



Department of Energy Program Review November 19, 2019

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Forest County Potawatomi Community

Background Forest County Potawatomi Community

The Potawatomi were once a part of a historical confederacy made up of the Ojibwa, Odawa and Potawatomi Nations known as the Council of the Three Fires. The Ojibwa were addressed as the “Older Brother” as such were also the “Keeper of the Faith”. The Odawa were referred to as the “Middle Brother” and were the “Keepers of the Trade”. The Potawatomi were known in this confederacy as “Little Brother” and “Keeper of the Fire”.

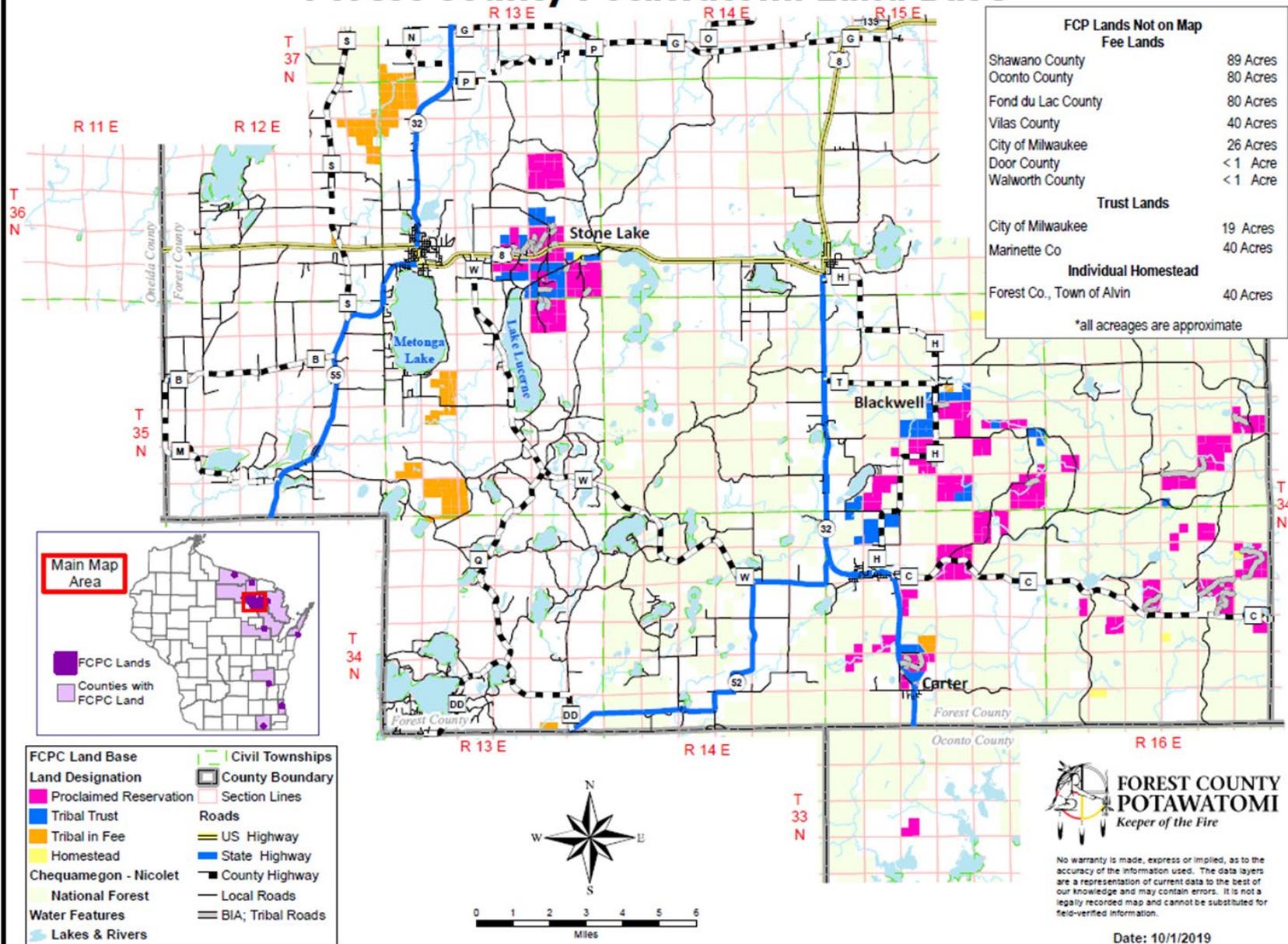




Background...

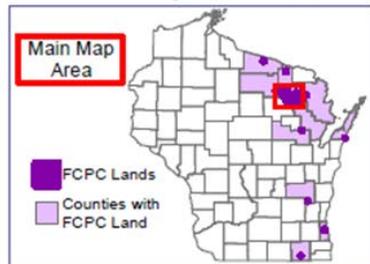
- ▶ The Potawatomi people occupied and controlled about 30 million acres in the Great Lakes area. In the 16th century, they migrated south and settled along the shores of Lake Michigan.
- ▶ They lived close to the Ottawa and Chippewa tribes which the 3 tribes formed an alliance together. The Potawatomi were tasked with keeping the Sacred Fire alive.
- ▶ In the 1800s, major portions of the Potawatomi lands were ceded to the US Government. They were forcibly removed from their tribal lands following the Treaty of Chicago in 1833.
- ▶ Some tribal members rebelled against the forceful removal and refused to leave the Great Lakes Region.
- ▶ In 1937 the Forest County Potawatomi Nation was formally organized under a constitution and bylaws.
- ▶ Today, FCPC includes more than 1,200 enrolled members and approximately 14,000 acres of forests, clear lakes, and streams.
- ▶ The Potawatomi are rich in honor, tradition and emotion. They cherish their special connection with the environment and its cycle of life following the season of nature.

Forest County Potawatomi Land Base

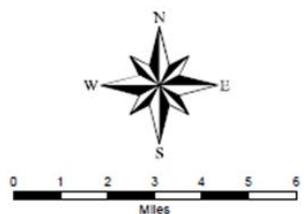


FCP Lands Not on Map	
Fee Lands	
Shawano County	89 Acres
Oconto County	80 Acres
Fond du Lac County	80 Acres
Vilas County	40 Acres
City of Milwaukee	26 Acres
Door County	< 1 Acre
Walworth County	< 1 Acre
Trust Lands	
City of Milwaukee	19 Acres
Marinette Co	40 Acres
Individual Homestead	
Forest Co., Town of Alvin	40 Acres

*all acreages are approximate



- FCPC Land Base**
- Land Designation**
 - Proclaimed Reservation
 - Tribal Trust
 - Tribal in Fee
 - Homestead
 - Chequamegon - Nicolet
 - National Forest
 - Water Features
 - Lakes & Rivers
- Other Features**
 - Civil Townships
 - County Boundary
 - Section Lines
 - Roads
 - US Highway
 - State Highway
 - County Highway
 - Local Roads
 - BIA; Tribal Roads

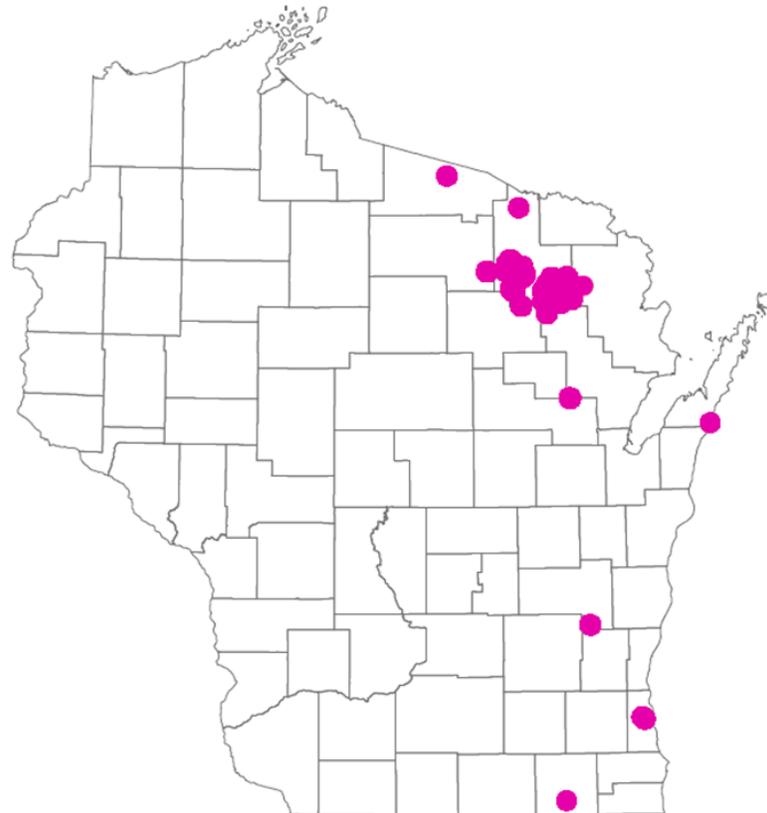


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Date: 10/1/2019

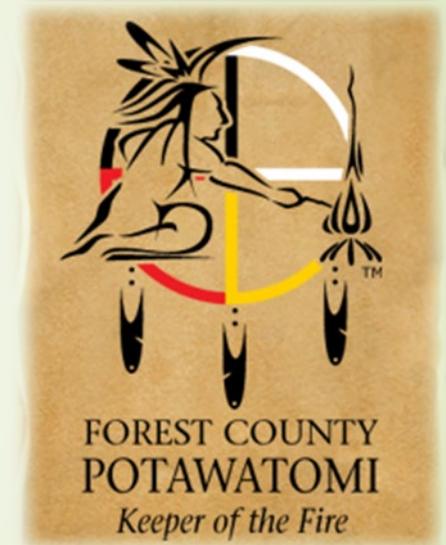
Land Base

Forest County Potawatomi Community Land Base 2019



Environmental Mission Statement

The traditional values of the Forest County Potawatomi Community teach us to respect all living things, to take only what we need from mother earth, and to preserve the air, water, and soil for our children. Reflecting these values, we take leadership in creating a sustainable and healthy world. We resolve to reduce our own environmental impacts and to take steps to remedy the impacts of others. We encourage others to do the same. We also seek legislative and policy changes that protect the environment for all people, including generations to come. (Adopted November 20, 2008)





Background...Planning Kabotie Report

- Linking energy projects to cultural values by establishing communication that provides accurate information.
 - Provide Clear and Concise Handouts/Articles to Describe Projects/Objectives.
 - Communicate with Community Members on a One to One basis.
 - Develop Home Energy Audits with education component.
 - Build a small biomass plant and demonstrate it's success.
 - Develop Community Coordination Program for Community Input and Information Regular Meeting.



Background...Planning Kabotie Report

- Establishing Protocol to Implement Energy Mission Statement with Goals of Energy Efficiency and Independence in all Projects.
 - Require more stringent energy efficient/renewable energy sources in construction projects.
 - Implement action on standing Energy Mission Statement.
 - Mandatory minimal requirement standards regarding building efficiencies.
 - Develop Energy Independence Plan for Community approval.
 - Pursue the purchase of a new land base.



Background...Planning

- Delegating appropriate working group to champion energy, efficiency, and independence.
 - Create a Sustainable Energy Officer position.
 - Create a Sustainability Coordinator.
 - Establish ad hoc Energy Working Group from elders, youth, health, education, and housing.
 - Create an Energy Working Group of Division Managers.



Background...environmental initiatives

- ▶ Class I Air Redesignation
- ▶ Participation in (former) Governor Doyle's CCTF
- ▶ Project Greenfire
- ▶ Adopted "Environmental Mission Statement"
- ▶ A Comprehensive Energy Audit
- ▶ Renewable Energy Credits (RECs) are purchased
- ▶ Four day work week was also established
- ▶ #14 On the EPA Top 20 Local Government List
- ▶ Member of the Green Power Partnership
- ▶ And many others...



Project Greenfire

- ▶ Established goal of energy independence using only renewable carbon-neutral or carbon-free resources.
- ▶ Comprehensive Energy Audit.
 - ▶ Established baseline of energy consumption / carbon footprint;
 - ▶ Identified “List of 100” facilities improvements;
 - ▶ Efficiencies have eliminated over 13,700 tons of CO₂;
 - ▶ Further reductions with ongoing projects.
- ▶ RECs purchased to completely offset electricity use and serve as bridge to energy independence.
- ▶ Resource assessments for potential projects.



Milwaukee Biodigester

- ▶ 2.0 megawatt anaerobic biodigester and biogas facility located near Potawatomi Bingo Casino in Milwaukee, WI
- ▶ Operates on liquid (pumpable) food wastes
- ▶ Generates revenue from a combination of tipping fees, electricity sold through a WE Energies Renewable Energy Tariff (local utility) and a heat loop to PBC
- ▶ Reduces waste to landfills and associated methane production, a component of green house gases.
- ▶ Great community project...partner with local businesses such as Miller Brewing.

Milwaukee Biodigester





2013 Project

- ▶ 2013 DOE Grant installed solar on 15 Tribal buildings. 455 kW array on PBC parking structure and 500 kW at Government sites on the Tribe's reservation.
- ▶ Funded through a grant from DOE and a partnership with a non-tribal entity who can take the Investment Tax Credit. Unique structure allows the Tribe to generate enough offset energy to “payback” the investment in under 5 years.
- ▶ Solar offsets between 20 and 97% of energy needs at each individual site.
- ▶ Utilizing the same structure for the current project

2013 Project

FCPC Solar Systems Performance Data (January to March 2017)								
Location	Solar System Size (kW)	Average Energy Rate (\$/kWh)	FCPC Solar System Cost (\$)	Total Energy Production January to March 2017 (kWh)	Estimated Cost Savings (January-March 2017) (\$)	Total Approximate savings earned so far	Amount Remaining to Achieve Payback (\$)	Estimated Time Until Payback is Achieved (yrs)
Air Monitoring*	12.5	0.115	\$ 6,947.83	2,312.47	\$ 265.93	\$ 1,788.68	\$ 5,159.15	3.6
AODA*	12.4	0.115	\$ 6,892.25	1,778.43	\$ 204.52	\$ 1,730.54	\$ 5,161.70	3.5
Caring Place	86.5	0.095	\$ 48,078.99	6,406.58	\$ 608.62	\$ 13,575.30	\$ 34,503.69	5.1
Family Resources	23.56	0.123	\$ 13,095.27	3,240.94	\$ 398.64	\$ 5,680.36	\$ 7,414.91	2.6
Gte Ga Nes Prescho	24.8	0.115	\$ 13,784.50	3,845.11	\$ 442.19	\$ 3,491.75	\$ 10,292.75	3.4
Milwaukee	447.64	0.09	\$248,810.14	59,445.00	\$ 5,350.05	\$ 84,589.38	\$ 164,220.76	3.7
Museum*	49.6	0.1	\$ 27,568.99	6,802.84	\$ 680.28	\$ 3,434.26	\$ 24,134.73	8.2
Natural Resources	22	0.128	\$ 12,228.18	2,262.30	\$ 289.57	\$ 5,529.58	\$ 6,698.60	2.4
Ordinance*	9	0.115	\$ 5,002.44	1,631.68	\$ 187.64	\$ 835.25	\$ 4,167.19	5.8
Property Manageme	24.8	0.115	\$ 13,784.50	4,937.42	\$ 567.80	\$ 1,965.95	\$ 11,818.54	7.0
Rec Center	62.25	0.124	\$ 34,600.20	10,649.99	\$ 1,320.60	\$ 16,684.68	\$ 17,915.52	1.9
Rising Sun Daycare*	24.8	0.115	\$ 13,784.50	3,527.07	\$ 405.61	\$ 3,332.28	\$ 10,452.22	3.7
Solid Waste	19.5	0.127	\$ 10,838.62	157.23	\$ 19.97	\$ 5,301.63	\$ 5,536.98	2.1
Stone Lake C-Store*	80.6	0.047	\$ 44,799.61	10,332.83	\$ 485.64	\$ 4,450.21	\$ 40,349.40	10.6
Utilities	23	0.126	\$ 12,784.01	3,073.09	\$ 387.21	\$ 6,576.35	\$ 6,207.66	1.9
*Phase II Sites		TOTAL	\$513,000.00	120,402.96	\$ 11,614.29	\$158,966.19	\$ 354,033.82	



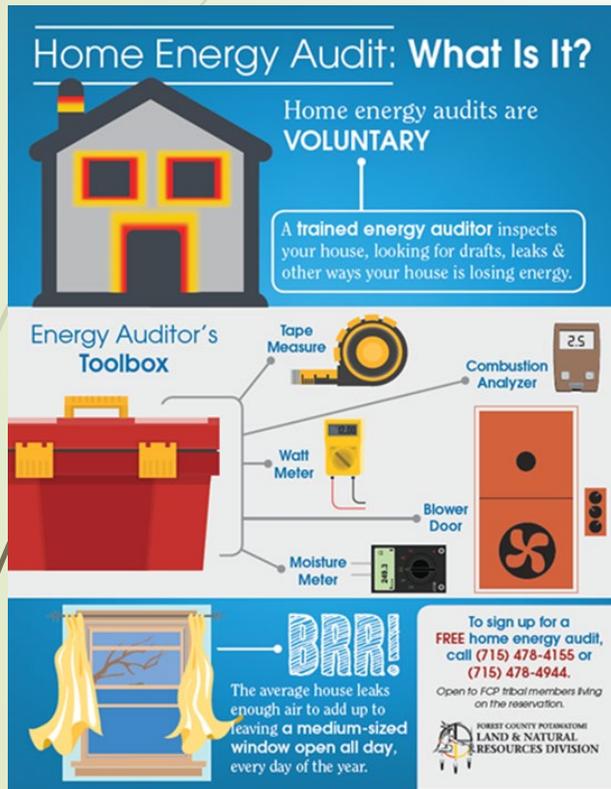
Project One: 2017 Developing Residential Baselines and EEMs



Developing Residential Energy Usage Baselines and Energy Efficiency Options- 2017

- ▶ Take the First Steps to gather an energy usage baseline for residential homes on Reservation and identify significant energy efficiency options to reduce the overall energy consumption by 15%
 - ▶ Approximately 250 homes – Goal to conduct audits on 115-130 homes
 - ▶ Gather energy usage data
 - ▶ Conduct home energy audits in homes
 - ▶ Present Home Energy Audit Report findings
 - ▶ Help implement energy efficiency updates and cost savings with the goal to reduce energy usage

Project Efforts 2017-Present



- ▶ Community Outreach – these efforts have been ongoing
 - ▶ Informational Meetings
 - ▶ Door-to-door visits
 - ▶ Mass mailings
 - ▶ News articles/Ads/brochures
 - ▶ Booths at community meetings
 - ▶ Incentive Kits
 - ▶ Facebook Advertisement
 - ▶ Website sign-up
- ▶ Collection of Energy Release Forms



Project Efforts and Accomplishments 2017-Present

Homes Participating

- ▶ Total number of homes and tribally owned rentals located on reservation that signed up for home energy audits:
 - ▶ Tribal Homes: 73
 - ▶ Tribal Rentals: 45
- ▶ Home Energy Audits Completed: 55
- ▶ Home Energy Audit Action Plans: 55



Project Findings

- ▶ Inadequate ceiling/attic insulation and building tightness
- ▶ Window/door weather seals missing
- ▶ Half of homes audited thus far have programmable thermostats but almost none are taking advantage of setbacks or are not programmed
- ▶ Most homes utilize about 50% energy efficient light bulbs
- ▶ Exhaust fans in bathrooms flow less than 100 cfm leading to moisture issues
- ▶ Box sill insulation is less than recommended and not air sealed
- ▶ Typical roof is 4/12 pitch with fiberglass shingles and soffit/ridge passive with no mechanical venting
- ▶ Many energy conservation opportunities identified



focus on energysm

Partnering with Wisconsin utilities

Accomplishments:

- Trained Focus on Energy Trade Ally Certified & DOE Home Energy Score Assessor
- Goal to conduct home energy audits for 115 homes – 118 signed up to participate
- Leverage as many financing opportunities as possible. Continue efforts for audits without grant funds through tribal dollars and local programs.

Project Modification



- ▶ Project was modified to perform energy audits on 4 additional residential living facilities on Reservation
 - ▶ Residential living facilities provide a number of community benefits. Reduction of cost for operation allows more funding to funnel to services. Men's, Women's Transitional Living Facilities and Elder Care.
- ▶ Project was extended in order to meet our initial goal to conduct home energy audits on 115 tribal homes



Challenges



- ▶ Change in staffing
- ▶ Under estimated amount of time it would require to obtain release of information forms for ALL tribal homes
- ▶ Utility data entry input into software has taken longer than expected
- ▶ Trade Ally Certification process
- ▶ Working with homeowners schedules



Tasks to complete

- ▶ Continue Home Energy Audits
- ▶ Continue completing Home Energy Action Plans and presenting them to home owners
- ▶ Implement EEMs-Council has allocated money for each homeowner for insulation, caulking, weatherstripping
- ▶ Encourage FOCUS on Energy “double dip” so home owners can implement more projects.



Project Two: 2017 Community Scale Solar



2017 Community Scale Solar

- ▶ Doe contributes \$1,000,000 -- FCPC Match, \$1,000,000
- ▶ FCPC enters a short term arrangement with a tax equity investor. FCPC provides cost share, equity investor provides cost share, and equity investor receives the solar investment tax credit over 5 years.
 - ▶ ITC is 30 percent for solar systems
 - ▶ In 2020 the ITC goes to 26% (must have some planning and investment in a new project before 2020 to receive the 30%).
 - ▶ ITC is a dollar for dollar reduction in the income tax a company has to pay.



2017 Community Scale Solar-Original Project Goals

- ▶ FCPC originally designed the project for Tribal housing, and select government buildings.
- ▶ The dynamics of that concept proved challenging:
 - ▶ PPAs with individual homeowners;
 - ▶ Ownership;
 - ▶ Leases with homeowners;
 - ▶ Solar garden/net metering;
 - ▶ Site selection and grading;
 - ▶ Complications with insurance; and,
 - ▶ Overall project benefits could be increased with more installed solar.



2017 Revised Project

- ▶ To overcome some of the challenges encountered with a Tribal housing project FCPC worked with DOE to revise the project.
- ▶ The revised project focused on Government buildings and enterprises and allowed the Tribe to increase the solar installation size.
- ▶ Three Tribal buildings were identified, the Executive Building, Health and Wellness Center and Potawatomi Carter Casino Hotel.
- ▶ Original project goal was to use approximately 50 Tribal members' homes and select government buildings for an estimated total of approximately 700 kW solar to offset traditionally sourced electric generation.



2017 Revised Project

- ▶ By focusing on larger installations FCPC was able to offset more grid sourced electric.
- ▶ The revised project is an estimated 941 kW installed.
- ▶ The cost per watt was reduced from \$.60 to \$.52 by implementing a project with larger installations. FCPC has typically been able to increase installation sizes and produce efficiencies during project implementation.
- ▶ Revisions to the project also allowed for a streamlined and more efficient project with installation being finalized in under a year and interconnection and commissioning occurring in one easy visit.



Project Complications

- ▶ PCCH 811 kW installation is the largest in the WPS service territory and required detailed negotiation with WPS.
 - ▶ Increased cost for upgraded equipment. Phase on and phase off. Dual metering.
- ▶ Solar Garden/Farm Concept is currently not feasible with Wisconsin regulatory requirements.
 - ▶ 20kw net metering in WPS service territory and no community metering mechanism.
- ▶ Health and Wellness roof warranty.

Carter



Looking forward...microgrid, battery storage and...more solar



Health and Wellness



Health and Wellness



Executive Building



More Problems

- ▶ Carter Casino
 - ▶ After installing, commissioning and interconnecting there was a communication failure. Although the array was producing energy it was not quantified. We can extrapolate from utility bills but that would be an estimation only...and the, July...
 - ▶ Northern Wisconsin experienced one of the worst storms in recent history in July of 2019. 10 separate tornadoes during a 24 hour period.



More Problems...Carter...and why next year's application is a microgrid.





Carter

- ▶ During these storms, rainfall in excess of 8-12 inches and heavy lightning.
- ▶ The weather did not play well with the solar panels. A direct lightning strike required significant work. The panels were not operational 7/20 through the end of September.
- ▶ We do know that the panels are working! Even though not properly monitored initially and with the outage, we have data showing 144,149 kWhs of production since the end of September... saving over \$22,212.
- ▶ Know your warranties, know your partners and plan for the elements.



Production at HW and Exec

- ▶ Health and Wellness: 41,165 kWhs for a savings of \$4,116
- ▶ Executive Building: 65,645 kWhs for a savings of \$6,564.
- ▶ Production verification is ongoing.



HANG IN THERE!



Project Three: 2019 Community Scale Solar



2019 Community Scale Solar

- ▶ FCPC's solar pv projects have developed over 2 MW of behind the meter generation at individual sites.
- ▶ On the reservation in Forest County Wisconsin the majority of government buildings have energy use offset by solar between 17 and 99.9%
- ▶ The new grant will provide an additional MW of solar pv energy for the Carter hotel, Aquaponics facility, Carter Wastewater Treatment plant, Stone Lake and Carter churches.
- ▶ In addition, several larger installations will be implemented in Milwaukee, Wisconsin on the Tribe's Wgema Campus, the biodigester and the Potawatomi Casino parking structures.

Individual installations

Building Name	Address	System Size (kW)
PBC	1721 W. Canal St., Milwaukee, WI 53233	250
PCCH	608 WI-32, Wabeno, WI 54566	250
Wgema Wgechda Building	3136 W. Kilbourn Ave., Milwaukee, WI 53208	255
FCPC Renewable Generation	2301 W. Canal St., Milwaukee, WI 53233	240
Carter Wastewater Treatment	723 Water Tower Rd., Wabeno, WI 54566	20
Stone Lake Church	5132 Jaeger Rd., Crandon, WI 54520	20
Carter Church	743 State Hwy 32, Wabeno, WI 54566	20
Aquaponics	3389 Cty Hwy H, Wabeno, WI 54566	60
Community Scale Total		1,115

Estimates of offsets and cost savings

Proposed Sites	Total PV Panel Power kW	Yearly Solar Elec. Prod. kWhs	Current Grid Elec. kWh/year	% Grid Elec. Offset by PV Panels	Est. Energy Cost Savings \$/year*
PBC	280	337,120	824,000	40.9	\$23,598
PCCH	197	233,750	5,611,000	4.2	\$17,780
WWTF	20	23,560	40,000**	58.9	\$1,649
Aqua.	60	70,800	82,300**	86.0	\$7,080
Wgema	225	334,050	338,800	98.6	\$33,405
FCPC RG	240	294,000	2,002,800	14.7	\$20,580
C Church	8	9,520	9,531**	99.9	\$952
SL Church	8	9,520	9,531	99.9	\$952
Total	1,068	1,336,480			\$105,996



Model

- ▶ FCPC would like to use the model they did for the 2013 and 2017 projects
 - ▶ Investment tax partner receives the ITC
 - ▶ Lowers FCPC's capital investment
 - ▶ FCPC creates LLC with partner and permits installations for the LLC
 - ▶ Ownership outright at the end of the ITC recovery period
 - ▶ Potential Challenges
 - ▶ ITC reduction at end of 2019 – 30% to 26%
 - ▶ Planning is complete, permitting for one project is complicated by Local Historic Preservation Committee-No legal authority so will not issue a certificate of appropriateness...



Recent steps

- RFP for Partner relationship developed. Will be circulated this week.
- Installations are planned
- NEPA review is complete with the exception of one location
- Interconnection agreements are currently with the utilities
- Site specific permits have been drafted
- Letter of Intent is waiting for the right partner...It is unlikely contracting and purchasing can be completed before the end of December.

THAT IS A IMPRESSIVE LIST

OF

NO INFORMATION

memegenerator.net





Project Four: 2019 Community Center Solar And EEMs

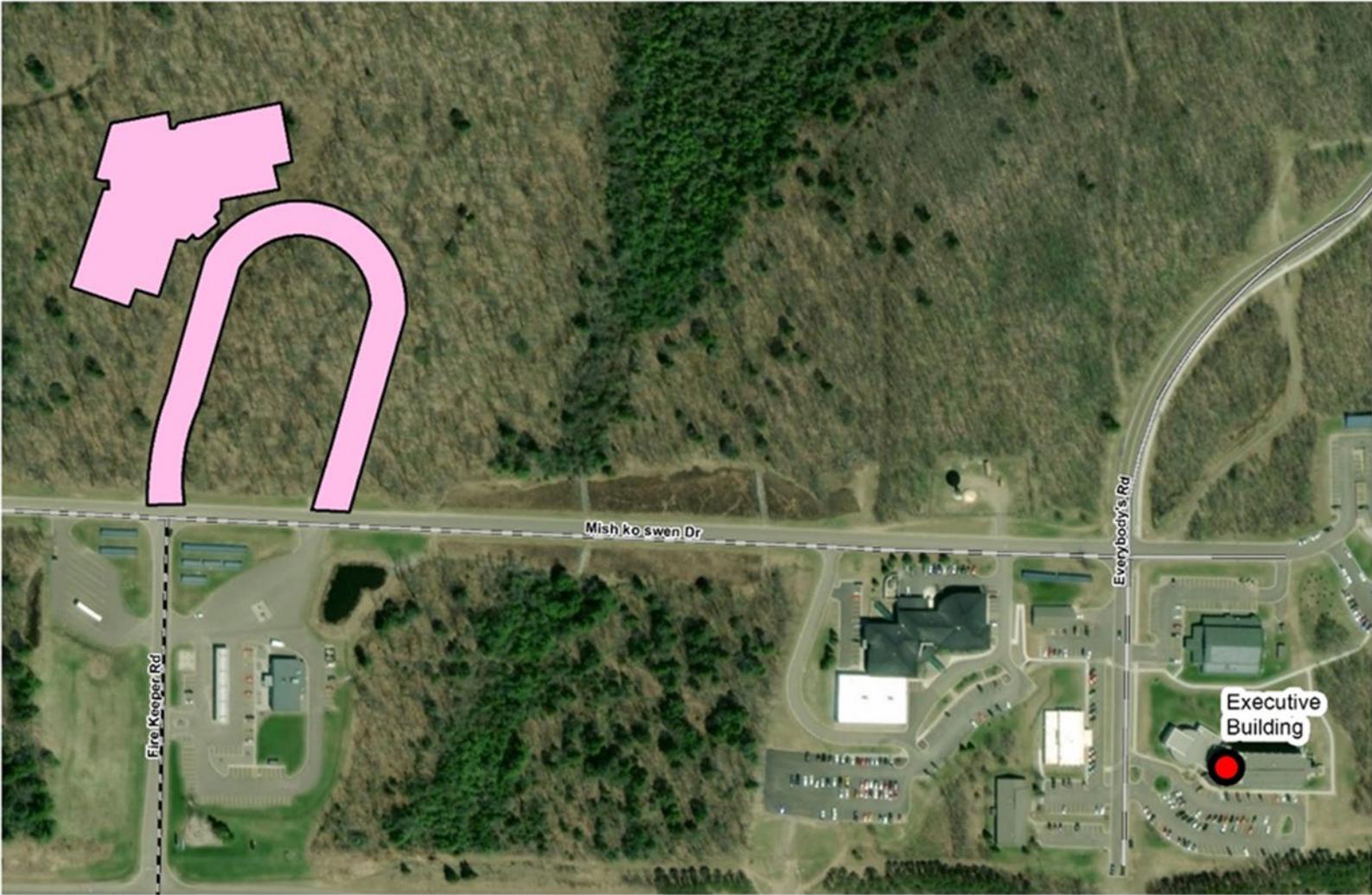


2019 Community Center Solar and EEM

- ▶ The new Forest County Potawatomi Community...Community Center was designed to provide space for cultural education, recreation, athletic training, competition, wellness and social events. The design was informed by the FCPC culture:
 - ▶ Follow the natural grade to lessen the impact to the land
 - ▶ The center provides inspiration in the form of an eagle in flight.
 - ▶ Community needs. Classrooms, recreational and meeting space that encourages multi-generational use and interaction.



Future Site for Community Center



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Date: 4/15/2019

Legend

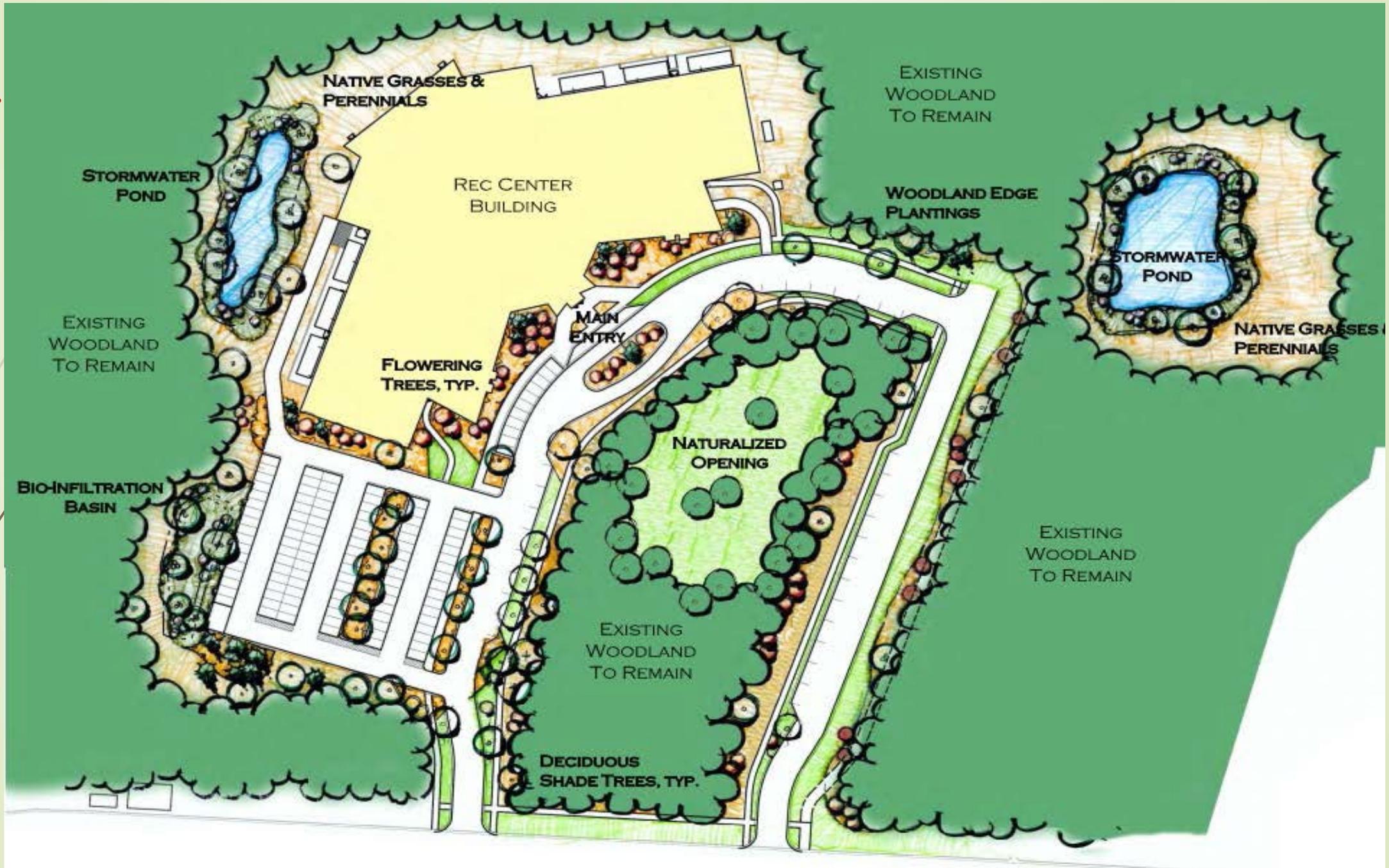
- New Community Center
- Executive Building Location
- BIA Road
- Tribal Road





Project Goals

- ▶ Based on the Tribe's environmental mission and FCPC values, the Tribe set specific project goals for options selection, such that each option must:
 - ▶ Minimize building energy demand;
 - ▶ Pay for itself over its lifespan;
 - ▶ Be technologically deployable within the construction timeline; and
 - ▶ Be grant eligible.
- ▶ In addition, any renewable energy generation system selected must:
 - ▶ Preserve the landscape; and
 - ▶ Must not discourage Tribal members from visiting the community center.



Decision Making

Improve / Add	Measure #	Option	Annual therms Saved	Annual kWh Saved	Cost	30 Yr Cost Savings	Payoff Year
Walls	1	R-21.85	610		4,545	10,914	13
	1	R-28.1	929		9,090	14,454	16
	1	R-34.35	1,103		13,383	14,571	18
Windows	2	U-0.20	6,677		158,146	11,071	29
Roof	3	R-37.5	454		12,087	-581	31
	3	R-40	883		24,584	-2,206	32
	3	R-42.5	1,261		49,168	-17,210	39
Under Slab	4	R-10	13,537		43,900	299,173	6
	4	R-20	18,049		87,800	369,622	9
Edge / BG	5	R-15	198		5,159	-141	31
	5	R-20	441		9,055	2,121	27
Boiler	6	Condensing	7,419		31,750	156,272	8
Pool	7	70% ERV	55,000		19,250	1,374,634	1
Light	8	Controls		103,120	20,000	268,659	4
Solar PV	9	200 kW		216,449	188,674	522,304	10
Total			89,950	319,569	577,226	2,702,044	8



Project as Proposed

- ▶ 8 EEMs and 200 kW solar
- ▶ Approximate annual savings of combined measures: \$111,000
 - ▶ • EEM1: Improve Wall Insulation - additional 3" of spray foam (R-34.35)
 - ▶ • EEM2: Improve Window Performance - decrease U-Value by 0.9 (U-0.20)
 - ▶ • EEM3: Improve Roof Insulation - additional 1.5" of extruded polystyrene (R-42.5)
 - ▶ • EEM4: Improve Under Slab Insulation - add 2" extruded polystyrene (R-10)
 - ▶ • EEM5: Improve Slab Edge and Below Grade Insulation - additional 2" of rigid extruded polystyrene (R-10)
 - ▶ • EEM6: Improve Boiler Efficiency - install more efficient condensing boiler
 - ▶ • EEM7: Energy Recovery System on Pool Unit - 70% energy recovery coil on pool HVAC
 - ▶ • EEM8: Lighting Controls - add automatic lighting controls
 - ▶ • Solar PV System: Roof-Mounted - 200 kW system



Updates

- ▶ Performance period began on October 1st, 2019.
- ▶ Work began on October 23rd to install EEM 5 – Improve Slab Edge and Below Grade Insulation – Add 2” Rigid Extruded Polystyrene to Foundation.
- ▶ Approximately 25% complete
- ▶ Purchased two EEMs on November 15th, 2019
- ▶ EEM6 – Improve Boiler Efficiency - Upgrade to Condensing Boiler
- ▶ EEM7 – Install Energy Recovery on Pool HVAC Unit
- ▶ Likely to Remove EEM2 from project due to cost overruns.
- ▶ EEM2 – Improve Window Performance – Decrease U-Value by 0.9
- ▶ Currently exploring other options for EEMs



Future direction for additional EEM

- ▶ Currently exploring building HVAC controls.
- ▶ If HVAC controls can save 10% of projected energy use, they could save 21,371 therms and 73,666 kWh, which would have a first year energy savings of \$16,591/yr and a payback in year 11.
- ▶ Potential to reduce building energy demand by 23-29%
- ▶ Based on a Pacific Northwest National Laboratory (2017) Report – Impacts of Commercial Building Controls on Energy Savings and Peak Load Reduction



Costs, Energy Savings and Simple Paybacks

- ▶ Improved Boiler Efficiencies and controls:
 - ▶ Annual utility savings: \$9,900
 - ▶ Simple Payback: 6 years
- ▶ Energy Recovery System on Pool
 - ▶ Annual utility savings: Approximately \$73,000
 - ▶ Simple Payback: 6 months
- ▶ Under Slab Insulation
 - ▶ Annual utility savings: Approximately \$54,000
 - ▶ Simple Payback: Approximately 3 years



Lighting controls

- Occupancy sensors
- Personal tuning
- Daylight Harvesting
- Institutional tuning
- Combination of these, lessens use by 38%
- Cost \$40,000
- Annual savings nearly \$23,000
- Simple Payback 1.8 years

Background...Planning

- ▶ Soapbox-This doesn't just happen. Planning. Effort. Fearless Commitment. Failure. Flexibility. There is no Easy Street in renewable energy.





Thank You!