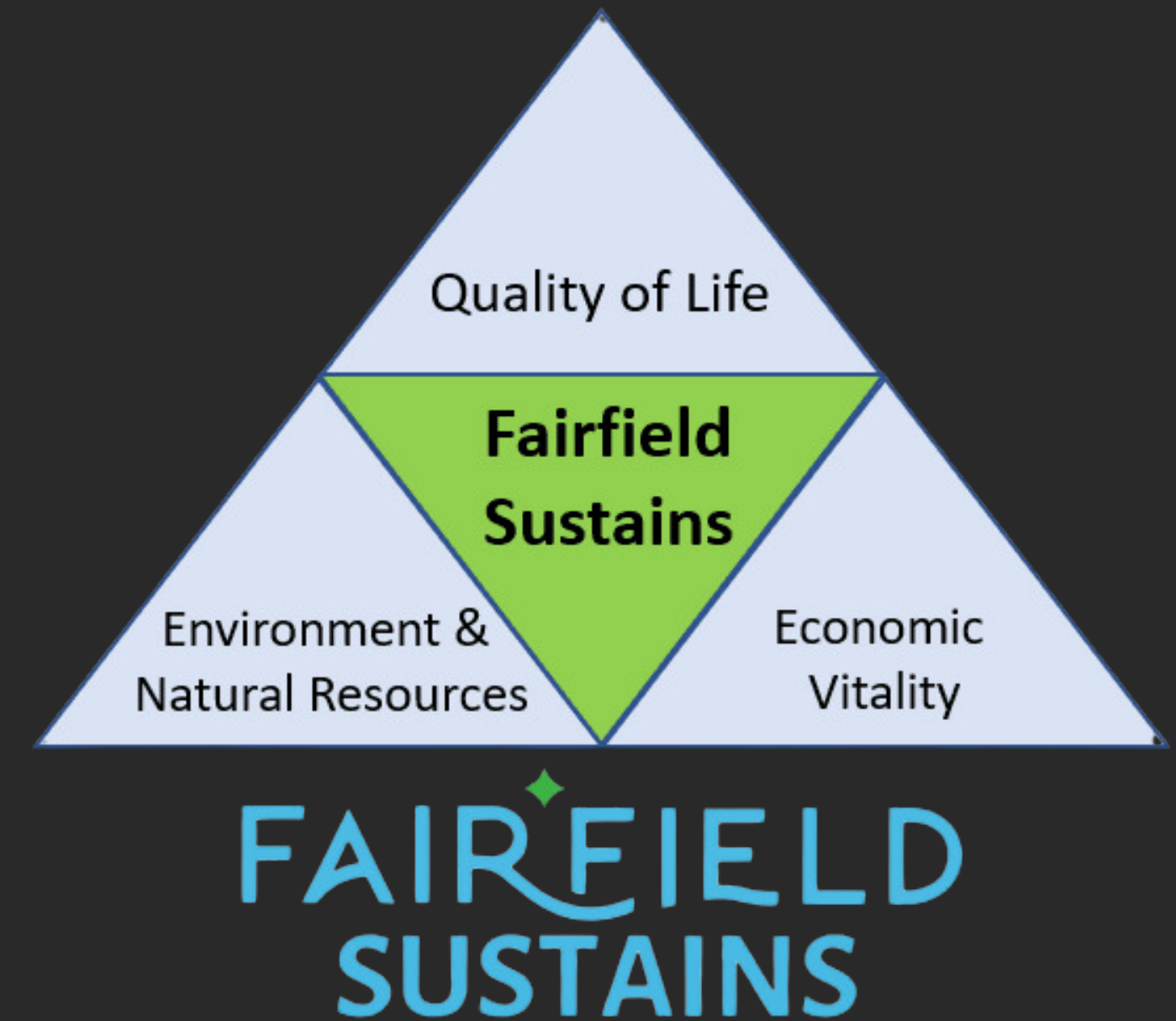
- Adam Sackenheim, Public Utilities Director
- Erin Lynn, Planning Manager

Miami University Institute for the Environment & Sustainability

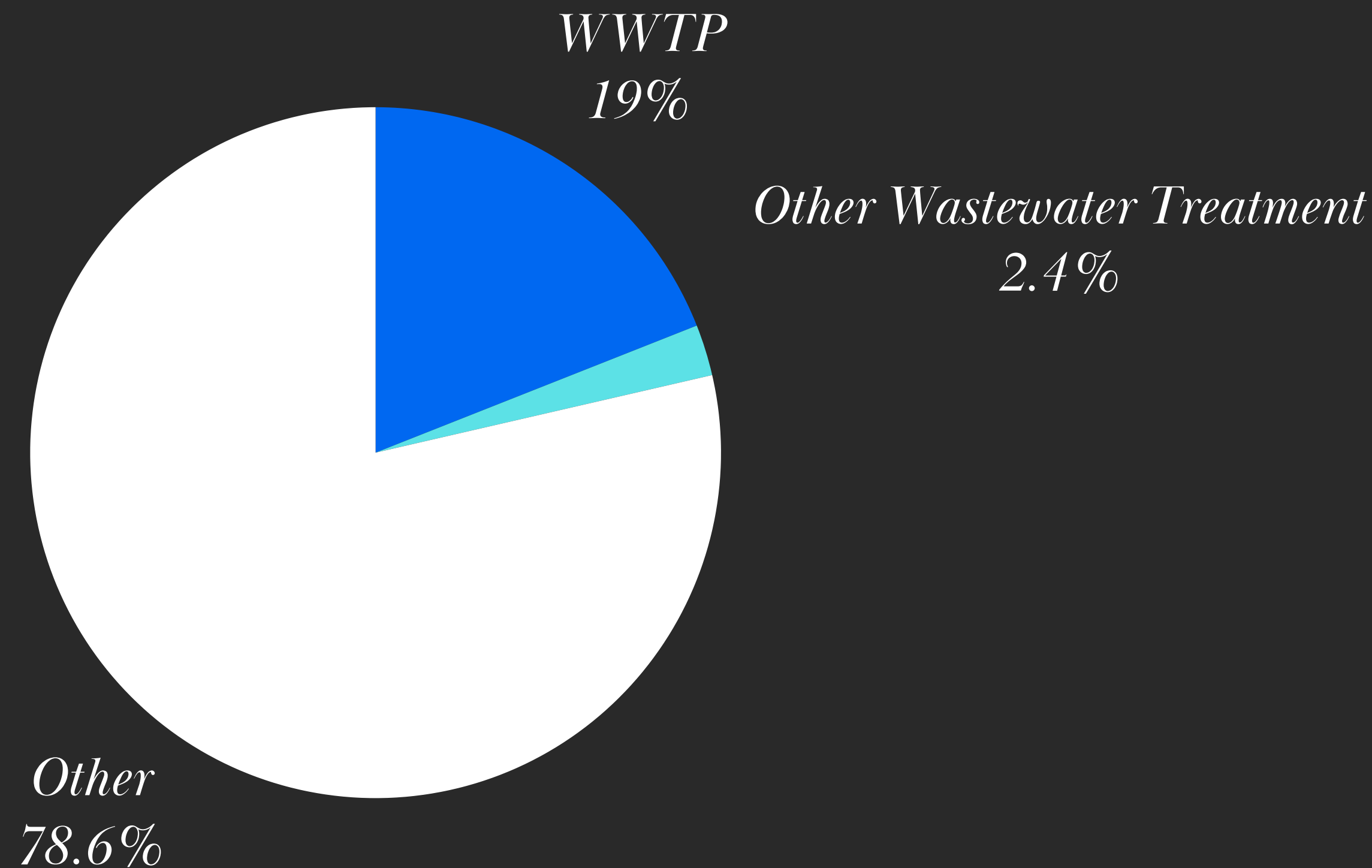
- Dr. Amanda Bentley Brymer, Assistant Director, Advisor, Project Supervisor
- Dr. Jonathan Levy, Director
- Todd Foster, Advisor

BACKGROUND INFORMATION

- The City of Fairfield Sustainability Plan is a city-wide initiative to increase sustainability, addressing environmental, economic, and livability in the city.
- In pursuit of this objective, the city's primary aim is to decrease energy use and greenhouse gas emissions from its municipal operations.
- One potential solution under consideration involves powering the wastewater treatment facility with solar energy.



CITY OF FAIRFIELD ELECTRICITY USAGE (2023)



Municipal Electrical Usage

PROJECT LOCATION



Source: Google Maps

GOAL & OBJECTIVES

The goal of this project is to analyze the financial, logistical, and spatial feasibility of installing solar panels at the City of Fairfield wastewater treatment plant to ultimately provide a guide to help our clients meet their sustainability goals and reduce operating costs.

Objective 01

*Identify
Relevant
Permits and
Regulatory
Requirements*

Objective 02

*Determine Land
Suitability and
Flood
Mitigation
Strategies*

Objective 03

*Estimate Solar
Panel Capacity
and Power
Production*

Objective 04

*Calculate Cost-
Benefit Analysis*

OBJECTIVE METHODOLOGY

Literature Review

Climate Change Models

*Sunlight Data / Solar Power
Yield*

*Solar Panel Recycling
Strategies*

Grants / Tax Credits

*Financial Information
Compilation*

Interviews

Government Officials

*Solar Power
Companies*

*Wastewater Treatment Plant
Directors*

Case Studies

Newark, OH

Lebanon, OH

PERMITS & REGULATIONS

Primary Goal

To navigate the many legal, permitting, and regulatory requirements to this project in order for this project to be fully compliant from the beginning and to prepare for any obstacles that may arise

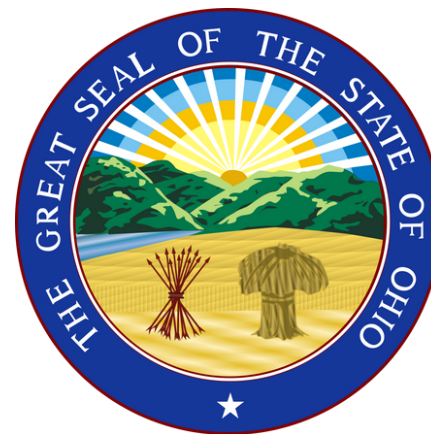
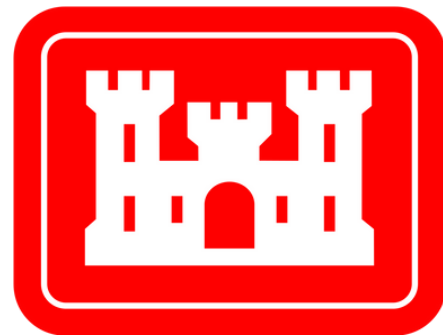
Organizations, Regulations, and Permits Investigates



FEMA



**Environment
Protection
Agency**



REGULATIONS AND PERMITS DELIVERABLES

Planning	Implementation	Construction
<u>Duke Energy</u>: Interconnection Application <u>Fairfield</u> : Notice of Alterations to a Watercourse <u>USACE</u>: Pre-Construction Notification	<u>Fairfield</u>: Floodplain Development Permit <u>ODNR</u>: Flood Hazard Area Development Permit <u>Ohio EPA</u>: 401 Water Quality Certification Permit <u>Ohio EPA</u>: Stormwater Discharge General Permit <u>FEMA</u>: No-Rise Certification <u>USACE</u>: Nationwide Permit 51	<u>Fairfield</u>: Accessory Structures Zoning <u>Fairfield</u>: Nonresidential Structures Zoning <u>Fairfield</u>: Post-Construction Certification

LAND SUITABILITY- FLOOD MITIGATION SOLUTIONS

Flooding in Fairfield

- Floodplain
- Flood of summer 2003
- Boats

Interviews

- FEMA
- Ohio EPA
- Solar companies
- Newark, OH
- Lebanon, OH
- Fairfield, OH

Climate Change

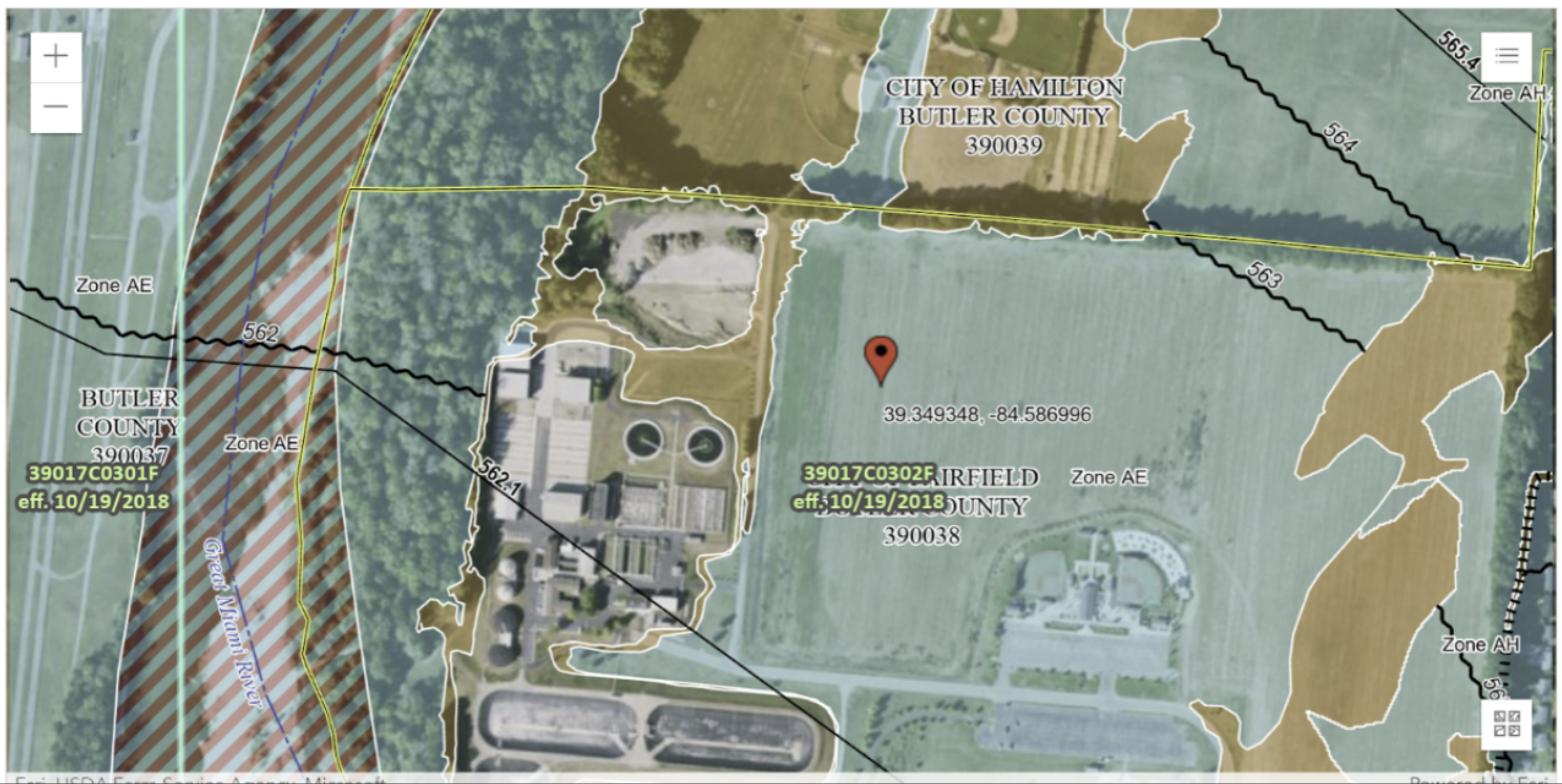
Intensity vs frequency

- More precipitation per storm
- Increased flash flooding
- Less impact on frequency

Solutions

- Civil Design
 - *Minimize flooding*
- Structural Design
 - *Minimize damage*
 - *Newark & Lebanon, OH*

FLOOD MAP OF PROPOSED AREA



Source: FEMA

SOLAR PANEL CAPACITY AND POWER PRODUCTION

Methodology

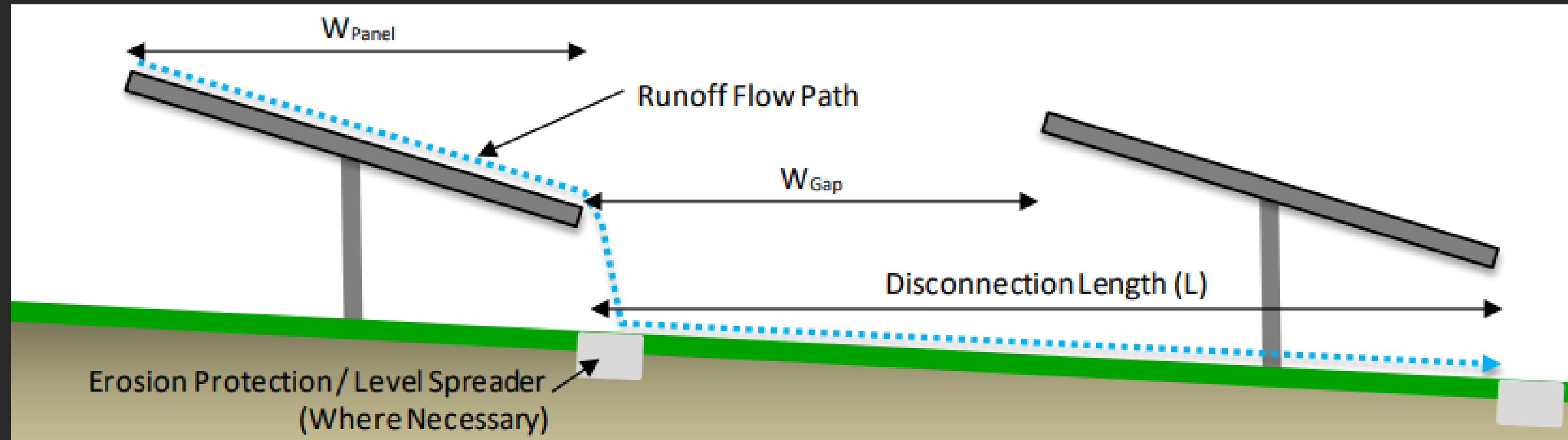
- Power production estimation
- Solar panel capacity
- Recycling strategies

Deliverables

- Electrical generation document
- Simulation of electrical generation



SOLAR PANEL CAPACITY



Source: Ohio EPA

Capacity Estimation Methodology

- Aerial imagery
- Module size
- Axis type
- Geographic location

Example Inputs

- Panel model: SunPower Solar series-A
- 40" width x 72" height
- Fixed axis
- Proposed site
- 54.4" inter-row spacing

POWER PRODUCTION ESTIMATION

System Production	3639 MWh/yr
Specific production	1277 kWh/kWp/yr
Normalized production	3.50 kWh/kWp/day

Simulation Inputs

Main parameters

☒ Orientation

☐ System

☒ Detailed losses

☒ Self-consumption

☒ Storage

Optional

☒ Horizon

☒ Near Shadings

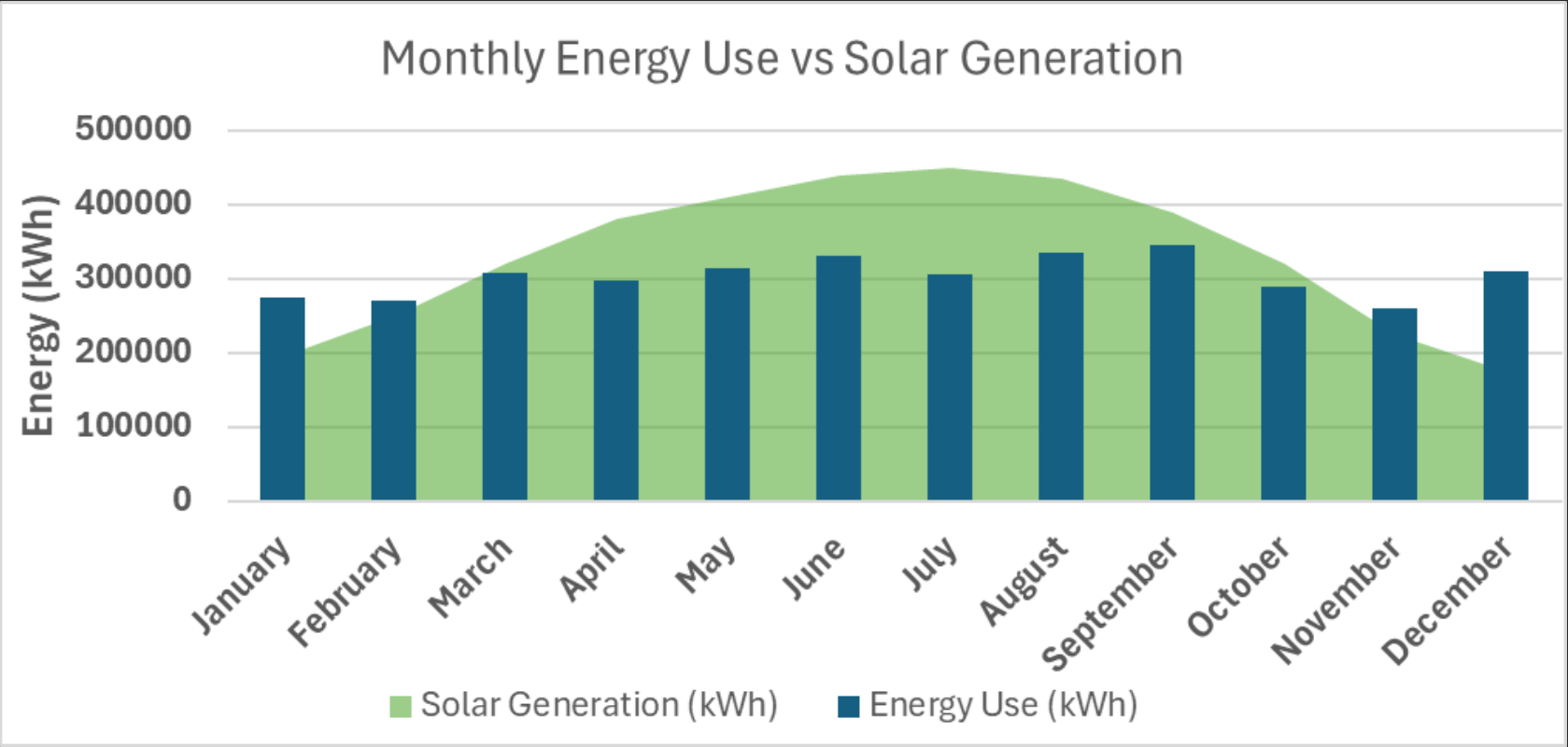
☐ Module layout

☒ Energy management

☐ Economic evaluation

Source: PVSyst

Power Production by Month

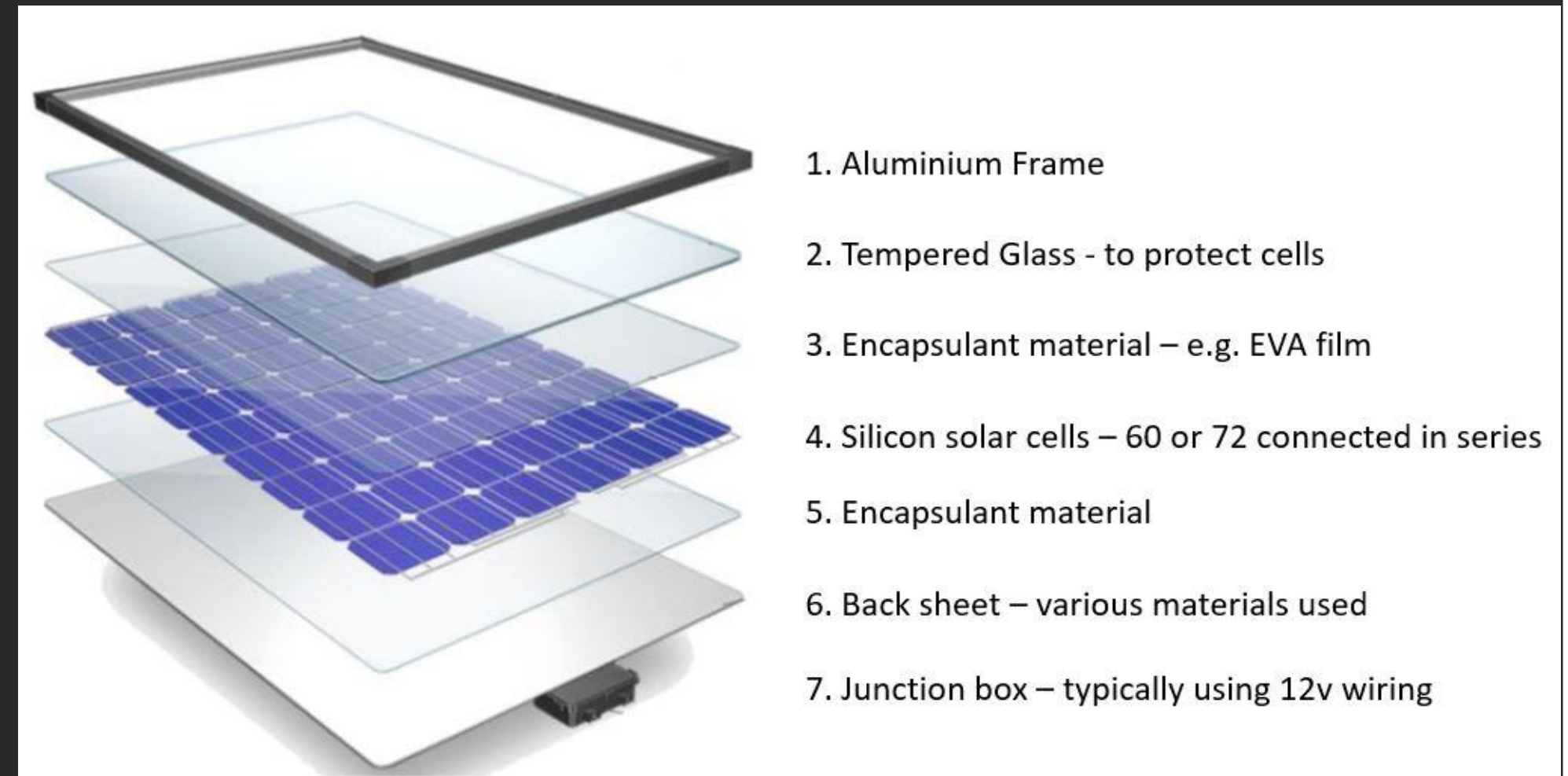


Source: Melink

RECYCLING STRATEGIES

Easily Recyclable Materials

- Glass accounts for roughly 75% of the panels by weight and is somewhat easily recyclable
- Aluminum
- Copper
- Plastic components



Source: Solar Choice

Current Challenges

- Hazardous materials (lead, cadmium)
- Lack of larger scale industry wide recycling
- Potentially expensive to dispose at end of life cycle

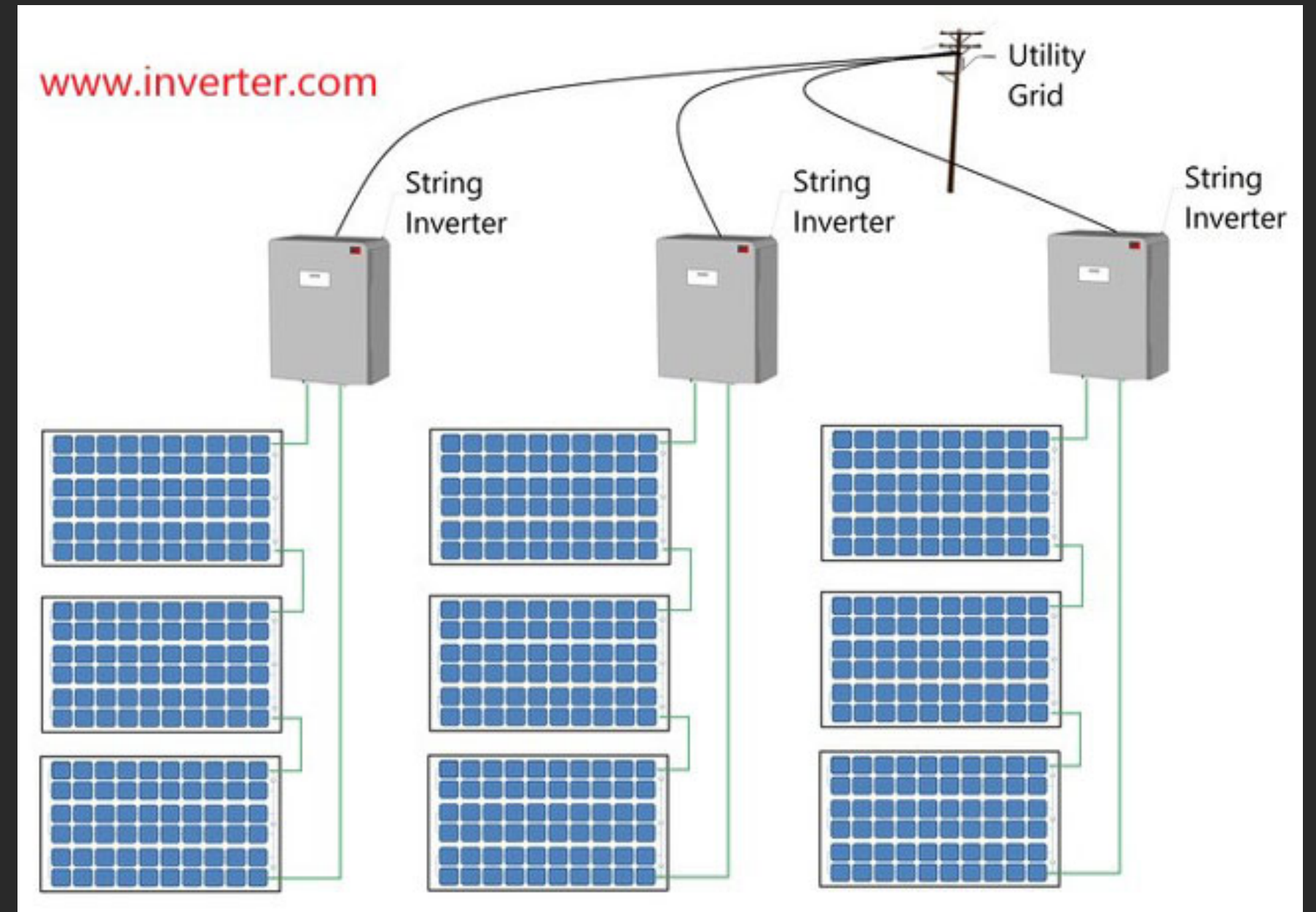
Lifespan and degradation

- Panels typically have a 30 year lifespan
- Annual degradation rate of .45% (Melink)

ELECTRICAL DESIGN RECOMMENDATIONS

Electrical Design

- String inverters (BRE, Director of Power Delivery Engineering, Ben Wilson)
- Fixed Axis panels (Nicholas Dill)
- Elevated electrical systems



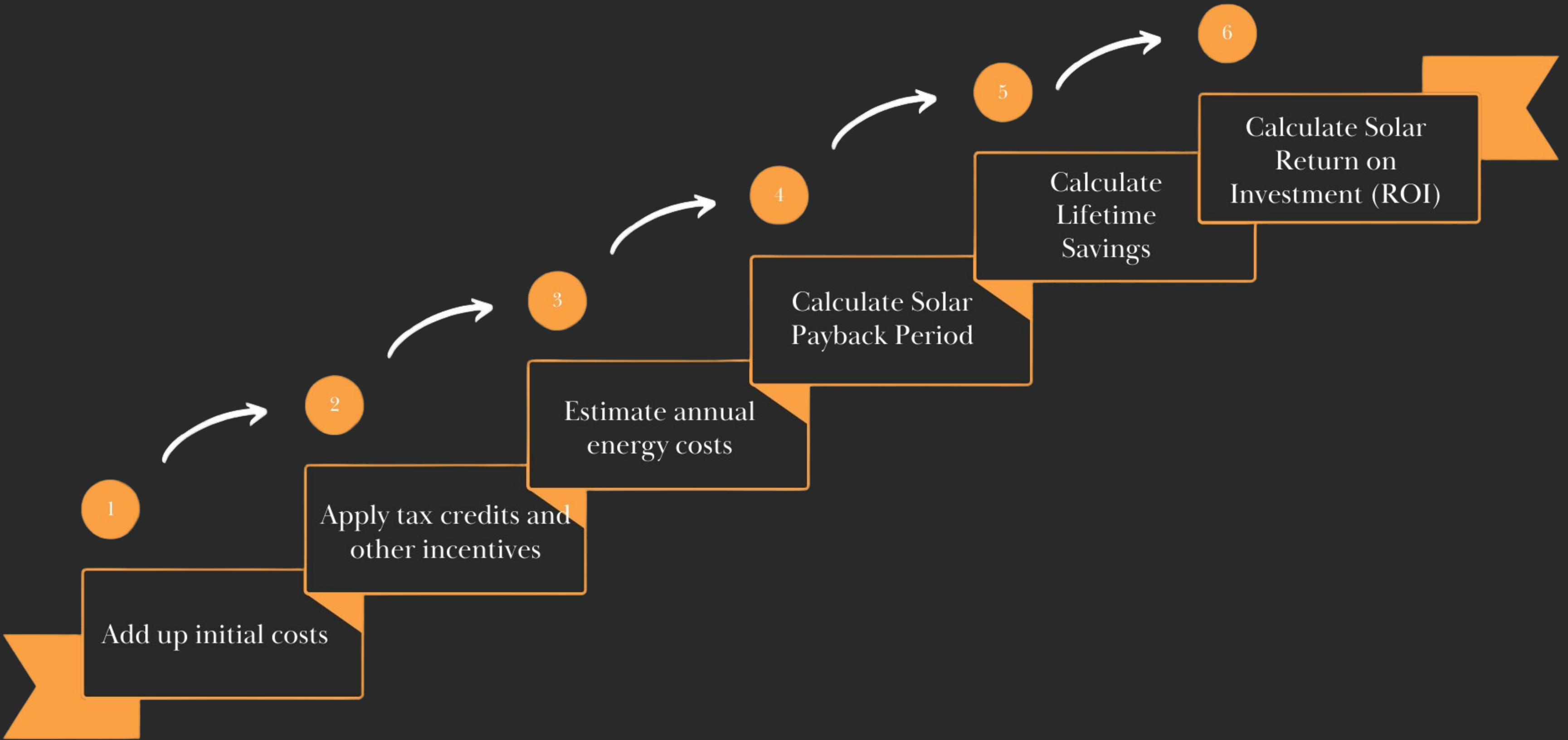
Source: Inverter.com

COST SCENARIOS & ROI



Solar PV System Cost: \$4,578,392

ROI CALCULATION METHODOLOGY



FINANCING OPTIONS

Cash Purchase

- Involves outright buying of the solar energy system with funds from the buyer's resources.

Power Purchase Agreement (PPA)

- Contract between business and third-party solar provider for purchasing solar-generated electricity.

Solar Loan

- Financing upfront solar costs through loans from financial institutions or solar financing companies.

Property Assessed Clean Energy (PACE) Financing

- Offers straightforward financing for energy upgrades with no upfront capital requirement.

Financing Option	Pro	Con
Cash Purchase	- Immediate ownership - Maximum financial benefits - Long-term return on investment - No monthly payments	- Significant upfront cost - Responsibility for maintenance - Opportunity cost - Lack of financing benefits
Solar Loan	- Financing flexibility - Spread-out cost - Preserve capital - Enjoy benefits	- Interest payments - Credit requirements - Total cost - Loan approval process
Power Purchase Agreements (PPAs)	- Minimal upfront capital costs - Reduced energy costs - Risk mitigation - Utilization of tax credits - Potential property value increase	- Ownership of SRECs - More complex buyout options - Potential property tax increase - Contract commitment - Involvement of additional party
PACE Financing	- Full coverage of project costs - No personal guarantees required - Off-balance sheet treatment - Fixed-rate and fixed-payment terms - Triple net lease pass-through	- Requirement for mortgage holder consent - Limited availability - Potential impact on property taxes - Potential impact on property taxes

ROI SCENARIOS

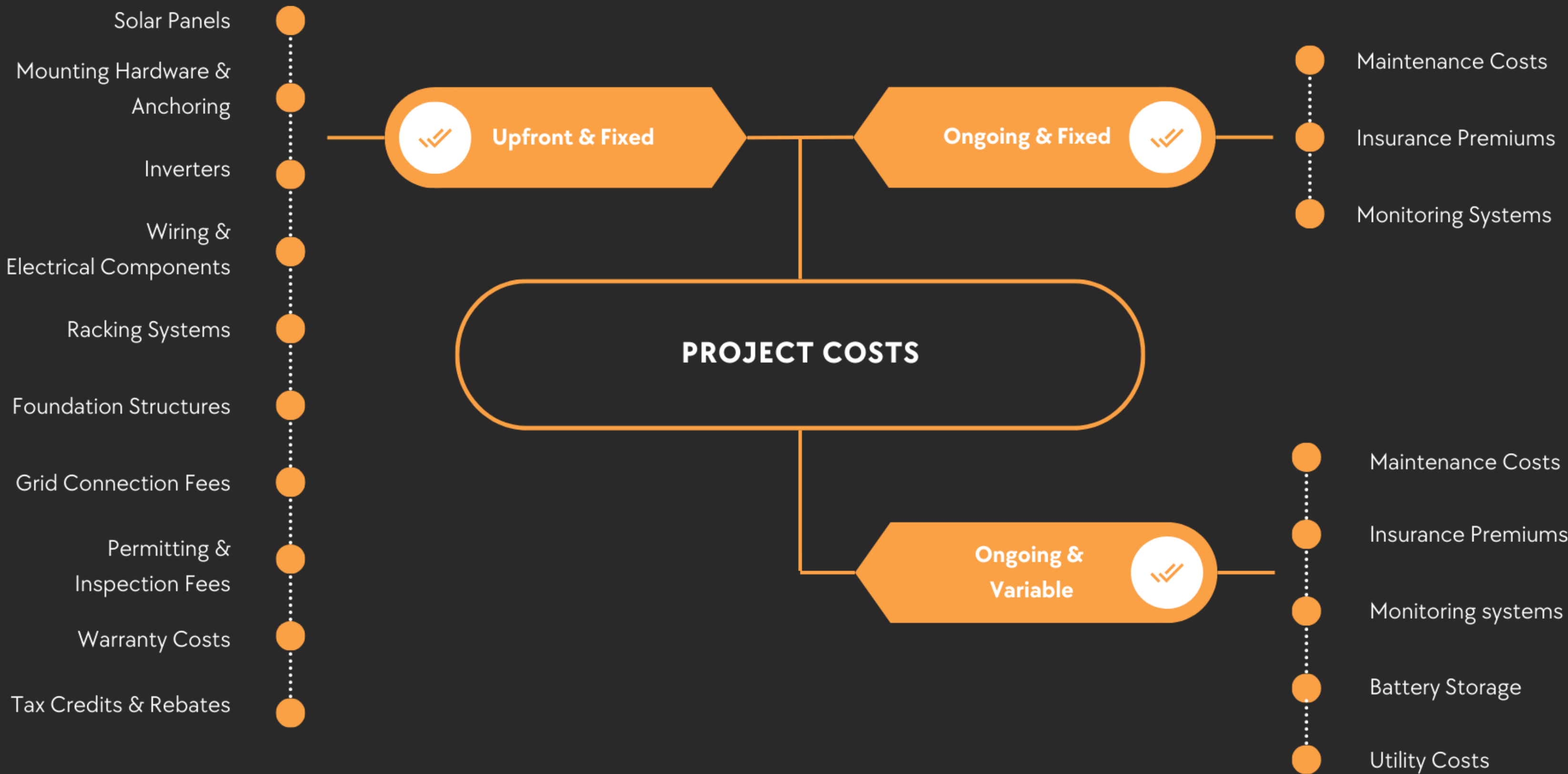
Cash Purchase

Loan with 4.9% Loan Rate

Power Purchase Agreement (PPA) (term of 30 years and a 2.5% escalation rate)

PROJECT COSTS

22



TAX CREDIT APPLICATION

ITC Credit

- The Investment Tax Credit (ITC) reduces income tax liability for a percentage of the cost (30%) of installing solar energy systems and is taken into account in the calculation of the ROI scenarios.

Solar PV System Cost: \$4,578,392 - ITC Credit: \$1,373,518 = Net Solar PV System Cost:
\$3,204,874

Other Incentives

- State incentives and private/public partnerships were not considered in the ROI scenarios, but are incorporated in the final report.

ROI SCENARIOS

*Cash Purchase**

Solar Payback Period: 12 years

Lifetime Savings: variable (year one savings \$278,110)

Return on Investment: highest and quickest ROI

Loan with 4.9% Loan Rate

Solar Payback Period: 31 years

Lifetime Savings: variable (year one savings \$278,110)

Return on Investment: second lowest ROI

Power Purchase Agreement (PPA) (term of 30 years and a 2.5% escalation rate)

Return on Investment: no up-front or out-of-pocket costs to the city but has the lowest ROI

CONCLUSION

If the City of Fairfield chooses to move forward with this initiative, we can predict:

- Reduced greenhouse gas emissions from wastewater operations
- Increased sustainability and progress towards Fairfield Sustains goals
- Reduced operating and electrical costs
- Long-term economic benefits
- Negligible negative environmental impact
- Serve as an example for future projects involving solar in other cities

ACKNOWLEDGMENTS

We'd like to again thank our advisors, clients, and interviewees for this opportunity:

Advisors

- Dr. Amanda Bentley Brymer, Assistant Director, Advisor, Project Supervisor
- Dr. Jonathan Levy, Director
- Todd Foster, Advisor

Clients

- Adam Sackenheim, Public Utilities Director
- Erin Lynn, Planning Manager

Interviewees

- Bryan Curry - Wastewater Facilities Manager, City of Newark, OH
- Shawn Coffey - Director of Electric, City of Lebanon, OH
- Nicholas Dill - City Engineer, City of Fairfield, OH
- Wesley Sluga - Stormwater Supervisor, Ohio EPA
- Eric Kuklewski - Branch Chief, FEMA
- Brian Kelly - President, Sea Bright Solar
- Scott Ameduri - President, Enerlogics
- Ben Wilson - Assistant Vice President, Ohio's Electric Operatives
- Olivia Herron - Director of Sustainability, Miami University

THANK YOU

ANY QUESTIONS?